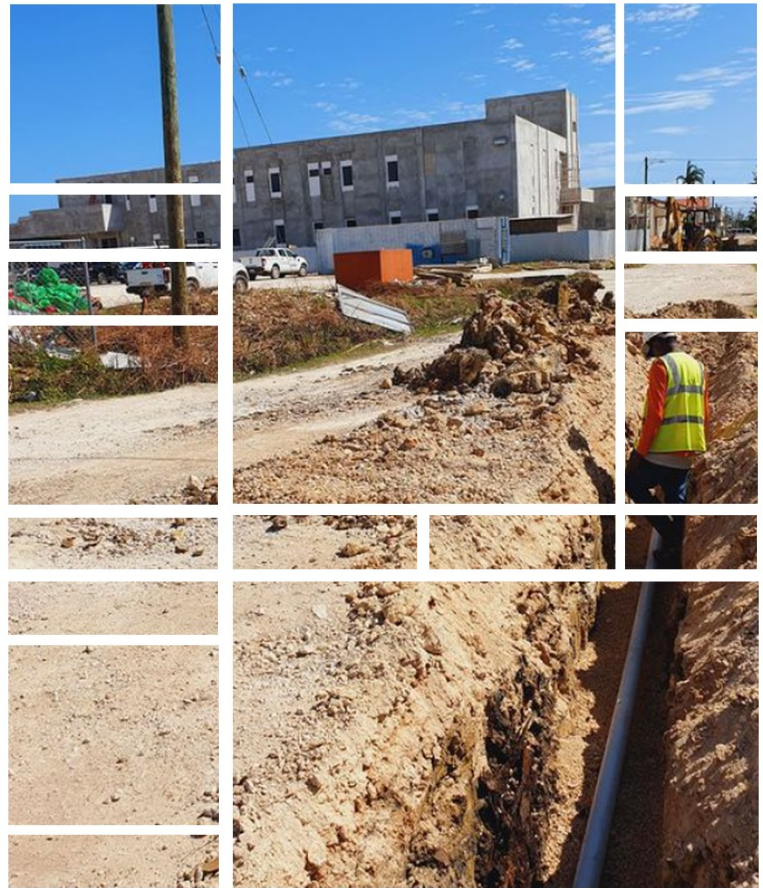
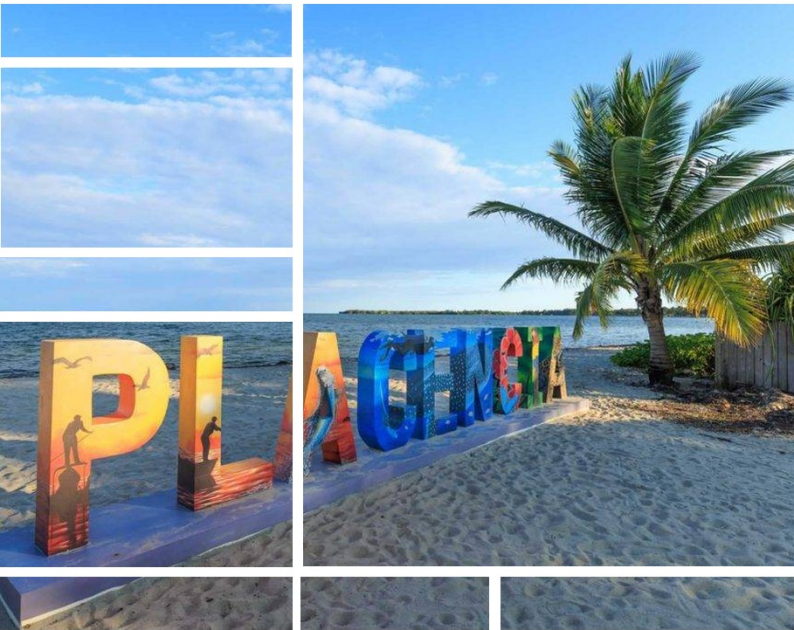
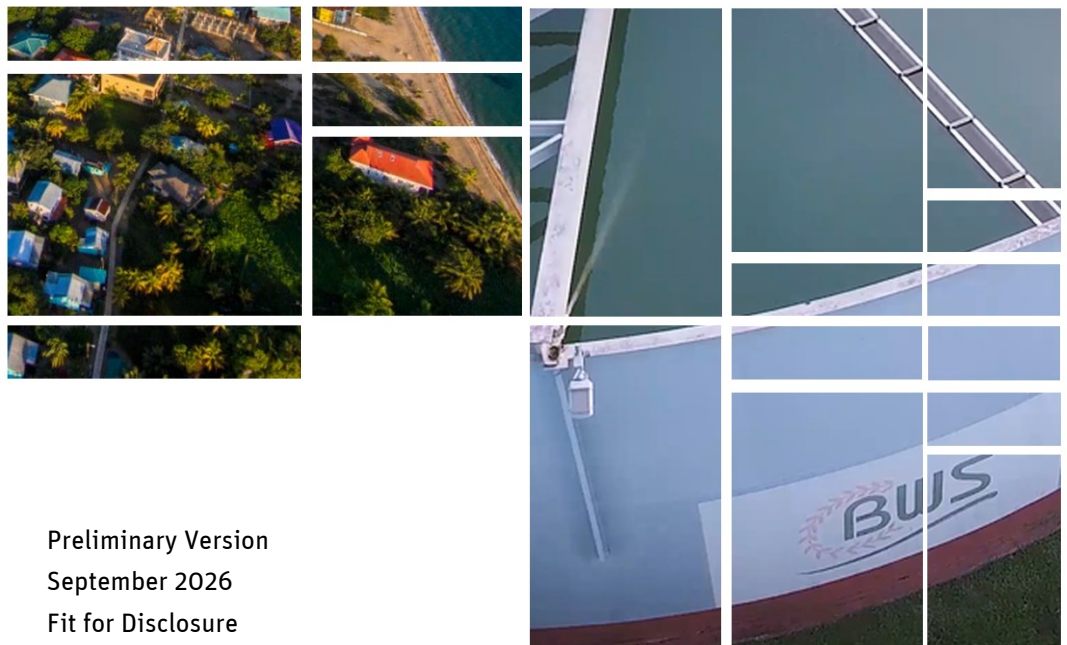




Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)

Environmental and Social Assessment | Environmental and Social Management Plan



Document Datasheet

<u>Executing Agency</u> Belize Water Services Limited (BWS)	<u>Project</u> Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)			
During the preparation of the Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056), the Belize Water Services Limited (BWS), with financing from the Inter-American Development Bank (IDB), commissioned the preparation of this Environmental and Social Assessment (ESA) for the proposed works under the Project. The purpose of this document is to assess the potential environmental and social impacts and risks associated with the Project and evaluate its alignment with the requirements of the IDB Environmental and Social Policy Framework (ESPF).	<u>Client</u> Interamerican Development Bank <u>Contract Date</u> August 2026			
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Executive Summary

Introduction

The objective of this Environmental and Social Assessment (ESA) is to evaluate the **Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)**, hereinafter the Project, in accordance with the Interamerican Development Bank's Environmental and Social Policy Framework (ESPF).

The specific objectives of the ESA were the following:

1. Conduct a comprehensive diagnostic evaluation of the Environmental and Social Baseline of the Projects Intervention Area. This includes a synthesis of the pertinent legal and institutional regulatory framework.
2. Identify and evaluate the environmental and social impacts and risks associated with the Projects, spanning all the phases from construction to operation and eventual closure. These evaluations encompass the physical, biological, and socioeconomic aspects of the environment.
3. Establish effective mitigation measures and implement robust management procedures to minimize the assessed impacts and risks. This will culminate in the formulation of the Project's Environmental and Social Management Plan, which will serve as a guiding document.

Project Description

The Project's general development objective (GDO) is to reduce coastal water pollution in Placencia, supporting the sustainability of the Blue Economy, particularly the coastal tourism sector.

The Project is structured in two components:

Component 1. Wastewater Collection and Treatment System for Placencia Peninsula (US\$18,600,000). This component will finance the construction and commissioning of a sewerage system and a wastewater treatment plant for the Placencia Peninsula, including training of BWS personnel in operation and maintenance of the infrastructure and the startup.

Component 2: BWS's planning and service management strategy (US\$600,000). This component will address the strengthening of BWS's operational and technical capacities to improve efficiency, reliability, sustainability, and resilience of sanitation services. This includes (i) enhanced planning and asset management systems, strengthened customer and environmental management, and the adoption of data-driven and preventive operational practices; and (ii) the development of a strategy for connectivity to the sewer system which will include incentives, support during the transition period, alongside a public awareness campaign on the proper use of the sewer system which includes the tourism establishments.

Legal and Institutional Framework

Chapter 3 of this ESA outlines the legal, sectoral, and institutional framework of the Projects, considering environmental, social, occupational health, and safety areas.

The legal framework is described based on international agreements and national environmental laws.

As this Project is proposed to be financed by a loan operation from the Inter-American Development Bank (IDB), this Chapter also describes the Environmental and Social Performance Standards included in IDB's Environmental and Social Policy Framework, which are applicable to the Project.

Environmental and Social Baseline

Chapter 4 of this ESA presents the Environmental and Social Baseline of the Project, where the analysis carried out allows us to know the location and description of the area of execution and influence of the project, to determine its current situation and the critical aspects to consider during the project's implementation.

In this section of the Study, the baselines for the physical, biological, and socioeconomic environments are described.

Likewise, an analysis of biodiversity and protected areas, vulnerability to natural disasters, and cultural heritage is carried out.

Environmental and Social Impacts and Risks

The Environmental and Social (E&S) Risk and Impact Assessment Process is developed in **Chapter 5**.

For the impact identification, the interactions between the project actions and the environmental components (physical, biological, and socioeconomic environment) were analyzed.

The analysis included an **impact matrix** for the Project, identifying the interactions between project's actions and environmental and social factors. In each box of the matrix, an impact rating was presented, according to its sign and magnitude.

During the **Construction Phase**, the primary adverse impacts identified include the risk of

occupational accidents during construction activities, as well as the potential for soil, water, flora, and fauna contamination associated with land reclamation, site grading, and vegetation removal.

During the **Operational Phase**, most significant impacts are predominantly positive, notably the reduction of the bacteriological and nutrient loading into regional water bodies, the introduction of a safely managed public sanitation network and the elimination of severe human health risks associated with exposure to contaminated marine and lagoon waters. Negative operational impacts were assessed as generally low in magnitude and are mainly associated with air emissions and potential nuisance odors, noise generation, accidental system overflows and the risk of occupational accidents during the works.

A **Disaster and Climate Change Risks Assessment** was included, which evaluates potential natural hazards that may impact on the project structurally and operationally, as well as the risks the project might introduce or exacerbate for communities and the environment.

The analysis identifies key hazards such as tropical storms and hurricanes, coastal erosion, sea level rise, and flooding, assessing their likelihood and potential consequences. Based on the identified risks, the project was categorized as **moderate** and mitigation measures proposed within the **Disaster Risk Management Plan (DRMP)** to enhance resilience.

Environmental and Social Management Plan

The ESMP for the construction stage includes the following Programs:

- 1 Monitoring and Control of Compliance with Mitigation Measures, Permits and Authorizations
- 2 Management of Construction Sites

- 3 Air Quality, Noise and Vibrations Management
- 4 Environmental and Social Liabilities
- 5 Flora and Fauna Management Program
- 6 Energy and Resource Efficiency
- 7 Waste Management
- 8 Effluent Management
- 9 Chemical Substances Management
- 10 Occupational and Community Health and Safety
- 11 Traffic and Pedestrian Management
- 12 Pest and Vector Control
- 13 Socio-Environmental Training for Construction Personnel
- 14 Disaster Risk and Climate Change Management Program
- 15 Emergency Preparedness and Response
- 16 Community Information and Participation
- 17 Chance Find Procedure
- 18 Coordination with Service Providers

Chapter 6 outlines the essential requirements for ESMP programs for construction stage and provides general guidelines for programs to be implemented during the operational stage (Operational ESPM).

This ESA also includes, as a separate document to this ESA/ESMP, a Stakeholder Engagement Plan to be implemented throughout the project's life cycle.

Conclusions

As usual in works of these characteristics, there are potential impacts and risks, mainly in the construction phase, such as negative impacts due to the risk of occupational accidents during the works, risk of soil and water contamination due to accidental spills, risk of soil erosion and sediment runoff, and risk of contamination due to poor

management of the solid and/or hazardous waste generated.

These negative impacts of the construction phase are limited in time, occur during the work period, and affect only the direct area of influence of the projects.

Potential temporary disruptions to economic activities during construction may occur in localized areas; however, these are expected to be short-term and manageable through the mitigation measures established under Program 16. Community Information and Participation, including measures to maintain access, minimize the duration of work, and coordinate with potentially affected businesses and economic activities.

The negative impacts are mitigable and acceptable, by the application of adequate mitigation measures is detailed in Chapters 5 and 6 of this study, along with the application of good construction practices for project design and siting that guaranteed compliance with national regulations, and the IDB Environmental and Social Performance Standards. These measures are expected to mitigate all the identified impacts and risks.

