CONTENTS

ABBREVIATIONS 3

1 PROJECT DESCRIPTION 5

1.1 BACKGROUND TO THE PROJECT 5

1.2 PROJECT DEVELOPMENT OBJECTIVE AND KEY INDICATORS 6

1.3 ANTICIPATED SUBPROJECT TYPES AND LOCATIONS 9

1.4 WORLD BANK SAFEGUARD POLICIES TRIGGERED 9

1.5 OBJECTIVE OF THE ESMF 10

2 RCIP IMPLEMENTATION ARRANGEMENTS 11

2.1 REGIONAL COORDINATION 11

3 LEGISLATIVE, REGULATORY AND INSTITUTIONAL FRAMEWORK 16

3.1 LEGISLATIVE REQUIREMENTS FOR ENVIRONMENTAL MANAGEMENT 16

3.2 MADAGASCAR 16

3.3 KENYA 22

3.4 BURUNDI 29

3.5 LEGISLATIVE REQUIREMENTS FOR TELECOMMUNICATION SECTOR 31

3.6 MADAGASCAR 32

3.7 KENYA 33

3.8 BURUNDI 33

3.9 INSTITUTIONAL ROLES AND RESPONSIBILITIES FOR THE TELECOMMUNICATIONS AND ENVIRONMENTAL SECTOR IN PHASE 1 COUNTRIES 34

3.10 GAP ASSESSMENT OF LEGISLATIVE STRUCTURE AND RECOMMENDATIONS 41

4 IMPACT ASSESSMENT AND MITIGATION MEASURES 43

4.1 POSITIVE ENVIRONMENTAL IMPACTS AND SOCIO-ECONOMIC BENEFITS 43

4.2 POTENTIAL NEGATIVE ENVIRONMENTAL AND SOCIAL IMPACTS 44

4.3 POTENTIAL OCCUPATIONAL, HEALTH AND SAFETY RISKS 45

4.4 ENVIRONMENTAL AND SOCIAL MONITORING 45

5 SUBPROJECT SCREENING, REVIEW AND APPROVAL 51

5.1 IMPLEMENTING AGENCIES 51

5.2 SCREENING AND REVIEW PROCESS 51

5.3 APPRAISAL AND MONITORING PROCESS 54

6 ACTION PLAN FOR IMPLEMENTATION OF EMPS 57

6.1 IMPLEMENTATION GUIDELINES FOR AN EMP 57
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>PUBLIC CONSULTATION AND DISCLOSURE PROCESS</td>
<td>60</td>
</tr>
<tr>
<td>7.1</td>
<td>PROCESS FOR PUBLIC CONSULTATION IN THE ESMF</td>
<td>60</td>
</tr>
<tr>
<td>7.2</td>
<td>PROPOSED DISCLOSURE PLAN</td>
<td>60</td>
</tr>
<tr>
<td>8</td>
<td>CAPACITY BUILDING RECOMMENDATIONS</td>
<td>62</td>
</tr>
<tr>
<td>8.1</td>
<td>STRENGTHENING OF PROJECT CAPACITY FOR IMPLEMENTING THE ESMF</td>
<td>62</td>
</tr>
<tr>
<td>9</td>
<td>PROPOSED BUDGET</td>
<td>64</td>
</tr>
<tr>
<td>10</td>
<td>ANNEX 1: IFC’S EHS GUIDELINES FOR TELECOMMUNICATIONS</td>
<td>65</td>
</tr>
<tr>
<td>11</td>
<td>ANNEX 2: IFC’S GENERAL OCCUPATIONAL, HEALTH AND SAFETY GUIDELINES</td>
<td>66</td>
</tr>
<tr>
<td>12</td>
<td>ANNEX 3: SCREENING FORM</td>
<td>67</td>
</tr>
<tr>
<td>13</td>
<td>ANNEX 4: WORLD BANK SAFEGUARD POLICY OP 4.01</td>
<td>71</td>
</tr>
<tr>
<td>14</td>
<td>ANNEX 5: TERMS OF REFERENCE FOR ESIA</td>
<td>72</td>
</tr>
<tr>
<td>15</td>
<td>ANNEX 6: EXAMPLE OF ENVIRONMENTAL CONTRACT CLAUSES</td>
<td>74</td>
</tr>
<tr>
<td>16</td>
<td>ANNEX 7: FORMAT OF AN ANNUAL ENVIRONMENTAL REPORT</td>
<td>78</td>
</tr>
<tr>
<td>17</td>
<td>ANNEX 8: TERMS OF REFERENCE FOR AN EMP</td>
<td>79</td>
</tr>
</tbody>
</table>
ABBREVIATIONS

APL Adaptable Program Loan
ARCT Agence de Régulation et de Contrôle des Télécommunications
BPO Business Process Outsourcing
CAGR Compound Annual Growth Rate
CBO Community Based Organisations
CCK Communications Commission of Kenya
CIP Communications Infrastructure Project
CNSI National Committee for the Information Society
DEC District Environmental Committees
EABs East Africa Backbone Operators Association
EAP Environmental Action Plan
EASSy Eastern Africa Submarine System
EBRD European Bank for Reconstruction and Development
EEP Environment Engagement Program
EEZ Exclusive Economic Zone
EIA Environment Impact Assessment
EMCA Environmental Management and Coordination Act
EMF Electric and Magnetic Fields
EMP Environmental Management Plan
ESMF Environmental and Social Management Framework
GOC Governance Oversight Committee
HSGIC Heads of State and Government Implementation Committee
ICNIRP International Commission on Non-Ionizing Radiation Protection
ICT Information and Communication Technology
IFC International Finance Corporation
IGEBU Burundi Geographic Institute
IXPs Internet Exchange Points
KCCT Kenya College of Communications Technology
Kenet Kenya Education Network
KWS Kenya Wildlife Service
MECIE Mise en Compatibilité des Investissements avec l'Environnement
MINATET Ministere de l’Amenagement du Territoire, de l’Environnement et du Tourisme
MoIC Ministry of Information and Communications
MTPC Ministry of Transport, Posts and Communications
MTPT Ministry of Transport, Posts and Telecommunications
NEMA National Environmental Management Authority
NEPAD New Partnership for Africa’s Development
NGO Non-governmental Organisation
OHS Occupational, health and safety
OMERT L’Office Malagasy d’Etudes et de Régulation des Télécommunications
ONE Office National de l’Environnement
ONT National Tourism Institute
OP Operational Policy
PCK Postal Corporation of Kenya
PPP Public Private Partnership
RAP Resettlement Action Plan
ROW Right-of-Way
RCIP Regional Communications Infrastructure Program
RPF Resettlement Policy Framework
<table>
<thead>
<tr>
<th>SATA</th>
<th>Southern Africa Telecommunications Association</th>
</tr>
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<tbody>
<tr>
<td>TCIP</td>
<td>Transparency &amp; Communications Infrastructure Project</td>
</tr>
<tr>
<td>TCIP-SC</td>
<td>TCIP Steering Committee</td>
</tr>
</tbody>
</table>
1 PROJECT DESCRIPTION

1.1 BACKGROUND TO THE PROJECT

The World Bank is embarking on a 10-year, multi-country Regional Communications Infrastructure Program (RCIP) to assist Eastern and Southern African countries to implement a strategy of effective connectivity by (i) offering technical assistance to promote further sector liberalization and resolve market efficiency gaps, (ii) financing coordinated backbone deployment to avoid redundant infrastructure initiatives and focus on missing links, (iii) designing public private partnership (PPP) arrangements to leverage private sector investment, and (iv) supporting the development of e-government applications and content to complement the deployment of the regional infrastructure.

The first Phase of Program, planned to start in mid-2007, includes country-specific projects in Kenya, Burundi and Madagascar, in the range of US$100m. The second Phase, planned for late 2007, may include Mozambique, Tanzania, Malawi, Zambia, Democratic Republic of Congo and Mauritius, depending on their readiness. It is also expected that other countries may request to join once the first tranche moves to implementation. Overall, the program is open to Angola, Botswana, Burundi, Comoros, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Somalia, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe, provided these countries are eligible for World Bank financing.

1.1.1 Description of the RCIP Phase I

The proposed program’s first phase fits the eligibility criteria of the IDA14 regional program:

- The proposed operation involves three or more countries, Kenya, Burundi and Madagascar, all of which need to participate for the project’s objectives to be achievable.
- The benefits accrued in the targeted countries, i.e., increased access to quality and affordable Information and Communication Technology (ICT) services, spill over country boundaries: i) higher volumes increase the viability of the regional communications infrastructure network and ii) cross-border initiatives incentivize countries to develop missing infrastructure to increase ICT access.
- There is clear evidence of country and regional commitment (e.g. 3 IDA support requests have been received from the respective Ministries of Finance of Kenya, Burundi and Madagascar; the Algiers Declaration from the Summit of the Heads of State and Government Implementation Committee (HSGIC) in November 2004 called on the World Bank Group to support regional connectivity efforts).
- The proposed Adaptable Program Loan (APL) structure will allow countries to be involved as they show commitment/readiness.
The proposed operation provides a platform for a high level of policy harmonization between countries fostering pro-competitive regional connectivity.

The program and its first phase are part of a well-developed and broadly supported regional strategy, potentially extending to 25 countries in East and Southern Africa.

Since the project is a regional project, regional IDA funding can be used up to \( \frac{2}{3} \) of the full proposed IDA amount of the project, with country allocations covering \( \frac{1}{3} \) of the project cost attributable to each individual country involved. The lending instrument will be an Adaptable Program Loan (APL).

1.1.2 Program objective and phases

The first Phase of the RCIP World Bank operation will take the form of Communications Infrastructure Projects 1, 2 and 3 (CIP 1, 2, 3) with a combined IDA volume of around US$100m and expected to reach the Board 1st quarter of 2007.

This will include Kenya (CIP 1 or Transparency & Communications Infrastructure Project - TCIP), Burundi (CIP 2) and Madagascar (CIP 3). Subsequent phases will reach the Board based on readiness of countries applying for support under the Program as well as availability of IDA/IBRD financing. Interested candidates include Malawi, Rwanda, Mozambique, Tanzania, Zambia, DRC and Mauritius (IBRD). It is also expected that other countries will accelerate their dialogue to use IDA funds once the first Phase moves to effectiveness. It is also expected that some RCIP-related ICT components will be included in national projects where scaling-up existing or pipeline country-specific project components makes sense or is found to be more efficient.

By the end of the program, all capitals and major cities in East and Southern Africa should be linked to the global Information and Communications network through competitively priced high-bandwidth connectivity. Traffic in the region is expected to increase by at least 36% Compound Annual Growth Rate (CAGR), and bandwidth costs projected to start at around US$150/Mbit in 2008 at retail level and rapidly decline further. This in turn should lead to lower prices for telephone services and better access to the Internet that will significantly improve foreign and local private investment opportunities in the region, decrease the cost of doing business and increase the prospects for job creation and wealth generation while enabling countries to reap the benefits of ICT as a platform to deliver services to their citizens.

1.2 Project Development Objective and Key Indicators

The RCIP Program, the CIP 1,2,3 and following CIP Projects have two overarching development objectives (i) to support populations and businesses across the Eastern & Southern Africa region to have access to quality and affordable telecom services (the “connectivity development objective”) and (ii) making use of affordable capacity, contribute to improved efficiency and transparency of selected government functions/entities through e-government applications (the “transparency development objective”).
1.2.1 Project components

The proposed 10-year, multi-phase APL will assist Eastern and Southern African countries to implement a strategy of effective connectivity by (i) offering technical assistance to promote further sector liberalization and resolve market efficiency gaps, (ii) financing coordinated backbone deployment to avoid redundant infrastructure initiatives and focus on missing links, (iii) designing public private partnership (PPP) arrangements to leverage private sector investment.

To maximize flexibility and client-responsiveness in a multi-country environment, RCIP has been designed as a menu of options which individual Governments choose from in order to package their RCIP operation. The various country-specific operations within the RCIP umbrella program will include a number of specific components and subcomponents, drawn from the following menu of options, which have been grouped under three broad headings or components.

Component 1: Enabling Environment, including Monitoring & Evaluation capacity-building. This will include the following subcomponents: (a) technical assistance to promote further sector liberalization and regulatory reforms so as to maximize the benefits of the regional infrastructure, from access to capacity (cost-modeling, tariff regulation, interconnection, essential facility regulation, competition policy and regulation, spectrum and other scarce resource management); (b) capacity building and training in the implementation of regulatory reforms; (c) accelerating the establishment of the legal and regulatory framework for the information society, in particular, on security of e-transactions, privacy and data protection, intellectual property rights, etc.; (d) supporting continued sector reform to maximize the impact of the connectivity component and strengthening the Public Private Partnership (PPP) framework to provide a sound basis for both the connectivity and eGovernment component; and (e) building monitoring and evaluation capacity.

While it is expected that not all countries will require the same level of support in all these areas, this enabling environment component is eminently regional in nature, as it will support the further opening of the sector in the participating countries, with important spillover effects due to increased traffic in the regional network and a consequent reduction in the overall costs. In addition, common areas of technical assistance and capacity building initiatives (in particular training courses) can be implemented as multi-country activities.

Component 2: Connectivity. This will include the following subcomponents: (a) support for the financing of an Eastern Africa Submarine System (EASSy) landing station or virtual landing station (for landlocked countries), which is expected to be essentially a passive infrastructure project with limited multiplex and switching equipment aimed at guaranteeing fair and unfettered physical access by all operators to the backhaul and EASSy network, as well as support for the creation of a national Internet Exchange Point (IXP), run by an association of operators or a private third party venture, with regional connections to other Internet Exchange Points (IXPs); (b) support to finance pre-purchase of capacity on the EASSy cable, backhaul and national backbone networks, as well as in rural areas, for targeted users (schools, universities, hospitals, eGovernment use as well as targeted user
groups) with discounted capacity prices; (c) support for the deployment of regional backhaul links across the borders with neighboring countries to reach the EASSy landing point, together with support for the deployment of the national backbones, on the basis of PPPs, leveraging private sector investment; (d) support to finance the establishment of a government virtual private network (GovNet) to cater to all the government communications needs (both data and voice/video); and (e) support to extend ICT in rural areas and/or community-driven ICT development on the basis of PPPs with competitive award of subsidies.

These sub-components should also be seen in the larger context of RCIP as they are key elements to ensure the viability of the regional communications infrastructure supported under RCIP. For instance, without the potential increased traffic made possible by an acceleration of national infrastructure roll-out and application building, the regional infrastructure may not be viable and therefore may not materialize. Conversely, without cross-border initiatives such as the EASSy project or other complementary cross-cross-border projects, the individual countries may not be in a position to achieve low-cost broadband access and therefore may not be in a position to advance their growth agenda and overall global competitiveness. Landlocked countries in Eastern and Southern Africa are especially disadvantaged as they need to interconnect with incumbents or national long distance operators in intermediary countries to backhaul traffic to the landing point and often pay exorbitant prices in the process. Effective cross-border links and supporting regulatory frameworks are therefore critical for the region as a whole.

Component 3: Transparency - eGovernment Applications. This component will target five to six major government applications amongst the government services which are candidates for transition to eGovernment delivery. The government services will be prioritized as follows: (a) implement eGovernment in quick win areas where there is a change champion, where private sector participation can be leveraged, and where the impact would be greatest in terms of transparency and accountability (e.g., customs, inland revenue services, pensions, drivers license/vehicle registration departments, utilities payments, etc.); and (b) introduce transaction based e-Procurement in selected departments based on high amounts but low volumes of transactions (transport), or in departments with low amounts but high volumes of transactions (health). This component will also support, where required, the establishment of a scalable transaction-enabled Government portal on which to anchor key eGovernment interventions and real time monitoring and evaluation.

Application development will also be critical in ensuring the viability of the regional communications infrastructure, as it will ensure increased demand for access, increased traffic and therefore the viability of the low cost high volume business model of EASSy, and related cross-border infrastructure links which the RCIP supports.
1.3 **ANTICIPATED SUBPROJECT TYPES AND LOCATIONS**

The project aims to finance structures such as the building of national terrestrial backbones, rollout of rural networks, and of the landing stations. Under the new design, financing of submarine cables is not envisaged.

At this pre-appraisal stage, it is not clear in which locations the activities will be targeted. However, it is highly likely that the networks will be following existing right of ways of current installations.

1.4 **WORLD BANK SAFEGUARD POLICIES TRIGGERED**

The two main World Bank safeguard policies triggered are the *OP 4.01 for Environmental Assessment* and *OP 4.12 for Involuntary Resettlement*, as explained below.

<table>
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<th>If applicable, how might it apply?</th>
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| [x] | **Environmental Assessment (OP/BP/GP 4.01)**  
The project aims to finance structures such as the construction of ducts for laying the fiber optic networks or from the construction of ancillary infrastructure, notably access roads, associated with towers for microwave links and rural wireless systems. Under the new design, financing of submarine cables is not envisaged.  
The risks associated with this kind of infrastructure are generally low, and the project is therefore assigned to environmental category B under OP 4.01. An Environmental and Social Management Framework (ESMF) will be prepared for the overall program. Specific costed Environmental Management Plans (EMP) be prepared as necessary for the terrestrial facilities during project implementation, in line with the ESMF, once the exact locations of those facilities have been identified. The ESMF will be submitted for Bank review and publicly disclosed in the affected countries and InfoShop prior to appraisal. |
| [ ] | **Natural Habitats (OP/BP 4.04)** |
| [ ] | **Pest Management (OP 4.09)** |
| [ ] | **Cultural Property (OP 4.11)** |
| [x] | **Involuntary Resettlement (OP/BP 4.12)**  
Land acquisition for terrestrial facilities will likely trigger OP 4.12 Involuntary Resettlement considerations. A Resettlement Policy Framework (RPF) will be prepared for the overall program. Specific costed Resettlement Action Plans (RAPs) will be prepared as necessary for the terrestrial facilities during project implementation, in line with the RPF, once the exact locations of those facilities have been identified. The RPF will be submitted for Bank review and publicly disclosed in the affected countries and InfoShop prior to appraisal. |
| [ ] | **Indigenous Peoples (OP 4.10)** |
| [ ] | **Forests (OP/BP 4.36)** |
| [ ] | **Safety of Dams (OP/BP 4.37)** |
| [ ] | **Projects in Disputed Areas (OP/BP/GP 7.60)** |
| [ ] | **Projects on International Waterways (OP/BP/GP 7.50)** |
1.5 **OBJECTIVE OF THE ESMF**

The main objective of this study is to develop options for the implementation of an Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) to be used for the environmental and social screening and assessment of backbone and rural telecommunications infrastructure project components to be funded within the framework of the Regional Communications Infrastructure Program for East & Southern Africa (RCIP).

The Frameworks will provide guidelines for the development of country- and project-specific Environmental Management Plans (EMP) and Resettlement Action Plans (RAPs), which will include criteria for the selection of sites for the construction activities related to the implementation of the projects under the Program, and for the design of environmental and social impact mitigation measures.
2

RCIP IMPLEMENTATION ARRANGEMENTS

2.1

REGIONAL COORDINATION

The overall connectivity initiatives in East and Southern Africa needs to be managed and coordinated both at national and regional levels. They also need to be coordinated with regards to activities financed by the World Bank Group as well as with activities privately funded, directly funded by Governments or funded by other Development Partners. The regional coordination is particularly relevant to ensure seamless connectivity, harmonized policy frameworks and increased scale economies. The ultimate objective of the World Bank Group and its development partners is to support several projects aimed at linking East and Southern African countries to one another and to the rest of the world by 2010.

In this context, it is important to manage and keep track of on-going national and cross-border infrastructure roll-outs, and the harmonization of policy frameworks so that national policy frameworks converge towards a harmonized policy framework. Considerable work has already been done in getting different governments to coordinate national programs, with some activities being financed by the World Bank Group and other donors as noted in earlier discussions. It is also likely that existing convening frameworks will continue to be used. These include:

- government policy forums under the African Union sponsorship: policy forums are regularly convened for the ICT sectors at the Ministerial level for policy decisions or at the technical level for policy development. This also includes activities carried out by the NEPAD eAfrica Commission (based in South Africa) which has tabled the NEPAD ICT Broadband Network Protocol which should be undergoing revisions following inputs by the industry.
- operators forums under the EASSy, East Africa Backbone operators association (EABs) and Southern Africa Telecommunications Association (SATA): the EASSy and EABs initiatives have led to regular discussion and coordination amongst operators driven by the desire to accelerate infrastructure roll-out. This is now being mirrored in the context of SATA.

With the exception of the NEPAD eAfrica Commission meetings, most of the above convening/coordinating activities have been carried out without the need for donor financing and we expect this to continue. NEPAD eAfrica Commission activities have been supported with various grants including from PPIAF. Other donors are currently contributing to its financing. Any additional World Bank Group-related trust funds may be subject to increased efforts by the Commission to broaden the consensus (including with telecom operators) around its regional ICT infrastructure-related activities.

It is expected that these convening frameworks will continue to be used for overall coordination, monitoring of progress in policy harmonization, monitoring of progress in the roll-out of cross-border infrastructure.
2.1.1 Kenya – National Coordination

The Kenya Transparency & Communications Infrastructure Project (TCIP) will be anchored at the Ministry of Information and Communications (MoIC). This is consistent with (a) identification of the MoIC as a champion for change and improved governance and (b) the MoIC team track record of consistently delivering over the last 15 months on challenging sector reform issues which are critical for this project notably the push to leverage private sector participation with the actual liberalization of the market (over ten international gateway licences delivered over the last 8 months), the engagement of Telkom Kenya restructuring and privatization (an on-going IFC Advisory Services mandate), and the commitment to national and cross-border infrastructure open access defended by MoIC.

Implementation Agency: the ICT Board

An independent agency created in the MoIC, the Information & Communications Technology Board (the “ICT Board”) will be in charge of marketing Kenya ICT business process outsourcing (BPO) opportunities both abroad and in Kenya. Given the scope of the project and the responsibilities of relevant government agencies in implementing the components of this project, the MoIC decided to house the TCIP implementation unit in charge of the coordination, overall monitoring and reporting of the project’s activities in the ICT Board. The TCIP-related staff would include an ICT Board Deputy-Managing Director (or the “TCIP-DMD”), with a role equivalent to that of a project manager/coordinator and day-to-day management, as well as a financial management specialist, a procurement officer, a technical manager, a M&E specialist and a Governance officer (who will report directly to the Board of Directors of the ICT Board).

The Government is particularly keen in having built-in governance mechanisms to ensure the ICT Board is results-oriented and delivers in line with a set of targets to be agreed upon. In this context, and as part of the measures to strengthen the governance framework, the following features are being proposed:

Governance Oversight Committee: the Board of directors overseeing the ICT Board will act as an independent Governance Oversight Committee (GOC) in charge of overall strategic guidance and direction during implementation, have fiduciary and governance oversight of the main disbursement areas for TCIP, and be responsible for monitoring the implementation of the monitoring and evaluation (M&E) framework, the risk management framework, and of relevant performance agreements. It is proposed that the GOC would have a mixed representation from public and private sector (ex-officio Permanent Secretaries from MoIC, Finance and the Attorney General’s Office, as well as 5 members from the private sector chosen by professional bodies). It is also proposed by the Government that due consideration should be given to gender representation and age profile for GOC membership. The GOC will meet every 2 months.

Risk management: It is also proposed that an institutional risk management framework be established based on consultation and that a risk-based internal audit approach be adopted.
Monitoring & Evaluation and disclosure of information: To monitor and evaluate the implementation progress, specific milestones and performance indicators have been set in place. During implementation, project performance, including the achievement of project outputs, progress toward the attainment of development objectives, and implementation timeline will be monitored through the use of semi-annual progress reports and impact studies prepared by the different implementing agencies. That the monitoring & evaluation related to project funding and implementation progress and impact will be carried out by the eGovernment Directorate (which has M&E capability) in the Office of the President. Each implementing agency will be responsible for the M&E at their subproject level and will report regularly to the eGovernment Directorate. The eGovernment directorate will consolidate the evaluation results from the different implementation agencies, identify common lessons learned and disseminate knowledge produced through the evaluation to the ICT Board.

Performance agreements: Activity performance agreements will be signed between the ICT Board and line ministries/agencies/entities that are benefiting from this project. Annual performance contracts between the Board of directors of the ICT Board and its key staff (Managing Director and deputy Managing Directors). Ongoing monitoring of the activity performance agreements and annual performance contracts will be carried out by the Governance officer.

Communication strategy: A far reaching communication strategy will be developed and implemented at the ICT Board in close consultation with implementing agencies, key stakeholders and substantive working partnerships with private sector participants.

It is also proposed that the compensation package for the Managing Director and the TCIP-DMD be inclusive of a TCIP project performance-related component. The award of this compensation component would have to be validated by the GOC only if targets have been achieved.

Other executing agencies under the oversight of the ICT Board

The eGovernment Directorate in the Office of the President will be tasked with the implementation of the eGovernment applications component (except e-procurement) in coordination with the entities to implement components under this project. The eGovernment Directorate will also be responsible for the overall project M&E arrangements.

The newly created Public Procurement Oversight Authority will be tasked with implementation of the e-procurement activities.

Kenet (Kenya Education Network) will be tasked with implementing the capacity pre-purchase scheme for the universities and technical college [this may require a subsidiary agreement].
The BPO Industry Association will be tasked with implementing the capacity pre-purchase scheme for the BPO industry [this may require a subsidiary agreement].

2.1.2  
**Burundi – National Coordination**

The Ministry of Transport, Posts and Telecommunications (MTPT) will assume overall responsibility for coordination and implementation of the project including procurement, disbursement and financial management. The implementation arrangements of MTPT involve two organizational levels: (i) the Steering Committee will be responsible for guidelines and advice regarding overall policy direction, general project oversight and implementation (ii) the executive secretariat will be responsible for project general coordination and fiduciary management. The Steering Committee will have representatives from MTPT, the 2nd Vice Presidency, and the regulator Agence de Régulation et de Contrôle des Télécommunications (ARCT). The draft ICT policy letter for Burundi proposes the establishment of a National Committee for the Information Society (CNSI) at the level of the 2nd Vice Presidency or the sector ministry, MTPT. CNSI could play the role of the project Steering Committee.

Day to day implementation of the project will be done through an Executive Secretariat. This secretariat will assure procurement and financial management expertise and project implementation. This secretariat is proposed to be housed in MTPT to facilitate knowledge transfer. In a second phase, if possible (to reassess at midterm) the role of secretariat will be assumed by the ministry.

The proposed arrangements have been discussed with the Government and the Country Team in the view of the Client’s limited capacity for implementation.

2.1.3  
**Madagascar – National Coordination**

The implementation arrangements proposed for Madagascar for coordination at national level are similar to those proposed for Burundi.

