

**DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK**

**GUYANA**

**WATER SUPPLY AND SANITATION INFRASTRUCTURE IMPROVEMENT  
PROGRAM**

**(GY-L1040 AND GY-X1003)**

**ENVIRONMENTAL AND SOCIAL MANAGEMENT REPORT (ESMR)**

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## ABBREVIATIONS

AOP	Annual Operating Plans
CIF	Caribbean Investment Facility
CIPD	Capital Investment and Planning Department
CReW	Caribbean Regional Fund for Wastewater Management Project
EA	Executing Agency
ESA	Environmental and Social Analysis
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency Guyana
ESMP	Environmental and Social Management Plan
ESMR	Environmental and Social Management Report
ESS	Environmental and Social Strategy
EU	European Union
FSO	Fund for Special Operations
GEF	Global Environment Facility
GWI	Guyana Water Incorporated
GOG	Government of Guyana
ICAS	Institutional Capacity Assessment System
MH&W	Ministry of Housing and Water
NDC	Neighborhood Democratic Council
NEAP	National Environment Action Plan
NRW	Non-Revenue Water
OC	Ordinary Capital
O&M	Operation and Maintenance
POD	Proposal for Operation Development
PSG	Project Specific Grant
PUC	Public Utilities Commission
RDC	Regional Democratic council
SSF	Safeguard and Screening Form for Screening and Classification of Projects
TC	Technical Cooperation

## I. PROGRAM DESCRIPTION

- 1.1 The borrower for the proposed operation is the Co-operative Republic of Guyana, who will be legally responsible to the Bank for the loan repayment. The Executing Agency (EA) will be the Guyana Water Incorporated (GWI) through the Capital Investment and Planning Department (CIPD), which will be responsible for the administration of the proposed operation, including planning, budgeting, and implementation
- 1.2 Program's activities will be co-financed by IDB resources and resources to be provided on a non-reimbursable basis by the European Union (EU)'s Caribbean Investment Facility (CIF),<sup>1</sup> through a Project Specific Grant (PSG). The total cost for the program is estimated to be US\$29,676,500. The IDB financing will be up to US\$7.5 million from the OC resources of the regular lending program, provided through the GLM, and up to US\$9,338,250 OC/FSO from the resources biannual allocation. The EU is expected to contribute €10, 675,000 through a PSG which will be administered by the IDB.
- 1.3 The general objective of the Program is to improve efficiency, quality and sustainability of the potable water services and improve sanitation infrastructure in Georgetown and other areas along the coast. The specific objectives are to: (i) improve pressure, quality and continuity of the water supply service in Georgetown, Cornelia Ida-De Kinderen; Diamond- Herstelling and Goed Bananen Land -Sheet Anchor-No.19; (ii) reduce the level of Non-Revenue Water (NRW) in the program areas, especially in Georgetown; (iii) improve access to adequate sanitation in the program areas; and (iv) strengthen Guyana Water Incorporated (GWI) performance in its operational and management practices. It is proposed that the program be comprised of four components as outlined below:
- 1.4 **Component I: Construction, rehabilitation and expansion of water treatment plants.** Based on the analytical work performed under ATN/OC-14086-GY, this component will finance the final designs and works required to improve the supply system and the water quality in the program areas, creating additional treatment capacity. The specific activities comprised in this component will include: (i) construction of four ground storage tanks to ensure water supply continuity and better pressure in the distribution network; (ii) construction of three new WTPs to ensure that the water quality standards are met; (iii) rehabilitation of the Shelterbelt and the Sophia WTPs, and (iv) expansion of the Central Ruimveldt WTP.
- 1.5 **Component 2: NRW Program.** Complementing Component 1, this Component will finance activities to reduce the NRW level in the program areas. It will include: (i) development of a NRW management program to define a reliable baseline, and monitor and control physical and commercial losses; (ii) system zoning for better management (including the installation of district meters, when

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<sup>1</sup> Launched in 2013 as a mechanism to support Caribbean Countries in financing key infrastructure.

necessary); (iii) meters installation; and (iv) network rehabilitation works. The meters installation will complement the program currently being implemented by GWI and supported by the GOG, with the objective of achieving universal metering by 2020.