The Project will contribute to long-term environmental sustainability by reducing coastal water pollution through the collection and treatment of wastewater in the Placencia Peninsula. It will improve water quality, support the sustainability of the Blue Economy and the coastal tourism sector, and strengthen the institutional and operational capacity of the Belize Water Services Limited (BWS) to deliver efficient, resilient, and sustainable sanitation services.

Therefore, the operation is considered **feasible**, without significant negative socio-environmental risks or impacts that cannot be mitigated.

Abbreviations

BAP	Biodiversity Action Plan
BOD	Biochemical Oxygen Demand
BSWaMA	Belize Solid Waste Management Authority
BTB	Belize Tourism Board
BTIA	Belize Tourism Industry Association
BWS	Belize Water Services Limited
CCLIP	Conditional Credit Line for Investment Projects
COD	Chemical Oxygen Demand
DOE	Department of the Environment
EA	Executing Agency
EIA	Environmental Impact Assessment
ESA	Environmental and Social Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESPF	Environmental and Social Policy Framework
ESPS	Environmental and Social Performance Standard
FOG	Fats, Oils and Greases
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
GVB	Gender-Based Violence
IBA	Important Bird Areas
ICIM	Independent Consultation and Investigation Mechanism
IDB	Interamerican Development Bank
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
MABR	Membrane Aerated Biofilm Reactor
MSDCC	Ministry of Sustainable Development, Climate Change & Solid Waste Management
MSW	Municipal Solid Waste
NICH	National Institute of Culture and History
NDC	Nationally Determined Contribution
NEAC	National Environmental Appraisal Committee
NEMO	National Emergency Management Organization
OAS	Organization of American States
PC	Public Consultation
PPCSD	Placencia Peninsula Citizens for Sustainable Development
PUC	Public Utilities Commission
SAE	Sexual Abuse and Exploitation
SEP	Stakeholder Engagement Plan
TSS	Total Suspended Solids
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWF	World Wildlife Fund
WWTP	Wastewater Treatment Plant

1. Introduction

1.1. Background

The objective of this Environmental and Social Assessment (ESA) is to **evaluate the environmental and social risks and impacts** of the Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056), hereinafter the “Project”.

This Project is the first under the Conditional Credit Line for Investment Projects (CCLIP). Its General Development Objective (GDO) is to reduce coastal water pollution in Placencia, thereby supporting the sustainability of Belize's Blue Economy, particularly the coastal tourism sector.

The Borrower and Executing Agency (EA) will be Belize Water Services Limited (BWS), with Belize acting as guarantor. Belize will provide the sovereign guarantee in accordance with the Policy on Guarantees Required from Borrowers (OP-303) – Revised Version (document GP-104-2) applicable to the referenced operation.

The total cost of the Project is US\$20,000,000, proposed to be financed by an IDB loan.

This Environmental and Social Assessment was developed as part of the environmental and social evaluation process of the Project and its components. Its purpose of which is to **predict, identify, assess, and correct potential environmental and social risks and impacts** of the Project, and to ensure compliance with the requirements established in the Environmental and Social Performance Standards (ESPS) contained in the IDB Environmental and Social Policy Framework.

By the Interamerican Development Bank's Environmental and Social Policy Framework (ESPF) and based on existing information on the Project, the Project has been classified as category “B”. The Project is expected to generate mostly local and short-term negative environmental and social impacts during the execution of the works. Effective and readily available mitigation measures and management plans have been identified to appropriately manage these impacts.

1.2. Objectives

The specific objectives of the Environmental and Social Assessment are:

1. Ensure that environmental, social, and occupational and community health considerations are integrated into the project design, construction, and operation.
2. Carry out the diagnosis of the Environmental and Social Baseline of the Project Intervention Areas, as well as the legal and institutional regulatory framework.
3. Identify and assess the main environmental and social impacts and risks on the physical, biological, and socioeconomic environment, in the Construction, Operation and Closing stages of the Project.
4. Identify the mitigation measures and management procedures to minimize the impacts and risks assessed and outline the contents of the Project's Environmental and Social Management Plan.

1.3. Scope

This document summarizes the process of environmental and social evaluation of the Project, as described in Chapter 2. **Table 1** below presents the outline and organization of the content of this Environmental and Social Assessment.

Table 1 - Contents of the Environmental and Social Assessment (ESA)

Chapter	Title	Description
1	Introduction	This chapter describes the scope of the ESA, including its contextual framework and objectives.
2	Project Description	This chapter includes an overview of the Project, describing the interventions planned in each component and their respective scopes.
3	Legal and Institutional Framework	This chapter describes the legal and institutional framework applicable to the Project, including the Inter-American Development Bank's Environmental and Social Policy Framework.
4	Environmental and Social Baseline	This chapter summarizes the basic information available about the physical, biological and socioeconomic environment within the Project intervention area and/or the indirect area of influence of the Project.
5	Environmental and Social Impacts and Risks	This chapter provides an overview of the methodology employed for assessing the Project's impacts on the physical, biological, and socioeconomic environment, and a detailed presentation of the results. Additionally, both general and specific mitigation measures are identified and expounded upon with the aim of avoiding, minimizing or compensating adverse impacts while enhancing positive impacts.
6	Environmental and Social Management Plan	This Chapter addresses the identified mitigation measures, organizing them into structured programs for deployment across the Project phases. Additionally, it establishes the institutional roles and responsibilities for effective implementation.
7	Conclusions	A summary of the conclusions arising from the ESA process, limitations and recommendations.
References		A list of all the references cited in the report and the documentation employed throughout the assessment process.
Annexes		The technical annexes include: 1. Labor Management Procedure. 2. Biodiversity Action Plan (BAP) Guidelines

2. Project Description

This chapter provides a comprehensive description of the Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056), the first operation under the Conditional Credit Line for Investment Projects (CCLIP), covering its objectives, components, and associated costs.

Additionally, it includes an analysis of both the general and technical specifications of the project, offering an understanding of its scope, design, and implementation aspects.

2.1. Background and Justification

The proposed Project consists of the development of a centralized sanitation system for the Placencia Peninsula, including a wastewater treatment plant (WWTP) and associated sewerage infrastructure.

The Project aims to reduce coastal water pollution and to increase access to safely managed sanitation services.. The WWTP and sewerage system will be designed to accommodate the growing demand for sanitation services and ensure adequate wastewater treatment to minimize environmental impacts.

The Project responds to significant gaps in wastewater management and sanitation services in Belize and, particularly, in Placencia. In 2024, only 11% of households in Belize had access to sewerage services, with coverage concentrated in Belize City, Belmopan, and San Pedro. In Placencia, the absence of a centralized sewerage and wastewater system has resulted in widespread reliance on on-site sanitation systems, including septic tanks and pit latrines.

Furthermore, approximately 35% of households, 10% of businesses, and 5% of hotels reportedly discharge wastewater directly into the environment, while the remaining on-site systems provide limited treatment due to high groundwater tables, permeable soils, and inadequate maintenance. These conditions contribute to the transport of nutrients, pathogens, and other contaminants to groundwater, the Placencia Lagoon, and adjacent coastal waters.

In this context, the Project seeks to address critical wastewater and sanitation gaps by expanding wastewater collection and treatment infrastructure, reducing pollutant loads reaching receiving environments, and supporting the long-term sustainability of the Blue Economy and coastal tourism in the Placencia Peninsula.

2.2. Objectives

This Project is the first under the CCLIP and its **general objective** is to reduce coastal water pollution supporting Belize's Blue Economy development. The **general development objective (GDO)** of the first CCLIP operation is to reduce coastal water pollution in Placencia, supporting the sustainability of the Blue Economy, particularly the coastal tourism sector. Finally, the **Specific Development Objective** is to increase access to safely managed sanitation services in the Placencia Peninsula.

2.3. Components

The Project has two components:

Component I. Wastewater Collection and Treatment System for Placencia Peninsula (US\$18,6 million).

This component will finance the construction and commissioning of a sewerage system and a wastewater treatment plant for the Placencia Peninsula, including training of BWS personnel in operation and maintenance of the infrastructure and the startup.

Component II. BWS's planning and service management strategy (US\$0,6 million).

This component will address the strengthening of BWS's operational and technical capacities to improve efficiency, reliability, sustainability, and resilience of sanitation services. This includes (i) enhanced planning and asset management systems, strengthened customer and environmental management, and the adoption of data-driven and preventive operational practices; and (ii) the development of a strategy for connectivity to the sewer system which will include incentives, support during the transition period, alongside a public awareness campaign on the proper use of the sewer system which includes the tourism establishments.

Administration or other contingent expenses (US\$0,8 million).

It will finance administrative costs, evaluations and external audits.

2.4. Beneficiaries

The Project is expected to have approximately 1,844 direct beneficiaries, who will gain access to wastewater collection and treatment services by the end of the Project.

In addition, the Project is expected to benefit an average of 300 tourists per day and 245 commercial establishments in the project area.

BWS will also be an institutional beneficiary through actions aimed at improving its operational and financial efficiency and incorporating climate resilience considerations into the design of the wastewater infrastructure.

2.5. Costs and Financing

The Project will be structured as a specific investment loan for a total amount of **US\$20,000,000**.

The proposed financing will originate from a loan from the Interamerican Development Bank, in a loan structure comprising US\$16 million in Ordinary Capital (OC) resources, US\$3 million from the Belize Revolving Fund as local counterpart financing, and a US\$1 million grant from the AquaFund Program (BL-J0013).

2.6. Implementation Arrangements

Belize Water Services Limited (BWS) will act as both the **Borrower and Executing Agency (EA)**.

Belize will provide the sovereign guarantee in accordance with the Policy on Guarantees Required from Borrowers (OP-303) – Revised Version (document GP-104-2). The sovereign guarantee will apply only to the Borrower's financial obligations, including payments of principal, interest, and fees, and will not cover the Borrower's performance obligations. Monitoring reports will be financed by the IDB.

2.7. Description of the Infrastructure Interventions within the Project

The following section has been developed based on the information available at this stage and provided in the following documents: “Project Profile”, “Initial Environmental and Social Review Summary (ESRS)”, “Feasibility Study for the Placencia Peninsula Pilot Wastewater Management System (2012)”, “Nutrient Fate and Transport Study of the Placencia Peninsula and Marine Environs (2022)” and “Cost Analysis - Vacuum Sewer System and WWTP, Placencia (2026)”.

The Project comprises two components: **Component I**, focused on the development of the wastewater collection and treatment system for the Placencia Peninsula, and **Component II**, focused on strengthening BWS’s planning and service management capacities.

Component 1 aims to implement a centralized sanitation system in the Placencia Peninsula comprising a wastewater collection system and a centralized wastewater treatment plant (WWTP). The system will collect and convey wastewater from households and businesses to the WWTP for treatment prior to discharge, reducing untreated wastewater discharges and associated pollution.

As a result, the Project is expected to increase access to safely managed sanitation services for the population and commercial users, including tourism-related establishments, in prioritized areas of the Placencia Peninsula, while improving wastewater treatment performance and reducing untreated wastewater discharges and associated nutrient loads.

The proposed Project area is located in Placencia, Belize’s third most visited tourist destination. The area experiences high visitor flows and rapid expansion of tourism-related infrastructure, placing increasing pressure on water, wastewater, waste management, and energy systems. Inadequate wastewater management contributes to coastal water pollution and ecosystem degradation, posing risks to coastal ecosystems and undermining the sustainability of tourism activities that depend on good coastal water quality.

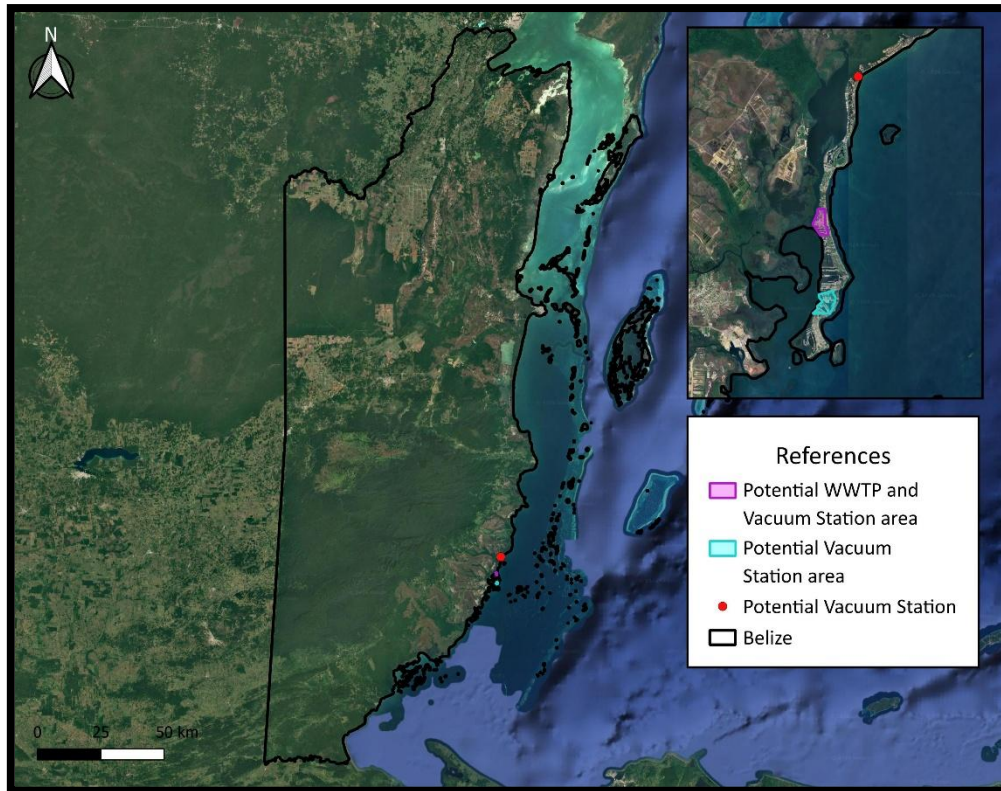


Figure 1 – Potential WWTP and Vacuum Station areas. Source: PlanEHS, 2026.