The Ministry of Transport, Posts and Communications (MTPC) will assume overall responsibility for coordination and implementation of the project including procurement, disbursement and financial management. The implementation arrangements of MTPC involve two organizational levels: (i) the Steering Committee will be responsible for guidelines and advice regarding overall policy direction, general project oversight and implementation (ii) the executive secretariat will be responsible for project general coordination and fiduciary management.

The Steering Committee will have representatives from MTPC, the regulator (currently OMERT (The Malagasy Office for Studies and Regulation of Telecommunications) and in the future ARTC) as well as representatives from other ministries and from the Presidency.

Day to day implementation of the project will be done through an Executive Secretariat. This secretariat will assure procurement and financial management
expertise and project implementation. This secretariat is proposed to be housed in MTPC to facilitate knowledge transfer. In a second phase, if possible (to reassess at midterm) the role of secretariat will be assumed by the ministry. The proposed arrangements have been discussed with the Government and the Country Team in the view of the Client’s limited capacity for implementation.
3.1 LEGISLATIVE REQUIREMENTS FOR ENVIRONMENTAL MANAGEMENT

This section provides a general overview of the applicable legal frameworks in the countries included in Phase I including the laws and regulations for environmental management and related sector laws and requirements for environmental impact assessment studies.

3.2 MADAGASCAR

3.2.1 Law no. 90-033, dated October 21st 1990, pertaining to the Charter of Malagasy Environment

The Charter of the Malagasy Environment includes the general principles of the national environmental policy, and measures for making them operational within the overall development framework of Madagascar. The starting point of the Charter is the environmental permanent data of Madagascar: humans, land and sub-soil, ecosystems, endemism. The Charter defines the major lines of the National Environmental Policy and presents the main directions. This policy defines all the measures that determine the orientations of the environmental protection actions. This policy should be able to evolve. It is translates into operations in the framework of the Environmental Action Plan (EAP) as defined within the major challenges of the state: decentralization, divestment, liberalization. The Programs of the EAP are in compliance with a strategy defined at all the levels, including the development of priority projects, called Environmental Projects. Finally, environmental actions cannot be separated from actions for a sustainable economic and social development.

The basic principles are:

- The Environment is priority concern of the state
- Protection and respect of the environment are everybody’s concern. Everybody has a duty to save the setting in which we live.

The institutional framework includes:

- A National Institutional Entity for Environment
- An advisory entity: the National Commission of Conservation for Development
- An operational entity: The National Office for Environment (Office national de l’Environnement – ONE)
- Several bodies for managing the operations.

If the state is to provide impetus and general setting, the major operational responsibilities should be assumed by decentralized communities, associations and citizens groups, or the private sector.
The Charter defines *environment* as including all the elements that determine and condition human activity, including:

- Biological surroundings: humans, flora, fauna;
- Physical surroundings: biological balance, natural resources, climate, soil;
- Socio-cultural surroundings: physical or cultural property, created by nature or by men, social organization;
- Interaction of all the above.

In the Charter, *Environmental degradation* designates:

- Any action which entails an abusive use of renewable natural resources as compared to their regeneration capacity;
- Any direct or indirect growth resulting from an abusive use of the environment;
- Any activity that, without harming directly the environment, could over time become a threat or a danger.

In the Charter, *safeguarding actions* designate works or actions to preserve structures, property or infrastructures, or at least to keep them in their present condition. Prevention, protection or defense actions are safeguarding actions.

Finally, in the Charter *rehabilitation* designates works or actions which will bring back structures, property or infrastructures to their original status. It can also cover socio-cultural aspects like mentality, endeavor, beauty, standards, etc.

The charter defines sectoral strategies:

- Development of education, training and awareness
- Soil conservation
- Protection and management of native biodiversity
- Development of ecotourism
- Sanitation of the setting of urban and rural life
- Implementing tools for managing, protecting and continuous monitoring of the environment.

The charter defines also regional strategies:

- High lands in the Center of the country
- Eastern Coast
- Western Intermediate Zone
- Western Coastal area
- Northern area
- Southern area.

The Charter mandates that an impact study be made on public or private investment projects that could harm the environment, which will consider the technical magnitude of these projects and the sensitiveness of the implementing area. Moreover, operators implementing activities with a detrimental impact on the environment will be liable to compensate the environment or to pay penalties to the State.
In conclusion, the Charter should provide:

- A coherent set of general rules, principles, orientations which would inspire all the environmental legislation;
- Organizational texts, laws, regulations and instructions or recommendations pertaining to the environment;
- Laws or regulations with a direct or indirect link to protecting natural resources, and linked to the general concept of environment and development;
- Ethics whose main purpose should be to create an ever renewing mentality of rational conservation and promotion of the environment;
- A declaration of mission: future generations would inherit a fertile land, renewed resources and better life conditions;
- A flexible text which can be changed and improved while programs proceed, techniques get more sophisticated and awareness develops at every level.

3.2.2 Decree 99-954 to ensure that investments will be compatible with the environment (known as decree MECIE)

Passing the law pertaining to the Malagasy Environment Charter and promulgating the Mise en Compatibilité des Investissements avec l’Environnement (MECIE) decree imply that public or private investment projects that could harm the environment would be subjected to an Environment Impact Assessment (EIA) or an Environment Engagement Program (EEP), depending on the technical nature and the magnitude of the projects and the sensitiveness of the location where they will be implemented.

The decree aims at fixing rules and procedures to ensure that investments are compatible with the environment, and at clarifying the nature, the duties and the level of authority of institutions or entities designated to enforcing these rules and procedures.

In its annexes I and II, the decree defines the types of projects to get an EIA or an EEP. Projects that should get an EIA are:

- Land development, construction of structures and works which could affect sensitive areas
- Plans, programs or policies that could change the natural environment or the use of natural resources, and/or the quality of human environment in urban and/or rural setting.
- Use or transfer of technology that could harm the environment
- Regular, frequent or ad hoc transport by road, rail or air of hazardous materials (corrosive, toxic, contagious, radioactive, etc.)
- Population displacement involving more than 500 people
- Land development, structures and works which, depending on their technical aspects, their magnitude and the sensitiveness of their implementation location could have a harming impact on the environment.
- Among these activities:
  - Road construction and development, surfaced or not
  - Excavation and shoulders of more than 20,000 cubic meters
- Water pumping at a rate higher than 30 cubic meters per hour
- Units of piling, disposal or treatment of domestic or industrial waste and other hazardous waste.
- Stockpiling hazardous products.

Projects that should get an EEP:

- Any maintenance project of surfaced road of 20 km or more
- Any maintenance project of non surfaced road of 30 km or more
- Any utilization or deviation of a classified permanent waterway, exceeding 50 percent of its flow rate in low season
- Any project of mechanized material extraction in a quarry.

The decree quotes the content of the EIA which is detailed in an instruction given by the ONE:

- A document certifying the legal status of the project’s location;
- A description of the investment project;
- An analysis of the environmental system affected or which could be affected by the project;
- A prospective analysis of possible impact of the planned interventions on the above described system;
- A Project Environmental Management Plan (EMP);
- A non technical summary written in Malagasy and in French.

The EIA can be written in Malagasy or in French.

According to the MECIE directive, the project will have to prove that it will comply with the relevant environment standards. If there are no national standards, the developer will follow established standards, which are recognized or recommended by international bodies affiliated to the United Nations. In case there are several sets of standards, the criteria for selecting one specific set should be included in the study. The ONE, in cooperation with the Ministry in charge of the environment and the technical ministries directly concerned will provide all information and useful data on these standards to the developers.

The EIA are handed over to the ONE which is responsible to forward them to the relevant bodies. The EIA are assessed by a Technical Evaluation Committee ad hoc, according to a procedure described in the decree, which includes a public consultation. The committee decides whether or not to give the environmental permit which should be included in any request for authorizing the works, the construction and the development. The request entails the payment of a contribution to the cost of the assessment of the EIA, which is calculated based upon the amount of the investment.

EEP's are evaluated by the environment cell of the technical ministry directly concerned which will write and send the relevant reports to the ministry responsible for the environment with a copy to the ONE.
The steps mandated by the Project Environment Management Plan should be implemented during all the life of the project; they should be monitored, controlled and if necessary reoriented. If an environmental disruption occurs, the developer will implement all necessary corrective measure. For projects under an EIA, the monitoring and the control should be done by the ministry responsible for the environment, the ministry responsible for that specific activity and the ONE. For projects under EEPs, the monitoring and the control should be implemented by the environment cells at the relevant ministries which will send their reports to the ministry responsible for the environment and to the ONE. Local governments will participate to the monitoring and control, as well as the relevant environmental bodies for the projects.

3.2.3

Ministerial Decree no. 4355/97 pertaining to the definition and delimitation of sensitive areas

This ministerial decree aims to implement the decree enforcing the compatibility of investments with the environment. Its goal is the definition and delimitation of areas particularly sensitive as per the articles of this decree.

An area is considered as sensitive if it involves one or several elements (in the areas of biology, economy, climate, physics and chemistry, culture, socio-economy) which have a specific value and are sensitive to human activities and natural events which could change these elements and/or harm or even destroy that area.

From the generic point of view, these areas include:

- Coral reefs,
- Mangroves,
- Islets,
- Tropical forests,
- Areas prone to erosion,
- Arid or semi-arid zones prone to desertification,
- Swamps,
- Natural conservation zones (including zones sheltering protected and/or disappearing species),
- Protective perimeters for drinking mineral or underground water,
- Areas of paleontology, archaeology, or historical value as well as their protective perimeters.

Each sensitive area is specifically defined and delimited in the annex of the ministerial decree.

It is important to note that, according to the MECIE decree, any project which could affect a sensitive area should be evaluated under an EIA.
3.2.4 *Act no. 98-029 pertaining to the Water Code, December 1998*

This Code deals with the following:

- Water as a public property;
- Management, conservation and development of water resources;
- Drinking water and sanitation as a utility;
- Collection of domestic waste water;
- Water policy;
- Financing Water and Sanitation sector;
- Organization of the Water and Sanitation sector.

The Water Code stipulates that water is a public property which can be taken only under the conditions of the current civil law in Madagascar. Any take or spill is under supervision of the administration.

Any work and/or take on surface or underground water must be authorized (besides limited take for personal use) by the National Water and Sanitation Authority.

Any person or organized body, public or private who practices a polluting activity or an activity which contains a risk for the water resources or for the hygienic status of the environment shall take any step to stop or prevent the danger. The law complies with the principle that the polluting person is the one who pays. Waste control shall comply with the environmental requests linked to the law 90-003 on the Environment Charter. Any person or organized body who produces or keeps waste which could be hazardous for the natural environment or public health is responsible for its disposal or treatment by ways which protect the environment. The Water Code deals also with sanitation which aims at making unhealthy conditions disappear: sanitation of towns and disposal or treatment of used waters.

Before any development, construction of structures or other works are implemented, a public survey and an Environmental Impact Assessment should be performed, when these works could affect the environment and disrupt the ecosystem. Any dumping on a watershed of unhealthy material or which could harm the water’s quality is forbidden. The law deals also with enforcing regulatory documents for protecting the plant cover of watersheds and forests near waterways.

3.2.5 *Law no. 99-021 pertaining to the policy of control and management of industrial pollutions*

This law defines the general framework for the rational management and control of industrial pollutions. The law stipulates that, in case harmful impact of pollutions could be generated by industrial activities, appropriate steps and prevention measures will be taken, as well as the overall management and rational control of the industrial environment. Any industrial operator is obligated to safeguard the environment with a cleaner production, and the reduction, valorization, treatment and disposal of industrial waste.
The law defines the institutional, legislative and regulatory framework.

This framework refers to the Constitution in which the environment protection is a basic principle, and refers to the Environment Charter. The management and control of pollutions is as first priority the responsibility of the Ministry in charge of Industries, in cooperation with the Ministry of the Environment. The private sector and all the citizens participate also to the implementation of this policy, everyone at his own level.

3.3 **KENYA**

Kenyan Acts of Parliament which mention the environment and/or natural resources are numerous. But some are more direct than others, and thus indicate certain critical areas of legal intervention in the management of natural resources and the environment. A prominent feature of Kenya’s environmental legislation is its diffuse nature with provisions being contained in about 77 statues. Most of the statutes are sectoral, either by natural resources such as fisheries, water, forestry and wildlife, or by the functional sectors such as public health, agriculture, factories, mining, shipping or chiefs’ authority.

3.3.1 **Requirements of the Environmental Management and Coordination Act (EMCA) 1999**

EMCA 1999 was enacted in 2000 to harmonize environmental legislation previously scattered among 77 national laws. As the principal environmental legislation in Kenya, EMCA sets the legal framework for environmental management. Its core elements are as follows.

*Creation of a National Environmental Management Authority (NEMA)*

EMCA 1999 allows for formation of the National Environmental Management Authority (NEMA) as the body charged with the overall coordination of environmental protection in Kenya, mainly through setting and harmonizing standards for environmental quality. NEMA was established in 2001, and is headed by a Director General appointed by the President. The Director General is assisted by several directors in charge of Enforcement, Education, and Policy, who in turn are assisted by Assistant Directors and Senior Officers. To facilitate coordination of environmental matters at a District level, EMCA 1999 allows for the creation of District Environmental Committees (DEC) chaired by respective District Commissioners, and the appointment of a District Environmental Officer who oversees environmental coordination and is also secretary to the DEC.

*Environmental Assessments*

Section 58 of EMCA requires that an Environmental Impact Assessment precedes all development activities proposed to be implemented in Kenya. This requirement was operationalised by NEMA through its publication of the Guidelines for the Conduct of EIAs and Environmental Audits (Kenya Gazette Supplement No. 56 of 13th June 2003).
The framework for environmental assessment in Kenya and a description of types of development that should be subjected to environmental impact assessment are outlined in Legal Notice 101 and the Second Schedule of EMCA respectively.

Legal Notice 101 is silent on the minimum size threshold for projects triggering EIA requirements. However Section 10(2) (Part II) of Legal Notice 101 allows for the approval of proposed projects at the ‘Project Report’ Stage. This Section is used by NEMA to grant Environmental Licenses to small projects without the requirement for a full-scale EIA.

Environmental Audits

Under Sections 68 and 69, EMCA requires that all ongoing projects be subjected to annual environmental audits as further expounded in Regulation 35 (1) and (2) of Legal Notice 101 of June 2003. Part V of the Legal Notice 101 defines the focus and scope of Environmental Audit studies as including an appraisal of all the project activities, within the perspective of environmental regulatory frameworks, environmental health and safety measures and sustainable use of natural resources.

Sectoral Coordination in Environmental Protection

Among other functions, EMCA mandates NEMA to regularly review and gazette standards and regulations for environmental quality as a way of guiding activity in all sectors.

Further, in recognition that EMCA is an umbrella law coordinating diverse sectoral statutes, all of which are still in force, the Legal Notice 101 of EMCA requires that the respective sectors be consulted as ‘Lead Agencies’ in making decisions pertaining to environmental assessment for projects in respective sectors. Therefore to ensure that NEMA does not approve projects that contradict sector policies and legislation, all EIA reports are subjected to review by the relevant sector in their capacity as Lead Agency. Their opinions have a strong bearing on the final decision arrived at by NEMA.

Preparation of a State of the Environment Report

State of the Environment Reports are issued annually for the entire country and also for each individual district. They are tools for environmental monitoring, and outline progress made in environmental management via existing policy goals and strategies and through the publication of emergent environmental concerns, especially those pertaining to unsustainable utilization of natural resources.

3.3.2 Environmental Protection through Sectoral Laws

Since the advent of EMCA, all sectoral laws require that EIAs be undertaken for all major projects touching on the sectors. Through the process of public disclosure demanded for all EIA reports, all proposed developments are subjected to public debate which facilitates development of a public position.
Some specific sectoral laws have important requirements for environmental / natural resource protection as follows.

(a) Legislation Relevant to Water Resources

Water resources are dealt with under several sectoral statues and it is not practical to bring all those statutes under one heading. The Agricultural Act (Cap 318), for instances has several provisions on water resources especially in relation to catchment conservation, because agriculture depends on water supply and security. But the Agriculture Act provides that where any provision there is inconsistent with a provision of the Water Act, the provisions of the latter shall prevail.

This part is therefore restricted to an overview of the Water Act No. 8 of 2002. The additional instruments in Kenya’s law are the National Water Conservation and Pipeline Corporation Order of 1988 issues as Legal Notice No. 270 in 1988. Other legislation that have a bearing on the management of water resources include; the Forests Act (Cap 385), the Irrigation Act (Cap 347), the Malaria Prevention Act (Cap 246), the Fisheries Act (Cap 378), the Lakes and Rivers Act (Cap 409), the River Basin Development Authorities Act (Cap 443), the Maritime Zone Act (Cap 371) and all the land tenure and land use legislations.

The purpose of the Water Act according to its title is to provide for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water, to provide for the regulation and management of water supply and sewerage services. Except for waters that are wholly situated in a private landowner’s domain, the Act vests the rights over all surface and ground water in the state. This is only subject to the rights which users may acquire under license from time to time.

The overall power for the control of every body of water is exercised by the Minister. He has the duty to promote the investigation, conservation and proper use of water resources throughout Kenya. The Act provides for a Water Resource Management Authority whose functions include, inter alia, develop principles and procedures for allocation of water resources, monitor national water resource management strategy, determine applications for permits for water use, regulate and protect water resources quality from adverse impacts, manage and protect water catchments, etc. In addition, under the Water (Catchment Board) Rules promulgated by the Minister, the country is divided into six Catchment Boards, vis-à-vis Tana Catchment Board, Rift Valley Catchment Board, Athi Catchment Board, Ewaso Nyiro Catchment Board, Lake Victoria (North) Catchment Board, and Lake Victoria (South) Catchment Boards. But these boundaries are subject to variation depending on available hydrological information.

Under the Act, the Minister may declare an area to be a conservation area and direct that special measures be taken for the conservation of ground water therein. Every person who has been using ground water in an area declared to be a conservation area and who desires to continue with the use must obtain permit within six months of the order. It is an offence to disobey such an order.
Protection of water supply is clearly a critical issue under the Act. Once the Minister has appointed a water undertaker to be responsible for control and distribution in a given area, there is a corresponding commitment to ensure the security of the supply. Accordingly, whenever the Minister is satisfied that special measures are necessary for the protection of a catchment area from which water is obtained; he may declare such an area to be protected area. By order, the Minister may regulate or prohibit activities within that area which may be contrite to the requisite conservation goals.

As in-depth analysis of the new Water Act reveals that the Act has created an integrated water resources management framework in Kenya.

(b) Environmental Health

The health of the environment is a broad issue that should apply to any activity occasioning environmental degradation. However, what we have in Kenya is construed rather narrowly to apply only to environmental problems which affect the human body, but not including diseases. For brief analytical purposes, it is handled in four subsections, namely:

- Public Health
- The Working Environment
- Radiation Control
- The Management of Hazardous Wastes

Public Health

Under this section the review is confined to the provision of the Public Health Act (Cap 242), the Traffic Act (Cap 403), the Local Government Act (Cap 265), the Penal Code (Cap 63) and the Factories Act (Cap. 514). Within the Public Health Act, the sections on housing and prevention of mosquitoes are directly pertinent.

On sanitation the Act borrows from the common law doctrine of nuisance which makes it an offence for any landowner or occupier to allow nuisance or any other condition liable to be injurious or dangerous to health to prevail on his land. A medical health officer, once satisfied of the danger, may issue an order requiring the owner or occupier of the land to remove the nuisance.

In addition, the Minister on the advice of the Central Board of Health may make rules and confer powers and impose duties for the carrying out of environmental health matters. Such matters may include inspection of building for their sanitary condition, construction standards and ventilation for buildings, drainage of land, keeping of animals etc.

Fighting malaria is also a critical environmental task dealt under the Act. Part XII makes it an offence to leave on one’s land or premises, any collection of water, sewage, rubbish, well, pool, gutter, channel cesspit, latrine, urinal or dung pit where mosquitoes may breed. Such a situation constitutes a nuisance. Any person who fails to clear such a nuisance is guilty of an offence under the Act.
Environmental health requirements are also provided for under the general powers and duties of the local authorities in the Local Government Act (Cap 265). Municipal Councils are required to provide and maintain sanitary services, sewage and drainage facilities, take measures for the control, destruction of rats, vermin, insects and pests, control or prohibit industries, factories and businesses which emit smoke, fumes, chemicals, gases, dust, smell, noise vibrations, discomfort or annoyance to the neighborhood, and to prohibit or control work or trade of disinfection or fumigation by cyanide or other means.

The Penal Code (Cap 65) carries the offence of common nuisance identical to that in the Public Health Act. The offence under the Penal Code is a misdemeanor punishable by imprisonment for one year. This however is distinct from that in the Public Health Act which may require the offender to abate the offence.

Air pollution is dealt with by the Traffic Act (Cap 403) and the Factories (Amendment) Act of 1990. The Factories Act specifically prohibits factories from emitting any dust, fumes or impurities into the atmosphere without undergoing appropriate treatment to prevent air pollution or other ill effects to life and property. The amendment further prohibits the use of any stationary internal combustion engine, discharging exhaust gas into the atmosphere without treatment.

The Traffic Act prohibits air pollution through Section 51 which requires that motor vehicle use proper fuels. The Rules promulgated under the Act provide that every vehicle be so constructed, painted and used as not to emit any smoke, or visible vapor.

Air pollution as a manifestation of nuisance is also prohibited under the Mining Act (Cap 306). Section 26 requires that a holder of prospecting or mining license who causes a nuisance or damage to a landowner or lawful occupier to pay reasonable compensation for such nuisance or damage.

The Working Environment

The two statues relevant to this subject are the Factories Act (Cap 514) and the Mining Act (Cap 306).

The primary environmental requirements under the Factories Act are that each factory must observe as high standards of cleanliness as are possible for the respective operations; avoid overcrowding, construct and maintain adequate ventilation, provide and maintain suitable natural or artificial lighting, as appropriate, provide drainage of floors and construct and maintain clean sanitary conveniences. The Minister for Labor may make rules specifying the requirements for these standards. All the standards prescribed and the rules promulgated by the Minister are however to be enforced by the local authority with the jurisdiction over the area in question. The Act also establishes the National Advisory Committee on Occupational Health and Safety chaired by the Chief Inspector of factories who is responsible to the Minister for Labor.
The Mining Act (Cap 306) consolidates the law relating to exploitation of natural resources; however it empowers the Minister to promulgate regulation for purpose inter alia of the safety and health of persons employed in the mines in a safe, proper sanitary and effectual manner.

**Radiation Control**

Since 1982, Kenya decided to join in the global movement for the use of nuclear energy for peaceful purposes, a movement lead by the International Atomic Energy Agency (IAEA). Most of such uses are in the fields of medicine, agriculture, energy and environmental monitoring. The dangers of injury to the public prompted the adoption of the Radiation Protection Act (Cap 243) in November 1984 to provide according to its citation, protection of the public and radiation workers from the dangers arising from the use of devices or materials capable of producing ionizing radiation and for connected purpose.

The Act prohibits the unauthorized manufacture, production, possession or use, sale, disposal, lease, loan or dealership, import, export of any irradiating device or radioactive material. All authorized buyers, sellers, users, of such device must be properly licensed. The Act is administered by the Chief Radiation Protection Officer assisted by a Radiation Protection Board.

**Management of Hazardous Waste**

In the foregoing section, we see that radiation protection focuses largely on protection of human beings against injury by such wastes or radiations. The Public Health Act also is concerned with the protection of human health. Section 75 of the Constitutions whose purpose is protection from the deprivation of property, empowers the government to acquire property “in circumstances where it is necessary to do so because property is in a dangerous state or injurious to the health of human beings or animals or plants.” This is the closet reference to the protection of the environment. To date, Kenya does not have a statute that deals with the management of hazardous waste (including disposal) as such.

And despite the numerous international conventions and protocols that deal with hazardous waste such as the London Convention, the Basel Convention and the Bamako Convention, it still remains for Kenya to develop and adopt national legislation on the management of hazardous waste. The current Environmental Management and Co-ordination Act in Kenya, only provides for framework law for the management of hazardous wastes. Currently, the National Environment Management Authority is in the process of developing regulations that will prescribe for the management of waste. These Regulations will have to be gazetted by the Minister of Environment and Natural Resources before they can be enforced as law.
(c) Legislation on Fisheries

Fisheries resources of Kenya fall into two categories: marine and inland. As far as marine fisheries are concerned, the Fisheries Act No. 5 of 1989 and the Maritime Zones Act No. 6 of 1989 are complimentary. But the Fisheries Act stands alone on the island fisheries so it applies to both categories uniformly.

The purpose of the Fisheries Act as stated in its citation is to provide for the development, management, exploitation, utilization and conservation of fisheries and for connected purposes. The Act requires that for any vessels to fish in Kenyan waters they must be registered by the Director of Fisheries.

Pollution as it affects fisheries is dealt with in the Regulations made thereunder. However, there is no mention of the subject in the principal Act. The Kenyan fishery waters are declared to be pollution prevention zones, presumably to mean an area within which discharge of pollutants including oil or oily wastes is strictly controlled.

(d) Legislation applicable to the marine environment

The provisions of the Fisheries Act apply to a great extent to the marine environment even though inland waters are also covered. Other statutes relevant to the marine environment are: The Maritime Zones Act No. 6 of 1989, the Wildlife (Conservation and Management) Act Cap 376, the Merchant Shipping Act (Cap 389) the Petroleum (Exploration and Production) Act Cap 308 and the Public Health Act (Cap 242).

The Maritime Zones Act of 1989 sets out a prerequisite to the rational conservation and management of the Kenyan marine resources and the environment by prescribing the limits of national jurisdiction. It specifies the territorial wastes of Kenya extend outwards to 12 nautical miles, from the baseline. The Exclusive Economic Zone (EEZ) on the other hand extends 200 nautical miles from the same baseline. This statute brings Kenyan claims in line with the provision of the Montego Bay Convention whose regime specifies too, that within the EEZ, the coastal state has sovereign rights and exclusive jurisdiction for the purposes of exploration and exploitation of the living and non-living resources, regulations and preservation of the marine environment, establishment and use of artificial islands, terminal and the control and authorization of scientific research. The statute also empowers the Minister to make regulation for the protection of the marine environment and regulation of exploitation and exploration of marine resources.

(e) Legislation on specifically protected areas

These are areas which through gazettement by the government are designates as protected by law. Applicable statutes are the Forest Act Cap 385, the Wildlife (Conservation and Management) Act Cap 376.

Under the Forest Act, the Minister of Environment and Natural Resources may from time to time declare unalienated Government land to be a forest are or part thereof.
to be a “nature reserve” whereby strict preservation of flora and fauna are undertaken.