- 1.6 **Component 3: Institutional strengthening of GWI.** This component will address the need to strengthen GWI capacity to manage the new infrastructure and move towards operational and managerial international standards. It will include: (i) capacity building activities on asset management and NRW reduction; (ii) capacity building activities to support the creation of a NRW unit within GWI; (iii) activities to strengthen GWI’s water resource management and planning capabilities (including the preparation of a groundwater management plan and the development of management tools); (iv) activities to strengthen GWI administrative, financial and commercial management (including support for the implementation of the new tariff structure); and (v) support for the implementation of a monitoring and evaluation system to track the GWI performance in time.
- 1.7 **Component 4: Improved access to sanitation.** Complementing the efforts made through the LO-2102/BL-GY, this Component will finance the conversion of obsolete pit latrines into efficient septic tank units. The number of pit latrines to be converted in each program area will be determined by the application of established selection criteria, which will include, among others, total household monthly income; absence of a septic tank; housing allocation within a low income lot. Households that benefitted from previous programs will be excluded. The Component will finance: (i) construction and installation of toilets and septic tanks; (ii) dissemination of information on O&M practices; and (iii) hygiene-related public awareness activities (e.g., general dissemination of good practices, sensitization workshops on specific gender based practices, etc.).
- 1.8 **Key Results Indicators.** Annex II describes in detail the Results Framework of the program. The main outcomes to be achieved in the program areas are presented hereafter:

**Table 1. Main Outcomes**

Key Results	Baseline	Target
Water samples that comply with national water quality standards (%)	0	90
Households with 24 hours of service continuity (%)	0	90
Households with water pressure within the national standards, 5m (%)	0	90
Percentage of NRW (%)	>60	<50
Households with upgraded access to drinking water (with connection)	0	55,300
Households with new adequate individual sanitation solution	0	1,000

Definition of upgraded: improvements in terms of water quality (subject to national standards), service continuity (hours/day) and/or water pressure (minimum and maximum levels specified in the technical regulations).

**A. Execution Scheme**

- 1.9 The Executing Agency (EA) will be GWI through the Capital Investment and Planning Department (CIPD), which will be responsible for the administration of the proposed operation, including planning, budgeting, and implementation. Regarding experience in E&S management it might be highlighted that the Linden Water System Rehabilitation Project (LWSRP) has afforded GWI important experience in the application of the GWI Environmental Guidelines for Construction Projects and Environmental Assessment (2005).
- 1.10 An executing group, including one program manager (PM) and two engineers a financial/accounting officer, a procurement officer, and a public relations officer will be designated by GWI and assigned to the execution of the program.
- 1.11 A certified Environmental and Social officer will be designated within GWI to provide environmental support and oversight to the various projects and programs (Oversight sludge investigations and pilot tests, monitoring of implementation of mitigation measures, H&S audits, etc). This designated environmental officer will manage the implementation, supervision and monitoring of the ESMP, with support of a public relations officer for the coordination with the Environmental Protection Agency (EPA), and together with the designated engineers and program manager.
- 1.12 The Divisional manager of operations, along with the assistant divisional managers for operations and the revenue manager of the WSS for the program areas, will be part of the executing group together with the CIPD team, and will report to the program manager. The financial management will be the responsibility of GWI's Finance Department
- 1.13 Also, GWI through its CIPD will be responsible to follow-up on the compliance with the GWI Corporate Environmental Procedures and IDB Policies for program activities, and will be responsible for supervision and reporting.
- 1.14 A qualified consulting firm will be hired by GWI using loan's resources to carry out the supervision of the construction works, to provide support in the monitoring of the ESMP implementation, and to transfer knowledge on proper operation and maintenance of the new assets.

**II. LEGAL AND INSTITUTIONAL FRAMEWORK**

**A. Environmental Protection**

- 2.1 The National Environment Action Plan (NEAP) developed in 1994 outlined the Government of Guyana main environmental policy objectives for sound management of the environment and natural resources. The Environmental Protection Agency was established through the Environmental Protection Act (1996); its identified functions consist in providing for the management, conservation, protection and improvement of the environment, the prevention or

control of pollution, the assessment of the impact of economic development on the environment and the sustainable use of natural resources.

