

SURINAME
Water Supply Infrastructure Rehabilitation
SU-L1018

FINAL

**ENVIRONMENTAL AND SOCIAL ANALYSIS/ ENVIRONMENTAL AND SOCIAL
MANAGEMENT FRAMEWORK (ESA/ESMF)**

18 October 2010

TABLE OF CONTENT

1	INTRODUCTION	4
2	PROJECT DESCRIPTION	5
3	INSTITUTIONAL AND LEGAL FRAMEWORK	7
3.1	Existing Institutions involved in the Environmental Management	7
3.2	International conventions	7
3.3	National legislation	8
3.4	Environmental and Social Safeguard Policies of IDB	8
3.5	SWM policies	11
4	ENVIRONMENTAL AND SOCIAL CONDITIONS	11
4.1	Physical Environment	11
4.2	Sensitivity of the natural environment	13
4.3	Socio-economic environment	13
5	ENVIRONMENTAL AND SOCIAL IMPACTS	15
5.1	Generic information on impacts and risks	15
5.2	Potential Positive or Beneficial Impacts	15
5.3	Potential Negative Impacts	16
5.3.1	Impacts during construction	16
5.3.2	Impacts during operation	20
5.3.3	Risks	20
6	ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES	20
6.1	Possible enhance measures	20
6.2	Mitigation measures	20
6.3	Monitoring measures	26
7	PUBLIC PARTICIPATION	27

ANNEXES

1	Terms of Reference for ESA/ESMF
2	Draft clauses for ESMP in Bidding and Contract Documents

LIST OF ABBREVIATIONS

AC	Asbestos cement
BOG	Bureau of Public Health
EA	Environmental Assessment
EIA	Environmental Impact Analysis
ESA	Environmental and Social Analysis
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
IDB	Inter American Development Bank
GOS	The Government of Suriname
NH/DW	Ministry of Natural Resources, Water Supply Division
NIMOS	National Institute for Environment and Research in Suriname
NRW	Non Revenue Water
OP	Operational Policy
SWM	Surinaamsche Waterleiding Maatschappij (Suriname Water Supply Company)
TC	Technical Cooperation
WHO	World Health Organisation

1.0 INTRODUCTION

The Government of Suriname (GOS) and the IDB are preparing a new operation Water Supply Infrastructure Rehabilitation (SU-L1018), to be approved by the IDB Board of Directors in November 2010.

Potable water service in the capital. The water supply system in Greater Paramaribo, which relies almost entirely on groundwater extraction, is operating under constant challenges. Lack of financial resources and autonomy, ever increasing demand, limited rehabilitation activities, and insufficient maintenance, have all led to a gradual deterioration of the assets, with levels of non-revenue water (NRW) reaching as high as 45%, and the number of micrometers in inoperative condition surpassing 20%. The operating surplus obtained with the last tariff adjustment in 2004 was eroded by increasing operating expenses. The lack of a reliable power supply, low electromechanical efficiency of the equipment (46%), and current operation and maintenance practices also suggest that significant energy and production savings could be achieved through an energy efficiency program. Although overall water quality is good, saltwater intrusion in some wells is increasing due to over-pumping. The net losses sustained by SWM have prevented the development and implementation of a much needed capital expenditure program.

As a direct result of the lack of adequate investments, the potable water supply system in Greater Paramaribo is characterized by:

- Inadequate production capacity
- Unreliable supply
- Restrictions on housing and other developments due to lack of water
- Old and inadequate production, transmission and distribution infrastructure
- High levels of technical and commercial losses.

Therefore, SWM intends to more intensively focus on improving the water supply to Greater Paramaribo. The Project aims to improve the provision of water supply services in Greater Paramaribo in a financially efficient and sustainable manner through the provision of capital investment subsidies for service quality improvement.

The New Master Plan - In 2009 a US\$0.5mil IDB Technical Cooperation (TC): Water Supply Master Plan for Suriname (SU-T1045) was approved. The purpose of the TC is to provide the technical and institutional framework to develop an improved and sustainable supply of potable water to urban and rural communities through: (i) the development of a Water Supply Master Plan for the country; and (ii) the preparation of a regulatory and institutional framework for the water sector, including a tariff policy and draft legislation for the formation of a regulatory body.

In conjunction with the TC, the proposed operation, described below, will be the first step in addressing the most pressing issues in water supply in Greater Paramaribo and in strengthening the growing institutional and executing capacity.

The no-project option will result in further deteriorating living conditions and community health standards within Greater Paramaribo. The associated costs to society in terms of health impact and lost productivity are most likely significantly larger than the subsidies with providing safe water supply.

Wastewater management – At present in Paramaribo, 80 to 85% of the population use septic tank while the rest of the urban population use pit latrines, typically in areas with low water supply. The design and maintenance of the septic tanks is often inadequate which in many cases results in overflow of raw sewage into the surface water drains or leakages of septage into the underlying aquifer. When the rainwater enters the combined drainage system the foul gases are first exhaled and continued rains can

cause flooding when the carrying capacity of the combined system is exceeded. In rural areas, the majority of the population has no access to sanitary facilities. Currently, an IDB financed Sanitation Sector Strategic Plan for Suriname has been prepared in 2009/2010 to identify steps for future improvements. Future operations will address the challenges in the rural areas and in the wastewater management, thus making use of the completed Master Plan and of the results of the Sanitation Sector Strategic Plan.¹

Environmental and Social Management Framework (ESMF) is an instrument that outlines the mitigation/enhancement, monitoring, consultative and institutional strengthening measures to prevent, minimize, mitigate or compensate for adverse environmental and social impacts and to enhance beneficial impacts. It has been prepared to have an instrument to ensure adequate environmental and social management during further detailing and the implementation of a project. This instrument is designed to comply with three essential objectives: (i) ensure the socio-environmental sustainability of the project; (ii) comply with national environmental legislation; and (iii) comply with the Environmental and Social Safeguard Policies of IDB.

2.0 PROJECT DESCRIPTION

Project Description - The objective of the project is to improve the water supply system in Paramaribo through rehabilitation works and increasing efficiency. Specifically, the project will support the Government of Suriname (GOS)'s efforts to improve management and operating practices; the Suriname Water Company: N.V. Surinaamsche Waterleiding Maatschappij (SWM), and the Department for Water Supply under the Ministry of Natural Resources (NH/DW); and to improve the water supply system in Paramaribo through rehabilitation works and efficiency enhancement measures.

A more substantial follow-up operation, presently under discussion, will address the potable water challenges in the rural areas and the wastewater management issues in Paramaribo and at country-level, thus making use of the completed Master Plan and of the results of the developing Sanitation Sector Strategic Plan.

The Executing Agency (EA) of the proposed project will be SWM.

Project Components - The project will finance the following Components:

Component 1: Non Revenue Water Program: This component would finance a management plan on Non Revenue Water (NRW) in Paramaribo and Wanica to minimize losses through the optimized operation of the distribution system. The plan will include the following activities: (i) development of a NRW management program to address the issue of commercial and physical losses; (ii) preparation of final designs and Environmental Assessment (EA) for civil works; (iii) implementation of a network simulation model; (iv) installation of flow and pressure meters in the network; (v) implementation of a pilot NRW project in a selected area of Greater Paramaribo; and (vi) revenue collection improvement.

Component 2: Water Supply System Rehabilitation:

This component will finance rehabilitation of secondary and tertiary networks in priority districts. It will include: (i) replacement of approximately 16 Km of Asbestos pipes; (ii) Replacement of

¹ For further information on the overall project design see the SU-L1018 Project Profile, available on-line <http://www.iadb.org/document.cfm?id=35232243>

35 Km of secondary distribution network; (iii) deeper re-laying of 70 Km of secondary distribution network; (iv) replacement of 5,000 household connections, including water meters and piping, in Leidingen, a district within Wanica; and (v) replacement of 7 km of a cast-iron old pipeline.

Component 3: Energy efficiency pilot project: This component, based on the results of the recently completed energy audit, financed through RG-T1605 “Energy Efficiency for Caribbean Water and Sanitation companies”. This component will address the need to improve energy use within SWM facilities, and will include: (i) purchase of portable measuring equipment and improvement of measuring procedures and practices; and (ii) replacement of inefficient pumping equipment and operational improvements of electric motors in 8 pilot locations.

Component 4: Institutional strengthening.:

This component will address the need to strengthen SWM’s O&M capacity, as well as the need to facilitate the handing-over of facilities from NH/DWV to SWM. It will include: (i) capacity building on O&M; (ii) Management Information System integration and upgrade of the major ICT servers; (iii) evaluation of water quality standards and assessment of SWM and NH/DWV needs in water quality monitoring activities and services; and (iv) public awareness campaign.

The implementation period of the Project is expected to be 4-5 years.

3.0 INSTITUTIONAL AND LEGAL FRAMEWORK

Some ministries have their own environmental sections, but their functioning is not yet considered a priority.

3.1 Existing Institutions involved in the Environmental Management in the Project Area:

- **Ministry of Natural Resources:** Dienst Drinkwatervoorziening (NH/DW). The Ministry of Natural Resources is in charge of managing, exploiting and protecting the natural resources like groundwater, oil, bauxite, gold and other minerals. The ministry is also in charge of energy and water supply in Suriname. Potable water is supplied through the Department of water supply within the ministry (NH/DW) and SWM. NH/DW supplies in the rural areas and interior, while SWM supplies in the urban areas.
- **SWM** is a private limited water supply company with all shares owned by the Government of Suriname (through its Ministry of Natural Resources). SWM has a concession to produce and supply potable water to the urban areas of Paramaribo, Nieuw Nickerie and Moengo.
- **Ministry of Labor, Technological Development and Environment.** The ministry has a separate department for general environmental issues. The ministry has set up NIMOS to take over some of the monitoring and enforcing tasks. The Labor department deals with labor issues, such as working hours, safety and contracts. The department employs Labor Inspectors to safeguard the labor conditions.
- **NIMOS.** The National Institute for Environment and Development in Suriname (*Nationaal Instituut voor Milieu & Ontwikkeling in Suriname, NIMOS*) was established in 1998. Currently there is no EIA legislation in Suriname, and therefore no formal (legal based) environmental permits are issued. However, NIMOS has prepared a set of guidelines based on World Bank guidelines for Environmental Impact Assessments. NIMOS uses similar categories and terminologies as the World Bank. Furthermore, NIMOS allows public disclosure through their office and website for the general public.
- **Ministry of Public Health:** The Office of Public Health (BOG) department safeguards the public health on behalf of the ministry. They check water quality in Paramaribo at few points in the network. The Regional Health Department (RGD) provides public health care through their regional offices in all districts. They are also involved in collecting data on the public health.
- **Ministry of Public Works.** This ministry is in charge of roads and public drainage and sewerage systems. It is important for SWM to coordinate with this ministry, so that new roads do not have to be cut open again.
- **CBO** (community based organizations)
- **District Commissioner:** The District Commissioner together with Councils of the District and Ressorts represent the local population. They have frequent contact with local people in their own neighbourhood and takes complaints and grievance to the SWM.

3.2 International conventions and treaties:

- 1) The Ramsar Convention on Wetlands of International Importance (1971);
- 2) The Convention on Biological Diversity (1992);

These treaties have no impact on the Project, as all activities are located in the urbanized areas of Paramaribo.

3.3. National Legislation

Water and Sanitation regulations, standards, guidelines and design criteria are of specific relevance. However, there are no specific regulations and standards on water in force.

Currently there are no acts for the protection of groundwater withdrawal areas or regulations for the withdrawal of groundwater. This means that within a definite radius in groundwater withdrawal areas regulations are missing to eliminate / forbid / control / minimize certain activities which can contaminate the groundwater. A set of regulations on groundwater protection areas was drafted in 2007. In the process of appraisal are:

1. Concept Wet Grondwaterbeschermingsgebieden: draft act concerning the protection of groundwater withdrawal areas
2. Concept Grondwater wet: draft act concerning the withdrawal of groundwater
3. Concept wet toezicht op waterkwaliteit van drinkwaterbedrijven: draft act supervision on water quality of water companies. This draft act refers to standards that shall be set for drinking water quality and is applicable for all companies that supply potable water to the public.