The principal legislation dealing with the management of wildlife resources is the Wildlife (Conservation and Management) Act of 1989. Wildlife in Kenya is classified as a national heritage held in trust for the benefit of the public. The administrative agency charged with the control and management of national parks and management of wildlife in general is the Kenya Wildlife Service (KWS). This regulatory regime requires that the Minister can declare that a given area is a national park, nature reserves or a sanctuary by gazette notice. The Act also provides for various offences and penalties thereof for those who enter and reside, hunt, collect products of bees or animals or their trophy, introduction of alien species, disturbing or quarrying animals, damaging geological, pre-historic, archeological or marine and other scientific objects or structures lawfully places in the parks, sanctuaries or reserves.

In addition Cap 376 also provides for the regulation of the movement of tourists through the parks, as well as licenses for access thereto. However, the statute does not make specific provision for the conduct of tourists which degrades the territorial or aquatic environment.

3.4 BURUNDI

In Burundi environmental management is governed by legal documents, some of which were designed long before the Environmental Ministry was established. The Law n. 1/010 of 30 June 2000 establishes the Environmental Code for Burundi, with the view to clarify and harmonize the environmental legal framework of Burundi.

3.4.1 Law n° 1/010 of 30 June 2000 establishing the Environmental Code in Burundi

The code introduces the Environment Impact Assessment (EIA) for any development project. The code envisions the promulgation of by-laws to complement a list of activities for which EIA is compulsory (Art. 24). An additional text will also define the national guidelines for further EIAs. The code already mandates that it will be mandatory for the Impact study to include the following points:

- The analysis of the initial condition of the site and its environment;
- The evaluation of the predictable consequences of implementing the project on the site and its human and natural environment;
- A list and description or steps planned by the applicant in order to suppress or reduce and if possible to compensate for the harmful consequences of the project on the environment and an estimate of the related expenses;
- The presentation of other alternative potential solutions and according to which rationale, from the environment protection point of view, the version of the project which was presented was selected.
The Environment Code covers all the natural and artificial elements, as well as economic, social and cultural factors which determine the existence, the transformation and the development of that environment, entities and human activities.

The Environment Code prepares prescriptions for:
- The protection and development of natural resources: soil and sub-soil, water, air, forests, all the protected areas and the biodiversity;
- The protection and development of the human environment: protection of the cultural values, development of land and human settlements
- Pollution and nuisance control, among them: facilities classified for protecting the environment, waste, chemicals whether toxic of dangerous.

The Government defines the policy and the national strategy for the environment upon proposal by the Minister in charge of the environment. This last is responsible for implementation, in coordination with other relevant ministries, if necessary.

Article 161 of the Environment Code specifies that all measures included in the various codes or legal and regulatory documents which could interfere directly or indirectly with the dispositions of that code will be harmonized with the content and the orientations of the same law, within five years.

3.4.2 Relevant decrees and legislative requirements

The major legal documents include:

*The Decree-Law dated July 17, 1976, on the Mining and Petroleum Code of the Republic of Burundi.* In its Article 10, it stipulates that all products from quarries, including peat belong to the state, and Article 146 of the same Law stipulates that all the land where quarries are exploited, including peat quarries are State-Owned property, in which survey, research, exploitation and management are under the same Mining Code, and under the authority of the Minister responsible for mines. These dispositions rule that swamps, which include a peat site considered as important, become state owned property the day the state decides to exploit it.

*Government Decree n°1/6 of 3 March 1980 creating national parks and natural reserves.* The decree indicates the legal status of protected areas, especially with regard to the banning of concession and transfer, special measures for conserving flora and fauna, banning of installation of communities in the vicinity of national parks and natural reserves, as well as visits to the inner parts of the area.

*Law n°1/02 of 25 March 1985 establishing the Forest Code.* The law provides a set of special regulations governing the administration, land use, development, monitoring and forest law enforcement. It includes a lot of clauses guiding the conservation and sustainable land use of forestry resources as well as other clauses aimed at facilitating forestry system integrity.

*Forestry Code governed by the Government Decree n°1/008 of 1st September 1986, establishing the forest code.* It aims at determining regulations that are applicable or
likely to be applicable overall the national territory, as well as any additional related or incorporated aspects, either natural or artificial.

**Government Decree n°10/40 of 18 December 1991 modifying regulations governing the technical and administrative management of quarries in Burundi.** The decree modifies Law n° 1/138 of 17 July 1976 establishing the mining and oil code in the Republic of Burundi, especially in Article 206. Technical departments of the Ministry of Energy and Mining are consulted to decide on the closing of any irrational development activities of a quarry.

**Government Decree n°1/41 of 26 November 1992 establishing and organizing the hydraulic public domain.** The law (Article 1) aims at the following: protection of aquatic environment, preservation of the "water" common resource, definition of water utilization in the interest of every user.

**The Decree 100/241 dated December 31st, 1992, which regulates the disposal of waste water in urban areas.**

**Government Decree n°1/032 of 30 June 1993 defining the production and marketing of plant seeds in Burundi.** A framework that allows contributing to the strengthening of the seed sector is established in order to produce high-quality disease-resistant agricultural seeds in sufficient quantity. To this end, the decree edicts a series of strict measures aimed at seed protection, multiplication and conservation as well as marketing of certified seeds.

**Government Decree n°1/033 of 30 June 1993 establishing plant protection in Burundi.** The objective of the decree is to ensure health protection of plants and products to be multiplied, through prevention and control of plant enemies at the level of their spreading over the national territory and dissemination and extension of plant protection techniques. The decree bans the detention and transport over the national territory of any plant enemy, at either development stage, and submits them to strict control of their export or import.

**The Ordinance 52/160 dated November 16, 1995, which regulates fisheries in the lakes.**

**The Environmental Action Plan, adopted in 1997, which aims at implementing the Agenda 21 adopted at the Rio Summit.**

### 3.5 LEGISLATIVE REQUIREMENTS FOR TELECOMMUNICATION SECTOR

This section provides a general overview of the applicable legal frameworks in the countries included in Phase I for regulation of the telecommunication industry.
3.6 MADAGASCAR

3.6.1 Act # 96-034 dated January 27, 1997

Act # 96-034 dated January 27, 1997, on institutional reform of the telecommunications sector, and related documents for implementation. The following decrees apply to the telecommunications sector:

Box 3.1 Applicable decrees regarding telecommunication sector in Madagascar

- Le décret n°99-143 du 24 février 1999, portant modalités d’encadrement des tarifs des services de télécommunication ;
- Le décret n°99-144 du 24 février 1999, modifiant l’article 8 du décret n°97-1155 et portant sur le nouveau taux à appliquer pour la fixation ainsi que les nouvelles modalités de paiement de la taxe de régulation ;
- Le décret n°99-191 du 10 mars 1999, portant modalités de mise en œuvre et de financement de l’accès aux services de télécommunication ;
- Le décret n°99-227 du 24 mars 1999, définissant les procédures et mesures à appliquer par l’OMERT pour la réglementation du secteur des télécommunications ;
3.6.2 Act # 2005-023, dated October 17, 2005

Act # 2005-023, dated October 17, 2005 was just published in the “Journal Officiel”. This act gives a framework which will enable investors of all sectors and in all decentralized communities in Madagascar to access progressively to the same services as advanced countries in Information and Communications Technologies (ICT). It lobbies in favor of a total liberalization of the sector and to open it to globalization.

3.7 KENYA

The Kenya Communications Act (No. 2 of 1998) provides the framework for the regulating the communications sector in Kenya. Enacted by Parliament in 1998, the Act was a deliberate attempt by the August House to give legislative teeth to the Postal and Telecommunications Sector Policy Statement (the Policy Statement), which had been issued by the then Ministry of Transport and Communications in January 1997.

The Kenya Communications Regulations 2001 clarify and expound on the said Act.

The Policy Statement defines the policy backdrop within which the telecommunications, radio communication and postal services would be operated and provides a framework for the introduction of certain structural changes in the sector. The Policy Statement was set out against a deliberate move by the government to optimize the sector’s contribution to the development of the economy as a whole by ensuring the availability of efficient, reliable and affordable communication services throughout the country.


3.8 BURUNDI

The telecommunications’ operational institutional framework was set up in 1997, by Presidential Decree No 100/182. The key institution is the telecommunications regulation and control agency, ARCT, overlooked by the Ministry of Transport, Posts and Telecommunications. The Ministry of Transport, Posts and telecommunications is the main Ministry in charge of the Telecommunications sector. It defines and ensures the implementation of telecommunications sector policies and enforces sector regulations.

(1) ¹ In French speaking countries the “Journal officiel” or JO is a government publication which lists new acts, laws, etc. The JO has official legal value (e.g. in Court, etc.)
3.8.1 National Strategy for developing Information and Communications Technologies (ICT)

The National Strategy for developing ICTs in Burundi was adopted in 2002. This strategy includes an action plan for the years 2002-2004 for the sectors deemed to be the most sensitive. The strategy aims at:

- Modernizing and expanding the telecommunications network;
- Rehabilitating the administration and improving access to information and public services;
- Developing an economy based upon knowledge;
- Modernizing the health system and enabling a better access to information on health;
- Strengthening the agricultural information system;
- Developing trade and industry;
- Enacting a legislation to offer incentives and promote new information and communication technologies.

3.9 Institutional Roles and Responsibilities for the Telecommunications and Environmental Sector in Phase 1 Countries

This section identifies the national organizations involved in the telecommunications sector and in the protection of the environment, natural habitats, and the natural and cultural resources, as well as agencies in charge of the application, enforcement and effective control of the regulations and norms in these thematic areas.
**Table 3.3.1  Role and responsibilities of institutions and regulatory agencies in Madagascar for RCIP**

<table>
<thead>
<tr>
<th>Institution/ regulatory agency</th>
<th>Role</th>
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| Office National de l’environnement (ONE) (National Office of the Environment) | The Office National de l’Environnement (National Office of the Environment) is totally integrated in the environment’s institutional landscape in Madagascar and its history takes us through the various steps of its evolution. But the basic reference is still the decree which created the ONE.  
  
The ONE’s mission is to ensure that economic and development activities will not be accomplished in ways which will be detrimental to the environment. This includes:
  
  - Elaboration of periodic environmental strategies,
  - Set up of management procedures for application of the decree MECIE,
  - Administrative, technical and financial management of periodic action programs,
  - Environmental action programs and related projects management,
  - Set up of investment and environmental compatibility. |
| Ministry of Culture, Information and Communication | The Ministry if responsible for overall policy and decision making regarding information, communication policies and cultural agendas. |
| L’Office Malagasy d’Etudes et de Régulation des Télécommunications (OMERT) (The Malagasy Office for Studies and Regulation of Telecommunications) | OMERT is the regulatory body for the telecommunication sector in Madagascar. It was created by the Act # 96-034 of January 27, 1997 as a public industrial and commercial entity with its own corporate name and financial autonomy, and was implemented by the decree # 97-1077 dated August 28, 1997.  
  
  This office’s mandate is to be the helper and arbiter for the operators and is responsible for enforcing the regulations and the rights of the users. It looks after the industry to operate using proper practices and enforces the free competition policy of the Government. |
<table>
<thead>
<tr>
<th>Institution / regulatory agency</th>
<th>Role</th>
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<tr>
<td>National Environmental Management Agency (NEMA)</td>
<td>NEMA is the institution with the legal authority to exercise general supervision and coordination over all matters relating to the environment, and is the principal instrument of the Government charged with the implementation of all policies relating to the environment. NEMA’s functions, which determine its scope of activities, are more particularly set out in Section 9 (2) of the Act. They include co-ordination the various environmental management activities being undertaken by the lead agencies and promoting the integration of environmental consideration into development policies, plans, programs and projects; undertake in co-operation with relevant lead agencies programs intended to enhance environmental education and public awareness about the need for sound environmental management, publish and disseminate manuals, codes or guidelines relating to environmental management, prepare and issue an annual report on the state of the environment in Kenya and in this regard may directed any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of the lead agency establishing and reviewing, in consultation with relevant lead agencies, land use guidelines; advising the Government on legislative and other measures for the management of the environment or the implementation of relevant international conventions, treaties and agreements in the field of environment; advising the Government on regional and international environmental conventions, treaties and agreements to which Kenya is a party, mobilizing and monitoring the use of financial and human resources for environmental management; and rendering advice and technical support where possible to entities engaged in national resources management and environmental protection so as to enable them to carry out their responsibilities satisfactorily.</td>
</tr>
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</table>
Another statutory committee is the Standards and Enforcement Review Committee established under Section 70 of the Act and chaired by the Permanent Secretary under the Minister responsible for environmental matters.

The functions of the Committee includes advising NEMA on how to establish criteria and procedures for the measurement of water quality, recommending to NEMA minimum water quality standards for all waters of Kenya, analysing and submitting to the Director General conditions for discharge of effluents into the environment, and documenting the analytical methods by which water quality and pollution control standards can be determined and appointing laboratories for the analytical services required. Other statutory functions of the committee are advising NEMA on how to establish criteria and procedures for the measurement of air quality (Section 78), the issue of regulations and guidelines and the prescription and submission to NEMA of draft standards on pesticides and toxic substances (Section 94), recommending to the Authority standards for emissions of noise and vibration pollution into the environment (Section 101), the establishment of standards for ionising and other radiation (Section 104). In this respect the Act confers on the Standards and Enforcement Committee rulemaking powers. This is important in the light of the fact that regulations and rules are required to implement the framework provisions of the Act. In practice, the draft regulations and standards are adopted by the Board of Management for ownership and then forwarded to the Minister for promulgation and gazettement. The Committee therefore acts as the technical arm of NEMA in setting these standards.
<table>
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<tr>
<th><strong>Institution/regulatory agency</strong></th>
<th><strong>Role</strong></th>
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| The National Environment Council (NEC) | The NEC is established by Section 4 of the Environmental Management and Coordination Act no. 8 of 1999. The Council held its 7th meeting on 12th August 2003 at which it reviewed and gave directions, on among other things, the formulation of environmental regulations and standards and multilateral environmental agreements. The Council considered and adopted reports from the Public Complaints Committee and the National Environmental Tribunal. Section 5 of the Act says the Council shall:  
  - be responsible for policy formulation and direction for the purposes of the Act;  
  - set national goals and objectives and determine policies and priorities for the protection of the environment;  
  - promote cooperation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes;  
  - perform such other functions as are assigned under the Act. |
| Ministry of Information and Communications | Its role is to license and regulate telecommunications. This includes regulation of:  
  - Information and Broadcasting Policy.  
  - Film Development, Licencing and Censorship.  
  - Kenya Broadcasting Corporation.  
  - Kenya News Agency.  
  - Kenya Institute of Mass Communication.  
  - Communications Commission of Kenya (CCK).  
  - Telkom Kenya.  
  - Postal Corporation of Kenya (PCK).  
  - National Communications Secretariat.  
  - Kenya College of Communications Technology (KCCT) |
<p>| The Communications Commission of Kenya (CCK) | CCK is the independent regulatory authority for the communications industry in Kenya. It is responsible for developing and co-coordinating the policies and strategies with respect to development and operation of telecommunications services in Kenya. In this regard, the Commission licenses telecommunications operators and service providers, and monitors their performance on a continuous basis to ensure that they discharge the obligations as stipulated in their licenses, and in keeping with the provisions of the Kenya Communications Act 1998 and the Kenya Communications Regulations 2001. |</p>
<table>
<thead>
<tr>
<th>Institution/ regulatory agency</th>
<th>Role</th>
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<tr>
<td></td>
<td>The Commission's mandate in regard to the sector involves the following:</td>
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<tr>
<td></td>
<td><strong>Telecommunications licensing</strong></td>
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<td></td>
<td>• Preparation of procedures and regulations on licensing of operators who include; vendors, Contractors, Engineers, Resellers, Network Operators, Service Providers, etc</td>
</tr>
<tr>
<td></td>
<td><strong>Telecommunications licensing enforcement</strong></td>
</tr>
<tr>
<td></td>
<td>• Enforces all telecommunications license conditions and regulations that have been agreed upon</td>
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<tr>
<td></td>
<td><strong>Industry and consumer affairs</strong></td>
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<tr>
<td></td>
<td>• Tariff Regulation</td>
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<td></td>
<td>• Develops pricing guidelines for service providers in order to ensure service affordability regarding various aspects of licenses and service provision, including complaints</td>
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<tr>
<td></td>
<td><strong>Universal Service Obligations</strong></td>
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<td></td>
<td>• Develops mechanisms to ensure the availability of telecommunications services to handling and dispute resolution</td>
</tr>
<tr>
<td></td>
<td><strong>Tariff regulation</strong></td>
</tr>
<tr>
<td></td>
<td>• Develops pricing guidelines for service providers in order to ensure service affordability</td>
</tr>
<tr>
<td></td>
<td><strong>Market Analysis</strong></td>
</tr>
<tr>
<td></td>
<td>• Reviews the sector on a continuous basis to ensure that competition is fostered and to guard against anti-competitive behavior by licensed operators</td>
</tr>
<tr>
<td></td>
<td>• Attends to all enquiries and complaints from customers-both licensees and consumers</td>
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</tbody>
</table>
**Table 3.3  Role and responsibilities of institutions and regulatory agencies in Burundi for RCIP**

<table>
<thead>
<tr>
<th>Institution/ regulatory agency</th>
<th>Role</th>
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</thead>
<tbody>
<tr>
<td>Ministere de l’Amenagement du Territoire, de l’Environnement et du Tourisme (MINATET) (Ministry of Urban Planning, Environment, and Tourism)</td>
<td>The duties assigned to this ministry are, among others, planning, coordination, implementation and monitoring all the actions pertaining to the environment. The MINATET includes a General Directorate for Land Development and Environment, which is divided into four directorates: Directorate of Forests, Directorate of Environment, Directorate of Rural Engineering and State-Owned land and the Directorate of Land Development and Land Registry. Also under the Ministry’s umbrella are some institutes under autonomous management: - The National Institute for Environment and Nature Conservation (INECN) which is involved mostly with the management or national parks and protected areas and which promotes managing the environment through environmental education. - The Burundi Geographic Institute (IGEBU) which produces the tools for managing the environment like maps, monitoring and management of meteorology and hydrology, and supports stations aerial navigation; - The National Tourism Institute (ONT) in charge of promoting tourism.</td>
</tr>
<tr>
<td>Ministry of Transport, Posts and Telecommunications</td>
<td>The Ministry of Transport, Posts and Telecommunications is the main Ministry in charge of the Telecommunications sector. It also overlooks the Agence de Régulation et de Contrôle des telecommunications (Regulatory Agency for Control of Telecommunications).</td>
</tr>
<tr>
<td>Agence de Régulation et de Contrôle des télécommunications (ARCT) (Regulatory Agency for Control of Telecommunications).</td>
<td>L’ARCT is in charge of regulating the telecommunications sector.</td>
</tr>
</tbody>
</table>
In order to ensure that the ESMF will be effectively implemented in the RCIP Phase 1 countries, it is important to determine whether the legislative structures are adequate for effective environmental management, and that these legislative structure would support the World Bank’s safeguard policies.

Based on the comparison table below, it seems clear that the legislation in all three countries provides sufficient basis for EIAs and EMPs to be completed for proposed activities under the RCIP, and the relevant institutions are in place to ensure effective implementation and monitoring of the required environmental measures, in compliance with national law and World Bank safeguard policies.

The World Bank requires that all projects comply with national law, but where there is conflict, the World Bank policies take precedence, except in cases where national standards are more stringent, for example for air emissions or effluents.

Where gaps exist, the World Bank / IFC safeguard requirements must be applied.

**Table 3.4  Gap assessment and comparison of legislation in RCIP Phase 1 countries**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Madagascar</th>
<th>Kenya</th>
<th>Burundi</th>
<th>WB / IFC safeguard requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>An EIA is required for proposed infrastructure activities</td>
<td>EIA is compulsory Decree N° 99 -954 (MECIE)</td>
<td>Section 58 of EMCA requires that an EIA precedes all development activities proposed</td>
<td>EIA is compulsory under Art.24 of the Code of Environment</td>
<td>Under the OP 4.12, a full EIA is required for all projects which are screened as Category A. For Category B projects, some form of environmental assessment is required, usually less rigorous than a full EIA, and often taking the form of an Environmental Management Plan (EMP).</td>
</tr>
<tr>
<td>Environmental authority must provide an environmental permit for projects prior to appraisal</td>
<td>Permits are required by the ONE</td>
<td>NEMA is responsible for granting Environmental Licenses</td>
<td>Permits are required by MINATET</td>
<td>OP 4.01 requires the approval and disclosure of EIAs by the relevant government authority</td>
</tr>
<tr>
<td>Issue</td>
<td>Madagascar</td>
<td>Kenya</td>
<td>Burundi</td>
<td>WB / IFC safeguard requirements</td>
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<tr>
<td>National guidelines and standards exist for OHS</td>
<td>The ONE will provide Proponents with copies of the standards and norms for OHS. If such norms do not exist, the Proponent must adhere to international standards and best practice guidelines.</td>
<td>OHS guidelines are outlined in the Public Health Act (Cap 242) and the Factories Act (Cap 514).</td>
<td>It is not clear whether OHS guidelines exist; if such norms are not available under the Code of Environment, then the Project must apply the international standards and norms.</td>
<td>The guidelines for OHS provided under the IFC Occupational, Health and Safety Guidelines should be applied for all infrastructure projects.</td>
</tr>
</tbody>
</table>
This section describes the potential positive and negative environmental and social impacts of the project based on the understanding of the types of activities to be financed under the Program, as described in Chapter 1. These impacts will be more clearly defined in the EMPs to be developed for each subproject once the Program is implemented.

Chapter 5, which follows, describes the process for screening proposed activities and the measures necessary for preparing Environmental Management Plans (EMPs) to address potential environmental and social impacts/issues likely to arise from Project activities.

4.1 **POSITIVE ENVIRONMENTAL IMPACTS AND SOCIO-ECONOMIC BENEFITS**

Telecommunication plays a major role in economic, social and cultural growth and development. The main socio-economic benefits of improved telecommunication services include:

- Shared towers allows price and service advantages to consumer through competition, unlike many other public utilities;
- Greatly extends geographic and socio-economic range of user/consumers;
- Greatly extends geographic and socio-economic range of non-voice or data services;
- Provides employment to small scale entrepreneurs who can afford their own service and provide 'per call' service to those who can't.

Moreover, integration of environmental enhancements in the design of the Project can also result in environmental benefits. Potential enhancements may include:

- recycling of waste materials;
- investment in new technology which does not contain hazardous materials;
- environmental awareness regarding the use of local supply of materials in a sustainable manner.
4.2 POTENTIAL NEGATIVE ENVIRONMENTAL AND SOCIAL IMPACTS

4.2.1 Impact categories

The potential negative impacts associated with telecommunications can be divided into three broad categories:

- impacts associated with the manufacture of telecommunications equipment;
- impacts associated with the setting up of telecommunication systems (e.g., antenna/mast erection, cable laying, telephone pole erection, and construction of exchange buildings);
- impacts associated with the operation and maintenance of the telecommunications systems (e.g., energy consumption, maintenance of telephone exchange systems and cables and the generation of hazardous wastes)

4.2.2 Types of potential issues related to the Project

Environmental issues in telecommunications projects primarily include the following:

- Terrestrial habitat alteration
- Aquatic habitat alteration
- Visual impacts
- Electric and magnetic fields
- Hazardous materials and waste
- Spills and accidental release of fuel
- Emissions to air
- Noise

The project is not expected to have any significant negative social impacts. The only potential impact has to do with land acquisition for the construction of telecommunications and ancillary infrastructure, such as access roads, which could prompt the need for involuntary resettlement of the affected populations. However, this potential impact is considered very unlikely, given that most of the proposed telecommunications facilities are expected to be constructed alongside existing infrastructure, such as roads and power transmission lines.

The environmental impacts expected from this project are moderate to minimal. The backhaul/backbone and rural ICT components are the only ones likely to have some environmental impact, either due to temporary disruption through the construction of ducts for laying the fiber optic networks or from the construction of ancillary infrastructure, notably access roads, associated with towers for microwave links and rural wireless systems.
Table 4.1 outlines the potential environmental and social impacts associated with the telecommunications industry. These are based on IFC’s EHS guidelines for telecommunications and EBRD’s Sub-sectoral Environmental Guidelines for Telecommunications.

A copy IFC’s EHS guidelines for Telecommunications (draft version of November 2006) and of IFC’s General Environmental, Occupational, Health and Safety Guidelines is attached as Annex 1 and 2 and should be used as guidance notes when preparing the impact assessment and mitigation plans for the subproject-specific EMPs.

4.3 POTENTIAL OCCUPATIONAL, HEALTH AND SAFETY RISKS

Occupational health and safety risks or hazards in telecommunications projects generally include the following:

- Electrical safety
- Electromagnetic fields (occupational)
- Optical fiber safety
- Elevated and overhead work
- Falls
- Confined space entry
- Motor vehicle safety

Occupational health and safety hazards may also arise during construction are common to other types of construction sites. Measures to address these issues at a subproject level are discussed in Chapter 6.

The IFC guidelines attached in Annex 1 and 2 provide detailed guidance on the OHS measures that should be put in place during construction and operation of the Program.

4.4 ENVIRONMENTAL AND SOCIAL MONITORING

Environmental monitoring programs for this sector should be implemented to address all activities that have been identified to have potentially significant impacts on the environment during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project.

Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring should be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken (IFC, 2006).
### Table 4.1 Potential environmental and social impacts and proposed mitigation measures

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impacts</th>
<th>Mitigation measures</th>
</tr>
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</table>
| **Terrestrial habitat alteration** | Terrestrial and aquatic habitats may be altered primarily during the construction of communications infrastructure depending on the type of infrastructure component and proposed location. Potential impacts to habitat may be more significant during construction and installation of linear infrastructure, such as long distance fixed line cables, as well as access roads to other types of infrastructure along previously undeveloped land. | Recommended measures to prevent and control impacts to terrestrial habitats during construction of the right-of-way include:  
  • Site fixed line infrastructure (e.g. fiber optic cable) and other types of linear infrastructure rights-of-way, access roads, lines, and towers to avoid critical habitat through use of existing utility and transport corridors, whenever possible;  
  • Avoidance of construction activities during the breeding season and other sensitive seasons or times of day;  
  • Revegetation of disturbed areas with native plant species  
  • Management of construction site activities as described in relevant sections of IFC’s General EHS Guidelines. |
| **Aviation collisions**       | The height of some television and radio transmission towers can pose potentially fatal risk to birds mainly through collisions. The likelihood of avian collisions is thought to increase with the height and design of the communications tower (e.g. guyed towers represent a higher potential for collisions), the presence of tower lighting (which attracts some species of birds at night or during low light conditions), and, most importantly, the tower location with regard to flyways or migration corridors. | Recommended prevention and control measures to minimize avian collisions include:  
  • Siting towers to avoid critical habitats such as nesting grounds, heronries, rookeries, foraging corridors, and migration corridors;  
  • Avoiding the cumulative impact of towers by collocating antennae on existing towers or other fixed structures (especially cellular telephone communication antennae), designing new towers structurally and electrically to accommodate future users, and removing towers no longer in use;  
  • To the extent feasible, limiting the tower height and giving preference to non-guyed tower construction designs while (e.g. using lattice structures or monopoles);  
  • If guy wired towers are located near critical bird habitats or migratory routes, installing visibility enhancement objects such as marker balls, bird deterrents, or diverters on the guy wires;  
  • Limiting the placement and intensity of tower lighting systems to those required to address aviation safety. |
<table>
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<tr>
<th>Issue</th>
<th>Potential Impacts</th>
<th>Mitigation measures</th>
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</table>
| Aquatic habitats | Depending on their location, the installation of fixed line components, including shore approaches for long distance fiber optic cables, and access roads to transmission towers and other fixed infrastructure, may require construction of corridors crossing aquatic habitats with the potential to disrupt watercourses, wetlands, coral reefs, and riparian vegetation. | Recommended measures to prevent and control impacts to aquatic habitats include:  
- Site power transmission towers and substations to avoid critical aquatic habitat such as watercourses, wetlands, and riparian areas, as well as fish spawning habitat, and critical fish over wintering habitat, whenever possible;  
- Maintaining fish access when road crossings of watercourses are unavoidable by utilizing clearspan bridges, open-bottom culverts, or other approved methods;  
- Minimizing clearing and disruption to riparian vegetation;  
- Management of construction site activities as described in the relevant sections of IFC’s General EHS Guidelines. |
| Visual impacts | The visual impacts from tower and antennae equipment may depend on the perception of the local community as well as the aesthetic value assigned to the scenery (e.g. scenic and tourism areas). | Recommendations to prevent, minimize and control the visual impacts include:  
- Minimizing construction of additional towers through collocation of proposed antennae in existing towers or existing structures such as buildings or power transmission towers;  
- Use of tower and antennae camouflaging or disguising alternatives such as masts or towers designed to look as trees;  
- Taking into account public perception about aesthetic issues by consulting with the local community during the siting process of antenna towers. |
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<tr>
<th>Issue</th>
<th>Potential Impacts</th>
<th>Mitigation measures</th>
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</table>
| **Hazardous materials and waste** | Telecommunications processes do not normally require the use of significant amounts of hazardous materials. However, the operation of certain types of switching and transmitting equipment may require the use of backup power systems consisting of a combination of batteries (typically lead-acid batteries) and diesel-fuelled electricity backup generators. Operations and maintenance activities may also result in the generation of electronic wastes such as nickel cadmium batteries and printed circuit boards from computer and other electronic equipment as well as backup power batteries. | Recommended hazardous materials management actions include:  
- Implementing fuel delivery procedures and spill prevention and control plans applicable to the delivery and storage of fuel for backup electric power systems, preferably providing secondary containment and overfill prevention for fuel storage tanks;  
- Implementing procedures for the management and disposal of lead-acid batteries, including temporary storage, transport and final disposal. Lead-acid batteries should be managed as a hazardous waste as described in IFC’s General EHS Guidelines;  
- Purchasing electronic equipment that meets international phase-out requirements for hazardous materials contents and implementing procedures for the management of waste from existing equipment according to the hazardous waste guidance in IFC’s General EHS Guidelines. |
| **Emissions to air**          | Emissions from telecommunications projects may be primarily associated with the operation of vehicle fleets, the use of backup power generators, and the use of cooling and fire suppression systems.                                                                 | Recommended management actions to minimize emissions include:  
- Implementation of vehicle fleet and power generator emissions management strategies as described in IFC’s EHS Guidelines and avoiding the use of backup power generators as a permanent power source, if feasible. |
<p>| <strong>Noise</strong>                    | The principal source of noise in telecommunications facilities is associated with the operation of backup power generators.                                                                                           | Recommended noise management action include the use of noise suppression shields and mufflers as well as the location of noise generating sources away from residential or other noise sensitive receptors to meet the noise emission levels provided in IFC’s General EHS Guidelines. |</p>
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<tr>
<th>Issue</th>
<th>Potential Impacts</th>
<th>Mitigation measures</th>
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| Electric and magnetic fields        | Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device, such as power lines and electrical equipment. Electric fields are produced by voltage and increase in strength as the voltage increases. Magnetic fields result from the flow of electric current and increase in strength as the current increases. Radio waves and microwaves emitted by transmitting antennas are one form of electromagnetic energy. Radio wave strength is generally much greater from radio and television broadcast stations than from cellular phone communication base transceiver stations. Microwave and satellite system antennas transmit and receive highly concentrated directional beams at even higher power levels. Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high-voltage power lines and substations or radio frequency transmissions systems, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern. | Recommendations applicable to the management of EMF exposures include:  
• Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).  
• Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure;  
• Limiting public access to antennae tower locations  
• Following good engineering practice in the siting and installation of directional links (e.g. microwave links), to avoid building structures;  
• Taking into account public perception about EMF issues by consulting with the local community during the siting process of antenna towers. |
This section outlines the screening, review and approval process for activities to be financed under the Project. As the locations for the subprojects are not clearly identified at this stage, it is important to have the appropriate tools in place to assist the Project implementing agencies in screening these activities for potential impacts and to provide guidelines for implementing measures to effectively address them.

In addition, as the first phase of the Project covers three countries, all which function under different legislative and institutional structures, the following section provides a “harmonized” approach to the screening and appraisal process for subprojects. Once the subprojects have been identified and locations selected, the Project should use this section as the guidelines to screening subprojects and implementing the appropriate measures while ensuring that all respective legislative requirements for screening and EIAs are adhered to.

5.1 IMPLEMENTING AGENCIES

As the RCIP Phase 1 will cover three countries, there are three main executing bodies under the Project that will have a responsibility in ensuring that the proposed screening and impact mitigation mechanisms are implemented. It is advised that an Environmental Specialist be assigned to each of the following:

- Kenya: Ministry of Information and Communications (TCIP Unit)
- Burundi: Executive Secretariat of the MTPT
- Madagascar: Ministry of Transport, Posts and Communication (MTPC)

5.2 SCREENING AND REVIEW PROCESS

The following diagram Figure 5.1 illustrates the process for screening and review of subprojects in each country.

(a) Screening of subproject activities

Once the subproject activity is defined and the location has been selected, a screening form will need to be filled out by the Proponent. The form will allow for identification of the potential environmental and social impacts associated with the proposed activity. As the ESMF and RPF should be utilized in tandem, the screening form will also allow for the identification and assessment of impacts related to potential land acquisition and involuntary resettlement. A template for screening is provided in Annex 3.
Figure 5.1 Proposed Screening, Review and Appraisal Process

**Subproject Appraisal Process**

1. **Application for subproject by Proponent**
2. **Subproject Appraisal**
3. **Subproject Approval**
4. **Subproject Implementation**
5. **Subproject Monitoring**

**Corresponding Safeguard Requirements**

- **Step 1: Subproject Screening**
  - Identification of subproject
  - Screening determination (low or high risk)

- **Step 2: Impact assessment**
  - **Low risk**
    - Develop generic mitigation and monitoring measures for subproject sectors
    - Apply environmental conditions in contract agreements
  - **Medium risk**
    - Develop and implement an EMP for each subproject
    - Apply environmental conditions in contract agreements
  - **High risk**
    - Carry out a subproject specific EA study
    - Develop subproject specific EMPs (and RAPs if applicable)
    - Apply environmental conditions in contract agreements

- **Step 3: Environmental and social review**
  - EMPs (and RAPs) reviewed by local Environmental and Social Specialists (or technical service providers e.g. NGOs)
  - Subproject approved on the basis of environmental and social review findings

- **Step 4: Subproject implementation**
  - Implement mitigation measures under the EMP (and RAP) for subprojects
  - Training of project staff, local govt officers, and communities in EMP (and RAP) implementation

- **Step 5: Environmental and social monitoring**
  - Monitor environmental and social compliance, pollution abatement, and EMP (and RAP) implementation
  - Carry out annual environmental and social audits for subprojects
(b) Scoping and field appraisal

Based on the information provided in the screening form, the reviewer (i.e. the relevant environmental ministry official/authority) will make a decision as to whether or not the subproject will require a more detailed investigation of the impacts through a field appraisal. Information collection will be achieved through observation and use of professional expertise and in some cases, interviews with the local people could provide information regarding human use values and/or environmental significance.

As part of the field appraisal, the Proponent shall identify the major stakeholders/community groups within the affected area that are likely to be impacted. A list of potentially affected groups shall be compiled and appended to the appraisal report.

(c) Assessment and classification of impacts

Based on the screening form and field appraisal (when required), the impacts are classified based on their risk category, and a decision is made as to whether the subproject will:

a) require an EIA study and/or RAP since the impacts qualify as being high risk and significant and may result in land acquisition and/or involuntary resettlement;

b) require only an EMP since the impacts are not significant and can be easily addressed through the implementation of a mitigation and management plan during construction and operation of the subproject; or

c) not require any safeguard measures as the impacts are considered minimal.

The following table outlines the risk categories, based on the World Bank OP 4.01 environmental categories (A, B, and C) and IFC’s EHS Guidelines. A copy of the World Bank’s OP 4.01 is attached as Annex 4.

<table>
<thead>
<tr>
<th>Types of activity</th>
<th>High (Category A)</th>
<th>Medium (Category B)</th>
<th>Low (Category C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Installation of masts and towers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Installation of fixed line cables and connectors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Construction of landing stations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Equipment housing (e.g. shelters, cabinets, auxiliary power units)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Construction of access roads and ROWs on greenfield sites</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Maintenance of access roads or other existing linear infrastructure which does not require ROW expansion</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(d) Identifying alternatives to subproject design

For subprojects which are deemed high risk, as they may result in significant impacts, the Proponent will re-assess the location and design of the subproject to ensure that there are no alternatives which may minimize or avoid these potential environmental and social impacts. If an alternative is not feasible, then the Proponent must prepare an EIA and/or RAP.

5.3 APPRAISAL AND MONITORING PROCESS

(e) Appraisal and Approval

Environmental permitting requirements

For Category A subprojects requiring an EIA:

The Proponent will submit a copy of the EIA to the relevant authority for review (refer to Tables 3.1 – 3.3). This should include all relevant information (as outlined in the country’s legislative requirements – refer to Chapter 3), namely an EMP, a set of environmental contract clauses and a summary of public consultations carried out.

Annex 5 provides the Terms of Reference for preparation of an EIA.

For subprojects which may result in involuntary resettlement or displacement, the Proponent is also required to submit a RAP to the relevant Resettlement Office / authority for approval. This is explained in more detail in the Project’s Resettlement Policy Framework.

For Category B subprojects which require an EMP:

The Proponent will submit a copy of the EMP to the relevant authorities (refer to Tables 3.1 – 3.3).

The objective of the EMP is to cater to the environmental and social needs of the project in a simple, responsive and cost effective manner that will not unnecessarily overload or impede the project cycle. The EMP should outline the measures needed to address the issues identified during the EA study. Moreover, a good EMP should demonstrate that proposed monitoring activities will encompass all major impacts and identify how they will be integrated into project supervision.

The EMP should be a simple two to four page document that outlines the following:

- Main environmental and social mitigation measures;
- Environmental training and capacity program; and
Environmental and social monitoring program.

This should include the following:

*Box 5.1 Contents of an EMP*

- Potential environmental and social impacts related to siting, construction and operation of the subproject
- Mitigation and monitoring measures to address potential impacts
- Responsibilities for monitoring EMP requirements
- Training and capacity building requirements for project officers and communities
- Estimated budget for implementation and training

The following *Section 6* provides detailed guidance on the implementation of EMPs under the RCIP.

The Proponent is required to include environmental contract clauses in the Technical Specifications and account for these measures in the subproject implementation budget. *Annex 6* provides a set of recommended contract clauses to include in contractor agreements.

**(b) Criteria for Approval**

- For those EIAs which meet the country’s EIA requirements and World Bank OP 4.01, an environmental permit can be granted.

- For those EIAs which do not meet the country’s EIA requirements and World Bank OP 4.01, an environmental permit is rejected and the relevant environmental authority (i.e. Ministry of Environment or Environmental Council) may want to carry out an audit. The Proponent will be asked to re-submit the EIA based on recommendations of the audit.

As emphasized in the World Bank’s guidelines, a subproject should not be approved and funded until such reports are received, approved and disclosed.

**(f) Disclosure of Subproject Information**

In compliance with World Bank guidelines and in the EIA decrees of all three Phase 1 countries, before a subproject is approved, the applicable documents (EIA, EMP and/or RAP) must be made available for public review at a place accessible to local people (e.g. at a district council office, at the Ministry of Environment), and in a form, manner, and language they can understand.
(g) Annual Monitoring Reports

Compliance monitoring comprises on site-inspection of construction activities to verify that measures identified in the EMP and/or RAP and included in the clauses for contractors are being implemented. This type of monitoring is similar to the normal tasks of a supervising engineer whose task is to ensure that the Contractor is achieving the required standards and quality of work.

Once implementation of the subproject has started, regular supervision missions should be carried out (by the Environmental Specialist or contracted out to a Consultant) and an annual monitoring report must be submitted to the executing agencies for each country (refer to Section 5.1) and World Bank for review.

The purpose of these reports is to provide:

- A record of Project and subproject transactions;
- A record of experience and issues running from year-to-year throughout the Project that can be used for identifying difficulties and improving performance; and
- Practical information for undertaking an annual review (see below).

*Annex 7* provides a recommended format for the Annual Report.
As it is more likely that the RCIP investments will result in the need for EMPs and not EIAs (since the impacts are expected to be in the Category B), the following section provides more detailed guidelines for preparation and implementation of EMPs. A similar section for RAPs is discussed in the RCIP Resettlement Policy Framework.

6.1 IMPLEMENTATION GUIDELINES FOR AN EMP

As discussed, any projects classified as Category B will require the preparation of an EMP to be approved and disclosed prior to the subproject being implemented. A Terms of Reference for preparation of the EMP is provided in Annex 8.

It is important to keep in mind that the content of the EMP will depend strongly on the nature of the risk associated with the subproject being proposed. The impacts associated with digging a trench along an existing road to install cable lines can be easily addressed through mitigation and monitoring measures applied in the civil works and supervision contracts without much if any site-specific environmental analysis. Whereas, building a tower in an area where it is necessary to construct an access road and clear vegetation require more rigor and a site reconnaissance and EMP that is specific to that subproject location is required. The guidelines for an ESIA and EMP attached as annexes provide a good reference for this.

6.1.1 Institutional/third party roles and responsibilities

The EMP should be prepared by the Proponent, either through a Consultant or Environmental Specialist with sufficient knowledge of the environmental and social issues related to the telecommunications sector. Ideally, the Consultant should have a strong understanding of the legislative structure of the country that the subproject EMP will be prepared for.

6.1.2 Implementation and monitoring schedule

The Project Implementation Unit should agree with the Proponent (i.e. the relevant government authority in each RCIP country) on the supervision of the EMP within the overall plan for the project. Accordingly, the supervision arrangements for the EMP should summarize key areas on which supervision will focus — critical risks to implementation of the EMP, how such risks will be monitored during implementation and agreements reached with the Proponent.

Supervision of the EMP, along with other aspects of the project, covers monitoring, evaluative review and reporting and is designed to:
determine whether the Proponent is carrying out the project in conformity with environmental safeguards and legal agreements;

• identify problems as they arise during implementation and recommend to the Proponent means to resolve them;

• recommend changes in project concept/design, as appropriate, as the project evolves or circumstances change; and

• identify the key risks to project sustainability and recommend appropriate risk management strategies to the Proponent.

It is vital that an appropriate environmental supervision plan is developed with clear objectives to ensure the successful implementation of an EMP.

6.1.3 Budget

The EMP for each subproject will outline the appropriate budget required to implement measures for mitigation and monitoring. It will also indicate the costs of training and capacity building required (see Section 6.1.4 below).

Costs should be calculated based on estimates provided by Contractors for any mitigative measures required during the civil works. For example:

• Costs of ensuring the appropriate dust suppression mechanisms are in place during excavation works must be calculated and included in the tender documents;

• Costs of installing erosion control measures should be estimated as part of the engineering costs;

• Training of staff on environmental and OHS issues should be outlined in detail (see Table 6.1);

• Costs of monitoring noise during construction should be calculated based on the frequency of monitoring and cost of equipment.

The EMP table provided in Annex 8 provides guidance on how to outline these costs.

6.1.4 Capacity building and technical assistance requirements

As part of best practice, and in order to comply with international standards for OHS, contractors and supervision consultants should be provided with awareness raising and environmental and OHS training on site. These should focus not only on the construction phase but also operational phase of the Project.

A proposed format for a 2-day training is provided in the following Table 6.1.
### Awareness raising and training for civil work contractors and supervision consultants

<table>
<thead>
<tr>
<th>Topic</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Awareness raising</strong></td>
<td>1 day</td>
</tr>
<tr>
<td>Environmental awareness</td>
<td></td>
</tr>
<tr>
<td>and the importance of effective</td>
<td></td>
</tr>
<tr>
<td>mitigation</td>
<td></td>
</tr>
<tr>
<td>Practice mitigation measures</td>
<td></td>
</tr>
<tr>
<td>and environmentally sound</td>
<td></td>
</tr>
<tr>
<td>construction techniques</td>
<td></td>
</tr>
<tr>
<td>Compliance with international</td>
<td></td>
</tr>
<tr>
<td>standards (based on Chapter 6)</td>
<td></td>
</tr>
<tr>
<td>on OHS for the telecommunication</td>
<td></td>
</tr>
<tr>
<td>sector</td>
<td></td>
</tr>
<tr>
<td>Compliance with local legislation</td>
<td></td>
</tr>
<tr>
<td>on OHS, EIA and EMP requirements</td>
<td></td>
</tr>
<tr>
<td><strong>Technical training</strong></td>
<td>1 day</td>
</tr>
<tr>
<td>Implementation of the EMP</td>
<td></td>
</tr>
<tr>
<td>(contract clauses)</td>
<td></td>
</tr>
<tr>
<td>Monitoring of EMPs (and RAPs)</td>
<td></td>
</tr>
<tr>
<td>Preparation of budgets</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2 days</td>
</tr>
</tbody>
</table>
7.1 **PROCESS FOR PUBLIC CONSULTATION IN THE ESMF**

During the course of the Project, consultations should be carried out with all significant stakeholder groups (see table below).

<table>
<thead>
<tr>
<th>Table 7.7.1 Key stakeholder groups in the RCIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and regulatory agencies</td>
</tr>
<tr>
<td>Public and private sector operators</td>
</tr>
<tr>
<td>Non-government organizations</td>
</tr>
<tr>
<td>Local stakeholders</td>
</tr>
<tr>
<td>Academic and research institutions</td>
</tr>
</tbody>
</table>

7.2 **PROPOSED DISCLOSURE PLAN**

For projects such as the RCIP, the World Bank procedures require that an ESMF (and RPF) is prepared and publicly disclosed prior to project appraisal. This allows the public and other stakeholders to comment on the possible environmental and social impacts of the project, and for the Appraisal Team to strengthen as necessary the frameworks, particularly measures and plans to prevent or mitigate any adverse environmental and social impacts.

Towards this end, this document will be publicly released through the World Bank’s InfoShop, and in public locations in Kenya, Madagascar and Burundi prior to project appraisal.

The documents should be made available in both English and French, in compliance with the World Bank’s *Public Consultation and Disclosure Policy*. 
7.2.1 Disclosure of subproject EMPs

EMP plans prepared for subprojects under the RCIP will also need to be disclosed to the public. Copies of the EMPs should be made available to communities and interested parties in accessible locations, through the local government authorities, i.e. local councils, district offices, etc. Copies of the EMPs should also be provided to the implementing agencies in each of the RCIP countries and submitted to the World Bank. This will ensure record keeping of all activities implemented under the ESMF, and ensure that the third-party audits have the adequate information required when undertaking the annual environmental audits.
8 CAPACITY BUILDING RECOMMENDATIONS

8.1 STRENGTHENING OF PROJECT CAPACITY FOR IMPLEMENTING THE ESMF

8.1.1 Appointing an Environmental Specialist to the executing agencies

As the different agencies will be responsible for the overall coordination of the Project in each country, it is important that an Environmental Specialist be part of the team to provide overall support in supervising the implementation of the ESMF and RPF guidelines and coordinating with the relevant stakeholders involved in the Project.

The Specialist will contribute to the objectives of the Project which include:

- the preparation, together with the implementing entities, of annual work programs and budgets;
- monitoring project progress as it relates to compliance with the ESMF guidelines, resolving implementation bottlenecks, and ensuring overall that project implementation proceeds smoothly;
- collecting and managing information relevant to the project and accounts (i.e. environmental monitoring and audit reports); and
- ensuring that the implementing bodies are supported adequately and that they adhere to the principles of the project, specific to compliance with ESMF guidelines.

The Specialist should be hired on a full-time basis and will report to the main bodies responsible for execution of the Project.

8.1.2 Training of the Environmental Specialists

It is also highly recommended that the assigned Environmental Specialists be provided with a two-day training on implementation of the ESMF. This will ensure that the specialists are equipped with the know-how on how to manage and monitor the environmental and social aspects related to the Project.

It is advised to hold a one-workshop in one of the RCIP Phase 1 countries, which all three specialists can attend. The workshop can be conducted by an external consultant with knowledge on the environmental management requirements for all three countries, including substantial knowledge on the World Bank safeguard policies and requirements including OHS standards.

An outline for the training is provided in Table 8.1.
Table 8.1  Proposed training format for ESMF implementation

<table>
<thead>
<tr>
<th>Module</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>• Objective of the ESMF</td>
<td></td>
</tr>
<tr>
<td>• Key stakeholders with a role in the ESMF</td>
<td></td>
</tr>
<tr>
<td>• Relevant legislative and regulatory acts and World Bank safeguard policies</td>
<td></td>
</tr>
<tr>
<td>• Structure and role of relevant environmental authorities as relates to the RCIP</td>
<td></td>
</tr>
<tr>
<td>Day 2</td>
<td></td>
</tr>
<tr>
<td>Summary of guidelines for the subprojects</td>
<td>0.5</td>
</tr>
<tr>
<td>• Screening</td>
<td></td>
</tr>
<tr>
<td>• Appraisal and approval</td>
<td></td>
</tr>
<tr>
<td>• Disclosure</td>
<td></td>
</tr>
<tr>
<td>• Annual Review</td>
<td></td>
</tr>
<tr>
<td>• Annual Reporting</td>
<td></td>
</tr>
<tr>
<td>Capacity building requirements</td>
<td>0.25</td>
</tr>
<tr>
<td>Budgeting for the RCIP country annual workplans</td>
<td>0.25</td>
</tr>
<tr>
<td>Total</td>
<td>2 days</td>
</tr>
</tbody>
</table>
The proposed budget for implementation of the measures and recommendations outlined in the ESMF for the Project is US $315,500.

As the subprojects and their locations have not been identified as this stage, a lumpsum amount has been designated to address the potential number of EIAs and EMPs that may be produced over the lifespan of the first phase as well as the monitoring requirements for the ESMF. This is an estimate and will need to be updated once the project design has been finalized.

**Table 9.1 Proposed budget for implementation of the ESMF**

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget for implementation of EIAs and EMPs</td>
<td>Lumpsum</td>
<td>$200,000</td>
</tr>
<tr>
<td>Nine 2-day training for contractors and consultants in each RCIP country</td>
<td>$3000 per workshop</td>
<td>$13,500</td>
</tr>
<tr>
<td>3 workshops per country (1 in each country for the first 3 years)</td>
<td>$3000 per workshop</td>
<td>$13,500</td>
</tr>
<tr>
<td>One 2-day training for Environmental Specialists (to be held in one of the RCIP Phase 1 countries)</td>
<td>$2000 per workshop</td>
<td>$2,000</td>
</tr>
<tr>
<td>Budget for annual monitoring and reporting on EMP implementation</td>
<td>Lumpsum</td>
<td>$100,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$315,500</strong></td>
</tr>
</tbody>
</table>
ANNEX 1: IFC’S EHS GUIDELINES FOR TELECOMMUNICATIONS
Environmental, Health, and Safety Guidelines for Telecommunications

Introduction

The Environmental, Health, and Safety (EHS) Guidelines are reference documents designed to provide project developers, financiers, facility managers, and other decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimizing, and controlling EHS impacts during the construction, operation, and decommissioning phases of a project or facility. *

How to Use This Document

The EHS Guidelines for Telecommunications provide information that is specific to facilities in this industry sector. They are organized according to the following sections.

- Section 1.0 — Industry-Specific Impacts and Management
- Section 2.0 — Performance Indicators and Monitoring
- Section 3.0 — References
- Annex A — General Description of Industry Activities

They are designed to be jointly used with the General EHS Guidelines document, which provides the user with guidance on common EHS issues potentially applicable to all industry sectors. On complex projects, multiple industry-sector guidelines may be useful. A complete list of industry-sector guidelines can be found at:

[www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines](http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines)

Appliability

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology, at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines may need to be established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account. The applicability of specific technical recommendations should be based on the professional opinion of qualified and experienced persons.

1. Associated installations and equipment include cellular, micro wave, and other radio-based systems; satellite receivers; wire line and wireless receiving, transmitting, and switching stations, and related equipment such as masts and towers, cables and connectors, equipment housing such as shelters and cabinets, backup batteries, and auxiliary power units (generators).

* Note: Attribution of all references, including verification for completeness and accuracy, to be completed for final draft.
1.0 Industry-Specific Impacts and Management

The following section provides a summary of EHS issues associated with telecommunications projects and infrastructure which occur during the construction and operational phase, along with recommendations for their management.

General guidance applicable to construction and decommissioning activities is provided in the General EHS Guidelines.

1.1 Environment

Environmental issues in telecommunications projects primarily include the following:

- Terrestrial habitat alteration
- Aquatic habitat alteration
- Visual impacts
- Electric and magnetic fields
- Hazardous materials and waste
- Emissions to air
- Noise

Terrestrial Habitat Alteration

Terrestrial and aquatic habitats may be altered primarily during the construction of communications infrastructure depending on the type of infrastructure component and proposed location. Potential impacts to habitat may be more significant during construction and installation of linear infrastructure, such as long distance fixed line cables, as well as access roads to other types of infrastructure along previously undeveloped land.