- 2.2 The EPA has the responsibility to ensure the compliance of all new activities to the Environmental Protection Regulations (2000) by issuing the required authorizations and monitoring their application.
- 2.3 “Environmental Guidelines for Construction Projects” and “Corporate Environmental Guidelines” have been prepared by the GWI in conjunction with the World Bank in January 2005. These Guidelines have been signed off by the EPA and include provisions for the preparation for sites-specific environmental briefs, obligations for contractors, health and safety plan, monitoring and evaluation procedures, roles and responsibilities for implementation, etc. They will be applied in a complementary way to the ESMP.

#### **B. Water and Sanitation**

- 2.4 Established in 2002, GWI is responsible for the design, construction, operation and maintenance of the water supply systems in Georgetown and the coastal area and for community water supply systems in the hinterland regions. GWI is also responsible for operation and maintenance of the existing sewerage systems in Georgetown. GWI operates in accordance with the regulations outlined in the Water & Sewerage Act 2002, under a license issued by the Ministry of Housing and Water (MH&W). This Ministry is in charge of sector policies and, along with the Public Utilities Commission (PUC), monitors the services provided by GWI. The PUC, a multi-sectorial regulatory body, has oversight for tariffs and quality of service provided by all public utilities.

#### **C. Water Quality**

- 2.5 Guyana’s laws or regulations do not address technical standards for potable water quality. The WHO Guidelines for Drinking-Water Quality have been used as a guide by GWI for their treatment plants, with a relaxed standard for iron. These standards have also been adopted by the Ministry of Health (MoH) for its monitoring and surveillance programmers.
- 2.6 The relaxed standard for iron was in response to the naturally occurring high levels of iron in most sources of waters in Guyana; the reduction of these levels requires expensive treatment. This and the fact that iron is not detrimental to health, justified this measure.

#### **D. Wastewater Regulations**

- 2.7 In accordance with the Environmental Protection Water Quality Regulations (2000), the EPA was mandated to establish parameter limits for concentration of constituent of effluent which can be discharged into any inland or coastal waters or lands of Guyana. No standards are available today, and no monitoring arrangements for water effluent are presently in place.

- 2.8 In recognition of this situation, together with a number of countries from the wider Caribbean, Guyana ratified the Convention for the Protection and Development of the Marine Environment in the WCR, also known as the Cartagena Convention (adopted in Cartagena, Colombia on March 24, 1983), and signed the Protocol on Land Based Sources (LBS) of Marine Pollution, which was adopted on October 6, 1999. The LBS sets several goals to govern domestic sewage discharges into the waters of the Wider Caribbean.
- 2.9 Within this framework, the “Caribbean Regional Fund for Wastewater Management Project” (GRT/FM-12725-RG) was approved in 2011 to provide the mechanism to initiate a long-term frame work for addressing wastewater issues in Guyana. The “CRFW “program aims to mobilize investments in wastewater management operations, looking at treatment opportunities.
- 2.10 In particular, under the CRFW, financed by the Global Environment Facility (GEF), the Bank is partnering with the United Nations Environment Programme to implement pilots in different countries, with the goal of mobilizing investments in wastewater management in the wider Caribbean region. Guyana has been selected as one of the pilots, whereby \$3 million is allocated to finance wastewater projects based on financially sustainable principles and with engagement from both the public and private sector entities.
- 2.11 Currently, a number of projects are being appraised within the CREW framework, including projects to deal with sludge disposal and treatment, wastewater treatment, treatment of leachate. Also, within the ATN/OC-14086-GY (Support for the Preparation of a Water Supply and Sanitation Infrastructure Improvement Program), a study is being prepared to assess the possibility to convert the Tucville sewer receiving facility into a wastewater treatment facility. Finally, it is worth mentioning that GWI has also presented to the attention of the authorities a proposal for the construction of a wastewater treatment plan for the Georgetown sewer system.