2.7.1. Sewerage System

During the first phase of the Project, the sewerage system is expected to cover the area extending from the southern end of the Placencia Peninsula to the Umaya Resort in Maya Beach, broadly corresponding to the area currently served by the potable water system. The sewerage system is estimated to have an approximate length of 15 km, although the final extent and length of the sewerage network will be refined during subsequent stages of design.



Figure 2 – Placencia Peninsula network. Source: Cost Analysis - Vacuum Sewer System and WWTP, Placencia, 2026.

Based on the preliminary assessment, **three main areas for pumping/vacuum stations (VS)** are being considered to convey wastewater from the different service areas, including Maya Beach, Seine Bight and Placencia Village, to a single centralized treatment facility. The preliminary areas of these stations and the proposed WWTP site are shown in the following figure.



Figure 3 – Potential WWTP and Vacuum Station (VS) locations. Source: PlanEHS, 2026.

The design of wastewater pumping stations should address **pump capacity and performance, equipment standards, and wet well configuration**. Pumps should be sized to accommodate the applicable design flows, including peak hourly flow (PHF), with at least two pumps generally provided per station and the capacity of the remaining pumps sufficient to handle peak flows when one unit is out of service.

Pumps handling raw wastewater should be protected against clogging and damage, be capable of passing solids of at least 3 inches in diameter and have suction and discharge openings of at least 4 inches. Non-corrosive materials should be used for internal pump components. Wet wells and pump intakes should be designed to minimize turbulence, with intake piping kept as short and straight as possible and dimensions established in accordance with the pump manufacturer's recommendations. Pumps and controls at main pumping stations should allow variable delivery rates to maintain

wastewater flows to the treatment works at approximately the rate at which wastewater enters the station.

System Configuration

The final configuration of the sewerage system has not yet been defined and is currently being evaluated based on a combination of **gravity/pressure sewer systems and vacuum sewer systems**. The preliminary design identifies areas where vacuum sewerage is considered the most suitable option, as well as areas where a combination of gravity/pressure and vacuum systems may be feasible.

In the **gravity system** wastewater from individual properties is conveyed by gravity to local collection points or clusters and then pumped between adjacent clusters through a pressure system until reaching the WWTP. This approach allows wastewater to be progressively conveyed from one cluster to the next toward the centralized treatment facility.

The main design criteria for the gravity sewer system address **pipe diameter, installation depth, slope, materials, and infiltration control, considering local soil conditions, groundwater levels, and hydraulic performance requirements**. Community sewer pipes receiving raw wastewater should generally have a minimum diameter of 6 inches, with 8-inch pipes preferred. Given the instability of local soil and high groundwater levels, sewer inverts should generally not be installed at depths greater than 6 feet, while minimum cover requirements should be maintained depending on the location. Sewers should be designed to achieve a minimum mean velocity of 2.0 feet per second when flowing full, based on Manning's formula, with minimum pipe slopes established accordingly. PVC is the preferred material for gravity wastewater collection systems based on standard practice in Belize, although final materials and installation requirements will be defined during detailed design. Sewer joints should be designed to minimize infiltration and prevent root intrusion, and post-construction leakage testing and inspection should be conducted prior to commissioning.

The **vacuum sewer system**, in contrast, uses pressure within a closed pipe network to convey wastewater from individual property or local collection points to a central vacuum station or, where applicable, directly to the WWTP. Under this configuration, wastewater from individual properties would initially flow by gravity into a local cistern, from which it would be drawn into the pressure-pipe system.

The final selection of the sewerage system will depend, among other factors, on coordination with local authorities and agreements with affected landowners regarding the installation of the required infrastructure.

2.7.2. Wastewater Treatment Plant

The potential WWTP location is in Seine Bight, in proximity to the Placencia Lagoon. Its central location along the Placencia Peninsula would facilitate the conveyance of wastewater from both the Maya Beach area and Placencia Village.

According to the Nutrient Fate and Transport (NFT) Study¹, the construction of the centralized WWTP in the Seine Bight area could require land clearing and the removal of vegetation, including mangroves. Furthermore, as the area may not provide sufficient available land, land reclamation (fill) may be

¹ Belize Water Services Limited. (2020, June). *Nutrient fate and transport study of the Placencia Peninsula and marine environs* (Report No. 181100.00; Final Project Report).

required. Potential impacts associated with the location and operation of the WWTP are assessed in Section 5 of this ESA.



Figure 4 – Potential area for the wastewater treatment plant (WWTP) at Seine Bight. Source: PlanEHS, 2026.

The **proposed configuration of the WWTP** consists of three wastewater treatment modules, each with a capacity of 200,000 GPD (approximately 757m³/day), for a total design capacity of approximately 2,271 m³/day. Space is also provided for a potential fourth module. During the final design and according to calculated flows it would be possible to change the configuration. The area required for the proposed treatment plant is estimated at approximately 0.40 acres (1,600 m²), corresponding to a site of approximately 656 ft by 263 ft (200 m by 80 m).

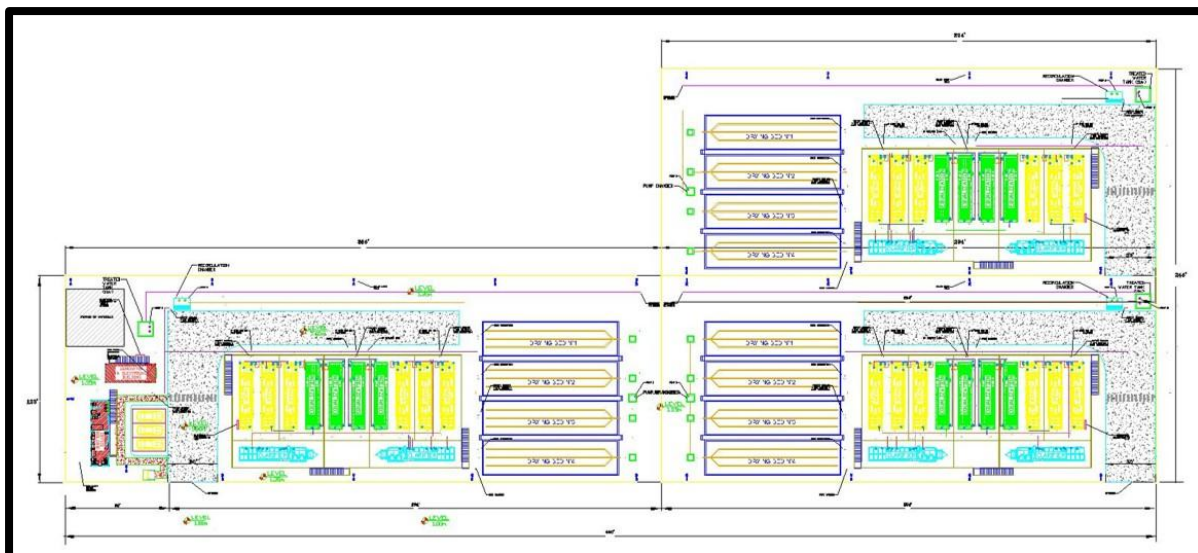


Figure 5 – Layout of the wastewater treatment plant. Source: Cost Analysis - Vacuum Sewer System and WWTP, Placencia, 2026.

The WWTP is proposed to receive wastewater conveyed from the different pumping/vacuum stations. The currently preferred treatment technology is a **Membrane Aerated Biofilm Reactor (MABR) system**, selected based on its low energy consumption, relatively small footprint, and potential to produce high-quality effluent suitable for discharge to the environment. The selection of this technology also considers its application and performance in the Environmental and Social Assessment (ESA) of the iCOAST Project: Integrated Collaborative Approaches for Sustainable Tourism in Belize (2026) project, which incorporates a comparable MABR-based treatment approach.

For the purposes of this ESA, the treatment process has been described using the Caye Caulker configuration as a technical reference. Based on the treatment process described for the Caye Caulker project, the proposed treatment process would begin with pre-treatment, including fine screening (1 mm) for the removal of solids and a FOG trap to remove fats, oils, and grease. This would be followed by flow equalization tanks to manage diurnal and seasonal variations in influent flows. During the biological treatment stage, eight (8) MABR modules would support biofilm growth to facilitate the removal of organic matter and nutrients, including nitrogen and phosphorus. Sand filtration would provide additional polishing of the treated effluent to support compliance with applicable water quality standards prior to discharge.

Sludge generated during the treatment process will be dried and subsequently used as compost. Mitigation measures to avoid potential negative impacts associated with sludge treatment are included in Sections 5 and 6 of this ESA.

2.7.3. Wastewater Effluent Reuse and Disposal

The proposed wastewater effluent reuse and disposal strategy was not defined in the Cost Analysis (2026) for the newly proposed WWTP location; however, several alternatives were considered in the 2012 Feasibility Study.

Marine Discharge

Marine discharge involves the direct discharge of treated effluent into the sea, typically through an outfall located at or near the seabed and at an appropriate distance from the shoreline. Municipal wastewater systems using marine discharge may rely, in some cases, on primary treatment followed by dilution and dispersion in the receiving marine environment.

The main advantages of marine discharge are its potential cost-effectiveness and the dilution and dispersion of pollutants and pathogens within the receiving waters, while maintaining a controlled separation between the discharge point and public areas. However, potential concerns include the accumulation of toxins, sludge, and grease, which may reduce the effectiveness of dilution and dispersion. Marine discharge may also pose risks to sensitive marine ecosystems, including coral reefs, depending on the location of the discharge point and the characteristics of the receiving environment.

Surface Water Discharge

Surface water discharge involves the direct release of treated effluent into receiving surface waters, such as streams, wetlands, or lakes. Depending on applicable regulatory requirements, treatment may include primary or secondary treatment prior to discharge. Where secondary treatment is provided, the receiving water body may contribute to further dilution and dispersion of the effluent. Potential concerns include residual chlorine and nutrient accumulation near the discharge point. The suitability of this alternative depends, among other factors, on the characteristics and assimilative capacity of the receiving water body and the relationship between the volume of discharged effluent and the available receiving water volume.

Land Application Discharge

Land application involves the use of treated or pretreated wastewater for treatment and disposal through the soil. The three main approaches are irrigation, overland flow, and infiltration–percolation. The suitability of each method depends on factors such as soil characteristics, permeability, topography, groundwater conditions, wastewater loading, and the intended level of treatment. Land applications can provide additional treatment through physical, chemical, and biological processes occurring in the soil and vegetation, while also allowing for the potential recovery or reuse of water and nutrients.

Irrigation

The three basic land application irrigation methods are flood, ridge-and-furrow, and spray irrigation. Flood irrigation involves inundating the land with several inches of water; ridge-and-furrow irrigation applies water by gravity flow through furrows, with crops grown on the ridges; and spray irrigation uses either portable or solid-set sprinklers. The selection of the irrigation method depends on soil permeability, crop characteristics, topography, and economic considerations. Irrigation disposal systems are typically restricted to the growing season, with storage required during the remaining months. However, given Belize's tropical climate, such systems may potentially be operated year-round.

Important factors in the design of irrigation systems include liquid loading, expressed in inches per week, and nitrogen loading, expressed in pounds per acre per year. The selection of appropriate crops should consider market value, management requirements, and the crops' specific responses to wastewater constituents. Common crop choices include grasses, which generally have high water and nitrogen uptake rates and relatively low maintenance requirements.

Wastewater treatment occurs predominantly within the upper 1.5 to 4 feet of soil. Where monitored, removal rates for BOD₅, TSS, and bacteria have generally been reported to reach approximately 99

percent. In loamy soils, heavy metals, phosphorus, and viruses have also been found to be almost completely removed through absorption. Nitrogen is primarily removed through plant uptake, and where crops are harvested, nitrogen removal rates of up to 90 percent have been achieved, depending on the leaching rate and crop type.

Land application of wastewater through irrigation differs from agricultural water reuse in terms of its primary objective. In land application systems, the primary objective is wastewater treatment and disposal while protecting groundwater resources. Consequently, crops are selected primarily for their capacity to take up water and nutrients rather than for their profitability or marketability. The factors to be considered when evaluating a property for irrigation application include site and soil characteristics, wastewater loading, and the requirements of the selected irrigation system.