There are few environmental policies, regulations and standards of specific relevance to the project. National legislation and policies related to potable water supply include ²:

4. Hindrance act (Hinderwet, GB 1930): This act regulates limitations on activities that can produce any form of hindrance to the general public, including noise, air pollution, etc.
5. Concessie wet (GB 1944 no.129). Concession to SWM to withdraw, manage and protect ground- and surface water in Wanica, Paramaribo, Albina, Moengo, Nieuw Nickerie and the West polder Nickerie.
6. Wetboek Strafrecht (GB 1911 no. 1 z.l.g. bij SB 2002 no. 70): this are the general laws that are used under the Suriname Juridical system (court of Justice)
7. Politiestrafwet (GB. 1915 no. 77, z.l.g. bij SB 1990 no.24): this is the act that empowers the Police to take any measure for safeguarding of the safety of people and public/private properties.
8. Waterleidingbesluit (GB 1938 no. 33): this act makes it mandatory to provide of potable water to all customers within the concession area of SWM.
9. Wet Regionale Organen (SB 1989 no. 44, z.l.g. bij SB 2000 no.54): this act regulates the powers, structures, responsibilities and duties of decentralised governmental organisations, like District Commissioner.
10. Bouwbesluit (GB 1956): this act regulates the technical specifications for buildings, including mandatory sanitary facilities.
11. Arbeidswet (GB 1963): this act regulates the labour's responsibilities and rights.
12. Decreet Arbeidsinspectie (SB 1983): this act regulates the responsibilities of the Labour Inspection unit to ensure proper implementation of the Labour Act.

Although there are no water quality standard set in Suriname, the World Health Organisation (WHO) standards are followed.

Monitoring is a shared responsibility of SWM/ NH/DW for their own facilities and the Public Health Department (BOG) for the general public.

3.4. Environmental and Social Safeguard Policies of the IDB

This project is Category B under NIMOS and IDB social and environmental review procedures because the impacts are site-specific, limited in number, and mitigation measures are readily identifiable.

² NIMOS, 2004

Because of the potential impacts which are considered minor to moderate, but readily manageable through the implementation of mitigation measures, the project has been classified as a Category “B” classification under IDB’s Environmental Policy (OP-703). Specific IDB Policies and Directives applicable to the project include OP-703, esp. B.6 “Consultation”, B.11 “Pollution Prevention and Abatement”, B.4 “Other Risk Factors” with regards to institutional capacity; and OP-102 “Disclosure Policy”. It is not anticipated that OP-710 on Involuntary Resettlement, OP-765 on Indigenous Peoples and OP-703, B.9 on Natural Habitats and Cultural Sites will apply.

In Suriname, there is a low probability of earthquakes, windstorms and droughts. There is a risk for flooding. However, this may not be treated as a high risk, as all civil works are usually scheduled for construction during the dry and small rainy seasons. If applicable, actions will be taken to ensure compliance with IDB’s Disaster Risk Management Policy (OP-704).

In addition to the Safeguard Policies, a relevant policy that applies to this operation is OP-745 (Basic Environmental Sanitation). As for the latter, an IDB financed Sanitation Sector Strategic Plan for Suriname has been prepared to identify steps for future improvements.

In accordance with the Category “B” classification (B.3 and B.5), the Environmental and Social Strategy (ESS) involves the preparation of an Environmental and Social Analysis (ESA) and the preparation of an Environmental and Social Management Framework (ESMF). Given the current status and nature of the Project, the ESA and ESMF will be combined into one document.

A summary of the application of the Environmental and Social Safeguard Policies initially identified for the project is given below.

Table 1: IDB Environmental Policy (OP-703) for the project

IDB Policies	Scenarios Activated by the Policies and the Requirements	Project: Improvement water supply
OP-703, B.6 Consultations	Consultation with affected parties and consideration of their view	Consultations as per IDB policies are reflected in Section 7. According to NIMOS general guidelines public hearings should be held depending on the nature of the project and the extent of public interest in the project. The need for public consultation will be assessed by NIMOS after receipt of a formal request from SWM during further Project design and preparation.
OP-703, B.4	Other risk factors – Institutional capacity	SWM exhibits weak institutional capacity for managing environmental and social issues therefore the institutional capacity of SWM needs to be improved. The Project will include a budget for SWM to allow for training, consultations and capacity building on monitoring and managing environmental and social mitigation measures.
OP 765 Indigenous people	To promote the development with identity of indigenous peoples and to prevent or minimize exclusion and adverse impacts that the project might generate with respect to indigenous peoples and their rights.	No activities in indigenous people area will be implemented
OP-703, B9	Natural habitats and cultural sites	The likelihood of affecting Cultural Sites

		and Natural Habitats is minimal. If during the performance or operation of works under the project any archaeological or historical site will be found or affected, then the work has to be stopped procedures based on good international practice will apply. A specific ESMP will then be prepared.
OP-703, B.10 Hazardous Material	Bank-financed operations should avoid adverse impacts to the environment and human health and safety occurring from the production, procurement, use, and disposal of hazardous material, including organic and inorganic toxic substances, pesticides and Persistent Organic Pollutants (POPs).	The disposal of hazardous material (asbestos cement pipes) will be avoided whenever possible or minimized. Therefore, a hazardous material plan needs to be prepared covering handling, storage and disposal or bury on-site. Suriname has not ratified the Basel convention so AC pipes are not allowed to be shipped or transported to other countries.
OP-703, B.11 Pollution Prevention and Abatement:	Bank-financed operations will include as appropriate, measures to prevent, reduce or eliminate pollution emanating from their activities.	Potential to cause air, soil or water contamination will be minimized by developing and implementing an ESMP
OP-704 Disaster Risk Management Policy	Natural and unexpected disasters	Paramaribo is subjected to flooding. Other forms of natural disasters, like earthquakes, hurricanes or extreme droughts have not been observed. In the last decade extreme weather conditions have become more frequent. Flooding may have adverse affects for the construction and maintenance of infrastructure. Therefore, climate change risk should be included in the Environmental Assessments during the design stage. Detailed climate change modelling has already been carried out to determine the hydrological requirements of the Water Securities Program. However impacts to infrastructure through projected changes in climatic conditions (i.e. flooding) has not necessarily been assessed. A participatory risk assessment needs to be undertaken with designers, operators and SWM to identify potential physical climate change impacts and associated impacts for the infrastructure. The adequacy of current controls and options for adaptation measures to minimize the identified risks will also be assessed. Adequate technical specifications will be used to mitigate these risks.
OP-710 Involuntary Resettlement	Covers any involuntary physical displacement of people caused by	It is unlikely that the execution of the project, especially in urban areas will generate involuntary deprivation of lands or loss of assets or other situations of the like. It is probable that at least for material storage land is required for temporary use. Acquisition or another arrangement of

		property for the localization must be prepared taking different situations into consideration, including property acquisition policies.
OP 745	Basic environmental sanitation	Water quality will comply standards for WHO drinking water quality and sanitation, and verification that parallel to the provision of drinking water, a solution for the disposal of sanitary sewerage / solid waste will be included in the Sanitation Sector Strategic Plan.
OP-102 Public Disclosure:	The Bank will make available to the public the relevant Project documents. The development of an adequate communication and public disclosure strategy will be required.	The ESA /ESMF will be disclosed in Suriname (SWM and NIMOS) and IDB webpage prior to the IDB Analysis mission.

3.5. SWM Policy³:

- comply with WHO standards for drinking water
- regular monitoring of water quality
- support zoning that addresses compatible land use, low density development, minimize site disturbance,
- adopt well head protection that limits certain land uses and exposure to pollution sources, such as gasoline stations
- create an inventory of potential sources locally and problem wells to ensure appropriate corrective actions are implemented
- public education/awareness.

4.0 ENVIRONMENTAL AND SOCIAL CONDITIONS

This ESA discusses the baseline situation in respect of climate, topography, air quality, soils and geology, hydrology, terrestrial ecology, cultural heritage sites and socio-economic structure as well as existing infrastructure and utilities such as water, sewerage, transportation network, electricity, air transport and telephone/telecommunications and solid waste management.

4.1 Physical Environment

Climate

Paramaribo is the capital city of Suriname with its climate which is typical of a tropical environment and characterized by two distinct seasons. Suriname has a tropical climate, with two rainy seasons and two dry seasons per year. The long rainy season from April to July and the long dry season from August to November are the most pronounced. The table below shows the main climatic parameters for Paramaribo.

Table 2: General climate conditions in Suriname (NIMOS 2002)

Measure	Period
Wind direction	NE (1.3 Beaufort)
Cool months	January
Hot months	October
Average rainfall	2200mm/year
Evaporation	1700 mm/year
Average temperature	22.8 – 30.5°C

³ Master plan for Coastal Areas, SWM, 2002

Humidity	89%
----------	-----

El Niño is a current of warm water that periodically flows along the Western coast of South America, usually with disastrous social and economic consequences in several areas of the littoral region. Suriname is affected by (i) floods in several areas affecting water, wastewater and storm water drainage systems, destroying roads; (ii) agricultural devastation; (iv) epidemic problems: dengue and malaria; (v) increase in sea level causing coastal erosion.

Topography / geology

Greater Paramaribo is located in the coastal area (Young and old coastal plain) of Suriname which can be characterized as flat because less than 5-feet elevation changes over entire area. The area is drained by several waterways: Booms Creek, Sluis Creek, Sommelsdijck Creek, Magenta Canal and Saramacca Canal and is seasonally flooded.

Detailed topographical surveys for the pipelines are not relevant for the moment as they will mostly follow the existing line. However, once the final alignment of the pipes has been chosen, a detailed survey will need to be carried out, including a tree survey of mature trees and significant flora, if applicable.

Air quality

Air quality has not been affected in Greater Paramaribo except for areas with industrial activities which are supposed to be of low impact because of its scale. Other sources that can slightly affect the air quality are vehicular traffic and open burning of household and commercial wastes. The major industrial sources, including bauxite-alumina processing and mining and sand quarrying are however located away from Greater Paramaribo.

Suriname lacks a routine air quality monitoring programme, and no monitoring data is available for the project area.

Hydrology - groundwater

The urban areas rely on ground water for their water supply, with a high percentage of residents having access. The overall quality is good, but saltwater intrusion in the wells due to over pumping is increasing.

Most of the rural areas use rain water collection or surface water for their water supply.

The groundwater in the coastal plain is characterized as follows⁴.

A. Very small to large quantities of fresh water available from the Tertiary age Coesewijne and A Sand artesian aquifers consisting of nonconsolidated and consolidated clastic sediments of clay and sandy clay, and coarse-grained sandstone. Depth to the Coesewijne aquifer ranges from 70 to 110 m in the Paramaribo area and up to 280 m in the western part of the country. Depth to the A Sand aquifer ranges from 120 m in the coastal area to 340 m in the western part of the country.

B. Small to large quantities of freshwater available primarily from the Tertiary age Zanderij aquifer consisting of nonconsolidated to consolidated sediments of sandstone, siltstone, and gravel. Depth to aquifer is less than 80 m.

And inland by:

C. Meager to large quantities of fresh water available locally from fractured and weathered zones in Precambrian age sedimentary, metaclastic and carbonate rocks. Depth to aquifer is less than 70 m.

D. Meager to moderate quantities of brackish to saline water available from fractured and weathered zones in Precambrian age granite and gneiss. Depth to aquifer is less than 70 m.

⁴ Plan Atlas van Suriname

The deep aquifers are not vulnerable for contaminants from the surface level (confined aquifer). General water quality concerns in the area are high Iron and Manganese concentrations, all occurring naturally. Recharge of the top aquifer takes place from precipitation and runoff infiltration.

Surface water/drainage

Several drainage canals are flowing through Greater Paramaribo. After long duration of intense rainfall, significant sheet flow occurs overland and flows slowly to the Suriname River through drainage canals. Significant ponding occurs over large areas. This slowly accumulates in the drainage canals and discharges through sluices and drainage pumping stations into the river or evaporates over time from the ponded areas.