#### **E. Compliance with IDB Policies and Safeguards**

- 2.12 Due to the potential impacts, which are considered minor to moderate but readily manageable implementing known mitigation measures, the project has been classified as Category “B” under IDB’s Environmental Policy (OP-703). Specific IDB Policies and Directives applicable to the program include OP-703 (B.05 “Environmental Assessment Requirements”, B.06 “Consultation”, B.11”Polluiton and Prevention and Abatement”, B.07 “Supervision and Compliance”), Disaster Risk Management Policy (OP-704) and Access to Information Policy (OP-102). Additional relevant policies that apply to and this Program is in compliance with include OP-742 “Health”, OP-761 “Gender Equality” and OP-745 “Basic Environmental Sanitation.

### **III. ENVIRONMENTAL AND SOCIAL SETTING**



- 3.1 Program Areas are all located in the Coastal Zone of Guyana. They are located in two Counties, divided by two of the three major rivers, are within a range of Administrative Districts, including one Municipality, three Regional Democratic Councils (RDC), and six Neighborhood Democratic Councils (NDCs).
- 3.2 Except for the Shelter Belt Treatment Plant in Georgetown, which also extracts water from the East Demerara Conservancy, all of the existing and proposed plants tap the Coastal Aquifer and employ the same treatment process. The hydrogeology, morphology, topography and climate of the program areas are very similar with some local variations, and reflect their common location within the Coastal Plain of Guyana. The characteristics and attributes of the Coastal Plain influenced the relatively similar societal patterns and economic development in the four Program Areas.
- 3.3 In 2010, 94% of the population in Guyana used an improved drinking water source (98% in urban areas, 93% in rural areas), as compared with 89% in 2000.<sup>2</sup> These statistics also indicate that about 84% of the population used improved sanitation facilities (88% in urban areas, 82% in rural areas). Despite these improvements, the water and sewerage services face operational, financial, and institutional challenges, as described below.
- 3.4 Potable water service. With a base of approximately 170,000 customers across the country, GWI water supply systems operate under constant challenges, the main problems including aging pipes and equipment, poor asset management, lack of adequate maintenance, illegal connections, high energy costs, uncertainty in aquifer yields, and inadequate financial performance. As a result, these problems have led to: (i) a gradual deterioration of the networks, with average nation-wide NRW levels estimated between 60% and 70% (higher than 70% in the capital Georgetown); (ii) unreliable service, with pressure as low as 1-3 meters,<sup>3</sup> and an average operating period of 16 hours/day; and (iii) electromechanical efficiency of equipment as low as 50% (in 2012), which, combined with the current operation and maintenance (O&M) practices and the high energy costs, brings the GWI expenditure on energy to about 60% of its annual expenses.
- 3.5 The situation in the three other locations mentioned above (i.e. Cornelia Ida to De Kinderen; Diamond-Herstelling; and Cumberland-Williamsburg) reflects the challenges already described, with the piped borehole water pumped, typically, for less than 16 hours per day; water pressure for the majority of households below the minimum acceptable level of 5m, with a significant proportion actually below 3m; and water losses well above 50%. In all areas, the water quality fails to

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<sup>2</sup> World Health Organization/UNICEF Joint Monitoring Programme on Water Supply and Sanitation: "Progress on sanitation and drinking-water – 2012 Update". An improved drinking-water source is defined as one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with fecal matter. An improved sanitation facility is defined as one that hygienically separates human excreta from human contact.

<sup>3</sup> In the coastal area, according to the License GWI is required to provide 24-hour continual service of pressurized water supply to a minimum of 5 meters at costumers' premises.