Overland Flow

Unlike irrigation and infiltration systems, overland flow functions primarily as a land treatment process rather than a land disposal process. It has been widely used for food-processing wastes in the United States and has also been evaluated for municipal wastewater. Soils with low permeability, which are generally unsuitable for irrigation or infiltration systems, can be suitable for overland flow. Similarly, although a high groundwater table can reduce the soil-filtering capacity of irrigation and infiltration systems, it has limited effect on the treatment performance of overland flow systems. The process utilizes the soil surface layer, surface organic matter, vegetation, and microorganisms to treat the wastewater. The groundwater table should be deeper than two feet to prevent waterlogging that could adversely affect vegetation.

Land used for overland flow should generally have a slope between 2 and 6 percent, allowing wastewater to flow as a relatively uniform sheet across the ground surface. Grass is typically planted to provide a habitat for bacteria that contributes to wastewater treatment. Because runoff is generated as part of the process, the system must also include provisions for collecting and managing the resulting effluent.

Overland flow systems are generally designed based on liquid loading rates, although organic loading or detention time may also be considered. The process is primarily biological and requires sufficient contact time between the wastewater and microorganisms to achieve adequate treatment. As with irrigation, overland flow systems are typically operated seasonally in colder climates and require storage during periods when application is not possible. Given Belize's tropical climate, however, year-round operation may potentially be feasible.

Effective operation and management of overland flow systems require maintaining appropriate hydraulic loading cycles, consisting of periods of wastewater application followed by resting periods, as well as maintaining active biological communities and healthy grass cover. Hydraulic loading cycles that have been successfully applied have included approximately 6 to 8 hours of spraying followed by 6 to 18 hours of drying, although more frequent cycles have also been used. Periodic cutting of the grass, with or without removal of the cut biomass, is also considered important, although the effects of harvesting on organic oxidation have not been fully demonstrated. Overall, wastewater treatment through overland flow has been reported to be only slightly less complete than treatment achieved through irrigation.

Infiltration, Percolation and Evaporation

Land application through infiltration, percolation, and evaporation (IPE) has been used for wastewater treatment and groundwater recharge for many years, with substantial hydraulic contributions to

groundwater. Very coarse sands and gravel are generally not ideal for this application because wastewater may pass too rapidly through the upper soil layers, where most biological and chemical treatment processes occur.

BOD₅, TSS, and bacteria are almost completely removed in most cases. Nitrogen removal, however, is generally limited unless specific operating procedures are implemented to optimize denitrification. Careful management of hydraulic loading cycles has resulted in nitrogen removal rates of up to 80 percent in high-rate systems currently in operation. From an environmental performance perspective, infiltration–percolation systems have generally been considered less reliable than irrigation and overland flow systems. However, poor performance has primarily been associated with systems that were not adequately monitored or managed.

The principal advantage of infiltration/percolation systems is that they require substantially less land than irrigation or overland flow systems and can potentially operate year-round. Their main disadvantages are the lower degree of treatment achieved in the surface soil layers and the requirement for highly permeable soils.

Effluent Reuse

The reclamation of water from wastewater has been practiced for many years, and reclaimed municipal wastewater has been used for a wide range of purposes. Increasing costs associated with developing new or supplemental water supplies have contributed to growing interest in wastewater reclamation and reuse.

Unlike wastewater treatment and disposal, water reclamation is undertaken to produce water for a specific beneficial use. Consequently, the quantity and quality of reclaimed water must be compatible with the intended application. A water reclamation facility should be capable of operating independently from the wastewater disposal system, such that a shutdown of the reclamation process does not adversely affect the overall wastewater disposal capacity. Where the effluent quality required for disposal is equivalent to that required for a particular reuse application, the treatment plant may be designed and operated based on the disposal requirements, with the treated effluent subsequently available for reuse or discharge at the discretion of the operating agency.

For water reclamation to be feasible, the reclaimed water must meet a defined need and be produced at a cost that users are willing to pay. Where reclaimed water replaces an existing water supply, its cost should be evaluated against the current cost of water to the user. Where reclamation enables a new use, the cost should instead be evaluated in relation to the actual value of the reclaimed water for that application.

Potential uses of reclaimed water include agricultural, industrial, recreational, and domestic applications, as well as groundwater recharge. Groundwater recharge is not considered an end use in itself, but rather a means of adding reclaimed water to local water resources in a manner that makes it available for future use.

Installation and Maintenance Costs

The installation and maintenance costs of land application systems depend on a range of site-specific and operational factors, making it difficult to establish generalized cost curves. Key cost variables include the distance between the wastewater treatment facility and the land application site, the volume of effluent to be managed, the equipment required for effluent conveyance and distribution, and the selected method of effluent distribution and application.

2.7.4. Alternative Analysis

An analysis of alternatives was conducted as part of the 2012 Feasibility Study, considering different options for wastewater collection, treatment, and effluent disposal and reuse. The alternatives assessed are summarized in the table below:

Table 2 – Collection, Treatment and Effluent Disposal and Reuse Alternatives Evaluated. Source: Feasibility Study for the Placencia Peninsula Pilot Wastewater Management System (2012).

System	Alternative	Brief Description of Alternative
Collection	1	Cluster to Cluster Pumping
	2	Common Force Mains (no parallel force mains)
	3	Common Force Mains (parallel force mains)
Treatment	1	Facultative Lagoons and Maturation Ponds
	2	Aerated Lagoons
	3	Extended Aeration
Effluent Disposal and Reuse	Supplement	Agricultural Effluent Reuse System
	1	Additional Nutrient Ponds
	2	Land Application: Infiltration, Percolation & Evaporation
	3	Use of Treated Effluent for Agricultural Irrigation

Based on the assessment, a combination of cluster-to-cluster and common force main collection systems was selected for the section extending from Placencia Village to Riversdale. For wastewater treatment, the preferred and most cost-effective alternative was the Facultative Lagoon and Maturation Ponds configuration. The preferred treatment and effluent disposal configuration were identified as Treatment Alternative No. 1: Facultative Lagoon with Maturation Pond, combined with Disposal Alternative No. 2: Infiltration, Percolation, and Evaporation Effluent Disposal Field.

However, the current Project configuration differs from the one considered in the 2012 Feasibility Study, particularly with regard to the potential location of the WWTP in the Seine Bight area. Therefore, a **preliminary cost analysis** was conducted in 2026 to assess potential configurations under the current Project conditions. An updated alternatives analysis will be conducted to further assess and confirm the most suitable wastewater collection, treatment, and effluent disposal and reuse options, considering the proposed WWTP location and updated technical and environmental considerations.

According to the preliminary 2026 cost analysis, a system comprising three main pumping/vacuum stations is being considered based on the potential location of the WWTP in the Seine Bight area. This configuration differs from the sewerage system evaluated in the 2012 Feasibility Study, which included 39 pumping stations distributed along the Placencia Road. A key limitation identified for the latter configuration is the lack of dedicated backup generators at each pumping station, which could result in interruptions to sewerage services in the event of a power outage.

Regarding wastewater treatment, the MABR system is currently considered the preferred technology for the Project. According to the 2026 assessment, achieving low nitrogen and phosphorus concentrations through lagoon-based treatment alone would be costly and would likely require additional tertiary treatment.

Finally, the proposed wastewater effluent reuse and disposal strategy was not defined in the 2026 Cost Analysis for the newly proposed WWTP location.

2.7.5. Component 2. BWS's planning and service management strategy.

This component focuses on strengthening BWS's operational and technical capacities to improve the efficiency, reliability, sustainability, and resilience of sanitation services. It will support improvements in planning and asset management, data-driven and preventive operational practices, service quality, environmental management, and overall sanitation performance.

In parallel, the component will develop and implement a sewer connectivity strategy to promote system uptake and effective use, including targeted connection incentives, a structured transition period for users, and public awareness campaigns targeting households, businesses, and tourism establishments. Together, these measures are expected to support effective service utilization, operational sustainability, and improved environmental outcomes.

No infrastructure works are expected from this component.

3. Legal and Institutional Framework

This chapter outlines the legal, sectoral, and institutional framework of the project, considering environmental, social, and occupational health and safety areas.

The first section of the chapter describes the national legal framework applicable. As this Project is proposed to be financed by a loan operation from the Interamerican Development Bank, the second section describes the Environmental and Social Performance Standards included in IDB's Environmental and Social Policy Framework, which are also applicable to the Project.

This chapter outlines the legal, sectoral, and institutional framework of the Project, considering environmental, social, and occupational health and safety areas.

3.1. International Legal Framework

Table 3 - International Legal Framework

International Regulations	
Paris Agreement (UNFCCC, 2015)	Belize is a Party to the Paris Agreement and has submitted updated Nationally Determined Contributions (NDCs) committing to reduce emissions and increase adaptation. Relevant for integrating climate resilience into wastewater design (elevated infrastructure, energy efficiency, flood risk reduction).
The Ocean Biodiversity Agreement, 2024	Belize was the first Caribbean nation to officially ratify the ocean biodiversity agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ Agreement), which stipulates a global commitment to safeguard 30 percent of the ocean by 2030.
Regional Agreement on access to information, public participation and justice in environmental matters in Latin America and the Caribbean (Escazú Agreement)	The Escazú Agreement recognizes, protects and promotes the rights of all human rights defenders of the environment by ensuring the three rights of access to information, participation, and justice in environmental matters. Belize ratified the agreement in 2023.
Rotterdam Convention - 2004	The objective of this Convention is to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties.
Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (BASEL) - 1997	The objective is to reduce hazardous waste movements between nations.
Vienna convention for the Protection of the Ozone Layer - 1978	It establishes that the parties should cooperate through research and exchange of information in order to better understand and

International Regulations	
	assess the effects of human activities on the ozone layer. The objectives are found in the Montreal Protocol.
Stockholm Convention on Persistent Organic Pollutants – 2004	The Stockholm Convention is a global treaty that aims to protect human health and the environment from the effects of persistent organic pollutants (POPs).
The United Nations Convention to Combat Desertification (UNCCD) - 1994	The objective of this Convention is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification
Convention on Biological Diversity. Rio de Janeiro 1992. - Ratified 1993	Its objective is to conserve biological diversity, promote the sustainable use of its components and encourage the equitable sharing of the benefits derived from natural resource use.
Convention for the Conservation of Biodiversity and Protection of Priority Areas of Central America - 1992	Its objective is to promote sustainable development in order to conserve the biological diversity and biological resources of the Central American region.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)- 1975	It was designed to ensure that international trade of animals and plants does not threaten their survival in the wild.
Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat - 1971	Its main objective is to ensure the conservation and sustainable use of Ramsar sites (wetlands).
International Labour Organization Conventions Act Chapter 304:01 – Revised Edition 2003	These agreements govern the relationship between contractors and their workers. They include, among others, minimum age, right of association, minimum wage, freedom of association and protection of the right to organize, abolition of forced labor, protection against radiation, paid vacations, etc.
International Covenant on Civil and Political Rights (Article 27) - 1976	It establishes that in those States in which ethnic, religious, or linguistic minorities exist, persons belonging to such minorities shall not be denied the right, in community with the other members of their group, to enjoy their own culture, to profess and practice their own religion, or to use their own language.
Convention for the Protection of Cultural Property in the Event of Armed Conflict UNESCO (Hague Convention) - 1954	It aims to protect cultural property, such as monuments of architecture, art or history, archaeological sites, works of art, manuscripts, books and other objects of artistic, historical or archaeological interest, as well as scientific collections of any kind, regardless of their origin or ownership.
Charter of the Organization of American States – 1951 and Protocol of Managua (Amendment) - 1993	Article XXIII of the American Declaration affirms that the property rights of indigenous peoples are not defined exclusively by entitlements within a state's formal legal regime but also include that indigenous communal property arises from and is grounded in indigenous custom and tradition.
Convention Concerning the Protection of World Cultural and Natural Heritage - 1972	The World Heritage Convention aims to promote cooperation among nations to protect heritage around the world that is of such outstanding universal value that its conservation is important for current and future generations.

International Regulations	
Convention on the Means Prohibiting and Preventing the Illicit Import, Export and Transfer Of Ownership of Cultural Property - 1970	The 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property urges States Parties to take measures to prohibit and prevent the illicit trafficking of cultural property. It provides a common framework for the States Parties on the measures to be taken to prohibit and prevent the import, export and transfer of cultural property.
Convention for the Safeguarding of the Intangible Cultural Heritage - 2003	The main objectives are to safeguard intangible cultural heritage and ensure respect for the intangible cultural heritage of the communities, groups, and individuals concerned to raise local, national and international awareness of the importance of intangible cultural heritage.
The Convention on the Protection and Promotion of the Diversity of Cultural Expressions - 2005	The Convention provides a new framework for informed, transparent and participatory systems of governance for culture.

3.2. National Legal Framework

3.2.1. Environmental Licensing

The Environmental Impact Assessment Regulations (Chapter 328) in Belize detail the processes involved in the preparation and evaluation of Environmental Impact Assessments (EIA). Screening of projects, programs or activities that could have significant negative impact on the environment is done through the Environmental Impact Assessment Process, as required by the Regulations².