Recommended measures to prevent and control impacts to terrestrial habitats during construction of the right-of-way include:

- Site fixed line infrastructure (e.g. fiber optic cable) and other types of linear infrastructure rights-of-way, access roads, lines, and towers to avoid critical habitat through use of existing utility and transport corridors, whenever possible;
- Avoidance of construction activities during the breeding season and other sensitive seasons or times of day;
- Revegetation of disturbed areas with native plant species;
- Management of construction site activities as described in relevant sections of the General EHS Guidelines.

Avian Collisions

The height of some television and radio transmission towers can pose potentially fatal risk to birds mainly through collisions. The likelihood of avian collisions is thought to increase with the height and design of the communications tower (e.g. guyed towers represent a higher potential for collisions), the presence of tower lighting (which attracts some species of birds at night or during low light conditions), and, most importantly, the tower location with regard to flyways or migration corridors.

Recommended prevention and control measures to minimize avian collisions include:

- Siting towers to avoid critical habitats such as nesting grounds, heronries, rookeries, foraging corridors, and migration corridors;
- Avoiding the cumulative impact of towers by collocating antennae on existing towers or other fixed structures (especially cellular telephone communication antennae), designing new towers structurally and electrically to

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3 Ibid.
4 Further information is available from the United States (US) Department of Interior, Fish and Wildlife Service, Service Guidance on the Siting, Construction, Operation and Decommissioning of Communications Towers (2000).
accommodate future users, and removing towers no longer in use;

- To the extent feasible, limiting the tower height and giving preference to non-guyed tower construction designs while (e.g. using lattice structures or monopoles);
- If guy wired towers are located near critical bird habitats or migratory routes, installing visibility enhancement objects such as marker balls, bird deterrents, or diverters on the guy wires;
- Limiting the placement and intensity of tower lighting systems to those required to address aviation safety.

**Aquatic Habitat Alteration**

Depending on their location, the installation of fixed line components, including shore approaches for long distance fiber optic cables, and access roads to transmission towers and other fixed infrastructure, may require construction of corridors crossing aquatic habitats with the potential to disrupt watercourses, wetlands, coral reefs, and riparian vegetation.

Recommended measures to prevent and control impacts to aquatic habitats include:

- Site power transmission towers and substations to avoid critical aquatic habitat such as watercourses, wetlands, and riparian areas, as well as fish spawning habitat, and critical fish over-wintering habitat, whenever possible;
- Maintaining fish access when road crossings of watercourses are unavoidable by utilizing clearspan bridges, open-bottom culverts, or other approved methods;
- Minimizing clearing and disruption to riparian vegetation;
- Management of construction site activities as described in the relevant sections of the General EHS Guidelines.

**Marine Habitat Alteration**

Long distance telecommunications cables such as fiber optic cables may reach across ocean stretches. Cables are typically installed using a cable-laying vessel and a remotely operated, underwater vehicle. Issues associated with marine habitat alteration include disruption to intertidal vegetation and marine life, including marine mammals, and sedimentation resulting in turbidity and reductions in water quality.

Recommended measures to prevent and control impacts to marine habitats include:

- Locating and siting cable routes, and shore access, to avoid critical marine habitats, such as breeding grounds, whenever possible;
- Burying submarine cables when traversing sensitive intertidal habitat;
- Monitoring cable laying path for presence of marine mammals;
- Avoiding laying of submarine cable during fish and marine mammals breeding periods, calving periods, and spawning seasons.

**Visual Impacts**

The visual impacts from tower and antennae equipment may depend on the perception of the local community as well as the aesthetic value assigned to the scenery (e.g. scenic and tourism areas).

Recommendations to prevent, minimize and control the visual impacts include:

- Minimizing construction of additional towers through collocation of proposed antennae in existing towers or existing structures such as buildings or power transmission towers;
- Use of tower and antennae camouflaging or disguising alternatives such as masts or towers designed to look as trees;
Taking into account public perception about aesthetic issues by consulting with the local community during the siting process of antenna towers.

Hazardous Materials and Waste
Telecommunications processes do not normally require the use of significant amounts of hazardous materials. However, the operation of certain types of switching and transmitting equipment may require the use backup power systems consisting of a combination of batteries (typically lead-acid batteries) and diesel fueled electricity backup generators. Operations and maintenance activities may also result in the generation of electronic wastes such as nickel-cadmium batteries and printed circuit boards from computer and other electronic equipment as well as backup power batteries.

Recommended hazardous materials management actions include:

- Implementing fuel delivery procedures and spill prevention and control plans applicable to the delivery and storage of fuel for backup electric power systems, preferably providing secondary containment and overfill prevention for fuel storage tanks;
- Implementing procedures for the management and disposal of lead acid batteries, including temporary storage, transport and final disposal. Lead-acid batteries should be managed as a hazardous waste as described in the General EHS Guidelines;
- Purchasing electronic equipment that meets international phase out requirements for hazardous materials contents and implementing procedures for the management of waste from existing equipment according to the hazardous waste guidance in the General EHS Guidelines.5 Considering the implementation of a take-back program for consumer equipment such as cellular telephones and their batteries.

Electric and Magnetic Fields
Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device, such as power lines and electrical equipment. Electric fields are produced by voltage and increase in strength as the voltage increases. Magnetic fields result from the flow of electric current and increase in strength as the current increases. Radio waves and microwaves emitted by transmitting antennas are one form of electromagnetic energy. Radio wave strength is generally much greater from radio and television broadcast stations than from cellular phone communication base transceiver stations. Microwave and satellite system antennas transmit and receive highly concentrated directional beams at even higher power levels.

Although there is public and scientific concern over the potential health effects associated with exposure to EMF (not only high-voltage power lines and substations or radio frequency transmissions systems, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment.6 However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.7

Recommendations applicable to the management of EMF exposures include:

- Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection

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5 The use of lead, mercury, cadmium, chromium (Cr VI), polybrominated biphenyls, and polybrominated diphenyl ethers should be restricted or phased out as described in European Union Directives (2003a and 2003b).


7 US National Institute of Environmental Health Sciences (2002)
Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; limiting public access to antennae tower locations (see also ‘Community Health and Safety’ of this document, below); following good engineering practice in the siting and installation of directional links (e.g. microwave links), to avoid building structures; taking into account public perception about EMF issues by consulting with the local community during the siting process of antenna towers.

**Emissions to Air**

Emissions from telecommunications projects may be primarily associated with the operation of vehicle fleets, the use of backup power generators, and the use of cooling and fire suppression systems. Recommended management actions to minimize emissions include:

- Implementation of vehicle fleet and power generator emissions management strategies as described in the General EHS Guidelines and avoiding the use of backup power generators as a permanent power source, if feasible; and
- Substitution in use of chlorofluorocarbons (CFCs) in cooling and fire-suppression systems, using contractors who are properly trained or certified in the management of CFCs.

**Noise**

The principal source of noise in telecommunications facilities is associated with the operation of backup power generators. Recommended noise management action include the use of noise suppression shields and mufflers as well as the location of noise generating sources away from residential or other noise-sensitive receptors to meet the noise emission levels provided in the General EHS Guidelines.

**1.2 Occupational Health and Safety**

Occupational health and safety hazards in telecommunications projects primarily include the following:

- Electrical safety
- Electromagnetic fields (occupational)
- Optical fiber safety
- Elevated and overhead work
- Fall protection
- Confined space entry
- Motor vehicle safety

Occupational health and safety hazards may also arise during construction are common to other types of construction sites and are described in detail, along with measures for their control and monitoring, in the General EHS Guidelines.

Excavation, construction, and repair of some components of a telecommunications system may result in workers' exposure to existing aboveground or underground utilities, including aerial or buried electric transmission lines or buried natural gas and petroleum pipelines. Identification and location of all relevant existing underground utilities should be undertaken prior to any excavation and trenching activities.

**Electrical Safety**

Workers may be exposed to occupational hazards from contact with live power lines during construction,
maintenance, and operation activities. Prevention and control measures associated with live power lines include:

- Only allowing trained and certified workers to install, maintain, or repair electrical equipment;
- Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines;
- Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards. Qualified or trained employees working on transmission or distribution systems should be able to achieve the following:\n  - Distinguish live parts from other parts of the electrical system;
  - Determine the voltage of live parts;
  - Understand the minimum approach distances outlined for specific live line voltages;
  - Ensure proper use of special safety equipment and procedures when working near or on exposed energized parts of an electrical system.
- Workers should not approach an exposed energized or conductive part even if properly trained unless:
  - The worker is properly insulated from the energized part with gloves or other approved insulation; or,
  - The energized part is properly insulated from the worker and any other conductive object; or,
  - The worker is properly isolated and insulated from any other conductive object (live-line work).
- Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan\(^{12}\);
- Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities;
- Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.

Recommendations to prevent, minimize, and control injuries related to electric shock include:

- All electrical installations should be performed by certified personnel and supervised by a certified person. Certification for such work should include theoretical as well as practical education and experience;
- Strict procedures for de-energizing and checking of electrical equipment should be in place before any maintenance work is conducted. If de-energizing is not possible electrical installations should be moved or insulated to minimize the hazardous effects;
- Prior to excavation works, all existing underground cable installations should be identified and marked. Drawings and plans should indicate such installations;
- All electrical installations or steel structures, such as masts or towers, should be grounded to provide safety as the electrical current chooses the grounded path for electrical discharge. In cases where maintenance work has to be performed on energized equipment, a strict safety procedure should be in place and work should be performed under constant supervision;

\(^{11}\) Further information is available from the Occupational Safety and Health Administration (OSHA), 29 CFR 1910.268 (Telecommunications).

\(^{12}\) Additional information on setback distances applicable to telecommunications work is provided in OSHA, 29 CFR 1910.268.
Personnel training should be conducted in revival techniques for electric shock.

**Electromagnetic fields (EMF)**

Electric and magnetic fields (EMF) are described in Section 1.1 above. Electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to electric power lines.\(^{13,14}\) Occupational EMF exposure should be prevented or minimized through the preparation and implementation of an EMF safety program including the following components:

- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
- Training of workers in the identification of occupational EMF levels and hazards;
- Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers;
- Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE)\(^{15}\).

Personal exposure monitoring equipment should be set to warn of exposure levels that are below occupational exposure reference levels (e.g. 50 percent). Action plans to address occupational exposure may include deactivation of transmission equipment during maintenance activities, limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, use of shielding materials; or installation of ladders or other climbing devices inside the mast or towers, and behind the transmission beams.

**Optical Fiber Safety**

Workers involved in fiber optic cable installation or repair may be at risk of permanent eye damage due to exposure to laser light during cable connection and inspection activities.\(^{16}\)

Workers may also be exposed to minute or microscopic glass fiber shards that can penetrate human tissue through skin or eyes, or by ingestion or inhalation. Optical fiber installation activities may also pose a risk of fire due to the presence of flammable materials in high-powered laser installation areas. Recommendations to prevent, minimize, and control injuries related to fiber optic cables installation and maintenance include:

- Worker training on specific hazards associated with laser lights, including the various classes of low and high power laser lights, and fiber management;
- Preparation and implementation of laser light safety and fiber management procedures which include:
  - Switching off laser lights prior to work initiation, when feasible
  - Use of laser safety glasses during live optical fiber systems installation
  - Prohibition of intentionally looking into the laser of fiber end or pointing it at another person

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\(^{13}\) A 1994 study estimated the average exposure of electrical workers (including jobs in electric utilities and other industries) in Los Angeles, California to be 9.6 miligauss (mG), compared to 1.7 mG for workers in other fields (S. J. London et al., 1994).

\(^{14}\) Although detailed studies of workplace exposure to EMF in the United States, Canada, France, England, and several Northern European countries have found no conclusive link or correlation between typical occupational EMF exposure and adverse health effects, some studies have identified a possible association between occupational exposure to EMF and cancer, such as brain cancer (U.S. National Institute of Environmental Health Sciences 2002) indicating there is evidence to warrant limited concern.

\(^{15}\) The ICNIRP exposure guidelines for Occupational Exposure are listed in Section 2.2 of this Guideline.

\(^{16}\) When extending a cable or mounting a cable connector, a microscope is typically attached to the end of the fiber optic cable allowing the worker to inspect the cable end and prepare the thin glass fibers for extension or connection assembly.
Restricting access to the work area, placing warning signs and labeling of areas with potential for exposure to laser radiation, and providing adequate background lighting to account for loss of visibility with the use of protective eyewear

Inspecting the work area for the presence of flammable materials prior to the installation of high-powered laser lights

Performance of a medical surveillance program with initial and periodic eye examinations;

Avoiding exposure to fibers through use of protective clothing and separation of work and eating areas.

Elevated and Overhead Work

The assembly of towers and installation of antennae can pose a physical hazard to workers using lifts and elevated platforms and those located below due to the potential for falling objects. Recommended management strategies include:

The area around which elevated work is taking place should be barricaded to prevent unauthorized access. Working under other personnel should be avoided;

Hoisting and lifting equipment should be rated and maintained and operators trained in their use. Elevating platforms should be maintained and operated according to established safety procedures that include such aspects as equipment and use of fall protection measures (e.g. railings), movement of location only when the lift is in a retracted position, repair by qualified individuals, and the use of effective locks to avoid unauthorized use by untrained individuals;

Ladders should be used according to pre-established safety procedures including, for example, proper placement, climbing, standing, and the use of extensions.

Fall Protection

Workers may be exposed to occupational hazards when working at elevation during construction, maintenance, and operation activities. Prevention and control measures for working at height include:

Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;

Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters (m) above the working surface, but sometimes extended to 7m, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point;

Installation of fixtures on tower components to facilitate the use of fall protection systems;

Provision of an adequate work-positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached;

Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident;

When operating power tools at height, workers should use a second (backup) safety strap.

Confined spaces

The type of confined spaces encountered in telecommunications projects varies but may include underground fixed line infrastructure collocated with other underground infrastructure in urban areas. Telecommunications companies should develop and
implement confined space entry procedures as described the General EHS Guidelines, and including the following:

- Requiring work permits for all confined space entries;
- Installation of appropriate access controls for non-permitted personnel including signage to alert workers to the hazards of confined spaces;
- Use of ventilation and oxygen / explosive level detection and alarm equipment prior to access.

Motor vehicle safety
The geographically dispersed nature of the infrastructure of some telecommunications operators may require the frequent use of ground transportation for maintenance activities. Under these circumstances, companies should prepare and implement motor vehicle safety programs to protect the safety of its workers and the communities in which they operate. Specific recommendations for motor vehicle safety are provided in the General EHS Guidelines.

1.3 Community Health and Safety
Examples of community health and safety hazards identified during the construction phase include: exposure to construction vehicles and transports, exposure to dust, noise and vibrations caused by the constructions works. These hazards are common to most typical construction sites and are described in detail, along measures for their control and monitoring in the General EHS Guidelines.

Some of the most significant operational phase hazards associated with telecommunications projects include:

- Structural and site access issues
- Aircraft navigation safety
- Driver safety and cellular phones

Structural and site access issues
Communities may be exposed to structural safety issues in the event of structural failure of masts or towers. These same sites may also attract unauthorized persons interested in climbing these structures, also representing a risk to their safety. Recommendations to manage site safety issues include:

- Design and installation of tower structures and components according to good international industry practice, taking into account the potential frequency and magnitude of natural hazards;
- Erection of fences in combination with other institutional controls and management approaches such as the posting of signs forbidding entry and placement of guards to protect the premises surrounding the site;
- Equipping masts or towers with anti-climbing devices to preclude unauthorized climbing;

Aircraft navigation safety
Antenna towers, if located near an airport or known flight paths, can impact aircraft safety directly through collision or indirectly through radar interference. Aircraft collision impacts can be mitigated by:

- Avoiding the siting of towers close to airports and outside of known flight path envelopes;
- Consultation with regulatory air traffic authorities prior to installation and adherence to regional or national air traffic safety regulations.

Driver Safety and Cellular Phones
Telecommunications companies who provide cellular phone service have little or no influence over the safe use of these devises by their clients. However, to the extent feasible, companies should promote the safe use of cellular telephones through such methods as customer information campaigns which may include, for example, distribution of information at
the time of customer service sign-up or by mail with billing information, or through public add campaigns.

2.0 Performance Indicators and Monitoring

2.1 Environment

Emissions and Effluent Guidelines
Telecommunications activities do not typically give rise to significant air emissions or effluents. Instead, site operations should apply the principles and guidelines described above and in the General EHS Guidelines, especially with regards to emissions or effluents during construction operations or from administrative and maintenance facilities. Table 1 lists exposure limits for general public exposure to electric and magnetic fields published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Electric Field (v/m)</th>
<th>Magnetic Field (µT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 – 150 kHz</td>
<td>87</td>
<td>6.25</td>
</tr>
<tr>
<td>10 – 400 MHz</td>
<td>28</td>
<td>0.092</td>
</tr>
<tr>
<td>2 – 300 GHz</td>
<td>61</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Combustion source emissions guidelines associated with steam- and power-generation activities from sources with a capacity equal to or lower than 50 MWth are addressed in the General EHS Guidelines with larger power source emissions addressed in the Thermal Power EHS Guidelines. Guidance on ambient considerations based on the total load of emissions is provided in the General EHS Guidelines.

Environmental Monitoring
Environmental monitoring programs for this sector should be implemented to address all activities that have been identified to have potentially significant impacts on the environment during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project. Monitoring frequency should be sufficient to provide representative data for the parameter being monitored.

Monitoring should be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken.

Additional guidance on applicable sampling and analytical methods for emissions and effluents is provided in the General EHS Guidelines.

2.2 Occupational Health and Safety

Occupational Health and Safety Guidelines
Occupational health and safety performance should be evaluated against internationally published exposure guidelines, of which examples include the Threshold Limit Value (TLV®) occupational exposure guidelines and Biological Exposure Indices (BEIs®) published by American Conference of Governmental Industrial Hygienists (ACGIH), the United States National Institute for Occupational Health and Safety (NIOSH), Permissible Exposure Limits (PELs) published by the Occupational Safety and Health Administration of the United States (OSHA), Indicative Occupational Exposure Limit Values published by European Union member states, or other similar sources.

17 http://www.acgih.org/TLV/  
18 http://www.cdc.gov/niosh/npg/  
20 http://europe.osha.eu.int/good_practice/risk/ds/oel/
Additional indicators specifically applicable to telecommunications activities include the ICNIRP exposure limits for occupational exposure to electric and magnetic fields listed in Table 2.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Electric Field (v/m)</th>
<th>Magnetic Field (µT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.82 – 65 kHz</td>
<td>610</td>
<td>30.7</td>
</tr>
<tr>
<td>10 – 400 MHz</td>
<td>61</td>
<td>0.2</td>
</tr>
<tr>
<td>2 – 300 GHz</td>
<td>137</td>
<td>0.45</td>
</tr>
</tbody>
</table>

**Accident and Fatality Rates**

Projects should attempt to reduce the number of accidents among project workers (whether directly employed or subcontracted) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities. Facility rates may be benchmarked against the performance of facilities in this sector in developed countries through consultation with published sources.21

**Occupational Health and Safety Monitoring**

The working environment should be occupational hazards relevant to the specific project. Monitoring should be designed and implemented by credentialed professionals22 as part of an occupational health and safety monitoring program. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents. Additional guidance on occupational health and safety monitoring programs is provided in the General EHS Guidelines.

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22 Credential professionals may include Certified Industrial Hygienists, Registered Occupational Hygienists, or Certified Safety Professionals or their equivalent.
3.0 References and Additional Sources


http://www.who.int/peh-emf/about/WhatisEMF/en
Annex A: General Description of Industry Activities

Telecommunication Systems
Telecommunication is the common description for technology enabling two-way communication between parties located at distances from each other. Telecommunication also comprises one-way communication technology such as television and radio broadcasting.

Wire line Systems
Telecommunication systems may be of wire line or wireless types. Wire line sites in general consist of a base station and switches connected to a network of telecommunication cable lines either installed as air cables or as ground based cables installed in trenches. The cables may be of copper or in recent years fiber optical cable that enhances the communication speed and capacity of the system. A wire line system may be used for a fixed telephone system or for broadband and internet systems purposes. A wire line system is often used as a backbone system for wireless systems to provide high capacity and redundant traffic security in communication between the main switches of such a system.

Wireless Systems
Wireless systems, or cellular systems, are typically designed in the same way as wire line systems. However, the actual transmission of telecommunication signals is managed through Radio Frequency (RF) energy. A typical cellular telecommunication network consists of a great number of base stations. Each base station is designed to serve a geographical area of network coverage and may be referred to as a cell in the total telecommunication network. The size of such cell is dependent on the type of telecommunication system and the installed equipment. For example, the Global System for Mobile communications (GSM) system transmits on a lower frequency, 900-1500 Mega hertz (MHz) in comparison to the 3G system which transmits on a frequency in the range of 1500-2000 MHz. A lower frequency, as for the GSM system, generally provides the telecommunication system antennas with a wider coverage thus requiring fewer base stations compared to a system transmitting at a higher frequency. However, the high frequency and the shorter wavelengths of a denser network provide a higher capacity for data transmission which is one of the benefits of the new 3G system.

In order to achieve best possible coverage and microwave link transmission conditions, antennas are typically mounted on rooftops, masts, or other similar high structures. The heights at which the antennas are mounted are varying from 15-90 meters depending on the topography of the terrain and on the radio signal coverage requirements in the area. To achieve the best coverage these antennas emit RF beams which are very narrow in the vertical direction, but very wide in the horizontal direction. The vertical direction and ground coverage is achieved by tilting the antennas forward a few degrees. The RF fields decrease rapidly when moving away from the antennas.

The signal transmission, or voice and data traffic, of a cellular telecommunication system may be divided into two parts. One is the communication between the base stations. Instead of the wire line system using copper or fiber optic cables, microwave link antennas are used as means of transmission. One base station is linked to the next by a microwave link creating a microwave-linked network enabling all base stations to communicate with each other and the major switches.

The signal transmission to the system end user, the person using the system to place a telephone call, is managed by RF antennas. The antennas communicate with the cellular handset by RF energy and the telecom equipment installed in the base station relay the call to switches located in the network and thereafter the call is rerouted to the recipient. To
be able to locate the recipient of a cellular call the telecommunication system is at all times keeping track of all cellular handsets in the systems and where each handset is located. When a handset is moving from one cell (or base station) to another, the system records the transfer and identifies the handset as part of a new cell. In this way, the system is able to at all times manage incoming calls and reroute them to the right base station and, subsequently, to the call receiver.

Typical cellular telecommunication sites are roof top sites and greenfield sites. A typical roof top site is located on the roof of a building with the antennas mounted on short poles or tripods on top of the roof. The equipment room is normally located inside the building, preferably in the attic or in the basement. The power supply for a roof top site is generally provided though the building landlord. This is the most common site type in urban areas.

In rural areas, greenfield sites are the most common type. The antennas are mounted on top of masts or towers instead of buildings. The typical greenfield structure in terms of masts and towers, consists of galvanized steel towers or guyed steel masts. The equipment room for a greenfield site is a prefabricated shelter placed on a concrete foundation. The footprint of a greenfield site is approximately 200 square meters. In many cases, a new access road must be constructed for site access.

The RF antennas and microwave link antennas are connected to the telecommunication equipment by feeder cables. These cables may be installed in shafts or cable ducts on roof top sites or attached to the steel structures of a mast or tower for greenfield sites.

Another application of wireless communication is the use of satellite systems. These systems may operate independently of any fixed installations and enables the user to receive and send information regardless of their geographical location.

The mobile units may be installed onto vehicles or designed as briefcases or backpacks. Fixed satellite system stations may be installed for various applications such as broadcasting applications with up-links and down-links, and analogue / digital television distribution.

The technology used for satellite communication is in essence identical to the one used for microwave links used for cellular telecommunication. The output power is higher reaching up to 600 Watts (W). Also the frequency is higher, around 14 Giga hertz (GHz). The hazards related to satellite systems are identical to those identified for any wireless telecommunication system.

Broadcasting Systems

Television and radio systems are typically designed as cellular telecommunication systems, with a few major exceptions. Communication is directed one way and the radio frequency antennas providing the television or radio coverage transmits on a lower frequency, thus creating a longer wave length. In addition, the transmission energy is considerably higher than for a cellular system enabling the signal to reach all receivers in the populated areas. Due to the high output energy and long wavelength fewer transmission stations are required.
ANNEX 2: IFC’S GENERAL OCCUPATIONAL, HEALTH AND SAFETY GUIDELINES
Environmental and Social Guidelines for

Occupational Health & Safety

This guideline contains the performance levels and measures that are normally acceptable to IFC and are generally considered to be achievable at reasonable costs by existing technology. While adherence to this guideline is strongly recommended, the application of these guidelines may be adjusted to each project or site, taking into account variables such as host country context, sponsor capacity and project factors. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if accepted by IFC, become project- or site-specific standards or requirements. The environmental assessment document must provide a full and detailed justification or explanation for the levels or measures recommended for the particular project or site.

1 INTRODUCTION

AREA OF APPLICABILITY

This guideline applies to places of work associated with IFC projects. The place of work may be a building, an installation or an outdoor area. The guidelines also apply to temporary places of work. IFC project sponsors should ensure that suppliers, service providers, contractors, and subcontractors are required to follow comparable practices.

The guideline covers general aspects of occupational health and safety only. It does not adequately cover high risk activities or sectors requiring advanced labor protection measures. It must for projects involving especially hazardous situations be supplemented with appropriate international standards and guidelines or national standards of equal standing. Supplementary guidelines would thus be needed for e.g. construction sites, sectors such as mining, oil & gas, petrochemicals, etc., and for work involving extensive handling of dangerous substances such as hazardous or toxic compounds, biological agents, radioactive materials, etc.