4.2 Sensitivity of the natural environment

Greater Paramaribo has a low level of sensitivity of the environment because of the following aspects:

- No Area with Environmental Protection Regime
- No Presence of ecosystems recognized as of high or critical sensitivity (wetlands, primary or secondary forests)
- Dominantly Flat terrains (slope <15%)
- Mostly built up areas for residential, commercial and institutional purposes

It needs to be noticed that some areas in Greater Paramaribo are vulnerable to flooding. These areas are typically the low lying areas or areas with poor drainage conditions.

Terrestrial ecology

Although Suriname is characterized by a very rich biodiversity no ecological survey is deemed necessary at this stage. The Greater Paramaribo area is mostly covered by swamps, shrubs and grasses common species in Suriname (the ecological environment is not very diverse). The area has no other specific ecological resources and/or protected nature areas in its surroundings. There are no rare or endangered species within the project construction area.

4.3 Socio-economic environment

Population

The total population of Greater Paramaribo is estimated at 250,000 people. The population forecasts from the 2004 national census indicate an average annual population increase for Suriname of 1.37 percent⁵.

Standard of living and income

In Paramaribo, a reasonable number of the population live in well-built houses and the rest live in poor quality homes. The immediate environment of the homes differs sharply between those located in the centre and urban areas, and those on the periphery (rural in character) or in uncontrolled settlements. Development is occurring with new commercial buildings and houses and the areas around many homes outside are decidedly well kept, even in the case of some of the poorest quality houses.

In Greater Paramaribo many people have:

- employ in the Public/service sector; mining sector (Rosebel Gold Mines; Suralco, State Oil Company); agriculture; SME (industry, trade & commerce).
- homes with 24 hrs electricity supply
- access to telecommunication: mobile phones and land lines. The National Telecommunication Company (Telesur) recently upgraded in many areas the network through installation of new switching stations and glass fibre optic cables.

⁵ ABS, 2005

Public health

Review of the health sector shows that life expectancy and infant mortality, both principal indicators of the state of health of the population, are 70 years and 27 respectively (national trend).

Sanitation

In Greater Paramaribo most households use flush toilets. Waste water from toilets (black water) flow through septic tanks (mandatory as per the local building codes) and the outflows usually discharge directly into the open ditches or rainwater sewerage systems along/under the roads. The septic tanks are often poorly designed and not well maintained.

Bathroom and kitchen (grey water) is discharged directly into ditches or sewers in front of the houses. Due to lack of a proper sewage collection and treatment system it is expected that the open waters (subsurface water) are highly contaminated. Combined with the flat topography and poor maintenance of ditches/drains these conditions result in poor natural drainage conditions.

In some areas with poor water supply people make use of latrines.

The improvements under this Project will not lead to significant larger wastewater volumes. The impacts on sanitation are therefore considered minor.

Solid Waste

Residential wastes are estimated to be generated at a rate of approximately 0.4 -0.5 kg per capita per day. Solid waste generated typically has a high organic content. However, there is a trend towards an increase in the volume of wastes being generated consistent with the growth of the population in the region, as would be expected.

The collection of solid waste in Greater Paramaribo is the responsibility of the Ministry of Public Works and waste collection services are provided free of charge to householders. The collection of waste from commercial premises is carried out at a price negotiated between the waste collection contractor and the owner.

The Ministry of Public Works manages an open (legal) disposal site at Ornamibo where garbage trucks are allowed to dispose of waste free of charge.

Water supply

In Greater Paramaribo 85-90% of the population has access to tap water through a piped water supply system and SWM has plans to increase it to >95%. There are still families, mainly in the fringes of Greater Paramaribo towards the rural areas, who rely on shallow wells and rainwater collection as their additional water supply. Particularly during dry periods, the community not connected to the SWM network is at high risk as they have no other source of water supply except ground water. Bottled mineral water can be purchased from local shops, but the affordability of bottled water is a bottleneck.

Currently, there are several public water treatment plants managed by SWM and NH/DW. Stations supervised by SWM and supplying to Greater Paramaribo are Republiek, Lelydorp, Helena Christina, Koewarasan, Leiding 9a (new), Van Hattemweg, William Kraan plein, Blauwgrond, Flora, Leysweg, and Livorno. The stations managed by NH/DW are Leiding 9a (old), Uitkijk and La Vigilantia.

Upgrading of some of the treatment plants and pumping stations is currently being carried out through the Dutch funded CRASH programme, while others have been rehabilitated in the previous Dutch funded programmes. The upgraded treatment plants are in reasonable to good condition and are managed well to the extent possible. Only Uitkijk and La Vigilantia are in poor condition, while Leiding 9a (old) is kept operational in the transition phase until the complete new treatment plant is operational.

In Paramaribo the pressure in the network is kept relatively low, with areas in the fringes and far reach of the pumping stations having zero pressure for major part of the day.

In the absence of legal requirements and standards for potable water quality, SWM and NH/DW are following the WHO standards and guidelines. Water quality of treated water at the pumping stations meet the WHO standards on most critical parameters such as Chloride, iron and ecoli. Water quality in the network at taps vary depending on the area and condition of the network. A substantial part of the network have sediments with high iron content and carry the suspended sediments to the taps. Also pipes with leakage are vulnerable to groundwater intrusion when the pressure is zero.

The Project will include budget for an assessment of water quality standards and set up of a monitoring system of water quality in the entire water supply system.

5.0 ENVIRONMENTAL AND SOCIAL IMPACTS

5.1 Generic information on impacts / risks

Listed below are the general impacts, which form the basis of the works, reviewed in this ESA / ESMF-document.

- Upgrading of the treatment facilities (mainly replacement of exiting pumps or electro-mechanical improvements)
- Rehabilitation of the distribution network by replacement of pipes and installation of water meters

The emphasis will be initially on the specific impacts that are likely to result from the nature of works (e.g. trenching, excavation, site-rehabilitation) and works category (e.g. water supply).

Improving water supply coverage in Greater Paramaribo will have a wide range of environmental and social implications. In general, successful implementation of the project will have high socioeconomic benefits to the people and will contribute to the health and well being.

Overall, negative expected impacts are related to small-scale water and sanitation infrastructure rehabilitation and construction works and operations. These impacts are localized and not considered significant and long-lasting and can be mitigated through appropriate mitigation measures. The severity and duration of these impacts can be minimized by ensuring that the excavation and construction works are limited to short working sections, and that works are carried out rapidly and efficiently.

5.2 Potential Positive or Beneficial Impacts

Successful implementation of the project will have numerous socio-economic benefits including:

- Better access to safe drinking water leading to improved standard of living; and changes in exposure to both communicable and non communicable diseases;
- Improvements in domestic hygiene and a reduction in health risks that were associated with poor water quality or inadequate access to services, as a result of improvements in drinking water quality and its availability.
- The program will contribute to increase in local development and employment as the local population are likely to be employed during the construction phase and after construction due to water related investments;
- promote a more sustainable use of water resources with improvements in the infrastructure to reduce losses and introduction of better metering and billing procedures to encourage more efficient use of water;
- a comprehensive metering program (of production and consumers) is expected to reduce the present rate of NRW (technical and commercial losses) to a more acceptable level.

- General improvements in service reliability and pressure levels;
- Sanitation will also be promoted with its attendant improvement in the health of the people such as reduced incidence of water borne diseases like malaria, dengue, etc.;
- Improvements in metering and administrative billing procedures;
- The program is expected to contribute to poor communities well-being associated with improved services, stability, and health.
- No resettlement or land acquisition is foreseen.

5.3 Potential Negative Impacts

5.3.1 Impacts during Construction

The proposed works include the replacement of the existing pipelines which are aged and in very poor condition. Most of the existing poor condition pipes are made of asbestos cement. The new pipes will be PVC.

Apart from the pipelines that are to be installed, no other new major structures will be erected on site or off site.

It is proposed to largely construct the replacement pipelines below ground surface and within road reserves or in verges. The pipes that will be installed to replace the old pipeline will be placed in trenches prepared by excavating into soil. Once the works are completed and all tests passed, the trenches are closed. If pipes are placed under existing paved roads, the top layer will be reinstated by paving back the top of the trench with asphalt. All soils within the reserve are either already disturbed, natural soils or imported material for formation of embankments. The only remaining negative environmental impact is associated with the visual impact of sections of the pipeline crossing culverts and bridges attached to existing headwalls.

Existing roadways, which are now being used as means of access for the maintenance of the existing pipelines, will be used during the pipeline replacement works.

Where short term interruptions are expected as a result of specific types of works, appropriate traffic management should be undertaken.

Long lasting visual impacts, lasting impact on background, noise, dust/emissions or indeed impacts on the natural hydrology geology or ecology are not anticipated.

Short term nuisance includes inconvenience to the public in the remote areas from construction traffic, road width restriction, dust emission and noise. This can be mitigated by restricting the working hours, employment of signage and flagmen and water sprays.

In cases where it is identified that during construction there is a danger of increased run-off or erosion of trenches, temporary bunds and/or drainage channels or holding ponds can be employed.

All vehicles and equipment are to be regularly serviced to ensure that no fuel or oil leakage occurs.

The trenches will mostly be up to 1.5m depth and approximately 0.5m wide. The resulting 'footprint' of disturbed land will therefore only be of the order of 2-3 metres wide for small-bore pipelines, and up to 5-6 metres wide at most, for large-bore pipes laid in trenches 2-3m deep and 1-1.5 m wide. This will accommodate the topsoil spoil on the outer side and the excavated trench material placed next to the open trench for immediate backfill.

The secondary or indirect impacts of the trenching works will be disruptions to traffic, pedestrians, and safety issues where trenches are located along pedestrian pathways and where they may block access to private and/or public property in both residential and commercial areas. There are also concerns that trenching if conducted during the rainy season or if left open for too long period can provide (i) favourable conditions for breeding of mosquitoes (and thus spreading of disease) and (ii) dumping grounds for rubbish.

Large scale removal of trees and vegetation due to Project activities is not expected. During pipeline construction, measures need to be taken to minimize severely damaging the original vegetation.

Climate, air quality and physical features are not predicted to be impacted upon in a major way; there may be short term impacts due to excavations, dust and noise. However, mitigation measures will be taken to restore the adverse impacts.

There are no cultural heritage sites in the area, and there is no long term environmental effect.

Indeed the long term effect on water supply is a positive one in that the project benefits the population in major sections of Greater Paramaribo, reduces levels of leakage, improves efficiency of supply, increases coverage, provides the opportunity for economic development and thus improves the economy to the benefit of the people of Suriname.

Impacts from replacing asbestos cement pipes

A critical aspect in the SWM drinking water distribution network is the presence of asbestos cement (AC) pipes which were used in 50s and 60s. In Paramaribo, more than 40% of the network consists of AC pipes. In general it is accepted that asbestos should be removed only if it is flaking or crumbling. Asbestos which is in good shape can be encapsulated with a coating. However, this method is temporary often making it more difficult to remove asbestos later.

With this rehabilitation project SWM plans to replace AC pipes because of the poor condition at joints, difficulties in handling, public perception and the availability of better materials. Usually these pipes are buried and intact. Replacement can result in breakages of pipes and release fine particles in the air.

Removal of these pipes needs to be implemented according to a work plan which should be based on a removal method advised by NIMOS and in line with international standards and best practices (e.g. by World Bank or American Society for Testing Materials (ASTM) standards). In 2009, NIMOS gave training on asbestos: how to identify asbestos material and how to remove asbestos.

The following procedure is advised by NIMOS:

- To hire a registered contractor to remove the asbestos material. All asbestos removers must be registered at The Ministry of Labour, Environment and Technological development.
- The most general method that works well for asbestos is moisture. Though fibers do not dissolve in water, it does stick to them enough to make them settle quickly to the floor with the other components of their matrix
- Asbestos pipes should be thoroughly soaked with water prior to removal in order to limit the exposure of free fibers. Removing dry asbestos can contaminate a whole area.
- All asbestos pipes must be wrapped with plastic sheet so that all material can be contained. Dispose of debris by carefully packing it in plastic sealed by duct tape (remove the largest pieces possible to reduce dust)
- In cooperation with the Ministry of Public Works a special area is dedicated (Ornamibo) to dispose the waste
- Buried asbestos material is covered.