All persons, agencies and institutions shall, before embarking on a proposed project or activity, apply to the Department of Environment (DOE) for a determination whether such project would require (1) **an environmental impact assessment (EIA), categorized as Schedule I projects³**; (2) **an EIA or a limited level environmental study is required, categorized as Schedule II projects⁴** or; (3) **an environmental impact assessment is not required, categorized as Schedule III projects⁵**.

² <https://doe.gov.bz/legislation/>

³ An EIA shall be completed for projects such as waste-disposal installation for the incineration or chemical treatment or disposal of waste, or installation designed solely for the temporary storage of waste; Clearing of more than 10 acres of mangroves in ecologically sensitive areas; Any proposed development project, undertaking or activity within any protected area or World Heritage Site (terrestrial and marine).

⁴ An EIA or limited level environmental study is required for projects such as: Development of tourist or recreational facilities in or adjacent to national parks or protected areas; Development of tourist or recreational facilities on cayes or islands; Wastewater Treatment Plants (WWTP); Any project mentioned in schedule I and II where there is an expansion of more than 50% over and above the existing project; the modification of a development which has been carried out where the development is withing a description of Schedule II.

⁵ The following guidelines are to be used by permitting agencies to determine whether an activity is to be sent to the DOE for Environmental Clearance: all applications for development in coastal areas or offshore cayes or island or World Heritage Site; All applications for development near or in ecologically sensitive areas (such as

A National Environmental Appraisal Committee (NEAC) is also established for the review of all EIA reports, and its composition includes both Government and Non-Government representatives.

Where an EIA is required, the developer submits draft Terms of Reference (ToR) to the DOE for review and approval. Once approved, the developer prepares the EIA, including public consultation with affected stakeholders. Following submission of the EIA, the developer must publish a DOE-approved public notice in at least two widely circulated newspapers for two consecutive weeks. The EIA is then reviewed by the National Environmental Appraisal Committee (NEAC), a multidisciplinary body comprising representatives from both government and non-government organizations. If the project is recommended for approval, the developer must prepare and implement an Environmental Compliance Plan (ECP) approved by the Committee. The DOE issues its decision within 60 days of receiving the completed EIA.

The DOE, on the recommendation of the Committee, may require a **public hearing or public consultation** in respect of any undertaking, project or activity in respect of which an EIA is required. In order to determine whether an undertaking requires this step, the DOE shall take into account: (a) the magnitude and type of the environmental impact, the amount of investment, the nature of the geographical area, including Outstanding Universal Values ascribed to the area under a World Heritage site designation, and the commitment of the natural resources involved in the proposed undertaking, project or activity; (b) the degree of interest in the proposed undertaking, project or activity by the public, the DOE and other government agencies, as evidences by the public participation in the proposed undertaking, project or activity; (c) the complexity of the problem and the possibility that information presented at a public hearing or public consultation may assist the developer to comply with its responsibilities regarding the proposed undertaking, project or activity.

Below is a table with a summary of the main regulations related to the environment for these projects:

Table 4 - Environmental Licensing pertaining to the Project.

National Regulations	
Environmental Protection Act, Cap. 328, amended in 2009	Comprehensive environmental protection legislation in Belize. Empowers the Department of the Environment (DOE) to regulate and enforce environmental protection, including EIA approvals and monitoring of existing projects, allowing designated officers to enter upon any land to take and remove samples of groundwater and making studies to assess the discharge of wastes, inspect records and facilities. The act also establishes that no person shall emit or discharge any pollutant into the atmosphere in contravention of permitted levels or emit, import, discharge deposit or dispose of waste that might directly or indirectly pollute water resources. The DOE may grant permits containing terms and conditions as considered necessary for the discharge of effluents.

but not limited to swamps, marshes, mangrove forest, lagoons, barrier reef, flood plain etc.); all applications for development within or in close proximity to protected areas, critical habitats for protected, threatened or endangered species of flora and fauna, primary biological corridors or World Heritage Sites; All applications involving the building of sewage treatment and disposal systems. This includes all plants which have an initial projected output of more than fifty thousand (50,000) gallons per day of sewage; Applications with proposed sites located in the primary flood plain of a major river or stream; Proposals at sites which are in close proximity to vulnerable areas (unstable soils, gully, stream banks or steep slopes more than 25 degrees); All applications for development in major watershed areas; Proposals which necessitate the clearing of large areas (more than 500 acres) of vegetation.

National Regulations		
		A person who inadvertently or accidentally causes an act of pollution shall without delay report such pollution to the DOE and the police.
Environmental Impact Assessment Regulations (SI 107 of 1995)		Requires Screening of projects and establishes 3 Schedules under which projects may classify: Schedule I requires an EIA; Schedule II requires an EIA or a Limited Level Environmental Study; Schedule III does not require an EIA and is subject of Environmental Clearance by the DOE. A National Environmental Appraisal Committee (NEAC) is also established for the review of all EIA reports, and its composition includes both Government and Non-Government representatives. A decision by the DOE to approve an EIA may be subject to the signing of an Environmental Compliance Plan, payment of environmental monitoring fee, posting of guarantees or performance bonds, and such other conditions as may be reasonably required for environmental purposes. DOE may require projects to undergo a public hearing or public consultation.

3.2.2. Water Regulations and Effluent Discharges

Table 5 - Water Regulations

National Regulations		
National Integrated Water Resources Act, Chapter 222.01 Revised Edition 2020		Establishes the overarching legal framework for the integrated management, protection, and sustainable use of the country's water resources, with direct relevance to wastewater treatment projects. The Act requires that water abstraction, augmentation, distribution or use and activities with potential to affect surface water or groundwater be managed under an integrated permitting (license) and regulatory system aimed at preventing water pollution and protecting water quality. It mandates coordination between the National Integrated Water Resources Authority and environmental regulators to ensure that treated effluent meets applicable water quality standards, that discharges do not compromise downstream uses or sensitive ecosystems, and that wastewater infrastructure is planned and operated in a manner consistent with basin-level water resource management objectives.
Water Industry Act, Chapter 222, Amended in 2020		Legal framework for the regulation, licensing and operation of water supply and sewerage services in Belize. It designated the Public Utilities Commission (PUC) as the regulator of water and sewerage service providers, requiring operators of wastewater and sewerage systems to be duly licensed and to comply with approved technical, operational, and service standards. The Act governs the collection, conveyance, treatment, and disposal of wastewater through public sewerage systems, including requirements related to system design, operation and

National Regulations	
	maintenance, service continuity, and consumer connections. It also enables oversight of tariffs, service quality, and performance obligations, ensuring that wastewater services are delivered in a manner that protects public health and supports sustainable water management, while operating in coordination with environmental permitting requirements established under separate environmental legislation.
Water Industry Authority (Tariffs) By-Laws, Chapter 222	Establishes that the methodology for the calculation of water and sewerage tariffs shall be that of the Regulatory Model as amended by the PUC, who will determine them based on a Business Plan submitted by the licensee and the Regulated Rate of Return.
Water Industry (Infrastructure Charges), Chapter 222	Infrastructure charges that shall be payable for each connection to the main system in areas which are not presently covered by the existing network of water supply and sewerage services shall be payable by the owner of the property.
Effluent Limitations Regulations, amended in 2009	These Regulations prohibit the discharges of effluent from new and altered point sources. They establish a licensing system for discharging effluents under specific conditions. The Effluent Limitations Regulations also establish the requirement for the treatment of effluent, as well as limitations or standards for physical and chemical parameters to be monitored for various industries and domestic effluents. In the 2009 amendment, the regulations include provisions for the treatment of domestic wastewater and the categorization of Class I and II Waters that differentiate waters with unique ecological characteristics that are sensitive to impacts of domestic wastewater. For this Project, although the final discharge point for the treated effluent has not yet been definitively selected and is subject to the finalization of the detailed engineering design, it is highly probable that Class I water standards will apply. This expectation is based on the project's proximity to highly sensitive coastal and marine ecosystems, including the Placencia Lagoon, surrounding mangroves, and seagrass beds, which serve as critical nurseries and foraging habitats for protected species. The final regulatory classification and specific discharge requirements will be formally confirmed with the Department of the Environment (DOE) once the final plant design and layout are completed.

National Regulations																													
	DISCHARGES FROM DOMESTIC WASTEWATER TREATMENT SYSTEMS (SEWAGE WATER AND GREY WATER) INTO CLASS I WATERS <table> <tr> <th><u>Parameter</u></th><th><u>Effluent Limit</u></th></tr> <tr> <td>Total Suspended Solids</td><td>30 mg/L *</td></tr> <tr> <td>Biochemical Oxygen Demand (BOD₅)</td><td>30 mg/L</td></tr> <tr> <td>PH</td><td>5-10 pH units</td></tr> <tr> <td>Fats, Oil and Grease</td><td>15 mg/L</td></tr> <tr> <td>Faecal Coliform (E.coli (freshwater) and Enterococci (saline water))</td><td>Faecal Coliform: 200 mpn/100 ml; or (a) E. coli: 126 organisms/100ml; (b) enterococci: 35 organisms/100ml</td></tr> <tr> <td>Floatables</td><td>Not visible</td></tr> </table> *Does not include algae from treatment ponds DISCHARGES FROM DOMESTIC WASTEWATER TREATMENT SYSTEMS (SEWAGE WATER AND GREY WATER) INTO CLASS II WATERS <table> <tr> <th><u>Parameter</u></th><th><u>Effluent Limit</u></th></tr> <tr> <td>Total Suspended Solids</td><td>150 mg/L *</td></tr> <tr> <td>Biochemical Oxygen Demand (BOD₅)</td><td>150 mg/L</td></tr> <tr> <td>PH</td><td>5-10 pH units</td></tr> <tr> <td>Fats, Oil and Grease</td><td>50 mg/L</td></tr> <tr> <td>Floatables</td><td>Not visible</td></tr> <tr> <td>Faecal Coliform</td><td>Not Applicable</td></tr> </table> *Does not include algae from treatment ponds	<u>Parameter</u>	<u>Effluent Limit</u>	Total Suspended Solids	30 mg/L *	Biochemical Oxygen Demand (BOD ₅)	30 mg/L	PH	5-10 pH units	Fats, Oil and Grease	15 mg/L	Faecal Coliform (E.coli (freshwater) and Enterococci (saline water))	Faecal Coliform: 200 mpn/100 ml; or (a) E. coli: 126 organisms/100ml; (b) enterococci: 35 organisms/100ml	Floatables	Not visible	<u>Parameter</u>	<u>Effluent Limit</u>	Total Suspended Solids	150 mg/L *	Biochemical Oxygen Demand (BOD ₅)	150 mg/L	PH	5-10 pH units	Fats, Oil and Grease	50 mg/L	Floatables	Not visible	Faecal Coliform	Not Applicable
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Public Utilities Commission Act Chapter 223 – Revised Edition 2000	Provides for the establishment of a Public Services Commission to regulate the provision of public services in Belize. The function of the Commission will be to ensure that the services provided by a public service provider are satisfactory and that reasonable rates are charged for such services. Public utilities include water supply and sewerage services. Whenever any person in Belize has a complaint in respect to public utilities, such person shall make a complaint to the Commission which shall thereafter proceed to deal with such complaint, including reviewing rates or determining improvements, alterations, substitutions to facilities that would be necessary and proper for the accommodation and convenience of the public.																												
Village Councils Act (Cap 88)	This act lays down provisions on the establishment of villages ⁶ and Village Councils.																												

⁶ any area of Belize not comprised within any city or town to be a village for the purpose of this Act, provided that at least two hundred persons who would be qualified to vote for village councils under this Act live in such an area.

National Regulations	
	States that a Village Water Board shall be established by the Minister in each village or community. The Water Board is responsible for: (I) all operations and maintenance activities necessary for the uninterrupted service of water in respect of its village or community; (II) regulating pumping hours to ensure uninterrupted and continuous water supply; (III) keeping proper records and account in respect of its activities; (IV) undertaking expansion of the water supply system for its village or community as occasion demands; (V) carrying out disconnection procedures;(VI) collecting user fees; (VII) laying water pipes in its village or community; and (VIII) effectively and efficiently undertaking any other function related to the supply of water in its village or community. The Minister may make Regulations for better carrying out of the functions of the Village Water Boards under this Act.
Public Health Act (Chapter 40)	Regulated the Public Health systems and established the power to inspect water and sewage works by a health officer whenever they think it's necessary in the interest of the public health, including the disposal of sewage.