DEFINITIONS, ABBREVIATIONS, AND ACRONYMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous material</td>
<td>Any compound or material posing an immediate or longer term hazard to human health due to its physical, chemical or biological effect.</td>
</tr>
<tr>
<td>Biological agents</td>
<td>Microorganisms, cell cultures, viruses, or human endoparasites able to provoke infections, allergy or toxic responses.</td>
</tr>
<tr>
<td>Microorganism</td>
<td>Microbiological entity, cellular or non cellular, capable of replication or transferring genetic material.</td>
</tr>
<tr>
<td>Exposure</td>
<td>Occupation-caused condition with potential immediate or long-term negative effect on the health and/or physical performance of the exposed person(s).</td>
</tr>
<tr>
<td>Exposure Limit (EL)</td>
<td>General term for expressions such as “Threshold Limit Values” (TLV), “Permissible Level”, “Limit Value”, “Occupational Exposure Limit” and similar terms used in regulations defining exposure limits for workers.</td>
</tr>
<tr>
<td>LA&lt;sub&gt;eq,8h&lt;/sub&gt;</td>
<td>Equivalent 8-hour continuous A-weighted sound pressure level (dB(A)).</td>
</tr>
<tr>
<td>LA&lt;sub&gt;max,fast&lt;/sub&gt;</td>
<td>Maximum A-weighted sound pressure level for “Fast” response time (0.125 sec).</td>
</tr>
<tr>
<td>mSv</td>
<td>MilliSievert - Dose equivalent unit for the amount of ionizing radiation energy absorbed per unit mass (body weight) (mJ/kg).</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal protective equipment.</td>
</tr>
<tr>
<td>UV</td>
<td>Ultra violet.</td>
</tr>
<tr>
<td>IR</td>
<td>Infra red.</td>
</tr>
<tr>
<td>WBGT</td>
<td>Wet bulb globe temperature (°C).</td>
</tr>
</tbody>
</table>

DESCRIPTION OF SECTOR

Assigned employees and visitors to workplaces may be exposed to a variety of personal health and safety risks. The type and level of exposure is generally related to factors controlled by the employer. Such factors include without being limited to workplace design, installations, equipment, tools, work procedures, raw materials, byproducts, and the degree and sophistication of employee training. Administrative and managerial facilities generally involve fewer risks and hazards than industrial settings.
Occupational health and safety risks that must be considered by the employer arise from normal functions and operations and during unusual circumstances such as accidents and incidents. The employer is responsible for implementing appropriate national and internationally recognized OHS standards, codes and guidelines. Maximum effectiveness of OHS systems requires the inclusion and meaningful participation of employees in implementation and maintenance of procedures and processes. To achieve meaningful and effective participation, the employer may have to implement a program to change employee culture and attitudes regarding health and safety.

2 GUIDELINES

GENERAL

The employer is responsible for planning, implementing and monitoring programs and systems required to ensure OHS on its premises. Such provisions shall be pro-active and preventive by identification of hazards as well as by evaluation, monitoring, and control of work related risks. The employer shall provide and maintain workplaces, plant, equipment, tools, and machinery and organize work so as to eliminate or control hazardous ambient factors at work. The employer shall provide appropriate occupational health and safety training for all employees. The organization shall, at no cost to the employee, provide adequate personal protective equipment. The employer shall record and report occupational injuries and illnesses. Contract specifications must include demands for service providers, contractors and sub-contractors to have or establish systems enabling them to meet the OHS requirements of the employer.

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

An Occupational Health and Safety management system (OHSMS) shall be established, operated and maintained for work associated with IFC projects. The OHSMS should be designed such that certification may be obtained. The comprehensiveness of the system depends on the nature and scale of the project and the magnitude of risks involved. The system may be based on OHSAS 18001, ILO-OHS 2001 or an equivalent internationally recognized standard. The content of an OHSMS is summarized in and further described in Annex 1. The adequacy of the adopted system shall be audited annually. Risk management within the OHSMS should be based on an internationally recognized standard such as AS/NZS 4360:1999.

The OHSMS shall be designed following a competent OHS audit to review the project, its organization and environment. The audit should identify needs for risk reduction and control measures related to transmission of blood borne pathogens (e.g. HIV, Hepatitis B virus etc.) at the place of work.

| 1. Occupational health and safety policy |
| 2. Organizational framework of the OHSMS |
|   - staffing of OHSMS |
|       - competence requirements |
|       - operating procedures |
|       - training programs |
|       - system documentation |
|       - communication |
| 3. OHS objectives (quantified) |
| 4. Hazard prevention |
|   - Risk assessment |
|       - prevention and control measures (active and passive) |
|       - management of changes |
|       - emergency preparedness and response |
|       - procurement (tools, equipment, plants, services, contractors) |
| 5. Performance monitoring and measurements |
|   - hazard prevention measures |
|   - ambient working environment |
|   - work related injuries, ill health, diseases and incidents |
| 6. Evaluation |
|   - feed back |
|   - corrective measures |
|   action plan |

Figure 2 Occupational Health and Safety Management System Features

1. The OHSMS shall incorporate universal precautions and measures against transmission of blood borne pathogens (e.g. HIV, Hepatitis B, etc.). For high risk workplaces where workers come into regular contact with human blood and body fluids, comprehensive precautions and dedicated training should be undertaken.
2. Risk Management, Standards Australia/New Zealand, 1999
PHYSICAL FACTORS IN THE WORKPLACE

BUILDINGS AND STRUCTURES

Building facilities housing installations, activities or sectors not necessitating special labor protection and safety measures shall comply with the following physical requirements. Where the nature of the activities or the materials used necessitates particular precautions, they must be designed according to local and internationally recognized standards as available for specific industries (e.g. mining, petroleum and chemical) and for hazardous materials such as asbestos.

Permanent and recurrent places of work shall be designed and equipped to protect OHS. Surfaces, structures and installations shall be easy to clean and maintain, and not allow for accumulation of hazardous compounds. Buildings must be structurally safe, provide appropriate protection against the climate and have acceptable light and noise conditions. Fire resistant, noise-absorbing materials should, to the extent feasible, be used for cladding on ceilings and walls. Floors should be level, even, and non-skid. Heavy oscillating, rotating or alternating equipment should be located in dedicated buildings or structurally isolated sections.

The space provided for each worker and in total must be adequate for safe execution of all activities including transport and interim storage of materials and products. Passages to emergency exits must be unobstructed at all times. The number and capacity of emergency exits must be sufficient for safe and orderly evacuation of the greatest number of people present at any time.

CONFINED SPACES

Engineering measures must be implemented to eliminate to the degree feasible existence and adverse character of confined spaces. Unavoidable confined spaces shall, to the extent possible, be provided with permanent safety measures for venting, monitoring and rescue operations. The area adjoining an access to a confined space shall provide ample room for emergency and rescue operations.

ACCESS

Passageways for pedestrians and vehicles within and outside buildings should be segregated and provide for easy, safe and appropriate access. Equipment and installations requiring recurrent servicing and cleaning should have permanent means of access. Hand, knee and foot railings must be installed on stairs, fixed ladders, platforms, permanent and interim floor openings, loading bays, ramps, etc. Openings must be sealed by gates or removable chains. Covers shall if feasible be installed to protect against falling items. Measures to prevent unauthorized access to dangerous areas must be in place.

INSTALLATIONS, EQUIPMENT, TOOLS AND SUBSTANCES

Installations, equipment, tools and substances shall be suitable for their use and selected to minimize dangers to safety or health when used correctly. Appropriate shields, guards or railings must be installed and maintained to eliminate human contact with moving parts, or hot and cold items. Equipment must be provided with adequate noise and vibration dampers. Electrical installations must be designed, constructed and maintained to eliminate fire or explosion hazards and risks to employees. Ergonomic risks and hazards shall be minimized by selecting equipment, tools and furniture appropriate for the assigned worker.

SIGNAGE

Hazardous and risky areas, installations, materials, safety measures, emergency exits, etc. shall be appropriately marked. Signage shall be in accordance with international standards, be well known to, and easily understood by workers, visitors and the general public as appropriate.

LIGHTING

Workplaces should, to the degree feasible, receive natural light and be supplemented with sufficient artificial illumination to promote workers’ safety and health. Emergency lighting of adequate intensity must be installed and automatically activated upon failure of the artificial light source to ensure safe shut-down, evacuation, etc.

VENTILATION AND TEMPERATURES

Sufficient fresh air must be supplied for indoor and confined work spaces. Factors to be considered in ventilation design include physical activity, substances in use and process related emissions. Mechanical ventilation systems shall be maintained in good working order. Point-source exhaust systems required for maintaining a safe ambient environment must have local indicators of correct functioning. Recirculation of contaminated air is generally not acceptable. Air inlet filters must be kept clean and

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6 Deviations from the general requirements are acceptable if the place of work and ambient environment are safe and the occurrence/duration of an activity limited.

7 ISO 9186 and ANSI Z535.3 advise on signage design.
free of dust and microorganisms. HVAC and industrial evaporative cooling systems shall be equipped, maintained and operated so as to prevent growth and spreading of disease agents (e.g. Legionella pneumophilia) or breeding of vectors e.g. mosquitoes and flies of public health concern. Air distribution systems must be designed so as not to expose workers to draughts.

The temperature in work, rest room and other welfare facilities should, during service hours, be maintained at a level appropriate for the purpose of the facility.

**FIRE DETECTION AND FIRE FIGHTING**
The workplace must be equipped with fire detectors, alarm systems and fire-fighting equipment. The equipment shall be maintained in good working order. It must be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present. Non-automatic firefighting equipment must be easily accessible and simple to use. Fire and emergency alarm systems shall be both audible and visible. The IFC Life and Fire Safety Guideline shall apply to buildings accessible to the public.

**CLEANING**
Washbasins with running hot and cold water shall be installed in sufficient numbers where demanded by the character of the work and when contaminants or pollution must be confined to the place of work. The washbasins must have soap and/or other appropriate cleaning agents.

Places of work, traffic routes and passageways shall be kept free from waste and spillage, regularly cleaned, and maintained.

**FIRST-AID**
The employer must ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations shall be easily accessible throughout the place of work. Eye-wash stations and/or emergency showers shall be provided close to all workstations where the recommended first-aid response is immediate flushing with water. Where the scale of work or the type of activity being carried out so requires, dedicated and appropriately equipped first-aid room(s) must be provided. First aid stations and rooms shall be equipped with gloves, gowns and masks for protection against direct contact with blood and other body fluids. Remote sites shall have in place written emergency procedures for dealing with cases of trauma or serious illness up to the point at which care of the patient can be transferred to an appropriate medical facility.

**WELFARE FACILITIES**
The scope and comprehensiveness of welfare facilities depend on the number of workers present at any one time and the activities executed. Welfare facilities must include locker rooms, an adequate number of toilets with washbasins, and a room dedicated for eating. Separate eating facilities shall be provided for employees wearing clean and soiled work clothes respectively. Gender-segregated changing rooms with lockers and benches should be provided when special work-clothes are required. Hot and cold water shower facilities and wash basins should be available in connection with locker rooms.

Water supplied to areas with food preparation or for the purpose of personal hygiene (washing or bathing) must meet drinking water quality standards.

If the circumstances (e.g. dirt, dangerous substances, humidity, blood, microorganisms, etc.) so require, separate lockers must be installed for isolating street-from work-clothes for the exposed employees. Work-clothes that may be contaminated with dangerous or contagious substances or in any way involve a health hazard to the worker, his family or the general public shall not leave the premises of work, but be collected on site and adequately cleaned and disinfected at the employer’s expense. Staff exposed to risk of contamination shall change clothes and undergo decontamination before entering common facilities such as eating places.

**PERSONAL PROTECTIVE EQUIPMENT**
The employer shall identify and provide appropriate personal protective equipment (PPE) that will offer adequate protection to the worker, co-workers and occasional visitors without incurring unnecessary inconvenience. The employer shall actively enforce use of PPE if alternative technologies, work plans or procedures cannot eliminate or sufficiently reduce a hazard or exposure. The employer shall ensure that PPE is cleaned when dirty, properly maintained and replaced when damaged or worn out. Proper use of PPE shall be part of the recurrent training programs for employees. Table 1 presents selected examples of occupational hazards and types of PPE available for different purposes.
### AMBIENT FACTORS IN THE WORKPLACE

#### NOISE

Noise limits for different working environments are provided in Table 2. No employee may be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day. In addition no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dBC. The use of hearing protection must be actively enforced when LAeq,8h reaches 85 dB(A), the peak sound levels 140 dB(C) or the LAmax,fast 110 dB(A).

**Objective** | **Occupational Hazards** | **PPE**  
---|---|---
Eye and face protection | Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation. | Glasses, shields, protective shades, etc.  
Head protection | Failing objects, inadequate height clearance, and overhead power cords. | Helmets with or without electrical protection.  
Foot protection | Failing or rolling objects, pointed objects, liquids. | Safety shoes and boots for protection against liquids and chemicals.  
Hand protection | Hazardous materials, cuts or lacerations, vibrations, extreme temperatures. | Gloves made of rubber or synthetic materials, leather, steel, insulating materials, etc.  
Respiratory protection | Dust, fogs, fumes, mists, gases, smokes, vapors, oxygen deficiency. | Facemasks with appropriate filters for dust removal and air purification (chemicals and gases) or air supply.  
Body/leg protection | Extreme temperatures, hazardous materials, biological agents, cutting and laceration. | Insulating clothing, body suits, aprons etc. of appropriate materials.  

Table 1 Occupational Hazards — Exposure Examples and Types of PPE Available

#### DRINKING WATER

The employer shall ensure an ample supply of drinking water at all places of work. Water supplies shall be conveniently located especially for areas of elevated temperatures, high physical activity, and cold or dry environments. Drinking water supplies shall be clearly marked especially where non-drinking water is also available.

#### ILLUMINATION, LIGHT RADIATION AND REFLECTIONS

Work area light intensity must be adequate for the general purpose of the location and type of activity and must be supplemented with dedicated work station illumination as needed. All light sources should be energy efficient with minimum heat emission. The employer shall take measures to

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9 WHO guideline values for community noise in specific environments, Geneva 1999.

10 The UK Health and Safety Executive at http://www.hse.gov.uk/hthdir/noframes/vibrat.htm provides information on reduction of vibration risks and a “Vibration exposure calculator”.


12 ISO standard 2631-1 (1997) chapters 5, 6 and 7 and Annex A and B.

13 European Community EC 2001/C 301/01.

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8 Drinking water shall as minimum comply with physical chemical and bacteriological requirements of the World Health Organization (WHO) Guidelines for Drinking Water Quality, Geneva 1998.

---

#### Table 2 Noise Limits LAeq,8h and Maximum LAmax,fast

<table>
<thead>
<tr>
<th>Location /activity</th>
<th>Equivalent level LAeq,8h</th>
<th>Maximum LAmax,fast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy Industry (no demand for oral communication)</td>
<td>85 dB(A)</td>
<td>110 dB(A)</td>
</tr>
<tr>
<td>Light industry (decreasing demand for oral communication)</td>
<td>50-65 dB(A)</td>
<td>110 dB(A)</td>
</tr>
<tr>
<td>Open offices, control rooms, service counters or similar</td>
<td>45-50 dB(A)</td>
<td>-</td>
</tr>
<tr>
<td>Individual offices (no disturbing noise)</td>
<td>40-45 dB(A)</td>
<td>-</td>
</tr>
<tr>
<td>Classrooms, lecture halls</td>
<td>35-40 dB(A)</td>
<td>-</td>
</tr>
<tr>
<td>Hospitals</td>
<td>30-35 dB(A)</td>
<td>40 dB(A)</td>
</tr>
</tbody>
</table>

---

#### Table 3 Vibration Exposure and Action Values Limits (acceleration, m/s²)

<table>
<thead>
<tr>
<th></th>
<th>Hand-arm vibration</th>
<th>Whole-body vibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily exposure limit value standardized to an 8-hours reference period</td>
<td>5 m/s²</td>
<td>1.15 m/s² or</td>
</tr>
<tr>
<td>Daily exposure action value standardized to an 8-hours reference period</td>
<td>2.5 m/s²</td>
<td>0.6 m/s² or</td>
</tr>
</tbody>
</table>

---

No drinking water shall as minimum comply with physical chemical and bacteriological requirements of the World Health Organization (WHO) Guidelines for Drinking Water Quality, Geneva 1998.
eliminate reflections and flickering of lights. The minimum limits for illumination intensity for a range of locations/activities appear in Table 4.

<table>
<thead>
<tr>
<th>Location /activity</th>
<th>Light intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency light</td>
<td>10 lux</td>
</tr>
<tr>
<td>Outdoor non working areas</td>
<td>20 lux</td>
</tr>
<tr>
<td>Simple orientation and temporary visits (machine storage, garage, warehouse)</td>
<td>50 lux</td>
</tr>
<tr>
<td>Workspace with occasional visual tasks only (corridors, stairways, lobby, elevator, auditorium, etc.)</td>
<td>100 lux</td>
</tr>
<tr>
<td>Medium precision work (simple assembly, rough machine works, welding, packing, etc.)</td>
<td>200 lux</td>
</tr>
<tr>
<td>Precision work (reading, moderately difficult assembly, sorting, checking, medium bench and machine works, etc.), offices.</td>
<td>500 lux</td>
</tr>
<tr>
<td>High precision work (difficult assembly, sewing, color inspection, fine sorting etc.)</td>
<td>1,000 – 3,000 lux</td>
</tr>
</tbody>
</table>

Table 4 Minimum Illumination Intensity on Objects of Work

The employer shall take precautions to minimize and control optical radiation including direct sunlight. Exposure to high intensity UV and IR radiation and high intensity visible light shall also be controlled. Laser hazards shall be controlled in accordance with equipment specifications, certifications, and recognized safety standards. The lowest feasible class Laser shall be applied to minimize risks.

**TEMPERATURE**

The employer shall maintain indoor temperatures that are reasonable and appropriate for the type of work. Risks of heat or cold related stress must be adequately addressed and feasible control measures implemented for work in adverse environments. The wet bulb globe temperature (WBGT) or a nationally recognized method of equal standing should be used for screening environmental contribution to heat stress. Commonly applied limits used for WBGT screening appear in Table 5. Additional investigations are required to properly assess the magnitude of the problem and identify feasible heat stress control measures.

<table>
<thead>
<tr>
<th>Level of physical activity - type of work</th>
<th>Maximum WBGT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum to light</td>
<td>29.5°C</td>
</tr>
<tr>
<td>Moderate - walking, standing, use of hand tools</td>
<td>27.5°C</td>
</tr>
<tr>
<td>High - heavy burdens, intensive use of tools</td>
<td>26°C</td>
</tr>
<tr>
<td>Very high – high speed intensive and heavy work</td>
<td>25°C</td>
</tr>
</tbody>
</table>

Table 5 Heat Stress Screening Temperatures WBGT°C

For continuous work in temperatures below -7°C, the wind-chill temperature should be calculated to assess the need for cold-stress precautions in addition to protective clothing. For wind-chill temperatures below -20°C, a 10-minute warm-up period should be provided in a heated shelter in the middle of any 4-hour work period. A second warm-up period of equal duration shall be added if the temperature decreases to -32°C. Additional warm-up periods shall be added for every following three degree temperature drop. Below wind chill temperatures of -43°C non emergency work should cease.

**HAZARDOUS MATERIALS**

Organizations that produce, handle, store, transport and dispose of hazardous materials (chemicals, gases, vapors, fumes, dust, fibers, etc.) shall in addition to the present guidelines fulfill the requirements of the IFC Hazardous Materials Management Guidelines.

The employer shall avoid the use of any hazardous substance by replacing it with a substance that under its normal conditions of use is not dangerous or less dangerous to the workers, if the nature of the activity so permits. Precautions must be taken to keep the risk

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14 Table 4 states minimum levels for illumination only. Final design of lighting levels and systems must adequately consider type and characteristic of the activity, required speed and accuracy of the performance, age of staff, reflectance of task surface, and color of the light, see e.g., Lighting Handbook 8th Edition, The Illumination Engineering Society of North America, New York, 1993.

15 The wet bulb globe temperature WBGT (ISO 7243 is calculated using one of the following equations: i) without direct sunlight exposure WBGT = 0.7 T_wb + 0.3 T_d and ii) with direct sunlight exposure WBGT = 0.7 T_wb + 0.2 T_d + 0.1 T_o. Where T_wb = natural wet bulb temperature, T_d = globe temperature and T_o = dry bulb temperature.


18 American Conference of Governmental Industrial Hygienists, ACGIH, 2001.

W = 13.12 + 0.6215 T_d - 11.37 V^{0.16} + 0.3965 T_d V^{0.16}, where W is the wind-chill index (°C) (equivalent chill temperature), T_d = dry bulb - air temperature (°C) and V = wind speed in km/h at 10 meters height.
of exposure as low as possible. Work processes, engineering and administrative control measures must be designed, maintained and operated so as to avoid or minimize the release of hazardous substances into the working environment. The number of employees exposed or likely to become exposed must be kept at a minimum and the level of exposure maintained below internationally established or recognized exposure limits.

When ambient air contains several hazardous compounds with additive effects, the combined exposure is assessed by summarizing the relative level of exposure to each compound. The resulting level of exposure is considered acceptable if the outcome is less than or equal to one (≤ 1.0)\(^{20}\).

The employer must ensure that all chemicals and hazardous materials present are labeled and marked according to national and internationally recognized requirements and standards. International Chemical Safety Cards (ICSC), Materials Safety Data Sheets (MSDS) or equivalent data/information in an easily understood language must be readily available to exposed workers and first-aid personnel. The employer must ensure adequate and competent supervision of the work, work practices, and the appropriate use of PPE.

**BIOLOGICAL AGENTS**
The employer shall avoid the use of any harmful biological agent by replacing it with an agent that, under its normal conditions of use, is not dangerous or less dangerous to the workers, if the nature of the activity so permits. Precautions must be taken to keep the risk of exposure as low as possible. Work processes, engineering and administrative controls must be designed, maintained and operated to avoid or minimize release of biological agents into the working environment. The number of employees exposed or likely to become exposed must be kept at a minimum. Levels of exposure must be maintained below internationally established/recognized exposure limits.

The employer shall review and assess known and suspected presence of biological agents at the place of work\(^{21}\) and implement appropriate safety measures, monitoring and training programs. Biological agents should be classified into four groups\(^{22}\):

1. Biological agents unlikely to cause human disease.
2. Biological agents that can cause human disease but are unlikely to spread to the community.
3. Biological agents that can cause severe human disease and present a serious hazard to workers and may present a risk of spreading to the community, for which there usually is effective prophylaxis or treatment available.
4. Biological agents that can cause severe human disease are a serious hazard to workers and present a high risk of spreading to the community, for which there is usually no effective prophylaxis or treatment available.

Measures to eliminate and control hazards from known and suspected biological agents at the place of work shall be designed, implemented and maintained in close co-operation with the local health authorities and according to recognized international standards. The employer shall at all times encourage and enforce the highest level of hygiene and personal protection especially for activities employing biological agents of group 3 and 4 above.

**IONIZING RADIATION**
Places of work involving occupational\(^{24}\) and/or natural\(^{25}\) exposure to ionizing radiation shall be established and operated in accordance with the, “International Basic Safety Standard for protection against Ionizing Radiation and for the Safety of Radiation Sources,”\(^{26}\) and its three interrelated Safety Guides. The acceptable effective dose limits appear in Table 6.

\[\sum_{1}^{n} \frac{c_{x}}{EL_{x}} = \frac{c_{1}}{EL_{1}} + \frac{c_{2}}{EL_{2}} + \ldots + \frac{c_{n}}{EL_{n}} \leq 1.0; \text{ where } n \]

is the total number of hazardous compounds present, \(c_{x}\) the ambient concentration level of compound No. \(x\), and \(EL_{x}\) its exposure limit.

\(^{20}\) Known presence means identified micro-organisms utilized in industry, research facilities and the like. Suspected presence are unidentified micro-organisms occasionally appearing in health care and veterinary facilities and laboratories or pathogens present in the work force.

\(^{21}\) European Community Directive 2000/54/EC of 18 September 2000 on protection of workers from risks related to exposure to biological agents at work.

\(^{22}\) Organizations processing, or applying radioactive substances for purposes such as medical or industrial processes, education, training, research, etc.

\(^{23}\) Underground mines (other than those for radioactive ore), spas, radon prone areas, etc.

\(^{24}\) IAEA Safety Series No. 115.
Exposure | Workers (min. 19 years of age) | Apprentices and students (16-18 years of age)
--- | --- | ---
Five consecutive year average - effective dose | 20 mSv/year | 
Single year exposure - effective dose | 50 mSv/year | 6 mSv/year |
Equivalent dose to the lens of the eye | 150 mSv/year | 50 mSv/year |
Equivalent dose to the extremities (hands, feet) or the skin | 500 mSv/year | 150 mSv/year |

Table 6 Effective Dose Limits For Occupational Ionizing Radiation Exposure [mSv/year]

The employer shall through appropriate contract specifications and monitoring ensure that service providers, as well as contracted and subcontracted labor is appropriately trained before start of their assignments.

### 3. Monitoring & Reporting Guidelines

Safety features, ambient working environments and OHS-indicators are subject to regular monitoring and review. The collected information shall be processed and findings reported to national authorities as required. The compiled information and any corrective measures taken shall be applied in a continuous process to improve the OHS management system. An annual report adequately presenting performance and achievements in regard to OHS shall be submitted to IFC. The report shall also outline and justify changes made to the OHSMS. Employee monitoring data (originals) must be saved for a period of 5 years or longer if required by national regulations.

The OHSMS shall include specifications for performance monitoring, evaluation, and improvement of the system as well as for recording and reporting occupational diseases and accidents.

### Performance Monitoring

**OHSMS organization.** The performance and achievements of the OHSMS organization shall be re-assessed annually.

**Safety inspection, testing and calibration.** The employer shall arrange for regular inspection and testing of all safety features and hazard control measures at the premises. The inspection shall focus on engineering and personal protective features, work procedures, places of work, installations, equipment, and tools used. The inspection must ensure that issued personal protective equipment continues to provide adequate protection and is being worn as required. All instruments installed or used for monitoring and recording of working environment parameters must be regularly tested and calibrated. Records shall be kept of all inspections, tests, and calibrations.

**Surveillance of the working environment.** The employer shall document compliance using an appropriate combination of portable and stationary...
sampling and monitoring instruments. Monitoring and analyses shall be conducted according to internationally recognized methods and standards. Monitoring methodology, locations, frequencies, and parameters shall be established individually for each project following a review of the seriousness of the inherent hazards.

Generally, monitoring should be performed during commissioning of facilities or equipment and at the end of the defect and liability period, and otherwise repeated according to the monitoring plan established as part of the OHSMS.

**Surveillance of workers health.** When extraordinary protective measures are required (against biological agents group 3 and 4 and/or hazardous compounds), the employer shall provide appropriate and relevant health surveillance to workers prior to first exposure and at regular intervals thereafter. The surveillance shall, if deemed necessary be continued after termination of the employment.

**Training.** Training activities for employees, and visitors shall be adequately monitored and documented (curriculum, duration, and participants). Emergency exercises including fire drills shall be adequately documented. Service providers and contractors must be contractually required to submit to the employer adequate training documentation before start of their assignment.

**ACCIDENTS AND DISEASES MONITORING**

The employer shall establish procedures and systems for reporting and recording: i) occupational accidents and diseases; and ii) dangerous occurrences and incidents. The systems must require and enable workers to report to their immediate supervisor immediately any situation they believe presents a serious danger to life or health. The systems and the employer shall further enable and encourage workers to report all: i) occupational injuries and near misses; ii) suspected cases of occupational disease; and iii) dangerous occurrences and incidents.