Note: the total disposal site (Ornamibo) area size is approx. 60 hectares, of which less than 20 hectares is being used now. The Ministry of Public Works is currently upgrading phase 1 (30 hectares) of the disposal site.

Risks

Exposure to asbestos fibre can occur when materials containing asbestos are sanded, sawn, drilled, or handled in maintenance or removal tasks. When these pipes will be dug up, they need to be sawn for transport to the disposal site (Ornamibo). During sawing asbestos particles can be released into air. Most of the larger fibres are deposited in the nose and upper airways where the body's normal defence mechanisms can clear them. However small fibres, (those too small to be seen by the naked eye) are easily inhaled and are deposited in airspaces deep in the lung tissue. The main diseases associated with the inhalation of asbestos fibres are Asbestosis, Mesothelioma, Lung Cancer and Pleural Plaques.

Alternative handling of asbestos cement pipes:

An alternative method to handle asbestos pipes is on-site burial of these pipes. According to United States Environmental Protection Agency (USEPA) non-friable asbestos waste may not be used as clean fill and on-site burial of AC pipe is not allowed, unless the reason for this burial meets specific exception conditions.

Asbestos materials in good shape often can be "encapsulated" by an asbestos abatement contractor to add a layer of protection. This involves coating asbestos with a heat-resistant paint or sealant (approved by the EPA) that creates a protective barrier and converts surface fibers into a safer form. Encapsulating can be temporary and almost as expensive as removal, depending upon the project, and may make later removal more difficult.

To protect pipes or ducts that are sound from future damage, they can be enclosed, or provided with a box around them. If asbestos is enclosed, the fibers usually aren't released into the air and therefore it isn't an immediate hazard.

The risks included for this method are as above but can be aggravated by other excavation activities of third parties (public services, households). In case, this alternative method will be selected precaution measures must be taken: the pipes must be buried at least 2m below surface and where they will be in permanent contact with groundwater.

However all the following safety requirements in the Regulations must be observed:

- abrasive cutting or sanding power tools should not be used as they generate large amounts of dust;
- non powered hand tools should be used;
- wetting down the material further reduces the release of dust when cutting. High pressure water jets/guns should not be used;
- work with products containing asbestos should be carried out in well ventilated areas and where possible in the open air;
- disposable overalls must be worn, and an approved respirator worn;
- all off-cuts and associated waste, including collected dust, are to be disposed of as asbestos waste; and
- good hygiene principles should be observed.

Further assessment of the best way to handle the asbestos cement pipes should be done in the next phase of the project once more information of location and sites are known. The detailed assessment of risks and impacts during construction and operation for project activities related to handling the asbestos pipes will be done during further project detailing and implementation. A Specific Environmental Management Plan will be prepared for this item under this Project.

Overview of negative impacts during construction of new pipes:

1. The most important impact and risk could occur from the removal of asbestos pipes. Increased risks to health and safety of operation personnel due to inappropriate removal of asbestos pipes. More details are provided elsewhere in this report. Other impacts as listed below are considered as low/minor impacts.
2. Waste generation from construction workers and at site. The rehabilitation works will require demolition of existing infrastructure and will generate rubble and waste that will need to be disposed of properly
3. Particulate emissions during mains replacement works, i.e. dirt and deposited material in the new pipe may be conveyed to the house taps if pipes are not adequately flushed before bringing them in use
4. Soil erosion, due to uncontrolled excavation of trenches during rainy seasons, from inadequacies in backfilling construction works and improper drainage of storm water
5. Dust and noise generation in association with operation and circulation of heavy vehicles and equipment, as well as by wind dispersal of excavated material
6. Lowering of the ground water table level may potentially occur in the close surrounding areas when the excavation of ditches and trenches goes deeper than 1.5 to 2 meters. This effect, combined with the decompression of the soil, may lead to increased terrain instability with potential risks to nearby infrastructure. Increased concentration of dirt in adjacent walkways and roads may also be expected, as well as of particulate matter in the storm water drainage system or in nearby water bodies, in association with carriage during storm events of excavated material usually stored adjacent to the ditch or trench.
7. Soil and groundwater contamination may also potentially occur as a result of leaching of chemicals used sometimes as pipe coating or lining, and by spillage of oil and other products used as lubricants, fuel, etc.
8. Reduced water quality in drains and ditches during the construction due to interruption of water flows during construction and over-pumping of groundwater into trenches.
9. Flora and fauna: only limited removal of the vegetation cover is expected, with occasionally removal of a tree if this is unavoidable
10. Disruption or damage to other services in narrow servitudes, e.g. power supplies, telephone lines, storm-water drains blocked by excavation for water mains and soil stockpiles, etc

The potential **social** impacts or nuisance will be those typically associated with construction activities that develop in or near urban areas, such as

1. Disturbance of quality of life due to nuisances such as noise and dust during construction,
2. Disruption to traffic, limited access to streets and disruption on pedestrian walkways when refurbishing or installing pipelines - mainly detours and hold-ups where trenches cross major routes and residential area access
3. Destruction of property, e.g. fences, gardens and property access driveways
4. Possible temporary disruption to water supply and wastewater services may also occur; however, this can be avoided and minimized to extent possible.
5. There can be increased risks to health and safety of workers or bystanders in association with possible accidents in the trenches, or with the operation of heavy equipment and vehicles, if standard protection measures are not adopted.
6. Reduced / loss of business potential for street vendors/ markets in construction corridor / sites. This risk has been assessed as to be minimal.

These environmental and social impacts have been assessed to be local and of short term for which effective mitigation measures and procedures can be designed.

5.3.2 Impacts during Operation

During the operation of the rehabilitated water supply network systems no substantial negative environmental and social impacts and risks are anticipated.

1. Only when the network will be flushed, some nuisance to the people will occur when the pipes are temporary out of service or if suspended particles enter the house connections. However, SWM already has a communication system in place to announce to the general public prior to the flushing activities.
2. The energy saving measures, particularly replacing old pumps, will result in improved operation of the pumping stations. It is expected that the noise levels at pumping stations will not increase.
3. Also, it has to be taken into account the potential social and economic impacts associated with improvements in metering and administrative billing procedures. These improvements may lead to higher water bills. However, it is expected that the impacts will be minor in Greater Paramaribo, as most of the people are already aware of paying water bills according to actual reading.

5.3.3 Risks

Disaster Risk and Climate Change – Suriname has a low exposure to multiple hazards because the country is not located in an active cyclone - or seismic region. The country is exposed occasional to flooding and coastal erosion. Severe environmental degradation in low lying areas and floodplains are a key contributing factor towards the country's vulnerability. It is not anticipated that floods will impact any project activity.

Further contributing factors include weak public infrastructures and services. With a projected increase in the frequency and severity of rainfall associated with climate change, the potential impacts on population and livelihood will require a comprehensive integrated approach towards the management of the risks associated with changing global and regional weather patterns. This should be addressed on national level through NIMOS.

Institutional capacity to manage environmental and social impacts and risks -

The government has not yet formulated plans to deal with all the risks mentioned above. There is a possibility that, due to limited capacity of involved government institutes, environmental and social impacts and risks will not be addressed adequately.

Capacity of SWM to follow-up on environmental and social issues

The present capacity of SWM to monitor site specific EMPs and overall to follow-up on environmental and social issues is limited. Therefore, some training is included in the Project (institutional strengthening component) for SWM staff to follow up on the ESMF and proper monitoring.

A complaint mechanism is in place, however the time to deal with complaints is often too long. Budget has been allocated in the Project (institutional component) to improve the customer care related to complaints for the Project implementation

Health and Safety - Currently SWM has no dedicated Health, Safety & Environment (HSE) procedures in place. However standard general health and safety procedures are followed at the facilities. SWM is

currently in the process of upgrading the laboratory facilities and ISO 22000 quality management certification of its entire operation.

6.0 ENVIRONMENTAL AND SOCIAL MITIGATION MEASURES

By design, the potential positive impacts of the project can readily be optimized while the potential negative environmental and social impacts are mostly restricted to the construction period. The ESA assessed them and considered them as minor to medium, being reversible and short-term and can be managed through a well defined mitigation and monitoring measures.

6.1 Possible Enhancement Measures

Possible enhancement measures of beneficial impacts would include the following:

- subproject construction should adhere to recommendable best construction practices that make effective and economical use of locally available resources including materials, expertise and labour.
- Highly reduce productions of solid, liquid and hazardous wastes (asbestos pipes).
- Ensure that the poor and other vulnerable groups can continue to safely satisfy their basic water needs.
- Ensure that social services provide education on appropriate hygienic conditions and water conservation, taking into consideration gender particular roles and responsibilities.
- Carrying out periodic checks of different components of the water production, transmission and distribution system to initiate immediate rehabilitation whenever problems are identified to reduce system leakage losses and downtime.

6.2 Mitigation Measures

Mitigation measures for negative environmental impacts include the following:

- Construction site management plans, to be prepared by the construction contractors will be required for all works. This plan will include a waste management plan for all activities during the construction period.
- Dust and air pollution due to dust when excavated material is stock piled, should be limited by means of wetting (particularly dry season), covering with foil or working in small sections so that the trenched are backfilled with excavated within shortest possible period (maximum 2-3 days).
- Avoid hampering drainage of surface water and plan for restoration measures after construction.
- Water sources checked for quality to confirm water quality standards are met.
- Construction activities should be scheduled appropriately to reduce high noise levels from overlapping noisy activities.
- Careful timing of construction to be conducted during the dry season instead of wet season to minimize any risk of flooding
- Avoid areas sensitive to erosion.
- Avoid establishing temporary access roads along steep slopes
- At the end of construction works, level off the soils and facilitate vegetation regeneration.
- Minimize land clearing areas
- Minimize long periods of lowering of ground water table (for deep pipe trenches) by working in dry season and working in small sections
- Prevention of work place injuries during construction is taken care of by the contractors, e.g. by means of signs, signals, fencing, etc.
- Carry out specific Environmental Assessment and preparation of a hazardous material management plan for handling asbestos pipes and other items that will be identified during the next stages of the Project.

Capacity of SWM to implement the ESMF

A Focal Point (or Environmental officer) in SWM with clear defined Terms of References will be appointed to follow up on the implementation of the ESMF, preparation of specific studies, complaint and grievance mechanism and overall environmental and social issues. His responsibility will also include reporting and follow up on complaints during Project implementation. The Focal Point will be assisted by staff from the SWM Laboratory and others as may be required. The Focal Point will coordinate with external agencies, such as Bureau for Public Health (BOG), Ministry of Public Works, etc. SWM will receive training under the institutional component of the Project and budget has been allocated to procure equipment for monitoring purposes.

Traffic Management Plans / Transportation

The proposed pipelines replacements will mostly follow the existing line. Where short term interruptions are expected as a result of specific types of works, appropriate traffic management needs to be undertaken. An overall traffic management plan should be prepared in order to minimize disruption for road users. The purpose of this traffic management plan is to outline the requirements to warn traffic of works ahead, to control the speed of traffic approaching and passing through a work area and the steps necessary to protect the workforce and the public from injury or incident during the progress of the works. All works, short interruptions, and traffic management in general should be done in co-ordination with the Road Authority and Ministry of Public Works.

In the table below a summary of mitigation measures and impacts are linked.