3.2.3. Solid and Hazardous Waste Management

Table 6 - Solid and Hazardous Waste Management regulations

National Regulations	
Solid Waste Management Authority Act	Establishes the Solid Waste Management Authority, a body corporate who's function is to make arrangements for the collection and disposal of all solid waste within a service area in accordance with this Act or any regulations made thereunder (could be via a contractor). Solid waste collection service will be provided in service areas (defined by the Authority) at least twice per week on days which will be notified from time to time by the Authority. The use of solid waste collection service in service areas shall be mandatory sage for large commercial establishments specifically excepted by the Minister. It shall be the responsibility of contractors to remove and dispose of all construction waste material resulting from new construction or other works on or at any premises.
Hazardous Waste Regulations	These Regulations address the overall management of hazardous wastes including storage, transportation, treatment and prohibitions. Hazardous wastes are determined as substances that are toxic, corrosive, flammable, reactive, explosive, infectious or pathogenic that may pose a threat to the environment and human health. The regulations do not apply to household waste while in the possession of householders or while un-segregated in a municipal waste management system, domestic sewage or waste resulting

National Regulations	
	from emergency spill clean ups, provided the Department has authorized the clean-up activity and has made proper arrangements for the disposal of any hazardous waste. There must be Hazardous Waste Management Facilities that keep an operating record and not be established in 100-year floodplains, within a 100m of any land subject to slope failure, within a wetland area, in a recharge area of an unconfined area, within a minimum of 1 ½ mile radius of any human settlement, including village, town, city, farm, resort or hotel, and within 300m of any non-intermittent watercourse or any other permanent water body. Hazardous waste storage should: ensure any leakage is contained, a secondary containment system provided a minimum for liquid hazardous waste, labelling, incompatible hazardous waste stored separately, routine inspections, suitable emergency situations equipment, trained operators to respond to emergency situations. No person shall store hazardous waste on site unless such storage is approved of by the Chief Environmental Officer. Transporters of hazardous waste shall provide certificates of collection to generators, transport authorized facilities by the Departments, obtain from the generator a manifest which shall be signed by both of them, and which shall accompany all collection, transport and delivery processes. All hazardous waste management facilities shall be sited, designed, operated, constructed and closed in accordance with guidelines approved by the Chief Environmental Officer. No liquid hazardous waste shall be disposed in a landfill and no disposal of solid hazardous waste either unless landfill is provided with at least two liners (one synthetic), a leachate collection and removal system, a groundwater monitoring system and a leak detection system between two liners. Moreover, a list of hazardous waste prohibited for landfill disposal is provided, including halogenated compounds and non-halogenated compounds (BTEX, methanol, acetone, etc.) with concentrations greater than 1,000mg/kg, flammable gases, hydrocarbon contaminated solids, etc.
Environmental Protection (Prohibition of the open burning of refuse and other regulations) 2020	These regulations discipline the prohibition of open-burning and other combustible materials for the protection of the environment. During the period of public emergency, no person shall cause, suffer, allow, or permit open burning of any refuse or combustible matter on any private or public land. A person that contravenes this regulation commits an offence and is liable on summary conviction to a fine not exceeding five thousand dollars or to a term of imprisonment not exceeding two years
Returnable Containers Act	The Returnable Containers Act describes the process for the collection and payment of specific deposits on beverage containers by all agents or dealers. The return varies as it depends on the container as is set out in this act.

National Regulations		
Environmental Protection (Pollution from Plastics) Regulation, 2020		These Regulations address the importation (only allowed by permit from the Chief Environmental Officer), manufacture, sale and possession of prohibited and restricted single-use plastics and Styrofoam products in Belize.

3.2.4. Flora, Fauna, and Protected Areas

Table 7 - Flora, Fauna, and Native Forest regulations

National Regulations		
National Protected Areas Systems Act, 2024		This Act provides for the maintenance of coordinated management of a National Protected Areas System, categorized as follows: (a) national park; (b) nature reserve; (c) wildlife sanctuary 1; (d) wildlife sanctuary 2; (e) natural monument; (f) forest reserve; (g) fishery areas, marine and inland water reserves as defined under the fisheries resources act; (h) archaeological reserve; (i) private protected area; (j) protected landscape or protected seascape; (k) spawning aggregation site; (l) special management area; (m) scenic landscape of geomorphic significance; (n) bird sanctuaries; (o) public reserves. The act establishes the Minister of Forestry, Wildlife and Biodiversity or Fisheries as responsible for the development of policies and plans for the National Protected Areas System and safeguarding natural heritage for all Belizeans, creates an advisory body, the National Protected Areas Commission to act in advisory capacity to the Minister and a National Biodiversity Office to maintain a Register of Protected Areas (each shall include a preliminary management plan), lead coordination and support the development and implementation of the National Protected Areas Plan with Forest and Fisheries Departments and to implement activities to ensure the achievement of national development plans and international conventions including the National Biodiversity Strategy and Action Plan, National Protected Area System Plan and Convention on Biological Diversity. Any declared Protected Area shall not be subject to any land disposition whatsoever except with the express written consent of Minister of Fisheries, Forestry or biodiversity as the case may be, all land disposition in relation to land that has been declared as protected areas shall be void.
Protected Areas Conservation Trust Act, 1995		The Act provides for the Establishment of: (a) the Protected Areas Conservation Trust; (b) an Advisory Council; (c) the Protected Areas Conservation Trust Fund; and (d) a Protected Areas Conservation Foundation. The Fund and the Foundation shall be established by the Board of Directors of the Trust, being a body corporate. The Board consists of government officials selected by specified Ministries and non-governmental representatives. The general function of the Board is to encourage and promote, through funding, the protection, conservation and enhancement of natural and cultural resources of Belize (sect. 16). The Council

National Regulations	
	shall advise the Board and coordinate the preparation of the National Strategic Protected Areas Conservation Trust Plan under section 34. The Plan shall outline policies and strategic directions to achieve the Trust's objective. The Act is completed by a Schedule in which activities which qualify for Trust funding are listed.
Forest Regulations (SI 52 of 2018)	Establishes that the Minister may from time to time make regulations, either of general application or confined to particular forest reserves or other areas of national land, or of private land to which it has been decided to apply any of the provisions for the protection of trees and forest produce being in or upon such reserve or other area, and in particular may prohibit any person as regards such reserve or other area from– (a) felling, girdling, lopping, tapping, burning, injuring or removing any trees ⁷ ; (b) squatting, residing, building huts or cattle enclosures; (c) setting fire to any grass or undergrowth, or kindling or carrying any fire, or leaving any fire burning in such manner as to endanger trees or forest produce; (d) grazing or pasturing cattle, or permitting cattle to trespass; (e) hunting, shooting, fishing, trapping, poisoning water or using explosives to destroy fish, clearing, cultivating or breaking up of land for cultivation or other purposes; (f) clearing, cultivating or breaking up of land for cultivation or other purposes ; (g) quarrying stone, burning lime or charcoal or collecting, manufacturing or removing any forest produce .
Forests (Protection of Mangroves) Regulations, 2018	Established that no person shall alter, allow or cause any mangrove to be altered unless the alteration is carried out under a permit issued by the Belize Forest Department. Factors considered when reviewing applications can include: 1) Distance of the proposed alteration from a designated park of other protected areas; 2) Impact on nearby coastal and reef areas, known to be of high ecological value; 3) Potential for direct and indirect economic benefits from the development; 4) Presence of over wash mangroves; 5) Alignment of the development with existing or proposed national, regional and local land-use plans; 6) Carbon storage and sequestration potential of the mangroves; 7) The current condition of mangroves. The Department shall impose conditional measures that shall be accepted and undertaken by the applicant to mitigate or remedy any adverse effects identified, such as: a) actions that would avoid or prevent mangrove alteration such as buffer zones; b) alternative site placement, facility design, work methods or equipment that would eliminate impacts to mangroves; c) offsetting through restoration or planting of new mangrove communities in adjacent degraded areas or other areas; d)

⁷ The act includes, in the Schedule I, a list of Rates of Royalty for specific tree species, including Mahogany, Cedar, Pine and Mangrove trees.

National Regulations	
	restoration and reforestation of two times the amount of mangroves that was cleared; e) a bond sufficient to ensure the successful completion of restoration activities with 80% survival rate after a minimum one year since planting.
Forest Fire Prevention Act, Chapter 212, Revised edition 2020	It provides that the Minister may declare any area of Belize to be a fire protection area . The Chief Forest Officer shall prepare a fire protection plan for any area declared to be a fire protected area.
Wildlife Protection Act 1981	Subject to provisions of this Act, no person shall: (a) hunt any species of wildlife set out in the Schedule; (b) hunt any species of wildlife other than the species listed in the Schedule, except, - (i) if the person is a resident of Belize, pursuant to a valid non-resident hunting license issued under section 13; (ii) if the person is not a resident of Belize, pursuant to a valid non-resident hunting license issued under section 13; (c) hunt any obviously immature wildlife or any female accompanied by its young; (d) hunt any wildlife species employing any fire, trap, poison, spring gun, gin, pitfall, light or electric device or missile containing an explosive, except as may be permitted pursuant to regulations under paragraph (i) of section 11 (sect. 3). No person shall hunt any wildlife species or have in possession wildlife or parts thereof or hunting gear in any area closed to hunting of wildlife pursuant to section 11 of this Act, save as the Minister by regulations may provide (sect. 4). Measures of defense of person or (agricultural) property are considered lawful (sect. 5). The Public Service Commission may appoint a game Warden and a number of game rangers as the Minister shall deem necessary (sect. 10). Section 15 deals with permits for the import and export of wildlife.

3.2.5. Air Pollution (Gaseous Emissions and Noise)

Table 8 - Air Pollution regulations

National Regulations	
Pollution Regulations, amended in 2002 and 2009	These Regulations establish the prohibition of releases into the environment of contaminants, unless done so with a permit issued by the Department of the Environment and at acceptable levels of contaminants from certain installations. The Act establishes the requirement to implement measures such as wetting down, covering, landscaping, paving, treating, detouring, or other reasonable means to prevent the emission of dust and other particulate matter. Motor vehicles shall be subject to testing for carbon monoxide emissions, hydrocarbon emissions, and crankcase pressure during inspections, in accordance with the procedures and limits prescribed by the Minister.

National Regulations

CONCENTRATION OF AIR CONTAMINANTS

	Concentration in micrograms per meter cube			
	SPM	SO ₂	CO	NO _x
A. Industrial and mixed use	500	120	5000	120
B. Residential & Rural	200	80	2000	80
C. Sensitive	100	30	1000	30

NOISE LEVEL

Noise Level According to the dB (A) Scale (as defined by the International Electronics Commission.

		Structure A		Structure B		Structure C		Structure D		Structure E	
Duration of Noise		D	N	D	N	D	N	D	N	D	N
1.	More than 9 hrs	60		60		70		70		85	
2.	More than 3 hrs, less than 9 hrs	70		70		75		75		90	
3.	More than 30 mins	75		75		80		80		100	
4.	More than 30 mins		45		45		45		45		90
5.	More than 15 mins and less than 1 hr	70		70		90		90		105	
6.	More than 10 mins and less than 30 mins		45		50		50		50		90
7.	More than 5 mins and less than 15 mins	70		85		100		90		90	
8.	More than 2 mins and less than 5 mins	90		95		100		100		95	
9.	Less than 10 mins		50		70		70		70		80
10.	Less than 2 mins.	100		100		105		100		110	
11.	Noise from infrequent (less than 4 times per week) explosions	109		109		114		114		114	

D = Day N = Night

Structure A: any building used as a hospital, convalescent home, old age home, or school.

Structure B: any residential building

Structure C: any building in an area that is used for residential and one or more of the following purposes: commerce, small scale production, entertainment.

Structure D: any residential apartment in an area that is used for the purposes of industry, commerce or small-scale production

Structure E: any building used for the purposes of industry, commerce, or small-scale production in an area used for the purposes of industry, commerce, or small scale production.

National Regulations	
	Materials such as solvents and other volatile compounds, including but not limited to paints, acids, alkalis, pesticides, fertilizer and manure, stored in commercial quantities, shall be processed, stored, used and transported in such a manner and by such means that they will not unreasonably evaporate, leak, escape or be otherwise discharged into the ambient air to cause or contribute to air pollution. Where it appears that polluting matter is likely entering or present in any waters, the Department may carry out such operations as it considers appropriate to prevent entry or remedying or mitigating any pollution caused or restoring the waters. The Department may issue, in respect of a person operating a site for elimination or storage of waste or a solid waste treatment plant and disposal system directions it considers appropriate respecting the quality of service, reports to be submitted, terms and conditions upon which the operation shall be carried out and the standards to be attained at the code of practice to be followed. Where operators fail to comply, the department may cancel or suspend the permit issued in respect to that operator or execute any work at the expense of the operator necessary to cause the operator to comply with established standards. The Pollution Regulations also establish the prohibition of industries operating and emitting contaminants into the environment, without a permit from the DOE. Powers of the DOE to control pollution includes the requirement that owners, occupiers and other agents clean up and abate pollution. To encourage voluntary compliance, the Department of the Environment is empowered to develop an environmental incentive program, as well as a “facility environmental audit program” as a comprehensive investigation and evaluation system designed for the detecting and preventing of violations of environmental requirements or the commission of pollution related offenses. The amended policies include the prohibition of the manufacture of Ozone Layer Damaging Substances (especially CFCs).
Environmental Protection (Ozone Layer Protection) Regulations, 2025	This act establishes a comprehensive framework to control, restrict, and prohibit the manufacture, trade, and use of ozone-depleting substances (ODS) and certain greenhouse gases. Their primary purpose is to protect the ozone layer by regulating substances such as CFCs, HCFCs, and HFCs, while ensuring Belize’s compliance with international obligations under the Vienna Convention, the Montreal Protocol, and its Kigali Amendment

3.2.6. Energy

Table 9 - Energy regulations

National Regulations	
Public Utilities Commission Act Chapter 223 – Revised Edition 2000	Provides for the establishment of a Public Services Commission to regulate the provision of public services in Belize. The function of the Commission will be to ensure that the services provided by a public service provider are satisfactory and that reasonable rates are charged for such services. Public utilities include water supply and sewerage services. Whenever any person in Belize has a complaint in respect to public utilities, such person shall make a complaint to the Commission which shall thereafter proceed to deal with such complaint, including reviewing rates or determining

National Regulations	
	improvements, alterations, substitutions to facilities that would be necessary and proper for the accommodation and convenience of the public.
Electricity Act, Cap 221 – Revised Edition 2020	The Belize Electricity Act, Chapter 221 establishes the regulatory framework for electricity supply in Belize, vesting oversight functions in the Public Utilities Commission (PUC), which is responsible for licensing the generation, distribution, and supply of electricity. The Act does not specify any numerical setback distances or corridor widths for electricity lines.