- meet WHO quality standards. These conditions would already justify the need of an urgent intervention. However, what makes an intervention in these locations highly strategic is that the construction of well-engineered WTPs would bridge some key geographical “treatment-gaps” in the West Coast of Demerara and in the East Bank Demerara.
- 3.6 In the peri-urban area of Cornelia Ida to De Kinderen residents are receiving untreated water of extremely poor quality. Presently there are two WTPs serving around 60% of the population on the West Coast of Demerara.
  - 3.7 The area of Diamond-Herstellling has been one of the fastest growing housing developments over the past seven years. This area is now comparable to other major towns such as New Amsterdam, Linden, Rose Hall and Anna Regina. However, contrarily to these towns, the area is not served by a WTP.
  - 3.8 The peri-urban area of Cumberland-Williamsburg is located close to the New Amsterdam WTP but does not benefit from the treated water supply as the customers in New Amsterdam. The water possess excessively high iron content, with the iron content being abnormally high (up to 7.2 mg/L, one of the highest within the whole GWI system), and the residents have to spend extra costs to purchase water for consumption.
  - 3.9 Sanitation Service. The city of Georgetown has a population of approximately 175,000 people, with a sewerage system, constructed between 1924 and 1929, that serves only 48,000 citizens (1,160 acres) in central Georgetown.<sup>4</sup> A satellite sewer network located in Tucville serves approximately 3,000 residents. The two systems are connected via a trunk main which originates at the Tucville septage receiving facility and terminates within the central sewer system.
  - 3.10 Greater Georgetown and the Program Areas outside of Georgetown (Cornelia Ida-De Kinderen ; Diamond- Herstellling and Goed Bananen Land -Sheet Anchor-No.19), use pit latrines and septic tanks: Based on a survey conducted in the WSIIR program areas, approximately ninety nine percent have access to “improved sanitation”, more than eighty (80) percent use septic tanks and fourteen (14) percent use improved (VIP) pit latrines (Sanitation Survey, IDB 2014). The pit latrines are generally in poor conditions (below WHO standards) and the septic tanks are not properly maintained (PAHO, 2009).
  - 3.11 The WSSIIP sanitation component will reduce the net impact by the conversion of 1000 pit latrines to septic tanks, improving the sanitation baseline conditions. In addition to the benefits of the conversion of 1000 pit latrines to septic tanks, the potential impacts will be mitigated by training and public education on the construction and maintenance of septic tanks and the potential health impacts, which are covered specifically under the project’s Component 4. The new septic tanks will be installed according to the national standards that take into account

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<sup>4</sup> The service area is bounded by the Demerara River in the West, Vlissengen Road in the East, the Atlantic Ocean in the North and Sussex Street in the South.

the established minimum security distances to water bodies and the design Consultant will review and recommend any additional design aspects in order to ensure the discharges will not be a source of pollution to surface water.

- 3.12 There is no expected an increase of discharge of sewage associated to the WSSIIP: Although the program will finance significant interventions to improve the water supply service in the program areas, it is projected that the gross daily water use at the completion of the WSSIIP will be 87MI/day, down from the current 105MI/d. This reduction is based in part on the proposed Non-Revenue Water (NRW) program aimed at reducing NRW levels to 45%. The NRW program also includes an extensive metering program which will improve cost recovery for the water service and based on GWI's experience with other communities, it can be projected that there will be a reduction of the water consumption per capita
- 3.13 The **Natural Disaster Risk. Guyana** is not susceptible to many of the natural disasters such as volcanoes, hurricanes, tornadoes or earthquakes; they are extremely rare according to the UNDP risk index. Furthermore, although the rains are sometimes delayed, prolonged or severe, droughts are rare. Flooding is the most significant natural threat. The systems and settlements within the Coastal Plain depend on effective management of the movement of water south from the interior to the Coast. Flooding generally occurs with the confluence of high precipitation and high tides when the flow and discharge is impeded by high tides and impaired transmission and drainage systems. Flooding could potentially aggravate the sanitation conditions fostered by the high incidents of pit latrines and a compromised water treatment and delivery system.
- 3.14 Proposed mitigation is detailed in the WSSIIP ESMP and includes specific considerations and recommendations to include into the design criteria of treatment plants, reservoirs and transmission facilities, under the responsibility of the design Contractor.
- 3.15 Social Conditions: The four communities in which the four component systems of the WSSIIP are being installed can fit into two classifications, urban and rural. The rural classification matches De Kinderen – Cornelia Ida and Goed Bananen Land, Sheet Anchor – No. 19 Village, while Georgetown and Diamond – Herstelling can be classified as urban. Generally, in all Administrative Regions, there are slightly higher proportions of males than females. The exception is Region 4 where there are a slightly higher percentage of females. More than 50 percent of the population is below 30 years. However the percentage of older persons is increasing faster than other groups.
- 3.16 De Kinderen-Cornelia Ida Area: The served-communities are classified as an upper middle or less poor group (0.303) according to the Enumeration District Marginality Index (EDMI (Guyana Census 2002). The primary employment sectors/industries are agriculture (rice, vegetables, coconuts and artisanal fishing, beef and dairy farming), service industries and construction, and National and