Table 3: Summary impacts and mitigation measures

Component/ activities	Expected or Possible Impact(s) and Risk	Mitigation Measure	Institutional Responsibilities to implement measures	Costs
All components Design stage of project	Negative impacts during construction Health and safety risks	Preparation to implement ESMF, capacity building and training of SWM. Monitor project activities and review mitigation measures. Set up technical audits and routine project reporting.	SWM Coordination with NIMOS	Budget included in Project for capacity building and training of SWM
Water Supply Mains renewal & rehabilitation	<p>1. Localized excavations, soil disturbances, disruptions to traffic, possible flooding from burst in mains. Danger to pedestrians and traffic where trenches coincide with roads, paths and walkways</p> <p>Water supply interruptions</p> <p>2. Possible damage to other services such as telephone cables</p> <p>3. Public health impact from workers coming into contact with damaged asbestos pipes</p> <p>4. Injuries during the proposed works</p> <p>5. Uncontrolled disposal of waste from construction site</p> <p>6. Extensive, medium to long-term disturbances (several weeks to a few months)</p> <p>7. Traffic redirection, trenching noises, soil stockpiling in narrow service-ways, dust in dry season, mud in rainy season, long period of lowering ground water table for deep trenches (if any)</p> <p>8. Noise, danger to public, damage</p>	<p>Preparation of construction site management plans which will include:</p> <ul style="list-style-type: none"> - Topsoil, subsoil stockpiling, avoid excavations during the rainy season - Access ways required to private properties - Carefully demarcate trenches in traffic and pedestrian areas - Only work on short sections of trenching in sloping areas - Notify public, in advance of temporary water supply cuts - HSE (Health, Safety and Environment guidelines for construction and operations aspects and follow-up - proper handling and disposal of waste generated a construction site (waste management plan) - Do main trenching in areas where disruptions will be minimal, do very short sections of 'link' trenches where disruptions will occur -especially to traffic - to reduce period of traffic disruption - Limit depth of trenches to 1.5 m or use support sheet piling for deeper trenches - work during dry seasons and with short 	<p>Contractor (for all construction related works)</p> <p>SWM to monitor Contractor through Supervision Team/ Consultant</p> <p>SWM to set up a Complaint mechanism</p> <p>SWM to raise awareness and improve Information / communication activities</p> <p>SWM to monitor Contractor through Supervision Team/ Consultant</p>	<p>Costs included in contractor's contract</p> <p>Budget included in Project for capacity building and training of SWM and communication/ Awareness campaigns</p>

		trench sections - Dampen down or cover soil stockpiles - Avoid extensive damage to trees by careful pipeline alignment and work in narrow servitude areas - Rehabilitate damaged drainage works immediately after completion of construction of mains - Prior to and during construction coordination between SWM and other utility companies, ministry of Public Works and Road Authority.		
Upgrading and replacement of mostly asbestos pipes and in some cases undersized PVC or corroded steel pipes	Unsafe handling of asbestos pipes on site Uncontrolled disposal of asbestos	- Preparation of a hazardous material management plan - Follow WHO guidelines concerning working with hazardous (waste) materials - Assign dedicated area as disposal site for AC pipes or bury AC pipe on site in controlled manner. - Training on asbestos issues	SWM/External Consultant Inspector Labor Department (Arbeidsinspectie) Contractor SWM in coordination with Min. of Public Works NIMOS	Budget is included in Project to prepare plan, capacity building and training of SWM and for additional costs for disposal of AC pipes
Water Supply Mains renewal and rehabilitation, in conjunction with network modeling and leakage investigations	1.As above	- As above, and demarcate trenches - Training: increase specialized knowledge on environmental-social issues.	See above SWM / Consultant	Costs included in contractor's contract Budget included in Project to prepare plan, capacity building and training of SWM
	2. Problems on sloping ground due to storm water entrainment in trenches	- Only work during the dry season and in short trench sections	Contractor	Costs included in contractor's contract
	3. Construction related accidents (on site, traffic, interaction / materials and equipment)	-Demarcation of sites, posting of signs, traffic control (accident / injury records, traffic counts, safety inventory)	Contractor	Costs included in contractor's contract
	4. Theft and vandalism: damage/ loss of construction materials	- Guarding of depots, community awareness	Contractor	Costs included in contractor's

				contract
Water Supply Mains renewal and Rehabilitation (continue)	Water Resources Supply - Lack of water supply to consumers during construction period	Water tanker used for surplus emergency supply	SWM	
	Biota - Loss of vegetation and increased erosion potential, refuge for animals in construction pits, open trenches and materials stockpiles	Diversion of pipes around vegetation of particular value, selective cutting, removal and proper disposal of all cuttings, monitoring of materials stockpiles Landscaping immediately after completion of construction works	Consultant/SWM Contractor	Budget to be included in Contractor's contract
	Local Livelihood issues / Development Economics: Reduced / loss of business potential for street vendors/ markets in construction corridor / sites, increased employment opportunities	Facilitate access to infrastructure and buildings that can temporarily not be reached and work in small manageable sections	Contractor	Budget to be included in Contractor's contract
	Aesthetics - Spill/ dumping, lack of removal and disposal of left over materials (sand, soil), littering (wind-blown waste)	Workers awareness, penalties	Contractor/ Supervision Team	Budget to be included in Contractor's contract
	Air Quality - Spreading of dust, reduced visibility at construction sites, potential noxious smells / sewerage replacement	Watering of access routes to reduce dust, avoid/ limit access routes through areas with existing heavy traffic/ markets/ population centres	Contractor	Budget to be included in Contractor's contract
	Construction noise	Work during day only, best practice	Contractor	
	Road Maintenance - Increased wear and tear on existing roads, reduced access	Traffic control, adherence to speed limits and recommended loads for construction vehicles	Traffic Police Contractor	
	Waste Management Pollution risk with unaccounted for waste/ improper disposal	Develop and Implement waste disposal program	Consultant/SWM (add clause in bidding document at design stage) Contractor (construction period)	

6.3 Monitoring measures

Monitoring Indicators for the Project

The (national) Environmental Assessment guidelines require the project proponent to prepare and undertake a monitoring plan and regular auditing. Monitoring is needed to check if and to what extent the impacts are mitigated, benefits enhanced and new problems addressed. The key verifiable indicators which will be used to monitor the impacts (depending on the nature, size and scope of the subproject) are presented below.

Table 4: Monitoring indicators and reporting

Component	Indicator	Reporting By
Economy	Annual revenues generated by water supply operations compared to forecast revenues.	SWM
Water	Quality of water based on National and WHO Standards Quantity of water used compared to initial estimates	SWM for pumping stations and in network BOG in network
Natural resources and land management	Complaints among water users Noise Dust	SWM NIMOS
Quality of life	Level of satisfaction of beneficiaries toward water supply sources and facilities	SWM through satisfaction survey
Communicable diseases	Prevalence rates (evolution over time) of diseases such as malaria and diarrhea.	BOG
Non communicable diseases	Prevalence rates of poisoning	BOG/Ministry of Health

Table 5: Summary monitoring plan

Parameter/indicator	Sample location	Analytical method	Sample/ reporting time	Responsibility
Noise	Stations	Observations	Monthly	SWM
Dust	Site specific areas during construction	Observations, field check, interviews	Weekly	SWM/Contractor
Traffic	Site specific areas during construction	Observations, field check, interviews	Weekly	SWM/Contractor
Health & safety	Site specific areas during construction	Observations, field check, interviews	Weekly	SWM/Contractor/ BOG/Inspector Labour Dept.
Water quality (WHO standard)	Consumers	Laboratory analysis and comparison to WHO standards	Monthly	BOG
Water quality (WHO standard)	Taps/Valves in distribution network	Laboratory analysis and comparison to WHO standards	Monthly	BOG
Water quantity, UFW (NRW)	Stations, network	Bulk meters, Control checks (for leakages, illegal connections), Readings of water meters	Daily, Monthly	SWM
incidence of disease (water-related diseases)	Consumers	Observations, field check, interviews	Monthly	BOG/RGD

7.0 PUBLIC PARTICIPATION

The ESA is disclosed prior to IDB's Analysis mission following IDB Policy OP-102.

The best way of ensuring that proposed water supply investments lead to sustainable services in the long run is to foster interaction between SWM, District - and Commune-level institutions, consultants, and the main beneficiaries, i.e. the users who will benefit directly from the project. There are three levels of consultations. The first level is with the local government, and representatives of local population (DR/RR/DC/CBO) or the prospective users in the service areas. The second level of consultation focuses on the environmental institute (NIMOS). The third level of consultation is with the proponent, SWM, and the Ministry of Natural Resources.

A stakeholder meeting was held on 29 July 2010 with the representatives of the local population of Paramaribo, consisting of delegates from the local government (DR/RR) and District Commissioner.

The findings of the consultation process show that many residents are dissatisfied about the lack of continuous supply of safe potable water and stated that they would want the project to be completed as soon as possible. The representatives of the local population insist on a major improvement of the potable water supply services.

NIMOS was contacted by phone on 19 and 20 August 2010 and meetings were held on 24 August and 1 September 2010. NIMOS mentioned that they appreciate to be involved already in the very first stage of the Project. They encourage this approach and will contribute in any way possible within their limited scope and responsibilities. NIMOS has requested that the Environmental Assessment procedures as set by NIMOS are followed as soon as the Project outline becomes more apparent. NIMOS also noted that based on the draft information provided, they would classify this project under Category B as a starting point. However, they would need the entire document to assess the project properly. NIMOS has disclosed the document through their website and office. The comments and recommendations of NIMOS (received 20 September 2010) have been addressed in this document.

Several meetings were held with SWM in the months July and August 2010. SWM confirms that the old pipes and inefficient energy use of pumps do have negative impact on the operations, financial conditions and image of SWM. The current Project will allow SWM to tackle the long due rehabilitation needs and so to improve the service delivery to the public. It will also contribute to reduce the Non Revenue Water levels, hence improving the financial conditions.

The local public disclosure of this ESA/ESMF will be handled through SWM and NIMOS.

During further design and implementation of the Project, specific ESMPs will be prepared as and when required. NIMOS will be requested to review and provide comments. It is recommended that these documents are disclosed also through NIMOS and SWM.

Comments from stakeholders and general public will be collected by SWM and addressed in the next versions of the ESMP. Specific questions will be addressed and answered to the stakeholder.

ANNEXES

Annex 1: Terms of Reference for ESA/ESMF

SURINAME
Water Supply Infrastructure Rehabilitation
SU-L1018

TORs
for the PREPARATION of an
ENVIRONMENTAL AND SOCIAL ANALYSIS (ESA) and
ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

A) BACKGROUND

The Government of Suriname (GOS) and the IDB are preparing a new operation Water Supply Infrastructure Rehabilitation (SU-L1018), to be approved by the IDB Board of Directors in November 2010.

Potable water service in the capital. The water supply system in Greater Paramaribo, which relies almost entirely on groundwater extraction, is operating under constant challenges. Lack of financial resources and autonomy, ever increasing demand, limited rehabilitation activities, and insufficient maintenance, have all led to a gradual deterioration of the assets, with levels of non-revenue water (NRW) reaching as high as 45%, and the number of micrometers in inoperative condition surpassing 20%. The operating surplus obtained with the last tariff adjustment in 2004 was eroded by increasing operating expenses. The lack of a reliable power supply, low electromechanical efficiency of the equipment (46%), and current operation and maintenance practices also suggest that significant energy and production savings could be achieved through an energy efficiency program. Although overall water quality is good, saltwater intrusion in some wells is increasing due to over-pumping. The net losses sustained by SWM have prevented the development and implementation of a much needed capital expenditure program.

The new Master Plan - In 2009 a US\$0.5mil IDB Technical Cooperation (TC): Water Supply Master Plan for Suriname (SU-T1045) was approved. The purpose of the TC is to provide the technical and institutional framework to develop an improved and sustainable supply of potable water to urban and rural communities through: (i) the development of a Water Supply Master Plan for the country; and (ii) the preparation of a regulatory and institutional framework for the water sector, including a tariff policy and draft legislation for the formation of a regulatory body.

In conjunction with the TC, the proposed operation, described below, will be the first step in addressing the most pressing issues in water supply in Greater Paramaribo and in strengthening the growing institutional and executing capacity.