3.2.7. Road Transport and Traffic Safety

Table 10 - Road Transport and Traffic Safety regulations

National Regulations	
Motor Vehicles and Road Traffic Act, Chapter 230	The Motor Vehicles and Road Traffic Act establish the legal framework governing road transport in Belize. It regulates the registration and licensing of motor vehicles, driver licensing requirements, vehicle inspection procedures, and the conditions under which vehicles may operate on public roads. The Act also establishes the principal rules for road use and traffic management, including speed limits, traffic signs and signals, right-of-way, parking, and the responsibilities of drivers, pedestrians, and vehicle owners. In addition, it provides enforcement authorities with powers to monitor compliance, investigate traffic offenses, and apply penalties for violations.

3.2.8. Labor Legislation

Table 11 - Labor Legislation Regulations

National Regulations	
Labour Act Chapter 297 - Revised Edition 2011 and Amendment Act 2020	The Belize Labour Act establishes a comprehensive national framework governing employment relationship, including minimum wages, working hours, overtime compensation, rest periods, paid leave, termination procedures, occupational safety, and mechanisms for labor dispute resolution. It recognizes fundamental labor rights, including the prohibition of forced labor, regulation of child labor through minimum age requirements⁸, and the protection of workers' rights to fair

⁸ No child shall be employed: (a) so long as he is under the age of **12 years**; (b) before the close of school hours on any day on which he is required to attend school; (c) before six o'clock in the morning or after eight o'clock in the evening on any day; (d) for more than two hours on any day on which he is required to attend school; (e) for more than two hours on any Sunday; (f) to lift, carry or move anything so heavy as to be likely to cause injury to him; (g) in any occupation likely to be injurious to his life, limb, health or education, regard being had to his physical condition.

National Regulations	
	remuneration and safe working conditions ⁹ . There are also provisions related to termination ¹⁰ , severance pay, maternity protection ¹¹ , and the right to organize and bargain collectively to promote fair treatment, non-discrimination, and safe and healthy working environments.
Workmen's Compensation Act Chapter 303 - Revised Edition 2000	The law establishes provisions on the liability of contractors for workers who are involved in accidents at work or while being transported to their workplace (compensation, insurance, insolvency, etc.).
Cooperative Societies Act	The act regulates the registration, duties and privileges of cooperative societies ¹² , rights and liabilities of members, audit and inspections, dissolutions and disputes. The governor may appoint a Registrar of Cooperative Societies who has duties and powers concerning registration, audit and inspection, dispute settlements and dissolution.
Occupational Safety and Health Bill, 2025	The bill establishes clear employer duties to provide safe and healthy working environment, including the identification of workplace hazards, including annual assessment of safety and health risks which workers and any other persons are exposed to implementation of preventive and protective measures, provision of appropriate personal protective equipment, worker training and mandatory reporting of accidents and occupational diseases. This includes construction work and the obligation of owners of the property to conduct an assessment of the construction site and prepare a list of all hazardous substances (chemical, biological, physical and combination thereof) that are present at the site and a floor plan showing the names of all hazardous substances, Safety Data Sheets and labelling. The bill also recognizes workers' rights to receive information, including a copy of the annual assessment of risks, and removes themselves from dangerous situations without penalty.

⁹ The act establishes that no person shall employ during the night in a public or private industrial undertaking a woman.

¹⁰ For the purpose of this section, the term unfair dismissal includes any distinction, execution or preferences made on the basis of nullifying or impairing equality of opportunity or treatment in employment or occupation.

¹¹ Where a woman is in receipt of maternity allowance under the Social Security Act, no employer shall, unless her absence has exceeded such maximum period as the Minister may by regulation prescribe, give notice of dismissal during such absence or give her notice of dismissal at such time that the notice would expire during such absence.

¹² Cooperative Society: a society whose objective is to promote the economic interest of its members.

3.2.9. Disaster Risk Preparedness and Response

Table 12 - Disaster Risk Preparedness and Response Regulations

National Regulations	
Disaster Preparedness and Response Act, 2000	An act to provide for the more effective organization of the mitigation, preparedness and response to and recovery from emergencies and disaster in Belize. There shall be a department of Government named the National Emergency Management Organization that shall be directed by a National Emergency Coordinator. The functions of the National Coordinator are outlined in section 4. There shall be a National Disaster Preparedness and Response Advisory Committee composed of members of the Cabinet (sect. 6). The National Emergency Coordinator shall prepare annually a National Disaster Preparedness and Response Plan under section 8. The Prime Minister may design especially vulnerable areas for purposes of mitigation of, preparedness for, and recovery from emergencies and disasters (sect. 15).
Disaster Preparedness and Response (Threatened Disaster Alert Mobilization) Regulations (Cap. 145).	These Regulations specify the actions that the National Coordinator shall undertake and procedures that shall be followed in the event of a threatened disaster alert under section 27 of the Act. The coordinator shall coordinate urgently the implementation of the Provisions of the National Disaster Preparedness Response Plan to meet the threatened disaster and in particular shall convene the meeting of the National Advisory Committee and other meetings, inform the public, set in motion the procedures for the manning of Emergency Operations Centres to meet the threatened disaster and disaster relief aid, etc. Every public officer shall cooperate with the National Coordinator in the discharge of any responsibilities assigned to that officer under the National Disaster Preparedness Plan and in the implementation of the procedures under that plan.
Disaster Preparedness and Response (Hazard Inspection) (Procedure) Regulations (Cap. 115).	These Regulations specify powers of Hazard Inspectors appointed under the Act in the circumstance where a hazard inspector is in reasonable doubt as to the identity of the occupier of any premises for the purposes of supplying that occupier with the information related to a hazard inspector's report under section 30(7) and (8) of the Act. Where a hazard inspector remains in reasonable doubt as to the identity of the occupier of the premises after compliance with Regulation 2, the notice of the availability of the report under section 30(7) and (8) of the Act may be given by advertisement in the Gazette and in at least one newspaper which is published in Belize.
Dangerous Buildings (Demolition) Act Chapter 133 – Revised Edition 2020	This Act focuses on the identification, inspection, and potential demolition of structures deemed hazardous in Belize. It authorizes the Commissioner of Police or senior police officers to inspect any suspect building.

National Regulations	
	Within this Act, "building" is broadly defined to include any edifice, wall, or other structure, along with anything attached to or projecting from such structures.
Belize Building Act, Chapter 131, revised edition 2020	Establishes requirements for the design and construction of infrastructure, including necessary applications for permits to build or demolish, the need of inspection of public buildings by the competent authority in matters related to fire protection, plumbing, mechanical, electrical and structural integrity before approval of use, amongst others. During such periods of time as are designated by the Government as being a hurricane watch, the owner, occupant or user of a property shall take precautions for the securing of buildings and equipment, and any fabric awnings and swing signs shall be lashed to the ground, and such other precautions shall be taken for the securing of buildings, structures, material or equipment as may be reasonably required.

3.2.10. Access to Information

Table 13 - Access to Information regulations

National Regulations	
Freedom of Information Act	The Freedom of Information Act establishes the legal framework governing public access to information held by public authorities in Belize. It grants individuals the right to request and obtain official information, subject to specific exemptions established by law, thereby promoting transparency, accountability, and good governance in public administration.

3.2.11. Cultural Heritage, Archaeological and Historical Sites

Table 14 - Cultural Heritage, Archaeological and Historical Sites Regulations

National Regulations	
Ancient Monuments and Antiquities Act, Cap. 330, revised edition 2000	This Act makes provision with respect to the protection and conservation of ancient monuments and related matters such as the acquisition of land by the Government for purposes of this Act. All ancient monuments and antiquities, whether upon any land or in any river, stream or watercourse, or under territorial waters of the country, shall vest in the Government and no person shall possess or have in custody any ancient monument or antiquity except under a license granted by the Minister in the prescribed form. The Act also concerns rights or owners of land on which ancient monuments are situated and allows the Minister to grant any occupier of land the right to demolish, for agricultural or other industrial reasons, an ancient monument situated on the land. The Minister may also, by Order, declare national land

National Regulations	
	containing or adjacent to an ancient monument to be an Archaeological Reserve. The Archaeological Commissioner may direct any land owner, contractor or any person who is about to engage in any operation which is liable to destroy, damage, interfere with or otherwise be to the detriment of any ancient monument or antiquity not to proceed with any operation until an archaeological exploration and survey are carried out and to take or to refrain or desist from taking any such action as part of the operation as the commissioner may decide to be fair and reasonable for the proper protection of the ancient monument or antiquity. If any person finds any ancient monument or antiquity they shall within 14 of such finding report the details of the finding to the Minister. If the Minister, after inspecting the ancient monument or antiquity found, shall decide that the national interest would be likely to be furthered by acquiring possession of such ancient monument or antiquity he may acquire the ancient monument or antiquity by notice published in the Gazette.
National Cultural Heritage Preservation Act, 2017 (N°40)	This Act sets forth the responsibilities and duties of the National Institute of Culture and History (NICH), National Heritage Advisory Council, the establishment of the National Heritage Fund, the preparation of the National Heritage Protection Plan, procedures and criteria for the designation of heritage assets¹³, and the establishment of the National Heritage Asset Register. The general functions of NICH under this Act shall be to promote and encourage the designation, protection, preservation, promotion and maintenance of heritage assets for the benefit and enjoyment of the present and future generations of the people of Belize and to ensure that the character of such assets is protected. The NICH shall take measures against the circumstances of misuse, lack of conservation, or application of wrong conservation methods. An inventory of heritage assets shall be established, updated, managed and published by the NICH. The National Heritage Advisory Council shall advise NICH generally on matters relating to heritage assets and shall exercise and discharge the functions conferred upon it by this Act. Furthermore, this Act sets forth provisions on procedures of registration of heritage assets, interim protection orders, acquisition for the promotion of cultural heritage or the preservation of the national or historical identity, compensation, as well as offences and penalties for damage to and destruction of heritage assets. The Minister

¹³ Movable or immovable property of great importance to the cultural heritage of every people such as monuments, art, archaeological sites, groups of buildings, manuscripts, books, structures of historic, cultural, architectural, archaeological, ethnographic, paleontological or national interest and significance.

National Regulations	
	responsible for culture may make regulations for the implementation of the provisions of this Act.

3.2.12. Gender

Table 15 - Gender Regulations

National Regulations	
National Women's Commission Act (N°1 of 2024)	This Act lays down provisions as regards the establishment, functions, administration and funds of the National Women's Commission. The functions of the Commission include but not limited to: (i) to advise on the formulation of national policy and programs with the aim of enhancing the position and development of women in the social, economic and political context; (ii) to review the existing laws affecting women; (iii) to increase public awareness against the discrimination and bad customs against women; (iv) to promote, develop and implement income generation and employment schemes through the grant of loans, establishment of home and cottage industries and, in particular, the acquisition of skills for the improvement of arts, crafts, food processing and such other vocational training of women within the context of their assessed needs and potentials; (v) to monitor for compliance and advise on the CEDAW, the Universal Declaration of Human Rights, the National Gender Policy as well as any other relevant national or international instruments; and (vi) to collect and analyze data, monitor and submit reports to the Minister on women education and counselling; health of women; existing legislation concerning the status of women; emerging needs of women; and women's involvement in national processes.
Protection against Sexual Harassment Act, Chapter 107, revised edition 2000	This Act provides for the prohibition of sexual harassment in the workplace by an employer to his or her co-workers so that both men and women work in a respectful and pleasant environment.

3.2.13. Land Use and Acquisition

Table 16 - Land Use and Acquisition Legislation

National Regulations	
Land Acquisition Act, Cap 184, Revised Edition 2000	It establishes the legal framework for compulsory land acquisition for public purposes, including procedures for notification, entry, valuation, compensation, and appeal. The Act provides for due process, public notification through Gazette publication, the right of affected persons to submit compensation claims , access to courts, and compensation based on market value assessed by an independent Board of Assessment , as well as provisions allowing compensation for severance, injurious affection, disturbance, and interest on delayed payments.