- local Government Agencies. Sugar cane and coconuts are cultivated on a smaller scale and there is also beef and dairy farming. There is a fairly high level of unemployment. The program area is ethnically and religiously heterogeneous with specific communities having ethnic predominance. Hindus have the highest representation followed by Christians and Muslims. Most households are headed by males but most women work out of the home. While most professional jobs are held by males there are proportionally a higher percentage of female professionals.
- 3.17 Goed Bananen Land, Sheet Anchor- No. 19 Village: The served-communities are classified as an upper or wealthy group (0.188) according to the Enumeration District Marginality Index (EDMI). The primary employment sectors/industries are agriculture (rice, sugar, vegetables, artisanal fishing), service industries and construction, and National and local Government Agencies and mining. There is a fairly high level of unemployment. The program area is ethnically and religiously heterogeneous with specific communities having ethnic predominance. Hindus have the highest representation followed by Christians and Muslims. Most households are headed by males but most women work out of the home. While most professional jobs are held by males there are proportionally a higher percentage of female professionals. There is good access to education up to the secondary level with continued development of education infrastructure.
- 3.18 Diamond-Herstelling: This Program Area is one of the fastest growing communities in Guyana due mainly to the development of planned housing schemes in the Greater Diamond Area. The Diamond – Herstelling area had an EDMI index of -0.299, matches that of Georgetown, reflecting the lowest poverty rating in Guyana. The area is growing exponentially fuelled by housing and related infrastructure development. While the Greater Diamond Area is mainly a suburban housing scheme, the other communities (Little Diamond, Farm, Arcadia/Mocha, Coven Garden and Herstelling) within the Program Area are mostly rural. Their primary employment sectors/industries are agriculture (sugar, vegetables, artisanal fishing), service industries, manufacturing, construction, and National and local Government Agencies A large portion of the non-agriculture workers work in Georgetown and other parts of Region 4. The program area is ethnically and religiously heterogeneous. Christians have the highest representation followed by Hindus and Muslims. Most households are headed by males but most women work out of the home. While most professional jobs are held by males there are proportionally a higher percentage of female professionals. There has been a net inflow of females into Region 4. There is good access to education up to the secondary level with continued development of education infrastructure. Tertiary education is accessible within the Region.
- 3.19 Georgetown area: Georgetown, the Capital City of Guyana reflects all the vibrancy and challenges in Guyana. What was once the known as the “Garden City” is plagued with overcrowding in certain areas, a population of 134,497 were registered on the 2002 National Census, poor planning, impacted traffic and lack of resources to supply basic services. Some of the social challenges

experienced in Georgetown stems from consistently high economic activity and growth over the last decade. It has an EDMI index of - 0.299 which is classified as lowest poverty rating in Guyana. There is a significant growth in Tourism, Infrastructure improvement and housing sector. There is a good access to education infrastructure. Public schools are notable complemented by private schools. Tertiary education is accessible within the Region. Their primary employment sectors, include service industries, manufacturing, construction, and National and local Government Agencies, entertainment, and limited agriculture. There is a fairly high level of unemployment even as there is a reported shortage of skilled and professional workers. Most households are headed by males but most women work out of the home. While most professional jobs are held by males there are proportionally a higher percentage of female professionals. There has been a net inflow of females into Region 4.