Wastewater management - In 2001 in Paramaribo, 70 to 80% of the population used septic tank while the rest of the urban population used pit latrines. The design and maintenance of the septic tanks is often inadequate which in many cases results in leakages of septage into the underlying aquifer. When the rainwater enters the combined drainage system the foul gases are first exhaled and continued rains can cause flooding when the carrying capacity of the combined system is exceeded. In rural areas, the majority of the population has no access to sanitary facilities. Currently, an IDB financed Sanitation Sector Strategic Plan for Suriname is being prepared to identify steps for future improvements. Future

operations will address the challenges in the rural areas and in the wastewater management, thus making use of the completed Master Plan and of the results of the Sanitation Sector Strategic Plan.⁶

Project Description - The objective of the project is to improve the water supply system in Paramaribo through rehabilitation works and increasing efficiency. Specifically, the project will support the Government of Suriname (GOS)'s efforts to improve management and operating practices; the Suriname Water Company: N.V. Surinaamsche Waterleiding Maatschappij (SWM), and the Department for Water Supply under the Ministry of Natural Resources (NH/DWV); and to improve the water supply system in Paramaribo through rehabilitation works and efficiency enhancement measures.

A more substantial follow-up operation, presently under discussion, will address the potable water challenges in the rural areas and the wastewater management issues in Paramaribo and at country-level, thus making use of the completed Master Plan and of the results of the developing Sanitation Sector Strategic Plan.

The Executing Agency (EA) of the proposed project will be SWM.

Project Components - The project will finance the following Components:

Component 1: Water Supply System Rehabilitation: This component will include improvements to the potable water treatment, storage and distribution facilities as identified during project preparation with the support of ongoing studies.

Component 2: Energy efficiency: Taking advantage of the results of the recently completed energy audit financed through RG-T1605 "Energy Efficiency for Caribbean Water and Sanitation companies", this component will finance equipment upgrades and implementation of energy efficient measures that will generate energy savings and recover expenses in the short term.

Component 3: Institutional Strengthening: This component will address the institutional strengthening needs of SWM and will tentatively include: (i) activities to improve SWM's organizational structure and execution capacity; (ii) non-revenue water (NRW) reduction plans; (iii) evaluation of water quality standards and assessment of SWM and DWV needs in water quality monitoring activities and services; and (v) training and knowledge transfer on best practices for energy use.

B) OBJECTIVES OF THE CONSULTANCY

The objective of the consultancy is to prepare an Environmental and Social Analysis (ESA) and the preparation of an Environmental and Social Management Framework (ESMF) for the aforementioned project. The documents will be prepared using the material and information available, with the goal of having a brief document with practical insights. More in-depth impact assessments, if needed, will be financed through the aforementioned operation.

C) INSTITUTIONAL AND REGULATORY CONTEXT

Country context and policies

⁶ For further information on the overall project design see the SU-L1018 Project Profile, available on-line <http://www.iadb.org/document.cfm?id=35232243>

The National Institute for Environment and Development in Suriname (*Nationaal Instituut voor Milieu & Ontwikkeling in Suriname, NIMOS*) was established in 1998. However, currently there is no EIA legislation in Suriname. Some ministries have their own environmental sections, but their functioning is not yet considered a priority.

ID policies

Because of the potential impacts which are considered minor to moderate, but readily manageable through the implementation of mitigation measures, the project team proposes a Category “B” classification under IDB’s Environmental Policy (OP-703). Specific IDB Policies and Directives applicable to the project include OP-703, esp. B.6 “Consultation”, B.11 “Pollution Prevention and Abatement”, B.4 “Other Risk Factors” with regards to institutional capacity; and OP-102 “Disclosure Policy”. It is not anticipated that OP-710 on Involuntary Resettlement, OP-765 on Indigenous Peoples and OP-703, B.9 on Natural Habitats and Cultural Sites will apply; however, this will be verified during the ESA.

In Suriname, there is a low probability of earthquakes, windstorms and droughts. However, if applicable, actions will be taken to ensure compliance with IDB’s Disaster Risk Management Policy (OP-704), especially due to the risks of floods. In addition to the Safeguard Policies, a relevant policy that applies to this operation is OP-745 (Basic Environmental Sanitation). As for the latter, an IDB financed Sanitation Sector Strategic Plan for Suriname is being prepared to identify steps for future improvements.

D) SCOPE OF WORK.

In accordance with the Category “B” classification (B.3 and B.5), the Environmental and Social Strategy (ESS) involves the preparation of an Environmental and Social Analysis (ESA) and the preparation of an Environmental and Social Management Framework (ESMF).

The ESA will be disclosed prior to IDB’s Analysis mission following IDB Policy OP-102.

(1) ESA

Annex 1 presents a generic outline of the ESA and details the content of each section. It has to be noted that the ESA outline is to be considered as guidance and has to be adapted to the specifics of this project, as appropriate.

In addition to the standard sections, key issues to be addressed within the ESA will include the following:

1. **Impacts and Risks** - The ESA report should present the potential impacts and risk in order of the different project phases (preparation, construction, operation). Impacts need to be qualified as (i) minor / moderate to significant and (ii) with an indication of the duration BEFORE as well as AFTER mitigation. This is essential as some mitigation measures may not be adequately implemented.
2. **Climate Change / vulnerability assessment and Disaster Risk Management** - The ESA should include a reference to the IDB Disaster Risk Management Policy and the risks assessments that would be required. Also, the ESA should include a preliminary evaluation of possible changes in the water pattern and a vulnerability/risk assessment of Climate change (esp. to infrastructure investment, e.g. change in water aquifer, higher risk of flooding, etc.). Given the complexity of such an evaluation, this assessment should rely mainly on the existing literature and on researches already completed by the IDB and other organizations.

3. **Potable water and wastewater** - This will take into account an assessment of proposed national standards and legislation on water and wastewater (if existent) and IDB Policies, esp. B.11 and B.4. with reference to international standards
4. **Analysis for Alternatives** (where possible) – e.g. siting, design, technology, no-action alternative.
5. **Institutional Assessment** - Include an institutional assessment of key players (e.g. local capacity for implementation of mitigation measures, monitoring and supervision of the execution of the proposed environmental management plans) and, if needed, institutional strengthening measures. The capacity of the company to implement the ESMF should also be assessed. Institutional arrangements for implementation and monitoring of the different activities and plans and costs / budget should be included in the EMP.
6. **Legal Section** - The legal section should not only include local requirements, but also refer explicitly to international, especially IDB policies, and World Bank Group standards
7. **Associated Facilities** – An assessment of associated facilities ("...new or additional works and/or infrastructure, irrespective of the source of financing, essential for a Bank-financed project to function...") (Environment Safeguards Compliance Policy; Definitions) should be included.

(ii) ESMF

Proposed activities could include, but are not limited to (i) environmental and social mitigation activities in the project cycle, (ii) capacity building measures and training; (iii) monitoring and evaluation arrangements and activities; (iv) improvement of the environmental and social management framework and system. See Annex 2 for an outline of a typical Environmental and Social Management Plan. Note: in this specific case, this outline has to be adapted to the specifics of this project, as appropriate. Given the information available, and as specified above, the expected product will be a Environmental and Social Management Framework.

If not all project activities have been identified during project preparation, the consultation will describe the process for an ESA and preparation of site-specific ESMFs during project implementation (including reporting approval process, budget for implementation of mitigation activities, monitoring and devaluation, etc.).

(iii) Consultation, Disclosure and Project Approval Process

The Consultant will:

- Assist SWM with the consultation and disclosure process of the ESA / ESMF. A list with consulted stakeholders and key discussion points will be summarized in an Annex. The draft ESA / ESMF should be discussed with / send to relevant stakeholders for comments, including NIMOS.
- (i) Given the current political situation, disclosure might not be approved by the newly elected Government by the current deadlines. If this is the case, the document will be disclosed on the IDB web-site; in the IDB Country office; (iii) at the Executing Agency (hard copy or electronic file if possible) . The executive summary of the ESA with a note where the full document can be found will be widely circulated by the Executing Agency among relevant stakeholders. Disclosure has to take place PRIOR to the Analysis Mission (which will be conducted from August 30 to September 3).
- (ii) Outline the process for public consultation, disclosure and approval process for sub-activities and information sharing process during project information. Describe the mechanism for feedback and remediation actions and indicate costs.

E) DELIVERIES AND PAYMENT SCHEDULE

OUTCOME / REPORTING

The outcome of this assignment will be an Environmental and Social Analysis / Environmental and Social Management Framework (ESA / ESMF).

The main body of the Synthesis ESA / ESMF should not exceed 30 pages. Generic information and references to Government, WB, IDB policies and regulations, etc. will be annexed.

The final report will be presented in English. The products will be delivered in WORD and PDF electronic format.

Deliveries	Due date	Payment Schedule
Signing of contract		30%
Draft Final Report	8 (working) days after beginning of the consultancy	50%
Final Report: submission and approval of final version after incorporation of comments	2 (working) days after receipt of comments from IDB	20%

F) CHARACTERISTICS OF THE CONSULTANCY

- **Type of Consultancy:** Individual.
- **Duration:** Duties will be performed during a period of 10 non-consecutive working days starting from July 20, 2010 to August 23, 2010. The consultant is expected to spend the 10 working days in Suriname.
- **Place of work:** Paramaribo, Suriname.
- **Qualifications:** The Consultant will have following qualifications:
 - At least 8 years of experience in water and sanitation project, in preparation and evaluation of environmental assessments and environmental management;
 - University Degree in Environmental Management, Water Supply and Sanitation, or Rural Development;
 - Excellent English and Dutch language skills.

Given the scope and the characteristics of the consultancy, the selected individual consultant will not be excluded from future bidding on work design and construction connected to the operation SU-L1018.

G) SUPERVISION

Coordination and technical supervision of the consultancy will be carried out by Marcello Basani, Water and Sanitation Specialist in Guyana: marcellob@iadb.org - (592) 225-7951), and Stefanie Brackmann, Environmental Specialist in Washington: sbrackmann - (202) 623-3385.

ANNEX I

GUIDELINES FOR THE PREPARATION OF AN ENVIRONMENTAL AND SOCIAL ANALYSIS (ESA)

The Inter-American Development Bank (Bank) policy requires that an Environmental and Social Analysis (ESA) is carried out by the project sponsor/borrower for all projects (Category B Projects) to be financed by the Bank with potentially impacts on the natural and human environment. Bank policy also requires that the project ESA be made available in the borrowing country at some public place accessible to affected groups and local NGOs and available to various Bank offices. Associated with a project ESA, there are other environmental, health and safety documents that may need to be developed to ensure adequate protection and controls related to the natural and human environment.

The objective of this guideline is to describe the necessary Bank requirements for the content and disclosure of an ESA. This document is not intended to provide a complete or detailed guidance on the preparation of an ESA, but rather the basic ESA requirements. For additional information or details please refer to the reference list in *Annex A* and IDB Safeguards Policies on the IDB Website.

ENVIRONMENTAL AND SOCIAL ANALYSIS

The Bank policy requires that the project sponsor/borrower prepare an ESA, in form and content acceptable to the Bank, for all projects to be financed by the Bank with negative impacts on the natural and human environment.⁷ The development of the ESA entails the systematic study, analysis and evaluation of an operation's potential environmental and social impacts (both positive and negative) taking into account overall cumulative primary and secondary consequences likely to alter significantly the quality of the natural and human environment. The ESA will vary in scope and type of analysis depending on the operation's characteristics. In general, they include a complete analysis of the potential or expected environmental and social impacts of the operation, an evaluation of its environmental and social costs and benefits, and the economic implications of the operation as proposed, and of alternatives including that of no action.

The specific objectives of an ESA of a Bank financed project are:

1. to identify the positive and/or negative alterations of the human and natural environment which may affect the quality of life as well as present and future options for sustainable social and economic development in the operations area of influence;
2. to identify preventive or mitigation measures to minimize the negative impacts and enhance the positive impacts of project design alternatives;
3. to determine whether the proposed operation is the optimal or at least a viable solution to the development needs it addresses after the costs and benefits of impacts, mitigated or not, are internalized; and
4. after comparing the alternatives, including that of no action, to recommend a course of action including preventive or mitigation measures.