**Occupational accidents and diseases.** The employer must with the assistance of a competent person investigate all reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses. The investigation should as far as possible:

1. Establish what happened;
2. Determine the cause of what happened; and
3. Identify measures necessary to prevent a recurrence.

Occupational accidents and diseases should at a minimum be classified according to Figure 3. Distinction is made between fatal and non-fatal injuries. The two main categories are divided into three sub-categories according to time of death or duration of the incapacity to work. The total number of man-days and hours worked during the reporting period must be stated.

<table>
<thead>
<tr>
<th>a. Fatalities (number)</th>
<th>b. Non-fatal injuries (number)</th>
<th>c. Total time lost non-fatal injuries (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.1 Immediate</td>
<td>b.1 Less than one day</td>
<td></td>
</tr>
<tr>
<td>a.2 Within a month</td>
<td>b.2 Up to 3 days</td>
<td>c.1 Category b.2</td>
</tr>
<tr>
<td>a.3 Within a year</td>
<td>b.3 More than 3 days</td>
<td>c.2 Category b.3</td>
</tr>
</tbody>
</table>

Figure 3 Occupational Accident and Disease Reporting

**REPORTING GUIDELINES**

The annual report to IFC on OHS shall include a comprehensive summary of the following.

**Host country regulatory compliance.** The employer shall record, list and preserve any reports submitted to host country authorities, e.g. on OHS, fire and safety inspections, compliance monitoring, emergency exercises, etc., as well as comments received and actions taken. Host country authority monitoring and inspections with subsequent actions taken shall also be summarized and reported.

**OHSMS reporting.** The annual report shall include summaries of OHS performance monitoring, and records of occurred occupational accidents, incidents and diseases. Special emphasis shall be placed on evaluation of findings and actions taken or planned due to the number and type of accidents observed. The report shall also include an assessment of the degree of fulfillment of the previous year’s OHS objectives and action plans for improvement.

The report shall include proposed revisions to the OHS Management System; revised quantitative objectives; action plans for technical improvements; and planned training activities.

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27 The day on which an incident occurs is not included in b.2 and b.3.
4. **BEST PRACTICE**

For projects or components of projects with particular health and safety risks, this guideline shall be supplemented with recognized national and/or international standards. The following OHS websites may be used to obtain additional information.

**ILO Safe Work, International Labour organization**

**NIOSH, National Institute of Occupational Safety and Health, US Department of Health and Human Services**
- [http://www.cdc.gov/niOHS/siteindx.html](http://www.cdc.gov/niOHS/siteindx.html) - Site Index A_Z
- [http://www.cdc.gov/niOHS/toplst.html](http://www.cdc.gov/niOHS/toplst.html) - Safety and Health Topics.

**WHO, World Health Organization**

5. **REFERENCES**


/12/ HIV/AIDS in the Workplace. IFC Good Practice Note number 2, 2002.

/13/ Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure; The American Conference of Governmental Industrial Hygienists (ACGIH), 2001.
6. ANNEXES

ANNEX 1

THE OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM

Occupational health and safety, including compliance with national OHS requirements, is the responsibility and duty of the employer. Implementation of a fully transparent OHSMS in an organization is a powerful tool towards fulfilling these obligations. The OHSMS signals the commitment of the organization to ensure safe working conditions. However, active participation from workers is required for optimum results. Meaningful participation by employees may be obtainable through efficient awareness raising and training to change the prevailing labor safety culture. An OHSMS must have features for continuous feedback and self-improvement.

POLICY

The OHS Policy Statement of the organization must be in writing and prepared in consultation with workers and their representatives. Senior management must endorse it. The policy shall be appropriate for the size and nature of the organization. The organization should, through a policy statement, be committed to: i) protect the health of all employees, ii) comply with relevant national and international OHS requirements, iii) ensure consultation with and active participation of the workers, and iv) continuously seek to improve the performance of the OHS system. The OHSMS should be integrated in or compatible with other management systems of the organization (e.g. ISO 9001-2000) and appropriately certified.

The employer should when feasible ensure establishment and efficient functioning of a “Safety and Health Committee.” The workers and their representatives should be given time and resources to participate actively in the processes of the OHSMS.

ORGANIZATION

RESPONSIBILITY AND ACCOUNTABILITY
A person at senior management level should have responsibility and authority for development, implementation, management review and evaluation of the OHSMS.

Structures and processes shall be created within the organization ensuring: OHS as a line management responsibility, effective supervision, co-operation and communication on implementation of the OHSMS, effective arrangements for identification and elimination or control of work related hazards and risks, the full participation of workers and their representatives, and appropriate allocation of resources.

COMPETENCE AND TRAINING
The organization must possess, develop or have permanent access to sufficient OHS competence to implement and maintain the OHSMS. Permanent competence is required to continuously identify, eliminate and/or control work related hazards and risks within the organization.

Appropriate OHS training programs must be established and implemented for all employees and levels of the organization. Training must be conducted by competent persons, take place prior to the start of a new activity, and be refreshed as needed. Training must be provided free of charge to the employees.

OHSMS DOCUMENTATION
An appropriately sized and scoped OHS manual shall be prepared and maintained. The manual shall at a minimum fulfill relevant national and international requirements for the activities of the organization. The manual should include: OHS Policy, OHS organization and allocation of responsibilities, schedules, procedures, instructions and other internal documents used for OHS management and control. There should be a section identifying key risks and hazards arising from the organization’s activities together with arrangements for their prevention and control. The manual shall establish procedures, schedules and methodologies for review of safety and control features, as well as plans and schedules for monitoring ambient working environment quality and individual exposure levels as appropriate.

OHS records with details appropriate to the needs of the organization shall be established, managed, and maintained locally. The records shall contain appropriate information regarding national OHS laws.

and regulation, the OHSMS itself, as well as monitoring data regarding elements such as workers health and exposure, ambient working environment, work-related injuries, ill health, diseases, incidents, training programs and lists of trainees. IFC requires original data and records to be saved for a minimum of 5 years.

COMMUNICATION
The OHSMS shall include effective arrangements for receiving and responding to internal and external communication. The system shall ensure communication and exchange of information among relevant levels and functions within the organization. The system shall ensure that concerns, ideas and inputs of workers are considered and addressed.

PLANNING AND IMPLEMENTATION

OHS AUDIT
A competent person shall carry out an initial OHS audit for new and existing organizations. The audit shall:

1. Identify applicable current national and international laws, regulations, treaties, agreements and OHS standards relevant for the organization and its activities;
2. Identify, anticipate and assess hazards and risks to safety and health arising from the existing or proposed work environment and organization;
3. Determine whether planned or existing controls are adequate to eliminate hazards or control identified risks; and
4. Analyze data provided from workers’ health surveillance for the present activities or equivalent ones elsewhere.

The audit shall be appropriately documented (text, tables, and photos) and shall subsequently be used for decision-making on implementation/revision of the OHSMS. The audit will further establish a quantified baseline for the objectives and achievements of the OHSMS.

OHS OBJECTIVES
Consistent with the OHS Policy Statement and results of OHS audits, measurable objectives shall be established for the entire organization and for individual departments. The objectives shall be realistic, achievable and focused on continued improvements. The objectives should be communicated to all relevant functions of the organization. The objectives shall be periodically evaluated and revised.

SYSTEM PLANNING, DEVELOPMENT AND IMPLEMENTATION
The system shall, at minimum, be planned and developed to comply with national laws and regulations, IFC guidelines, and to fully support the elements endorsed by the organizations senior management. The planning, implementation and operation shall be closely related to the objectives established by the audit. The OHSMS shall ensure availability of sufficient resources for achieving the established goals.

HAZARD PREVENTION AND CONTROL MEASURES
Hazards and risks to workers’ safety and health shall be identified and assessed on a recurrent basis. Identified occupational hazards may be analyzed and prioritized using the below qualitative risk analysis matrix 30.

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Insignificant</th>
<th>Minor</th>
<th>Moderate</th>
<th>Major</th>
<th>Catastrophic</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Almost certain</td>
<td>H</td>
<td>H</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>B. Likely</td>
<td>M</td>
<td>H</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>C. Moderate</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>D. Unlikely</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>E</td>
</tr>
<tr>
<td>E. Rare</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

Legend
E: extreme risk; immediate action required
H: high risk; senior management attention needed
M: moderate risk; management responsibility must be specified
L: low risk; manage by routine procedures

Preventive and protective measures should be introduced immediately when a hazard is recognized and fully implemented in the shortest feasible time. Further in the following order of priority:

1. Eliminate the hazard/risk;
2. Control the hazard/risk at source through use of engineering controls and organizational measures;
3. Minimize the hazard/risk through design of safe work systems and administrative control measures; and
4. Where a residual hazard/risk cannot be adequately controlled, the employer shall provide for free appropriate personal protective equipment and implement measures to ensure its use and maintenance.

The established preventive and protective measures and operational procedures shall be revised regularly and modified if necessary. Measures shall comply with national laws and regulation, reflect good practice, and consider the current status of knowledge of the sector.

MANAGEMENT OF CHANGE
The impact of proposed changes both internal (organization, staff, procedures, processes etc.) and external (new regulation, OHS knowledge, technology, organizational mergers, etc.) must be evaluated and preventive steps taken prior to their introduction. Application of new methods, materials, processes, equipment and tools should always be preceded by a hazard identification and risk assessment involving the affected workers. Issuance of a “decision to change” can ensure that all affected employees are properly informed and trained when needed.

EMERGENCY PREVENTION, PREPAREDNESS AND RESPONSE
Emergency prevention, preparedness and response arrangements shall be suitable for the needs of the organization. The plans shall be prepared in cooperation with external emergency services and agencies as applicable. The arrangements must ensure adequate internal exchange of information and communication, and provide for information and communication with outside authorities and the neighborhood as needed. The system must adequately address first-aid and medical assistance, firefighting and emergency evacuation of staff. Training and exercises shall be conducted.

PROCUREMENT
Procurement includes a potential for changes. Procedures must be established to ensure that safety and health requirements of the organization are implemented in procurement, renting and leasing specifications. The OHS requirements of the organization shall be identified and compliance with these demands ensured prior to procurement of goods and services.

CONTRACTING
Procedures shall be established to ensure that the OHS requirements of the organization apply to contractors, sub-contractors, service providers and their workers. OHS criteria should be included when evaluating and closing contracts. Contractors should be committed to provide OHS training appropriate for the contracted works to the involved workers and managers. Work-related injuries, ill health, diseases and incidents among the contractors' and subcontractors’ workers occurring while performing work for the organization shall be recorded according to the demands of the OHSMS and reported to the organization. The organization shall regularly monitor the OHS performance of contractors and sub-contractors and ensure that appropriate training has been provided and that on-site procedures are followed.

EVALUATION

PERFORMANCE MONITORING AND MEASUREMENT
Procedures to regularly monitor, measure and report OHS performance and procedures shall be developed, implemented and periodically reviewed. The OHSMS manual shall specify the monitoring responsibility of different levels of the employer’s management. Qualitative and quantitative performance indicators shall be used according to the size and nature of the organization. The monitoring shall provide sufficient feed-back on OHS performance.

Active monitoring should include elements required by a proactive OHS management system such as:

1. monitoring of the achievements of specific plans, established performance criteria, and fulfillment of objectives;
2. systematic inspection of work systems, premises, plant, and equipment (job hazard analyses);
3. surveillance and monitoring of the working environment, including the organization of the work and activities involved;
4. surveillance of workers’ health where appropriate; and
5. compliance with laws, regulations and other requirements.

Reactive monitoring should include identification, reporting and investigation of:

1. work related injuries, ill health (including record keeping and monitoring of sickness/absence), diseases, and incidents;
2. other losses such as damage to property;
3. deficient safety and health performance including OHSMS failures; and
4. workers rehabilitation and health restoration programs.

INVESTIGATION OF WORK-RELATED INJURIES, ILL HEALTH, DISEASES, AND INCIDENTS
All work related injuries, ill health, diseases, and incidents must be investigated by a competent person to identify any failures in the OHSMS. The outcome
of investigations shall be communicated to the Safety and Health Committee where established and to persons responsible for corrective actions. Reports produced by external investigative agencies shall be acted upon in the same manner as internal investigations.

AUDIT
Arrangements shall be made for periodic audits of the OHSMS to confirm the adequacy of the system. An audit policy should cover independency of auditors, scope and frequency of audits, methodology and reporting.

MANAGEMENT REVIEW
The employer’s management shall regularly review the OHSMS and assess whether it meets planned performance objectives and whether it is adequate for meeting the needs of the organization and its stakeholders. Management must evaluate the need for changes to the overall system or parts thereof, identify actions required to remedy deficiencies, and evaluate the effectiveness of follow-up actions from previous management reviews.

ACTIONS FOR IMPROVEMENT
The OHSMS shall include a capacity for continuous evaluation and analysis of system performance and follow-up actions to address partial or overall improvements. Planning and implementation of needed improvements should follow the decision process outlined above.
Sub-project name: 

Sub-project Location (include map/sketch): (e.g. province, district, etc).

Type of activity: (e.g. new construction, rehabilitation, periodic maintenance)

Estimated Cost:

Proposed Date of Commencement of Work:

Technical Drawing/Specifications Reviewed: (circle answer): Yes No

This report is to be kept short and concise.

1. Site Selection:

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.

<table>
<thead>
<tr>
<th>Issues</th>
<th>Site Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Natural habitats</td>
<td>No natural habitats present of any kind</td>
</tr>
<tr>
<td>Water quality and water resource availability and use</td>
<td>Water flows exceed any existing demand; low intensity of water use; potential water use conflicts expected to be low; no potential water quality issues</td>
</tr>
<tr>
<td>Natural hazards vulnerability, floods, soil stability/erosion</td>
<td>Flat terrain; no potential stability/erosion problems; no known volcanic/seismic/flood risks</td>
</tr>
<tr>
<td>Cultural property</td>
<td>No known or suspected cultural heritage sites</td>
</tr>
<tr>
<td>Issues</td>
<td>Site Sensitivity</td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Involuntary</td>
<td>Low population density; dispersed population; legal</td>
</tr>
<tr>
<td>resettlement</td>
<td>tenure is well-defined; well-defined water rights</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Indigenous peoples</td>
<td>No indigenous population</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Checklist questions:

**Physical data:**
- Site area in ha
- Extension of or changes to existing alignment
- Any existing property to transfer to sub-project
- Any plans for new construction

Refer to project application for this information.

**Preliminary Environmental Information:**
- State the source of information available at this stage (proponents report, EIA or other environmental study).
- Has there been litigation or complaints of any environmental nature directed against the proponent or sub-project

Refer to application and/or relevant environmental authority for this information.

**Identify type of activities and likely environmental impacts:**
- What are the likely environmental impacts, opportunities, risks and liabilities associated with the sub-project?

Refer to ESMF Chapter 3 – Impact, Mitigation and Monitoring Guidelines
**Determine environmental screening category:**

<table>
<thead>
<tr>
<th>Yes/No answers and bullet lists preferred except where descriptive detail is essential.</th>
</tr>
</thead>
</table>

After compiling the above, determine which category the subproject falls under based on the environmental categories A, B and C.

Refer to ESMF Chapter 4 – Screening and Review Process

**Mitigation of Potential Pollution:**

<table>
<thead>
<tr>
<th>Yes/No answers and bullet lists preferred except where descriptive detail is essential.</th>
</tr>
</thead>
</table>

Does the sub-project have the potential to pollute the environment, or contravene any environmental laws and regulations?

Will the subproject require pesticide use?

If so, then the proposal must detail the methodology and equipment incorporated in the design to constrain pollution within the laws and regulations and to address pesticide use, storage and handling.

Does the design adequately detail mitigating measures?

Refer to ESMF Chapter 3 – Impact, Mitigation and Monitoring Guidelines

**Environmental Assessment Report or environmental studies required:**

<table>
<thead>
<tr>
<th>Yes/No answers and bullet lists preferred except where descriptive detail is essential.</th>
</tr>
</thead>
</table>

If Screening identifies environmental issues that require an EIA or a study, does the proposal include the EIA or study?

Indicate the scope and time frame of any outstanding environmental study.

**Required Environmental Monitoring Plan:**

|---|

If the screening identifies environmental issues that require long term or intermittent monitoring (effluent, gaseous discharges, water quality, soil quality, air quality, noise etc), does the proposal detail adequate monitoring requirements?

Refer to ESMF Chapter 3 – Impact, Mitigation and Monitoring Guidelines

**Public participation/information requirements:**

<table>
<thead>
<tr>
<th>Yes/No answers and bullet lists preferred except where descriptive detail is essential.</th>
</tr>
</thead>
</table>

Does the proposal require, under national or local laws, the public to be informed, consulted or involved?

Has consultation been completed?

Indicate the time frame of any outstanding consultation process.
Refer to Chapter 2 – Relevant legislative acts in the RCIP country

<table>
<thead>
<tr>
<th>Land and resettlement:</th>
<th>Yes/No answers and bullet lists preferred except where descriptive detail is essential.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the likelihood of land purchase for the sub-project?</td>
<td></td>
</tr>
<tr>
<td>How will the proponent go about land purchase?</td>
<td></td>
</tr>
<tr>
<td>What level or type of compensation is planned?</td>
<td></td>
</tr>
<tr>
<td>Who will monitor actual payments?</td>
<td></td>
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</tbody>
</table>

Refer to the Resettlement Policy Framework.

<table>
<thead>
<tr>
<th>Actions:</th>
<th>List outstanding actions to be cleared before sub-project appraisal.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Approval/rejection</th>
<th>Yes/No answers and bullet lists preferred except where descriptive detail is essential.</th>
</tr>
</thead>
<tbody>
<tr>
<td>If proposal is rejected for environmental reasons, should the sub-project be reconsidered, and what additional data would be required for re-consideration?</td>
<td></td>
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</tbody>
</table>

Recommendations:

- [ ] Requires an EIA and/or RAP, to be submitted on date: ______________________
- [ ] Requires EMP, to be submitted on date: ______________________
- [ ] Does not require further environmental studies

Reviewer:
Name: ______________________
Signature: ______________________
Date: ______________________
Environmental Assessment

1. The Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.

2. EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project’s potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

3. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property); and transboundary and global environmental aspects. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country

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1. “Bank” includes IDA; “EA” refers to the entire process set out in OP/BP 4.01; “loans” includes credits; “borrower” includes, for guarantee operations, a private or public project sponsor receiving from another financial institution a loan guaranteed by the Bank; and “project” covers all operations financed by Bank loans or guarantees except structural adjustment loans (for which the environmental provisions are set out in OP/BP 8.60, Adjustment Lending, forthcoming) and debt and debt service operations, and also includes projects under adaptable lending—adaptable program loans (APLs) and learning and innovation loans (LILs)—and projects and components funded under the Global Environment Facility. The project is described in Schedule 2 to the Loan/Credit Agreement. This policy applies to all components of the project, regardless of the source of financing.

2. For definitions, see Annex A. The area of influence for any project is determined with the advice of environmental specialists and set out in the EA terms of reference.


4. Global environmental issues include climate change, ozone-depleting substances, pollution of international waters, and adverse impacts on biodiversity.

Note: OP, BP, and GP 4.01 together replace OMS 2.36, Environmental Aspects of Bank Work; OD 4.00, Annex A, Environmental Assessment; OD 4.00, Annex B, Environmental Policy for Dam and Reservoir Projects; OD 4.01, Environmental Assessment; and the following Operational Memoranda: Environmental Assessments: Instructions to Staff on the Handling of the Borrower’s Consultations with Affected Groups and Relevant Local NGOs, 4/10/90; Environmental Assessments: Instructions to Staff on the Release of Environmental Assessments to Executive Directors, 11/21/90; and Release of Environmental Assessments to Executive Directors, 2/20/91. Additional information related to these statements is provided in the Environmental Assessment Sourcebook (Washington, D.C.: World Bank, 1991) and subsequent updates available from the Environment Sector Board, and in the Pollution Prevention and Abatement Handbook. Other Bank statements that relate to the environment include OP/BP/GP 4.02, Environmental Action Plans; GP 4.03, Agricultural Pest Management; OP/BP/GP 4.04, Natural Habitats; OP 4.07, Water Resources Management; OP 4.09, Pest Management; OP 4.11, Safeguarding Cultural Property in Bank-Financed Projects (forthcoming); OP/BP 4.12, Involuntary Resettlement (forthcoming); OP/GP 4.36, Forestry; OP/BP 10.04, Economic Evaluation of Investment Operations; and OD 4.20, Indigenous Peoples. This OP and BP apply to all projects for which a PID is first issued after March 1, 1999. Questions may be addressed to the Chair, Environment Sector Board.
environmental studies; national environmental action plans; the country’s overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. The Bank does not finance project activities that would contravene such country obligations, as identified during the EA. EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project.

4. The borrower is responsible for carrying out the EA. For Category A projects, the borrower retains independent EA experts not affiliated with the project to carry out the EA. For Category A projects that are highly risky or contentious or that involve serious and multi-dimensional environmental concerns, the borrower should normally also engage an advisory panel of independent, internationally recognized environmental specialists to advise on all aspects of the project relevant to the EA. The role of the advisory panel depends on the degree to which project preparation has progressed, and on the extent and quality of any EA work completed, at the time the Bank begins to consider the project.

5. The Bank advises the borrower on the Bank’s EA requirements. The Bank reviews the findings and recommendations of the EA to determine whether they provide an adequate basis for processing the project for Bank financing. When the borrower has completed or partially completed EA work prior to the Bank’s involvement in a project, the Bank reviews the EA to ensure its consistency with this policy. The Bank may, if appropriate, require additional EA work, including public consultation and disclosure.

6. The *Pollution Prevention and Abatement Handbook* describes pollution prevention and abatement measures and emission levels that are normally acceptable to the Bank. However, taking into account borrower country legislation and local conditions, the EA may recommend alternative emission levels and approaches to pollution prevention and abatement for the project. The EA report must provide full and detailed justification for the levels and approaches chosen for the particular project or site.

**EA Instruments**

7. Depending on the project, a range of instruments can be used to satisfy the Bank’s EA requirement: environmental impact assessment (EIA), regional or sectoral EA, environmental audit, hazard or risk assessment, and environmental management plan (EMP). EA applies one or more of these instruments, or elements of them, as appropriate. When the project is likely to have sectoral or regional impacts, sectoral or regional EA is required.

**Environmental Screening**

8. The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

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5. For screening, see para. 8.
6. EA is closely integrated with the project’s economic, financial, institutional, social, and technical analyses to ensure that (a) environmental considerations are given adequate weight in project selection, siting, and design decisions; and (b) EA does not delay project processing. However, the borrower ensures that when individuals or entities are engaged to carry out EA activities, any conflict of interest is avoided. For example, when an independent EA is required, it is not carried out by the consultants hired to prepare the engineering design.
7. The panel (which is different from the dam safety panel required under OP/BP 4.37, *Safety of Dams*) advises the borrower specifically on the following aspects: (a) the terms of reference for the EA, (b) key issues and methods for preparing the EA, (c) recommendations and findings of the EA, (d) implementation of the EA’s recommendations, and (e) development of environmental management capacity.
8. These terms are defined in Annex A. Annexes B and C discuss the content of EA reports and EMPs.
9. Guidance on the use of sectoral and regional EA is available in EA Sourcebook Updates 4 and 15.

*These policies were prepared for use by World Bank staff and are not necessarily a complete treatment of the subject. Additional copies are available to the public through the InfoShop.*
(a) **Category A**: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive,\(^\text{10}\) diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project’s potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the “without project” situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an EIA (or a suitably comprehensive regional or sectoral EA) that includes, as necessary, elements of the other instruments referred to in para. 7.

(b) **Category B**: A proposed project is classified as Category B if its 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 mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project’s potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).\(^\text{11}\)

(c) **Category C**: A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

(d) **Category FI**: A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

**EA for Special Project Types**

*Sector Investment Lending*

9. For sector investment loans (SILs),\(^\text{12}\) during the preparation of each proposed subproject, the project coordinating entity or

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\(^\text{10}\) A potential impact is considered “sensitive” if it may be irreversible (e.g., lead to loss of a major natural habitat) or raise issues covered by OD 4.20, *Indigenous Peoples*; OP 4.04, *Natural Habitats*; OP 4.11, *Safeguarding Cultural Property in Bank-Financed Projects* (forthcoming); or OP 4.12, *Involuntary Resettlement* (forthcoming).

\(^\text{11}\) When the screening process determines, or national legislation requires, that any of the environmental issues identified warrant special attention, the findings and results of Category B EA may be set out in a separate report. Depending on the type of project and the nature and magnitude of the impacts, this report may include, for example, a limited environmental impact assessment, an environmental mitigation or management plan, an environmental audit, or a hazard assessment. For Category B projects that are not in environmentally sensitive areas and that present well-defined and well-understood issues of narrow scope, the Bank may accept alternative approaches for meeting EA requirements: for example, environmentally sound design criteria, siting criteria, or pollution standards for small-scale industrial plants or rural works; environmentally sound siting criteria, construction standards, or inspection procedures for housing projects; or environmentally sound operating procedures for road rehabilitation projects.

\(^\text{12}\) SILs normally involve the preparation and implementation of annual investment plans or subprojects as time slice activities over the course of the project.
implementing institution carries out appropriate EAs according to country requirements and the requirements of this policy. The Bank appraises and, if necessary, includes in the SIL components to strengthen, the capabilities of the coordinating entity or the implementing institution to (a) screen subprojects, (b) obtain the necessary expertise to carry out EA, (c) review all findings and results of EA for individual subprojects, (d) ensure implementation of mitigation measures (including, where applicable, an EMP), and (e) monitor environmental conditions during project implementation. If the Bank is not satisfied that adequate capacity exists for carrying out EA, all Category A subprojects and, as appropriate, Category B subprojects—including any EA reports—are subject to prior review and approval by the Bank.

Sector Adjustment Lending

10. Sector adjustment loans (SECALs) are subject to the requirements of this policy. EA for a SECAL assesses the potential environmental impacts of planned policy, institutional, and regulatory actions under the loan.

Financial Intermediary Lending

11. For a financial intermediary (FI) operation, the Bank requires that each FI screen proposed subprojects and ensure that sub-borrowers carry out appropriate EA for each subproject. Before approving a subproject, the FI verifies (through its own staff, outside experts, or existing environmental institutions) that the subproject meets the environmental requirements of appropriate national and local authorities and is consistent with this OP and other applicable environmental policies of the Bank.