#### IV. ENVIRONMENTAL AND SOCIAL IMPACTS AND RISKS

- 4.1 The WSSIIP Program Areas are not expected to have any major, significant and/or irreversible negative environmental or social impacts. Expected negative impacts are mainly related to water supply infrastructure construction works and operations, including construction noise, dust, waste generation, traffic disruption and health and safety risks
- 4.2 **Construction phase:** Impacts found in this stage are typical for this type of work such as, generation of noise, dust and combustion gases, soil or surface water contamination, back-wash water containing suspended solids, chemicals, risk of accidents due to traffic, opening of ditches, accumulated earth mounds, presence of machinery, solid waste generation in the camp, difficulties of access to homes and public buildings.
- 4.3 **Operation phase: Risk** of water supply not meeting quality standards due to improper management of water treatment plants, poor maintenance of the distribution system, improper handling and storage of water at the household level, contamination of surface or groundwater water from the discharge of untreated backwash and sludge from treatment plants or a lack of mishandling of individual sanitation facilities (septic tanks), disruption to treatment plants due to flooding, generation of noise and vibration due to operation of the pumps and the water treatment plants equipment, production of sludge and other waste materials in the water treatment plant, leakage in water pipelines, etc.
- 4.4 Regarding potential impacts over water resources availability, there is no expected negative changes in groundwater yields due to the Program: The WSSIIP Feasibility Study projects that there will be a net reduction of (27MI/day) water extracted from the Coastal Aquifer, even though there will be a marked increase in the amount of residents receiving treated water (49,000), and in the volume of treated water produced (18MI/d). The project reduction is supported

by decommissioning of wells, the (improvement) reduction in the rates of non-revenue water, the universal use of meters, and the rehabilitation of the distribution network. The risks associated to the success and sustainability of these efficiency measures has been mitigated through the NRW Component by which such activities are being funded and effectively implemented by the Program.

- 4.5 Natural disaster risks and climate change vulnerability: while flooding is the most significant natural threat in Coastal Plain, and climate change could potentially aggravate flooding by the combined effect of both extreme rainfall events and sea level rise, this risk has been assessed for the Program with the result of being classified as low, given specially the location for the proposed facilities. However, specific mitigation and control measures have been included in the Program ESA and ESMP and will have to be considered within the final project design (as part of the Design Consultant's contract). For instance, sensitive electro-mechanical will be flood-proofed and placed on elevated platforms as much as possible; storage facilities for treatment chemicals will also reflect the propensity for flooding on the Coastal Plain.

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## V. MANAGEMENT OF IMPACTS AND RISKS

- 5.1 Mitigation measures for the direct impacts will be incorporated into the bidding documents of the works and will be under the direct responsibility of the contractor, under the supervision independent (supervision) contractors to GWI, the of the Executing Agency, and may be monitored by the IDB. Both direct and indirect environmental impacts will be mitigated through the implementation of the environmental and social impacts management strategy outlined in the ESMP.
- 5.2 **Construction Phase:** During construction, mitigation measures described in the ESA, the ESMP and GWI Environmental Guidelines for Construction Projects and Environmental Assessment will be applied. These include measures such as: public awareness and information campaigns, the preparation and disclosure of a construction planning and phasing schedule, coordination of service interruption with public utilities and public administrations, the establishment of a grievance mechanism, the adherence by the contractor to strict health and safety measures, traffic management, restricted circulation hours for heavy trucks and machinery, rerouting of vehicle and pedestrian traffic, marking and temporary fencing of excavated areas and trench crossings.
- 5.3 Additionally, access routes, signage, etc. will be constructed to facilitate access and avoid accidental falls, application of dust suppression methods, limited working hours, management of construction materials and waste, implementation of safety conditions in the trenches through the use of appropriate shoring systems and dewatering, implementation of warning signs, barriers and signals, flood emergency plans, etc. The informed participation of the impacted communities,

civic organizations and interested parties will be facilitated through public consultation and awareness programs using a variety of media.