The ESA must include, as a minimum, the items listed below. Table 1 presents a recommended generic format and content for Bank financed project ESA.

⁷ For projects with significant impacts on the natural or human environment, the Bank requires an Environmental Impact Assessment (EIA).

- An executive summary highlighting the main arguments, evidence and recommendations in support of the operations feasibility from the standpoint of environmental quality and social impacts;
- A description of the proposed operation, its objectives, and the environmental and social conditions in its area of influence;
- A description of the institutional and legal environmental framework associated with the project, including any project specific legal (e.g., concession contracts, permits, etc.) or other requirements;
- An analysis of the direct and indirect environmental and social impacts and risks;
- A summary description and evaluation of the considered alternatives, the rationale for selecting the proposed alternative, and a description of its impacts;
- A record of the process and a summary of the results of consultation with affected groups;
- Options and recommendations for preventing, avoiding, reducing, eliminating or compensating the impacts of the selected alternative; including responsibilities for implementation for the mitigation plans, timeline for implementation, budget; etc.
- The schedule, assignment of responsibility and budget for the environmental quality and social impact management measures;
- The monitoring, reporting and evaluation requirements during the execution of the operation and thereafter; and
- A description and quantification (when possible) of the environmental and social benefits, and of the costs of any unmitigated environmental and social impacts.

Based upon the project characteristics (e.g., location, potential impacts, etc), it may be necessary for the project ESA to include some of the following aspects:

- Ambient monitoring and surveys (e.g., ambient air quality, meteorological, water quantity and quality, noise, soil and ground water conditions, flora and fauna, social, etc.);
- Mathematical modeling (e.g., air emissions, waste water discharges, water withdrawals, spill release, noise, etc.);
- Geographical information systems (e.g., for linear projects such as roads, pipelines, etc.),
- Human and/or environmental risk assessments;
- Quantitative economic evaluation of project benefits and costs (impacts, mitigations, etc.); and
- Alternative analysis of mitigation and control measures.

RELATED ENVIRONMENTAL, HEALTH AND SAFETY DOCUMENTS

Based upon the specific project characteristics there may be a need to prepare an ESA and/or other documents during the environmental assessment process. These documents, for example, may include:

- Environmental and Social Management Plan
- Resettlement Plan;
- Risk Assessment (e.g., engineering, human health, environmental);
- Emergency Response and Contingency Plan;
- Industrial Hygiene and Worker Safety Plan;
- Public Consultation Plan;
- Environmental Site Assessment; and
- Environmental, Health and Safety Compliance Audit (for projects with existing facilities and/or operations).

TABLE 1
GENERIC OUTLINE FOR AN ESA

4.0 EXECUTIVE SUMMARY

The section should include present a concise discussion of the key and significant aspects, including the following: project description; applicable environmental, health and safety legal requirements; environmental and social conditions; principal project impacts; proposed mitigation and monitoring measures; project alternatives, and public consultation

5.0 PROJECT DESCRIPTION

This section must include a detailed quantitative description of the proposed project (including any associated project facilities and operations). The following recommended subjects to be included: project basis and objectives, project proponents (sponsors), site location(s), facilities (direct, associated and indirect), process, inputs, products, hazardous materials, special materials (e.g., radioactive substances, asbestos, PCB, ozone-depleting compounds, radon), residues/wastes, emissions/discharges, associated infrastructure, construction activities, operation activities, closure activities (as appropriate), project time schedule for construction and operation, project costs.

6.0 INSTITUTIONAL AND LEGAL FRAMEWORK

Applicable host country environmental and occupational safety and health institutions and legal requirements. This should include the following: national, state or province, local (e.g., municipal or city) institutions and legal requirements (including specifically all necessary permits/authorizations and all applicable standards or limits for emissions, discharges, and ambient conditions); relevant requirements of applicable international treaties /conventions/agreements; other applicable legal requirements (e.g., concession contract, etc.); and any other requirements that will be applied to the project (e.g., international standards or guidelines, best/good management practices, requirements of potential investors, lenders and insurers). These requirements must cover all environmental, social, health and safety related areas, including, but not limited to,: environmental impacts assessments, air quality, water supply, waste water, protection of sensitive areas and endangered species, land use control, waste management (both non-hazardous and hazardous), hazardous materials, expropriation, resettlement, worker health and safety.

4.0 ENVIRONMENTAL AND SOCIAL CONDITIONS

This section should present a detailed description, including quantitative data and information, on the existing environmental and social conditions at the proposed project site(s)/location(s) and the complete direct and indirect project area of influence. The following is a representative list (not necessarily totally inclusive) the environmental and social conditions that should be summarized and assessed: Land Use, Climate and Meteorological Conditions, Air Quality, Noise, Geology, Soils, Natural Hazards (seismic, faults, sink holes, flooding, hurricanes, tornadoes, etc.), Water Resources (surface and ground water, coastal, etc.), Flora (especially tropical rain forests, wetlands, or unique or sensitive habitats), Fauna, Endangered and Threatened Species (including sensitive species, economically important species), Natural Parks or Protected Areas, Archeological Resources, Cultural and Historical Resources, Visual Resources, Population and Settlement Patterns, Livelihoods (level of employment and income patterns), Health and Education Levels (including endemic

diseases), Services and Infrastructure, Social Organizations and Groupings, Indigenous Populations, Gender, and Sensitive Populations (elderly, poor, disabled, young).

5.0 ENVIRONMENTAL AND SOCIAL IMPACTS

This section should present a detailed description (quantitative to extent possible) of the anticipated project specific environmental, social and health and safety impacts. This should include the following: impacts associated with the environmental and social conditions presented in section 4.0; impacts related to all project phases (e.g., construction, operation, closure) and all directly associated project facilities and operations (for instance related to Sponsors supply chain); negative and positive impacts; direct and indirect impacts; and unmitigated, irreversible, unavoidable impacts. As feasible, the economic value of impact (positive and negative) should be provided.

6.0 ANALYSIS OF ALTERNATIVES

This section should present a short comparison of feasible project alternatives, in terms of both the project (i.e., technology, design, operation, etc.) and site selection. A description should be provided as to how the proposed project relates to the overall strategy/policy for the applicable technical area (e.g., the basis and rationale for the project). The assessment of project alternatives and site selection must specifically include environmental and social factors and include a no action (i.e., without the project) scenario. The alternative assessment should be quantitative and expressed in economical terms, as feasible. The assessment must clearly state and justify the selected alternative.

7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

This Section should describe the proposed project environmental and social management plan. This plan must include, as a minimum, the following components: (a) detailed description of the proposed environmental and social control and mitigation measures for project construction and operation; (b) detailed description of the planned environmental and social monitoring program for both construction and operation; (c) description of the planned worker health and safety plan, procedures and controls; (d) description of planned environmental contingency plan and procedures; (e) description of the proposed environmental, health and safety management system (including personnel, training, documentation, auditing, etc.); and (f) description of project specific supervision and evaluation actions to be implemented. For each component listed above, the proposed time schedule (i.e., when initiated, when completed, frequency), responsibility (i.e., who will implement), and the estimated cost must be provided; this information should be provided for the individual actions within a component.

8.0 PUBLIC PARTICIPATION

The section must describe the specific actions performed related to disclosure of project-related environmental and social information. This should specifically include the method (including the exact date, location and form) of public disclosure of the project ESA or any other related documents that may also have been made available. A description must also be provided of the completed (i.e., already performed) project-related public participation/consultation activities and programs related to populations affected by the project (e.g., who was consulted, when, where and how, etc.). The description must also state the results from these activities. The section must also include a description of activities that will be performed during project construction and operation to inform and consult with the affected population. A complete record of public participation activities should be presented as an appendix.

APPENDICES

- Authors of the ESA (names, affiliations, qualifications, relationship to project sponsor)
- Terms of Reference for preparation of the ESA
- Complete record of public consultation activities (e.g., meetings, public hearings, etc.)
- Environmental, health and safety permits/authorizations
- Complete results of ambient monitoring or sampling performed for ESA
- Complete results of mathematical modeling (or related quantification) of project impacts
- Bibliography and References

PUBLIC DISCLOSURE

Listed below are the recommended steps and methods to be performed in order to comply with the Bank requirements on public disclosure of a project ESA or associated documents. For further information see the IDB Disclosure of Information Policy (OP-102)

- The ESA document released must be an adequate ESA, which implies providing sufficient information to the public (e.g., local affected population, groups, NGOs or non-governmental organizations, etc.) to allow adequate evaluation of the project. Thus, the ESA released does not necessarily (albeit it could) have to be the final ESA which would be submitted to the applicable governmental authorities to meet regulatory requirements, but could be a preliminary ESA that provides sufficient information on the project characteristics, anticipated impacts and proposed mitigation measures.
- The ESA must be made available to the affected population and public. This means that, for example, simply having the ESA completed or submittal to a governmental agency is NOT sufficient. Thus, the Project Borrower should develop and implement various specific measures, which account for the specific characteristics and culture of the project location and local population, to accurately and sufficiently inform the public of the proposed project and the availability of the ESA (e.g., notices in newspaper, radio announcements, etc.), to obtain/receive comments from the public regarding the project (e.g., meetings, location to send written comments), to review the comments from the public, and incorporate, as feasible the comments into the project design. The measures developed and implemented should be part of the overall Project Public Participation/Consultation Plan.
- The release of the ESA must be done as early as possible, especially in relation to the Banks evaluation process of the project. The intent is to allow the affected population adequate time to sufficiently understand the project such that the public may provide comments and that these comments can be considered both by the Borrower and the Bank. Thus, the ESA should be made available prior to the initiation of the Banks environmental and social due-diligence or the project, and for projects of having potentially significant environment affects, at a minimum, of four months prior to the consideration of the project by the Banks Board of Directors.
- The Borrower should document the exact date and location of ESA availability to the Bank and to the public, the method(s) used to make available the ESA to the public, the method(s) used by the Borrowers to receive comments from the public, and how the comments received were considered and incorporated into the project design.

ANNEX II

CONTENTS OF AN ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

The format of an ESMP needs to fit the circumstances in which it is being developed and the particular requirements for which it is designed. For Category A projects, mitigation measures and their means of implementation should be described in detail, including institutional arrangements; for many Category B projects, the EA may only require a management plan.

ESMPs, or their equivalents, should demonstrate that proposed monitoring activities will encompass all major impacts and how they will be integrated into project supervision. It is important that the ESMP identifies and confirms linkages to other safeguard policies relevant to the project, e.g., policies dealing with resettlement or indigenous peoples issues. The ESMP should also describe measures to facilitate substantive public consultation and involvement and needed reporting arrangements.

The following aspects should be addressed within ESMPs:

- **Summary of impacts:**

Predicted adverse environmental impacts and their relationship to social impacts (and any uncertainties about their effects) for which mitigation is necessary should be identified and summarized.

- **Description of mitigation measures:**

Each measure should be described in relation to the impact(s) and conditions under which it is required. These should be accompanied by, or referenced to, designs, development activities (including equipment descriptions) and operating procedures and implementation responsibilities. Proposed mitigation measures to facilitate public consultation should be clearly described and justified.

- **Description of monitoring program:**

The ESMP identifies monitoring objectives and specifies the type of monitoring required; it also describes environmental performance indicators which provide linkages between impacts and mitigation measures identified in the ESA report - parameters to be measured, methods to be used, sampling location and frequency of measurements, detection limits (as appropriate) and definition of thresholds to signal the need for corrective actions. Monitoring and supervision arrangements should be agreed by the relevant Agencies and the contractor to: ensure timely detection of conditions requiring remedial measures in keeping with good practice; furnish information and the progress and results of mitigation and institutional strengthening measures; and, assess compliance with national environmental legislation and regulations. Such arrangements should be clearly specified in the project implementation/operations manual to reinforce project supervision.

- **Legal requirements and bidding and contract documents:**

The incorporation of detailed mitigation, monitoring and supervision arrangements into legal conditions and covenants is essential. Where supervision identifies inadequacies in their implementation, such documents provide a basis for enforcing and reporting remedial actions. It

is good practice to ensure that implementation of major environmental requirements is linked to disbursement conditions.