12. In appraising a proposed FI operation, the Bank reviews the adequacy of country environmental requirements relevant to the project and the proposed EA arrangements for subprojects, including the mechanisms and responsibilities for environmental screening and review of EA results. When necessary, the Bank ensures that the project includes components to strengthen such EA arrangements. For FI operations expected to have Category A subprojects, prior to the Bank’s appraisal each identified participating FI provides to the Bank a written assessment of the institutional mechanisms (including, as necessary, identification of measures to strengthen capacity) for its subproject EA work. If the Bank is not satisfied that adequate capacity exists for carrying out EA, all Category A subprojects and, as appropriate, Category B subprojects—including EA reports—are subject to prior review and approval by the Bank.

Emergency Recovery Projects

13. The policy set out in OP 4.01 normally applies to emergency recovery projects

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13. In addition, if there are sectorwide issues that cannot be addressed through individual subproject EAs (and particularly if the SIL is likely to include Category A subprojects), the borrower may be required to carry out sectoral EA before the Bank appraises the SIL.

14. Where, pursuant to regulatory requirements or contractual arrangements acceptable to the Bank, any of these review functions are carried out by an entity other than the coordinating entity or implementing institution, the Bank appraises such alternative arrangements; however, the borrower/coordinating entity/implementing institution remains ultimately responsible for ensuring that subprojects meet Bank requirements.

15. Actions that would require such assessment include, for example, privatization of environmentally sensitive enterprises, changes in land tenure in areas with important natural habitats, and relative price shifts in commodities such as pesticides, timber, and petroleum.

16. The requirements for FI operations are derived from the EA process and are consistent with the provisions of para. 6 of this OP. The EA process takes into account the type of finance being considered, the nature and scale of anticipated subprojects, and the environmental requirements of the jurisdiction in which subprojects will be located.

17. Any FI included in the project after appraisal complies with the same requirement as a condition of its participation.

18. The criteria for prior review of Category B subprojects, which are based on such factors as type or size of the subproject and the EA capacity of the financial intermediary, are set out in the legal agreements for the project.

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executive directors (EDs) and makes the report available through its InfoShop. Once the borrower officially transmits any separate Category B EA report to the Bank, the Bank makes it available through its InfoShop.\textsuperscript{21} If the borrower objects to the Bank’s releasing an EA report through the World Bank InfoShop, Bank staff (a) do not continue processing an IDA project, or (b) for an IBRD project, submit the issue of further processing to the EDs.

\textbf{Implementation}\\

20. During project implementation, the borrower reports on (a) compliance with measures agreed with the Bank on the basis of the findings and results of the EA, including implementation of any EMP, as set out in the project documents; (b) the status of mitigatory measures; and (c) the findings of monitoring programs. The Bank bases supervision of the project’s environmental aspects on the findings and recommendations of the EA, including measures set out in the legal agreements, any EMP, and other project documents.\textsuperscript{22}

\begin{itemize}
\item \textsuperscript{21} For a further discussion of the Bank’s disclosure procedures, see \textit{The World Bank Policy on Disclosure of Information} (March 1994) and BP 17.50, \textit{Disclosure of Operational Information}. Specific requirements for disclosure of resettlement plans and indigenous peoples development plans are set out in OP/BP 4.12, \textit{Involuntary Resettlement} (forthcoming), and OP/BP 4.10, forthcoming revision of OD 4.20, \textit{Indigenous Peoples}.
\item \textsuperscript{22} See OP/BP 13.05, \textit{Project Supervision}, forthcoming.
\end{itemize}

\footnotesize{These policies were prepared for use by World Bank staff and are not necessarily a complete treatment of the subject. Additional copies are available to the public through the InfoShop.}
Definitions

1. The following definitions apply in OP and BP 4.04:

   (a) Natural habitats\(^1\) are land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions.

   All natural habitats have important biological, social, economic, and existence value. Important natural habitats may occur in tropical humid, dry, and cloud forests; temperate and boreal forests; mediterranean-type shrub lands; natural arid and semi-arid lands; mangrove swamps, coastal marshes, and other wetlands; estuaries; sea grass beds; coral reefs; freshwater lakes and rivers; alpine and sub alpine environments, including herb fields, grasslands, and paramos; and tropical and temperate grasslands.

   (b) Critical natural habitats are:

   (i) existing protected areas and areas officially proposed by governments as protected areas (e.g., reserves that meet the criteria of the World Conservation Union [IUCN] classifications\(^2\)), areas initially recognized as protected by traditional local communities (e.g., sacred groves), and sites that maintain conditions vital for the viability of these protected areas (as determined by the environmental assessment process\(^3\)); or

   (ii) sites identified on supplementary lists prepared by the Bank or an authoritative source determined by the Regional environment sector unit (RESU). Such sites may include areas recognized by traditional local communities (e.g., sacred groves); areas with known high suitability for bio-diversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species.\(^4\)

   Listings are based on systematic evaluations of such factors as species richness; the degree of endemism, rarity, and vulnerability of component species; representativeness; and integrity of ecosystem processes.

   (c) Significant conversion is the elimination or severe diminution of the integrity of a critical or other natural habitat caused by a major, long-term change in land or water use. Significant conversion may include, for example, land clearing; replacement of natural vegetation (e.g., by crops or 1. Biodiversity outside of natural habitats (such as within agricultural landscapes) is not covered under this policy. It is good practice to take such biodiversity into consideration in project design and implementation.

2. IUCN categories are as follows: I—Strict Nature Reserve/Wilderness Area: protected area managed for science or wilderness protection; II—National Park: protected area managed mainly for ecosystem protection and recreation; III—Natural Monument: protected area managed mainly for conservation of specific natural features; IV—Habitat/Species Management Area: protected area managed mainly for conservation through management intervention; V—Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation; and VI—Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems.

3. See OP/BP 4.01, Environmental Assessment.

4. Rare, vulnerable, endangered, or similarly threatened, as indicated in the IUCN Red List of Threatened Animals, BirdLife World List of Threatened Birds, IUCN Red List of Threatened Plants, or other credible international or national lists accepted by the RESUs.

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Operational Policies

conversion of natural habitats can occur as the result of severe pollution. Conversion can result directly from the action of a project or through an indirect mechanism (e.g., through induced settlement along a road).

(d) **Degradation** is modification of a critical or other natural habitat that substantially reduces the habitat's ability to maintain viable populations of its native species.

(e) **Appropriate conservation and mitigation measures** remove or reduce adverse impacts on natural habitats or their functions, keeping such impacts within socially defined limits of acceptable environmental change. Specific measures depend on the ecological characteristics of the given site. They may include full site protection through project redesign; strategic habitat retention; restricted conversion or modification; reintroduction of species; mitigation measures to minimize the ecological damage; post development restoration works; restoration of degraded habitats; and establishment and maintenance of an ecologically similar protected area of suitable size and contiguity. Such measures should always include provision for monitoring and evaluation to provide feedback on conservation outcomes and to provide guidance for developing or refining appropriate corrective actions.
Content of an Environmental Assessment Report for a Category A Project

1. An environmental assessment (EA) report for a Category A project focuses on the significant environmental issues of a project. The report’s scope and level of detail should be commensurate with the project’s potential impacts. The report submitted to the Bank is prepared in English, French, or Spanish, and the executive summary in English.

2. The EA report should include the following items (not necessarily in the order shown):

   (a) **Executive summary.** Concisely discusses significant findings and recommended actions.

   (b) **Policy, legal, and administrative framework.** Discusses the policy, legal, and administrative framework within which the EA is carried out. Explains the environmental requirements of any cofinanciers. Identifies relevant international environmental agreements to which the country is a party.

   (c) **Project description.** Concisely describes the proposed project and its geographic, ecological, social, and temporal context, including any off-site investments that may be required (e.g., dedicated pipelines, access roads, power plants, water supply, housing, and raw material and product storage facilities). Indicates the need for any resettlement plan or indigenous peoples development plan (see also subpara. (h)(v) below). Normally includes a map showing the project site and the project’s area of influence.

   (d) **Baseline data.** Assesses the dimensions of the study area and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Also takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigatory measures. The section indicates the accuracy, reliability, and sources of the data.

   (e) **Environmental impacts.** Predicts and assesses the project’s likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any residual negative impacts that cannot be mitigated. Explores opportunities for environmental enhancement. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specifies topics that do not require further attention.

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1. The EA report for a Category A project is normally an environmental impact assessment, with elements of other instruments included as appropriate. Any report for a Category A operation uses the components described in this annex, but Category A sectoral and regional EA require a different perspective and emphasis among the components. The Environment Sector Board can provide detailed guidance on the focus and components of the various EA instruments.


These policies were prepared for use by World Bank staff and are not necessarily a complete treatment of the subject. Additional copies are available to the public through the InfoShop.
(f) **Analysis of alternatives.** Systematically compares feasible alternatives to the proposed project site, technology, design, and operation—including the “without project” situation—in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where feasible. States the basis for selecting the particular project design proposed and justifies recommended emission levels and approaches to pollution prevention and abatement.

(g) **Environmental management plan (EMP).** Covers mitigation measures, monitoring, and institutional strengthening; see outline in OP 4.01, Annex C.

(h) **Appendixes**

(i) List of EA report preparers—individuals and organizations.

(ii) References—written materials both published and unpublished, used in study preparation.

(iii) Record of interagency and consultation meetings, including consultations for obtaining the informed views of the affected people and local nongovernmental organizations (NGOs). The record specifies any means other than consultations (e.g., surveys) that were used to obtain the views of affected groups and local NGOs.

(iv) Tables presenting the relevant data referred to or summarized in the main text.

(v) List of associated reports (e.g., resettlement plan or indigenous peoples development plan).

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3. Environmental implications of broad development options for a sector (e.g., alternative ways of meeting projected electric power demand) are best analyzed in least-cost planning or sectoral EA. Environmental implications of broad development options for a region (e.g., alternative strategies for improving standards of living an a rural area) are best addressed through a regional development plan or a regional EA. EIA is normally best suited to the analysis of alternatives within a given project concept (e.g., a geothermal power plant, or a project aimed at meeting local energy demand), including detailed site, technology, design, and operational alternatives.
Environmental Management Plan

1. A project’s environmental management plan (EMP) consists of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels. The plan also includes the actions needed to implement these measures.\(^1\) Management plans are essential elements of EA reports for Category A projects; for many Category B projects, the EA may result in a management plan only. To prepare a management plan, the borrower and its EA design team (a) identify the set of responses to potentially adverse impacts; (b) determine requirements for ensuring that those responses are made effectively and in a timely manner; and (c) describe the means for meeting those requirements.\(^2\) More specifically, the EMP includes the following components.

Mitigation

2. The EMP identifies feasible and cost-effective measures that may reduce potentially significant adverse environmental impacts to acceptable levels. The plan includes compensatory measures if mitigation measures are not feasible, cost-effective, or sufficient. Specifically, the EMP

(a) identifies and summarizes all anticipated significant adverse environmental impacts (including those involving indigenous people or involuntary resettlement);

(b) describes—with technical details—each mitigation measure, including

the type of impact to which it relates and the conditions under which it is required (e.g., continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate;

(c) estimates any potential environmental impacts of these measures; and

(d) provides linkage with any other mitigation plans (e.g., for involuntary resettlement, indigenous peoples, or cultural property) required for the project.

Monitoring

3. Environmental monitoring during project implementation provides information about key environmental aspects of the project, particularly the environmental impacts of the project and the effectiveness of mitigation measures. Such information enables the borrower and the Bank to evaluate the success of mitigation as part of project supervision, and allows corrective action to be taken when needed. Therefore, the EMP identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the EA report and the mitigation measures described in the EMP. Specifically, the monitoring section of the EMP provides

(a) a specific description, and technical details, of monitoring measures, including the parameters to be

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1. The management plan is sometimes known as an “action plan.” The EMP may be presented as two or three separate plans covering mitigation, monitoring, and institutional aspects, depending on borrowing country requirements.

2. For projects involving rehabilitation, upgrading, expansion, or privatization of existing facilities, remediation of existing environmental problems may be more important than mitigation and monitoring of expected impacts. For such projects, the management plan focuses on cost-effective measures to remediate and manage these problems.
measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions; and

(b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

**Capacity Development and Training**

4. To support timely and effective implementation of environmental project components and mitigation measures, the EMP draws on the EA’s assessment of the existence, role, and capability of environmental units on site or at the agency and ministry level.³ If necessary, the EMP recommends the establishment or expansion of such units, and the training of staff, to allow implementation of EA recommendations. Specifically, the EMP provides a specific description of institutional arrangements—who is responsible for carrying out the mitigatory and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training). To strengthen environmental management capability in the agencies responsible for implementation, most EMPs cover one or more of the following additional topics: (a) technical assistance programs, (b) procurement of equipment and supplies, and (c) organizational changes.

**Implementation Schedule and Cost Estimates**

5. For all three aspects (mitigation, monitoring, and capacity development), the EMP provides (a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and (b) the capital and recurrent cost estimates and sources of funds for implementing the EMP. These figures are also integrated into the total project cost tables.

**Integration of EMP with Project**

6. The borrower’s decision to proceed with a project, and the Bank’s decision to support it, are predicated in part on the expectation that the EMP will be executed effectively. Consequently, the Bank expects the plan to be specific in its description of the individual mitigation and monitoring measures and its assignment of institutional responsibilities, and it must be integrated into the project’s overall planning, design, budget, and implementation. Such integration is achieved by establishing the EMP within the project so that the plan will receive funding and supervision along with the other components.

³ For projects having significant environmental implications, it is particularly important that there be in the implementing ministry or agency an in-house environmental unit with adequate budget and professional staffing strong in expertise relevant to the project (for projects involving dams and reservoirs, see BP 4.01, Annex B).
An environmental and social impact assessment (ESIA) report for a telecommunications project should focus on the significant environmental, social, health and safety issues of the proposed project, whether it is/or includes new construction, rehabilitation or expansion. The report’s scope and level of detail should be commensurate with the project’s potential impacts.

The ESIA report should include the following items (not necessarily in the order shown):

(a) **Executive summary.** Concisely discusses significant findings and recommended actions.

(b) **Policy, legal, and administrative framework.** Discusses the policy, legal, and administrative framework within which the ESIA is carried out. Explains the EHS requirements of any co-financiers. Identifies relevant international environmental agreements to which the country is a party.

(c) **Project description.** Concisely describes the proposed project and its geographic, ecological, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power plants, water supply, housing, and raw material and product storage facilities). Indicates the need for any resettlement plan. Normally includes a map showing the project site and the project’s area of influence.

(d) **Baseline data.** Assesses the dimensions of the study area and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the project commences. Also takes into account current and proposed development activities within the project area but not directly connected to the project. Data should be relevant to decisions about project location, design, operation, or mitigatory measures. The section indicates the accuracy, reliability, and sources of the data.

(e) **Environmental and social impacts.** Predicts and assesses the project’s likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures and any residual negative impacts that cannot be mitigated. Explores opportunities for environmental enhancement. Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specifies topics that do not require further attention.

(f) **Analysis of alternatives.** Systematically compares feasible alternatives to the proposed project site, technology, design, and operation—including the “without project” situation—in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their...
suitability under local conditions; and their institutional, training, and monitoring requirements. For each of the alternatives, quantifies the environmental impacts to the extent possible, and attaches economic values where feasible. States the basis for selecting the particular project design proposed and justifies recommended emission levels and approaches to pollution prevention and abatement.

(g) Environmental management plan (EMP). Covers mitigation measures, monitoring, budget requirements and funding sources for implementation, as well as institutional strengthening and capacity building requirements.

(h) Appendixes

(i) List of EA report preparers – individuals and organizations.
(ii) References—written materials both published and unpublished, used in study preparation.
(iii) Record of interagency and consultation meetings, including consultations for obtaining the informed views of the affected people and local nongovernmental organizations (NGOs). The record specifies any means other than consultations (e.g., surveys) that were used to obtain the views of affected groups and local NGOs.
(iv) Tables presenting the relevant data referred to or summarized in the main text.
(v) List of associated reports (e.g., socio-economic baseline survey, resettlement plan)
Proper environmental management of construction projects can be achieved only with adequate site selection and project design. As such, the EA for projects involving any new construction, or any rehabilitation or reconstruction for existing projects, should provide information as to screening criteria for site selection and design including the following:

**Site selection**
Sites should be chosen based on community needs for additional projects, with specific lots chosen based on geographic and topographic characteristics. The site selection process involves site visits and studies to analyze: (i) the site’s urban, suburban, or rural characteristics; (ii) national, state, or municipal regulations affecting the proposed lot; (iii) accessibility and distance from inhabited areas; (iv) land ownership, including verification of absence of squatters and/or other potential legal problems with land acquisition; (v) determination of site vulnerability to natural hazards, (i.e. intensity and frequency of floods, earthquakes, landslides, hurricanes, volcanic eruptions); (vi) suitability of soils and subsoils for construction; (vii) site contamination by lead or other pollutants; (viii) flora and fauna characteristics; (ix) presence or absence of natural habitats (as defined by OP 4.04) and/or ecologically important habitats on site or in vicinity (e.g. forests, wetlands, coral reefs, rare or endangered species); and (ix) historic and community characteristics.

**Project design**
Project design criteria include, but are not limited to, the consideration of aspects such as heating, ventilation, natural and artificial light energy efficiency, floor space (ft²) per bed/ward, requirements for x-ray rooms, adequacy of corridors for wheelchair/bed access, adequate water supply and sanitation systems, historical and cultural considerations, security and handicapped access.

**Construction activities and environmental rules for contractors**
The following information is intended solely as broad guidance to be used in conjunction with local and national regulations. Based on this information, environmental rules for contractors should be developed for each project, taking into account the project size, site characteristics, and location (rural vs. urban).

After choosing an appropriate site and design, construction activities can proceed. As these construction activities could cause significant impacts on and nuisances to surrounding areas, careful planning of construction activities is critical. Therefore the following rules (including specific prohibitions and construction management measures) should be incorporated into all relevant bidding documents, contracts, and work orders.

**Prohibitions**
The following activities are prohibited on or near the project site:
- Cutting of trees for any reason outside the approved construction area;
- Hunting, fishing, wildlife capture, or plant collection;
- Use of unapproved toxic materials, including lead-based paints, asbestos, etc.
- Disturbance to anything with architectural or historical value;
- Building of fires;
- Use of firearms (except authorized security guards);
- Use of alcohol by workers.

**Construction Management Measures**

**Waste Management and Erosion:**
Solid, sanitation, and hazardous wastes must be properly controlled, through the implementation of the following measures:

**Waste Management:**
- Minimize the production of waste that must be treated or eliminated.
- Identify and classify the type of waste generated. If hazardous wastes (including health care wastes) are generated, proper procedures must be taken regarding their storage, collection, transportation and disposal.
- Identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each.
- Control placement of all construction waste (including earth cuts) to approved disposal sites (>300 m from rivers, streams, lakes, or wetlands). Dispose in authorized areas all of garbage, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials.

**Maintenance:**
- Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes or wetlands).
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose spent oils on the ground, in water courses, drainage canals or in sewer systems.
- Identify, demarcate and enforce the use of within-site access routes to limit impact to site vegetation.
- Install and maintain an adequate drainage system to prevent erosion on the site during and after construction.

**Erosion Control**
- Erect erosion control barriers around perimeter of cuts, disposal pits, and roadways.
- Spray water on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion, as needed.
- Maintain vehicle speeds at or below 10mph within work area at all times.

**Stockpiles and Borrow Pits**
Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 15 meters away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive waterbodies.

Limit extraction of material to approved and demarcated borrow pits.

**Site Cleanup**

- Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

**Safety during Construction**

The Contractor’s responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following:

- Carefully and clearly mark pedestrian-safe access routes.
- If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours.
- Maintain supply of supplies for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction.
- Conduct safety training for construction workers prior to beginning work.
- Provide personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed and -shanked boots, etc.) for construction workers and enforce their use.
- Post Material Safety Data Sheets for each chemical present on the worksite.
- Require that all workers read, or are read, all Material Safety Data Sheets. Clearly explain the risks to them and their partners, especially when pregnant or planning to start a family. Encourage workers to share the information with their physicians, when relevant.
- Ensure that the removal of asbestos-containing materials or other toxic substances be performed and disposed of by specially trained workers.
- During heavy rains or emergencies of any kind, suspend all work.
- Brace electrical and mechanical equipment to withstand seismic events during the construction.

**Nuisance and dust control**

To control nuisance and dust the Contractor should:

- Maintain all construction-related traffic at or below 15 mph on streets within 200 m of the site.
- Maintain all on-site vehicle speeds at or below 10 mph.
- To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90 db.
- In sensitive areas (including residential neighborhoods, hospitals, rest homes, etc.) more strict measures may need to be implemented to prevent undesirable noise levels.
- Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding families and businesses, and especially to vulnerable people (children, elders).
- Phase removal of vegetation to prevent large areas from becoming exposed to wind.
- Place dust screens around construction areas, paying particular attention to areas close to housing, commercial areas, and recreational areas.
- Spray water as needed on dirt roads, cut areas and soil stockpiles or fill material.
- Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.

**Community Relations**
To enhance adequate community relations the Contractor should:

- Following the country and EA requirements, inform the population about construction and work schedules, interruption of services, traffic detour routes and provisional bus routes, as appropriate.
- Limit construction activities at night. When necessary ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.
- At least five days in advance of any service interruption (including water, electricity, telephone, bus routes) the community must be advised through postings at the project site, at bus stops, and in affected homes/businesses.

**Chance Find Procedures for Culturally Significant Artifacts**
The Contractor is responsible for familiarizing themselves with the following “Chance Finds Procedures”, in case culturally valuable materials are uncovered during excavation, including:

- Stop work immediately following the discovery of any materials with possible archeological, historical, paleontological, or other cultural value, announce findings to project manager and notify relevant authorities;
- Protect artifacts as well as possible using plastic covers, and implement measures to stabilize the area, if necessary, to properly protect artifacts
- Prevent and penalize any unauthorized access to the artifacts
- Restart construction works only upon the authorization of the relevant authorities.

**Environmental Supervision during Construction**
The bidding documents should indicate how compliance with environmental rules and design specifications would be supervised, along with the penalties for non-compliance by contractors or workers. Construction supervision requires oversight of compliance with the manual and environmental specifications by the contractor or his designated environmental supervisor. Contractors are also required to comply with national and municipal regulations governing the environment, public health and safety.
### Relevant environmental authority:

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<tr>
<th>Reporting dates:</th>
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### Subprojects approved:

<table>
<thead>
<tr>
<th>Subproject title</th>
<th>Activities</th>
<th>Project phase (a)</th>
<th>Env. category</th>
<th>EIA / EMP completed?</th>
<th>Env. Permit granted?</th>
<th>Effectiveness of EMP</th>
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<tr>
<td>(name, location, title or reference)</td>
<td>(new construction, rehabilitation, maintenance)</td>
<td>See note below</td>
<td>(A, B or C)</td>
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<td>Yes, No or N/A</td>
<td>Good, poor, or needs improvement</td>
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### Subprojects rejected:

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### Notes:

1. Subproject phase will be one of the following: (a) under project preparation or appraisal, (b) appraised, or (c) implementation.
2. Issues: accidents, litigation, complaints or fines are to be listed.
3. e.g. if an environmental permit was not granted, explain why.
The EMP should be formulated in such a way that it is easy to use. References within the plan should be clearly and readily identifiable. Also, the main text of the EMP needs to be kept as clear and concise as possible, with detailed information relegated to annexes. The EMP should identify linkages to other relevant plans relating to the project, such as plans dealing with resettlement or indigenous peoples issues. The following aspects should typically be addressed within EMPs.

**Summary of impacts:** The predicted adverse environmental and social impacts for which mitigation is required should be identified and briefly summarized. Cross-referencing to the ESIA report or other documentation is recommended, so that additional detail can readily be referenced.

**Description of mitigation measures:** The EMP identifies feasible and cost effective measures to reduce potentially significant adverse environmental and social impacts to acceptable levels. Each mitigation measure should be briefly described with reference to the impact to which it relates and the conditions under which it is required (for example, continuously or in the event of contingencies). These should be accompanied by, or referenced to, designs, equipment descriptions, and operating procedures which elaborate on the technical aspects of implementing the various measures. Where the mitigation measures may result in secondary impacts, their significance should be evaluated.

**Description of monitoring program:** Environmental performance monitoring should be designed to ensure that mitigation measures are implemented, have the intended result, and that remedial measures are undertaken if mitigation measures are inadequate or the impacts have been underestimated within the ESIA report. It should also assess compliance with national standards and World Bank Group requirements or guidelines.

The monitoring program should clearly indicate the linkages between impacts identified in the ESIA report, indicators to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions, and so forth. Although not essential to have complete details of monitoring in the EMP, it should describe the means by which final monitoring arrangements will be agreed.

**Institutional arrangements:** Responsibilities for mitigation and monitoring should be clearly defined. The EMP should identify arrangements for coordination between the various actors responsible for mitigation.
### Environmental Management Plan

#### A. Mitigation

<table>
<thead>
<tr>
<th>Project Activity</th>
<th>Potential Environmental and Social Impacts</th>
<th>Proposed Mitigation Measure(s) (Incl. legislation &amp; regulations)</th>
<th>Institutional Responsibilities (Incl. enforcement &amp; coordination)</th>
<th>Cost Estimates</th>
<th>Comments (e.g. secondary impacts)</th>
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<td>Pre-Construction Phase</td>
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<td>Construction Phase</td>
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<td>Operation and Maintenance Phase</td>
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#### Environmental Management Plan

#### B. Monitoring

<table>
<thead>
<tr>
<th>Proposed Mitigation Measure</th>
<th>Parameters To be Monitored</th>
<th>Location (Incl. methods &amp; equipment)</th>
<th>Frequency of Measurement</th>
<th>Responsibilities (Incl. review and reporting)</th>
<th>Cost (equipment &amp; individuals)</th>
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<tr>
<td>Pre-Construction Phase</td>
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<td>Operation and Maintenance Phase</td>
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<td>Total Cost for all Phases</td>
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Environmental Management Plan

C. Institutional Strengthening and Training for Implementation

<table>
<thead>
<tr>
<th>I. Institutional Strengthening Activity</th>
<th>Position(s) (Institutions, PIUs, contractors, construction supervision consultants)</th>
<th>Scheduling</th>
<th>Responsibilit(ies)</th>
<th>Cost Estimates</th>
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<tr>
<td>Mitigation Measures</td>
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<tr>
<td>Monitoring Requirements (incl. compliance)</td>
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<tr>
<th>II. Training Activity</th>
<th>Participants</th>
<th>Types of Training</th>
<th>Content (modules, etc.)</th>
<th>Scheduling</th>
<th>Cost Estimates</th>
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<td>EMP Implementation, Re-design, Conflict Resolution, etc.</td>
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<td>Environmental Processes, Methods &amp; Equipment</td>
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Environmental Management Plan

D. Scheduling and Reporting

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<tr>
<th>Activity</th>
<th>Year 1 Q1</th>
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