- 5.4 **Operations phase:** Creek crossing (pipes) will be constructed in a way to avoid leakage or infiltration; leakage detection and repairs will be part of ordinary GWI maintenance procedures; a pilot study for management of sludge/wastes from water treatment plant will be developed under the Program and will be presented before the operation of the new treatment plant (including protocols for characterization, handling and disposal); appropriate constructive measures and scheduled maintenance of pumps would prevent any significant noise from pump stations and water treatment plants. Additionally a hydrologic study of the costal aquifer will be instituted to establish the aquifer's boundaries and sustainable yield as part of the new Groundwater Management Plan to be developed under the Program.
- 5.5 **Supervision:** The contractor has the main responsibility for the implementation of the mitigation measures during the construction phases. Project supervision of civil works, including environmental and social issues, will be provided by an independent consulting firm. The supervision firm shall have the appropriate experience and qualifications allowing for effective supervision and monitoring of the implementation of the mitigation measures defined in the ESMP. The supervision consulting firm will represent GWI and liaise with the Contractor and GWI continuously and effectively. The H&S/Environmental Specialist in the GWI Program Management Team or Executing Group will monitor/audit and, provide guidance on the WSSIIP works during the construction and operation phases.
- 5.6 **Monitoring and Reporting:** During construction phase, the Supervision Firm will issue monthly progress reports on the advancement of works incorporating a chapter on environmental and social impacts and health and safety issues and on the application of the EMSP for the reporting period. The Executor will report these issues to the Bank in its Semester Report. The Contractor shall keep daily site logbooks reporting the salient information concerning staff, equipment, materials delivery, climatic conditions and accidents that occurred during working hours. During the operation phase GWI will implement a monitoring programme to assure the production and delivery of water at the designated quality and satisfaction of the project objectives. A monitoring and inspection programme should be instituted to focus on the operation and performance of the various component systems in the Program Areas. Compliance with **WHO water quality standards** will be a primary issue focus of the monitoring programme. Water quality monitoring should include treatment plant, distribution system and households
- 5.7 **Management of Wastewater:** The completion of the WSSIIP Program is not projected to increase the amount of generated domestic wastewater. The projection is that water consumption (hence wastewater) will in fact decrease with the implementation of universal volumetric tariff for water supply (through the

NRW component), since many households will, for the first time, have to pay for water consumption. This supported by the experience from previous projects in Guyana with metering implementation activities.

- 5.8 The WSSIIP will in addition improve the current conditions by the sanitation component's conversion of 1000 pit latrines to septic tanks, will improve the sanitation baseline conditions. Additional potential impacts will be mitigated by training and public education on the construction and maintenance of septic tanks and the potential health impacts.

## **VI. PUBLIC CONSULTATION**

- 6.1 As part of the Environmental and Social Analysis, a socio-economic survey was conducted, in part, to inform the residents about the advantages of the rehabilitation of the WSSIIP within their respective Program Area, gather information concerning their socio-economic conditions, their evaluation of the cost and quality of service, and assessing their willingness to pay for an improved service. The survey has been carried out over more than 500 households.
- 6.2 A series of consultations/ meetings were conducted by the GWI and IDB Staff and consultant in Fort Ordinance (Sheet Anchor- # 19 Village) and, Uitvlugt (De Kinderen – Cornelia Ida) on January 29 and February 5, respectively, to inform the communities about the project, its scope, possible impacts, and to get their feed –back and inputs to carry out the Project Risk Management analysis.
- 6.3 Subsequent meetings were conducted after the Draft ESA was published and located on IDB and GWI websites; the consultation meetings were held on March 1 and March 15, 2014, at Diamond and Kitty (Georgetown), respectively. The purpose of this meeting was to inform the stakeholders and residents of the improvements expected as a consequence of the installation and rehabilitation of the respective systems, and the potential positive and negative impacts associated to the works. Copies of the Draft ESA report were sent before the meeting to the representatives of stakeholder or residents, in order to enhance the knowledge about the project characteristics and facilitate discussion on the different aspects.
- 6.4 The final version of the ESA incorporating the comments received during the public consultation process and be disclosed on the IDB and GWI websites, prior to the Analysis Mission, according to the OP-102 “Access to Information” policy.
- 6.5 As the ESMP states, further consultation meetings shall be organized before the commencement of works, including the coordinating the activities between the Contractor and the different public utility operators and involved stakeholders. Additionally, information and education campaigns will accompany all the construction phases. The selected Contractor shall nominate a person from his staff who will liaise with the representatives of GWI, Work Supervision, Municipality, residents and public authorities. The public consultation under the



ESMP will include specific conditions in order to ensure that both genders will be equally attended.

## **VII. RECOMMENDATIONS**

- 7.1 **Special contractual conditions for the first disbursement** should include: (i) evidence that the Operations Manual for the program, with an Environmental and Social Management Plan (ESMP) as annex, is approved by the Board of GWI and has entered into effect in accordance with terms and conditions previously agreed upon with the Bank.
- 7.2 **Special contractual conditions for execution** should include: (i) compliance with the ESMP and the GWI Corporate Environmental Guidelines; and (ii) appointment by GWI of an environmental and social officer before the commencement of any infrastructure work.