It is important to translate ESMP requirements into bidding and contract documents to ensure that obligations are clearly communicated to contractors.

- **Institutional arrangements:**

Responsibilities for mitigation and monitoring should be defined along with arrangements for information flow, especially for coordination between agencies responsible for mitigation. This is especially important for projects requiring cross-sectoral integration. In particular, the ESMP specifies who is responsible for undertaking the mitigating and monitoring measures, e.g., for enforcement of remedial actions, monitoring of implementation, training, financing, and reporting. Institutional arrangements should also be crafted to maintain support for agreed enforcement measures for environmental protection.

Where necessary, the ESMP should propose strengthening the relevant agencies through such actions as: establishment of appropriate organizational arrangements; appointment of key staff and consultants; and, arrangements for counterpart funding and on-lending.

- **Implementation schedule:**

The timing, frequency and duration of mitigation measures and monitoring should be included in an implementation schedule, showing phasing and coordination with procedures in the overall project implementation /operations manual. Linkages should be specified where implementation of mitigation measures is tied to institutional strengthening and to the project legal agreements, e.g. as conditions for loan effectiveness or disbursement.

- **Reporting:**

Procedures for providing information on the progress and results of mitigation and monitoring measures should also be clearly stated. Recipients of such information should include those with responsibility for ensuring timely implementation of mitigation measures and for undertaking remedial actions. In addition, the structure, content and timing of reporting should be designed to facilitate supervision and arrangements should be established for the timely receipt of monitoring reports and their forwarding for review and comment.

- **Cost estimates:**

These should be specified for both the initial investment and recurring expenses for implementing all measures defined in the ESMP, integrated into the total project costs and factored into financing negotiations. As mitigating costs may occur at points during project implementation or operations, indications of cash flow should be provided.

It is important to capture all costs – including administrative, design and consultancy, and operational and maintenance costs – resulting from meeting required standards or modifying project design.

The development of mitigation measures, monitoring, institutional arrangements and scheduling may be aided by the use of matrices shown below. Along with appropriate text, these should be

incorporated in the ESMP document and incorporated in the project implementation /operational manual.

Environmental and Social Impacts

Project Activity	Potential Environmental / Social Impacts / Risk	Proposed Mitigation Measures	Institutional Responsibilities to implement mitigation measures	Cost Estimates
<i>For each activity</i>				

Monitoring

Proposed Mitigation Measure	Indicators	Measurements (Incl. equipment, methods, location)	Frequency of Measurement	Responsibilities Incl. review, reporting)	Cost (Equipment, individuals)
<i>For each activity</i>					

Training and Capacity Building

Training Activities and Capacity Building	Participants. Focus Group	Scheduling	Content (modules, etc.)	Cost Estimates

Annex 2: Draft clauses for ESMP requirements in bidding and contract documents

DRAFT ENVIRONMENTAL CONTRACT CLAUSES

Clause No. -- Environmental Management, Safety and Security

1. Before the order to commence civil works, the contractor is required to implement the Environmental Management Plan (EMP) as specified in the Environmental Impact Assessment (EIA) prepared for the particular road works. The Plan shall spell out how the contractor should achieve environmental targets and objectives specified in the EMP and agreed upon by the Environmental Coordinator, Environmental Management Unit, MOWPT, and the Ministry of Tourism, Environment and Culture. The plan shall include, to the extent practicable and reasonable, all steps to be taken by the Contractor to protect the environment in accordance with the provisions of the Environment Act, 2001 and Environmental Guidelines for Transport Projects, 2005. Where the EMP does not exist, the clauses contained herein shall form the basis of a rehabilitation plan.

2. Notwithstanding the contractors' obligation under the above clause, the Contractor shall implement all measures necessary to restore the sites to acceptable standards and abide by environmental performance indicators specified under the EMP to measure progress towards achieving objectives during execution or upon completion of civil works. These measures shall include but not limited to the following: -

(a) Minimize the effect of dust on the surrounding environment resulting from earth mixing sites, asphalt mixing sites, dispersing coal ashes, vibrating equipment, temporary access roads, etc. to ensure safety, health and the protection of workers and communities living downwind of dust producing activities.

(b) Ensure that noise levels emanating from machinery, vehicles and noisy construction activities are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and communities near rock - blasting areas.

(c) Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to civil works being carried out.

(d) Prevent bitumen, oils, lubricants and waste water used / produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes.

(e) Prevent and minimize the impacts of quarrying, earth borrowing, piling and building of temporary construction camps and access roads on the bio-physical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards.

(f) Upon discovery of ancient heritage, relics or anything that might or believed to be of archeological or historical importance during the execution of works report such findings to the Ministry of Tourism, Environment and Culture, in fulfillment of the Environment Act, 2001, and outline measures aimed at protecting such historical or archaeological resources.

(g) Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities.

(h) Implement soil erosion control measures in order to avoid surface run off and prevents siltation etc.

(i) Ensure that garbage, sanitation and drinking water facilities are provided in construction workers camps.

(j) Ensure that in as much as possible, local materials are utilized to avoid importation of foreign material and long distance transportation.

(k) Ensure public safety and meet traffic safety requirements for the operation of work to avoid accidents.

3. The contractor shall indicate the period within which he/she shall maintain status on site after completion of civil works to ensure significant perturbations arising from such works have been taken into account.

4. The contractor shall adhere to the proposed activity implementation schedule and the monitoring plan / strategy to ensure effective feedback of monitoring information to both project management and the Environmental Coordinator, Environmental Management Unit (EMU), MOWPT, so that impact management can be implemented properly, and if necessary, adapt to changing and unforeseen conditions.

5 The Project Coordinator, EMU, in conjunction with the Ministry of Tourism, Environment and Culture, shall inspect significant sites where civil works have been carried out and proposed mitigation measures implemented and shall give certification regarding the adequacy or inadequacy of rehabilitation measures carried out on the bio-physical environment and compensation for socio-economic disruption resulting from implementation of civil works.

6. If the Contractor fails to implement the approved EMP, the Project Coordinator, EMU, shall seek legal redress through the Ministry of Tourism, Environment and Culture and appropriate penalties shall be instituted in accordance with the provisions of the Environment t Act, 2001.

SPECIFIC ENVIRONMENTAL ISSUES TO BE CONSIDERED

Worksite/camp site Waste Management

- All vessels (drums, containers, bags, etc.) containing oil/fuel/surfacing materials and other hazardous chemicals must be banded in order to contain spillage. All waste containers, litter and any other waste generated during the construction shall be collected and disposed off at designated disposal sites in line with the provisions of the Environment Act, 2001.
- All drainage and effluent from storage areas, workshops and camp sites shall be captured and treated before being discharged into the drainage system in line with the provisions of the Environment Act, 2001.
- Used oil from maintenance shall be collected and disposed off appropriately at designated sites or be re-used or sold for re-use locally.
- Entry of runoff to the site shall be restricted by constructing diversion channels or holding structures such as banks, drains, dams, etc. to reduce the potential of soil erosion and water pollution.
- Construction waste shall not be left in stockpiles along the road. Waste and other excess material shall be used for rehabilitating borrow areas and landscaping around the road.
- If other spoil disposal sites are necessary, they shall be located in areas of low land use value and where they will not result in material being easily washed into drainage channels. Whenever possible, spoiled materials should be placed in low-lying areas and should be compacted and planted with species indigenous to the locality.

Material Excavation

- Contractors shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.
- The location of quarries and borrow areas shall be subject to approval by relevant authorities including traditional authorities if the land on which the quarry or borrow areas fall in traditional land and by the Environmental Coordinator, EMU.
- Extraction sites shall not be located in the vicinity of settlement areas, cultural sites, wetlands or any other valued ecosystem component.
- Extraction sites shall not be located adjacent to stream channels wherever possible to avoid siltation of river channels. Where they are located near water sources, borrow pits and perimeter drains shall surround quarry sites.
- Extraction sites shall not be located in forest reserves. However, where there are no other alternatives, permission shall be obtained from the Department of Conservation and Forestry and an environmental impact assessment shall be conducted.
- Extraction sites shall not be located on high or steep ground or in areas of high scenic value.
- Only sites that can easily be rehabilitated shall be chosen. Areas with minimal vegetation cover such as flat and bare ground or areas covered with grass only or covered with shrubs with height of less than 1.5 m.

- Extraction site boundaries shall clearly be demarcated and marked to minimize vegetation clearing.
- Vegetation clearing shall be restricted to the area required for safe operation of construction work. Vegetation clearing shall not be done for not more than three months in advance of operation
- Extraction sites shall not be located in archaeological areas. Excavations in the vicinity of such areas shall proceed with great care and shall be done in the presence of staff from the Ministry of Tourism, Environment and Culture.
- Stockpile areas shall be located in areas where trees can act as buffers to prevent dust pollution. Perimeter drains shall be built around stockpile areas. Sediment and other pollutant traps shall be located at drainage exist from workings.

Rehabilitation and soil erosion prevention

- To the extent practicable rehabilitate the site progressively so that the rate of rehabilitation is similar to the rate of construction.
- Always remove and retain topsoil for subsequent rehabilitation. Soils shall not be stripped when they are wet as this can lead to soil compaction and loss of structure.
- Topsoil shall not be stored in large heaps. Low mounds of no more than 1 to 2m high are recommended.
- Revegetate the stockpile to protect the soil from erosion, discourage weeds and maintain an active population of beneficial soil microbes.
- Locate stockpiles where they will not be disturbed by future construction activities.
- To the extent practicable reinstate natural drainage patterns where they have been altered or impaired.
- Remove toxic materials and dispose them of in designated sites. Backfill excavated areas with soils or overburden that is free of foreign material that could pollute ground water and soil.
- Identify potentially toxic overburden and screen with suitable material to prevent mobilization of toxins.
- Ensure the reshaped land is formed so as to be inherently stable, adequately drained and suitable for the desired long-term land use and that would allow natural regeneration of vegetation.
- Minimize the long-term visual impact by creating landforms, which are compatible with the adjacent landscape.
- Minimize erosion by wind and water both during and after the process of reinstatement.
- Compacted surfaces shall be deep ripped to relieve compaction unless subsurface conditions dictate otherwise.
- Revegetate the area with plant species that will control erosion, provide vegetative diversity, and that will through succession, contribute to a stable and compatible ecosystem. The choice of plant species for rehabilitation shall be done in consultations with local research institutions, forest department and the local people, as they will be long-term beneficiaries.

Water resources management

- The contractor shall at all costs avoid conflicting with water demands for local communities.
- Abstraction of water both surface and underground shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.
- Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.
- Temporary damming of streams and rivers shall be done in such a way that disruption of water supplies to communities down stream is avoided and maintain the ecological balance of the river system
- No construction water containing spoils or site effluent especially cement and oil shall be allowed to flow into natural water drainage courses.
- Wash water from washing out of equipment shall not be discharged into watercourses or road drains.
- Site spoils and temporary stockpiles shall be located away from the drainage system and surface run off shall be directed away from stockpiles to prevent erosion

Traffic management

- Location of access roads/detours shall be done in consultation with the local community especially where access road shall traverse important ecosystem component. Access roads shall not traverse wetland areas.
- Upon the completion of civil works, all access roads shall be ripped off and rehabilitated.
- Access roads shall be sprinkled with water atleast five times a day in settled areas and three times in unsettled areas to suppress dust emissions.

Blasting

- Blasting activities shall not take place in the vicinity of settlement areas, cultural sites, or wetlands.
- Blasting activities shall be done during working hours and local communities shall be consulted on the proposed blasting times
- Noise levels reaching the communities from blasting activities shall not exceed 90 decibels

Health and Safety

- The contractor in advance of the construction work shall mount an awareness and hygiene campaign. Workers and local residents shall be sensitized on health risks particularly of AIDS
- Adequate road signs to warn pedestrians and motorists of construction activities, diversions, etc. shall be provided at appropriate points.
- Construction vehicles shall not exceed maximum speed limit of 40km per hour