Land Utilization Act, Chapter 188, Revised Edition 2000

It provides the primary authority for land-use planning in Belize. The Act requires that government approval be obtained before any parcel of land can be subdivided and provides general authority to regulate land use in order to protect watersheds, prevent soil erosion, control clearing of forest, and regulate the type of development permitted in designated areas.

3.2.14. Indigenous communities

Table 17 - Indigenous Communities Regulations

National Regulations	
Constitution of Belize	states the need for a State that protects the identity, dignity and social and cultural values of Belizeans, including those of Belize's indigenous peoples. No legal measures have been developed to make that protection effective for the Maya people of the country.
Maya of Southern Belize Free Prior Informed Consent Protocol ("FPIC")	The Protocol affirms that Government, as well as third parties, must consult with the Mopan and Q'eqchi people prior to proceeding with initiatives or projects which may affect the Maya villages' rights on their land, territory, and resources . This Protocol has been in the making for many years, with multiple revisions resulting from numerous consultations with relevant parties.

3.3. Other Sectoral and Framework Documents

International Finance Corporation (IFC). Environment, Health, and Safety Guidelines (2007). The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice for adequate management of projects.

International Finance Corporation (IFC). Environment, Health, and Safety Guidelines for Water and Sanitation (2007). Technical reference document containing general and specific examples of international best practices for the water and sanitation sector.

Horizon 2030 – National Development Framework for Development in Belize (2010). Long-term national development framework articulating Belize's vision for sustainable growth, economic resilience, good governance, and environmental stewardship.

National Solid Waste Management Policy of Belize. (2015). This document establishes the government's vision and strategic objectives for the prevention and management of waste, and the policies needed to achieve them.

Inter-American Development Bank. Meaningful Stakeholder Consultation (2017). This publication describes principles and content that should be present for a consultation process to be considered meaningful. It is consistent with existing IDB environmental and social safeguards policies and reflects both explicit and implicit requirements in these policies and accompanying procedures and requirements.

Inter-American Development Bank. Water and Sanitation Sector Framework (2017). This document highlights the positive impacts on health, education, and economic growth provided by access to and quality of water and sanitation services. It presents international and regional empirical evidence on the main successful policies and programs and good practices to consider when designing interventions in the sector, the main challenges facing the sector in Latin America and the Caribbean, lessons learned from the IDB's experience in the sector, based on lending operations, technical cooperation projects, and knowledge products completed in recent years, and the goals, principles, dimensions of success, and lines of action that will guide the IDB's operational and research activities.

Inter-American Development Bank. Disaster and Climate Change Risk Assessment Methodology for IDB Projects (2019). Technical reference document for natural disaster and climate change risk assessment for eleven typical natural hazards in the Latin American and Caribbean region.

3.4. Institutional Framework

The institutions responsible for the implementation and environmental and social management of the Project, including the monitoring of the construction and operation phases, are preliminarily identified below.

The roles of the entities listed in this table are not exhaustive and should be updated in subsequent stages. Additionally, if necessary, other stakeholders related to the execution of the Project should be included.

Table 18 - Institutional Framework

Institution	Role/ Responsibility
Belize Water Services Limited (BWS)	• Executing Agency • Responsible for the implementation of the Project, including: • Component I: which involves the construction and commissioning of the wastewater collection and treatment system for the Placencia Peninsula. • Component II: which focuses on strengthening BWS's operational, technical, planning, asset management, customer, and environmental management capacities. • Belize Water Services Limited (BWS) is the national water and sewerage utility, serves all municipalities and certain villages.
Department of the Environment (DoE) (within the Ministry of Sustainable Development, Climate Change and Solid Waste Management)	• Responsible for the environmental assessment and permitting process for projects subject to environmental approval. • Reviews Environmental and Social Impact Assessments (ESIAs) and coordinates the Environmental Impact Assessment process in accordance with national environmental legislation. • Receives technical recommendations from the National Environmental Appraisal Committee (NEAC) as part of the environmental review process.
Belize Solid Waste Management Authority (BSWaMA)	• Belize Solid Waste Management Authority (BSWaMA) oversees the national solid waste management system and the operation of transfer stations throughout the country.
Village Town Councils in Placencia and Seine Bight	• Local governance structures that facilitate community engagement, support local infrastructure maintenance and help identify community needs, concerns and possible impacts • Coordinate with the Project on matters related to local infrastructure, public services and community development, as relevant.

Institution	Role/ Responsibility
Institute of Archaeology (National Institute of Culture and History)	Responsible for the protection, preservation and sustainable management of Belize's cultural and archaeological resources and Archaeological Reserves, such as Serpon Sugar Mill in Stann Creek District.
National Emergency Management Organization (NEMO)	- The Government Department is responsible for training and coordination across the public and private sector to prepare, mitigate, respond and recover from disasters. - There are 9 District Emergency Committees, including Stann Creek, where Placencia is located.

3.5. IDB's Environmental and Social Policy Framework: IDB Environmental and Social Performance Standards (ESPS)

After a description of the **10 Environmental and Social Performance Standards**, a table is presented with the details of the actions to be implemented in the Project to comply with them.

3.5.1. ESPS 1 – Assessment and Management of Environmental and Social Risks and Impacts

This Standard applies to all investment finance Programs and provides the basis for all other Standards by providing guidance on how to assess and manage environmental and social risks and impacts. It defines the importance of having an Environmental and Social Management System (ESMS).

The objectives of this Standard are:

- To identify and evaluate environmental and social risks and impacts of the Program.
- To adopt a mitigation hierarchy and a precautionary approach to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks, and impacts on workers, Program-affected people, and the environment.
- To promote improved environmental and social performance of Borrowers through the effective use of management systems.
- To ensure that grievances from Program affected people and external communications from other stakeholders are responded to and managed appropriately.
- To promote and provide means for adequate engagement with Program-affected people and other stakeholders throughout the Program cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.

The Borrower, in coordination with other government agencies and third parties, as appropriate, will conduct a process of environmental and social assessment and establish and maintain an ESMS appropriate to the nature and scale of the Program and commensurate with the level of its environmental and social risks and impacts.

The main characteristics of an ESMS are:

- Dynamic and continuous process initiated and led by the executing agency.
- It involves a collaboration between the borrower, its workers, the people affected by the Program and, when appropriate, other interested parties.

- Uses the “plan, do, check and act” process to manage environmental and social risks and impacts.

The ESMS will incorporate the following elements:

- i. Program-specific environmental and social framework.
- ii. Identification of risks and impacts.
- iii. Management programs.
- iv. Organizational capacity and competency.
- v. Emergency preparedness and response.
- vi. Stakeholder engagement.
- vii. Monitoring and review.

3.5.2. ESPS 2 - Labor and Working Conditions

Environmental and Social Performance Standard (ESPS) 2 recognizes that pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.

The objectives of this Standard are:

- To respect and protect the fundamental principles and rights of workers.
- To promote fair treatment, non-discrimination, and equal opportunity of workers.
- To establish, maintain, and improve the worker-employer relationship.
- To ensure compliance with national employment and labor laws.
- To protect workers, including workers in vulnerable situations such as women, people of diverse sexual orientations and gender identities, persons with disabilities, children (of working age, in accordance with this ESPS) and migrant workers, workers engaged by third parties, and primary supply workers.
- To promote safe and healthy working conditions, and the health of workers.
- To prevent the use of child labor and forced labor (as defined by the ILO).
- To support the principles of freedom of association and collective bargaining of Program workers.
- To ensure that accessible and effective means to raise and address workplace concerns are available to workers.

The scope of application of this Performance Standard depends on the type of employment relationship between the borrower and the Program worker. Applies to Program workers hired directly by the borrower (direct workers), those hired through third parties to perform work related to core Program functions for a significant period (contract workers), and those hired by the borrower's primary suppliers (workers in the main supply chain).

The borrower shall adopt and apply labor management policies and procedures appropriate to the nature and size of the Program and its workforce. In the application of this Performance Standard, the requirements related to gender equality and stakeholder participation must also be considered, in accordance with ESPS 9 and 10.

3.5.3. ESPS 3 - Resource Efficiency and Pollution Prevention

Environmental and Social Performance Standard (ESPS) 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. This ESPS outlines a Program-level approach to resource management and pollution prevention and control, and avoidance and minimization of GHG emissions. It builds on the mitigation hierarchy, and the “polluter pays” principle. It recognizes the disproportionate impact of pollution on women, children, the elderly, and the poor and vulnerable. Appropriate mitigation measures, technologies, and practices should be adopted for efficient and effective resource use, pollution prevention and control, and avoidance and minimization of GHG emissions, in line with internationally disseminated technologies and practices.

The objectives of this Standard are:

- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from Program activities.
- To promote more sustainable use of resources, including energy and water.
- To avoid or minimize Program-related emissions of GHG.
- To avoid or minimize generation of waste.
- To minimize and manage the risks and impacts associated with pesticide use.

The borrower must apply technically and financially viable and effective measures to improve his efficiency in the consumption of energy, water and other important resources and inputs. In addition, during the design and operation of the Program, the borrower must consider alternatives to avoid or minimize greenhouse gas emissions, and the prevention of contamination of the air, water and soil components.

3.5.4. ESPS 4 - Community Health, Safety, and Security

Environmental and Social Performance Standard (ESPS) 4 recognizes that Program activities, equipment, and infrastructure can increase community exposure to risks and impacts, including those caused by natural hazards and climate change. In addition, communities that are already subjected to adverse impacts from natural hazards and climate change may also experience an acceleration and/or intensification of adverse impacts due to Program activities.

The objectives of this Standard are:

- To anticipate and avoid adverse impacts on the health and safety of the
- Program-affected people during the Program life cycle from both routine and non-routine circumstances.
- To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Program-affected people.
- To anticipate and avoid adverse impacts on the Program itself from natural hazards and climate change during the Program life cycle.

This ESPS addresses potential risks and impacts to the Program-affected people from Program activities. It also addresses potential risks and impacts to the Program itself that may result from natural hazards and climate change.

Occupational health and safety requirements for workers are included in ESPS 2; environmental standards to avoid or minimize impacts on human health and the environment due to pollution are included in ESPS 3; requirements to address sexual and gender-based violence risks in instances of communal conflict and influxes of outside workers are included in ESPS 9; and stakeholder consultation and information disclosure requirements are included in ESPS 10.

3.5.5. ESPS 5 - Land Acquisition and Involuntary Resettlement

Environmental and Social Performance Standard (ESPS) 5 addresses impacts of Program-related land acquisition, including restrictions on land use and access to assets and natural resources, which may cause physical displacement (relocation, loss of land or shelter), and/or economic displacement (loss of land, assets, or restrictions on land use, assets, and natural resources leading to loss of income sources or other means of livelihood).

Unless properly managed, involuntary resettlement may result in long-term hardship and impoverishment for the Program-affected people, as well as environmental damage and adverse socio-economic impacts in areas to which they have been displaced. For these reasons, involuntary resettlement should be avoided. However, where involuntary resettlement is unavoidable, it should be minimized, and appropriate measures to mitigate adverse impacts on displaced people and host communities should be carefully planned and implemented.

The objectives of this Standard are:

- To avoid, and when avoidance is not possible, minimize displacement by exploring alternative Program designs.
- To avoid forced eviction.
- To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by:
 - i. providing compensation for loss of assets at replacement cost and transitional hardships;
 - ii. minimizing disruption to their social networks and other intangible assets;
 - iii. ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.
- To improve or restore the livelihoods and standards of living of displaced people.
- To improve living conditions among physically displaced people through the provision of adequate housing with security of tenure, and safety at resettlement sites.

3.5.6. ESPS 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources

Environmental and Social Performance Standard (ESPS) 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. The requirements set out in this ESPS have been guided by the Convention on Biological Diversity, which defines biodiversity as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and

the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems.”

Ecosystem services are the benefits that people, including businesses, derive from ecosystems. Ecosystem services are organized into four types: (i) provisioning services, which are the products people obtain from ecosystems; (ii) regulating services, which are the benefits people obtain from the regulation of ecosystem processes; (iii) cultural services, which are the nonmaterial benefits people obtain from ecosystems; and (iv) supporting services, which are the natural processes that maintain the other services.

The objectives of this Standard are:

- To protect and conserve terrestrial, freshwater, coastal and marine biodiversity.
- To maintain the ecosystem functions to ensure the benefits from ecosystem services.
- To promote sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

Based on the risks and impacts identification process, the requirements of this ESPS are applied to Programs (i) located in modified, natural, and critical habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the Borrower has direct management control or significant influence; or (iii) that include the production of living natural resources (e.g., agriculture, animal husbandry, fisheries, and forestry).

3.5.7. ESPS 7 - Indigenous Peoples

Environmental and Social Performance Standard (ESPS) 7 recognizes that Indigenous Peoples, as distinct social and cultural peoples, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development that is accordance with their worldview.

There is no universally accepted definition of “Indigenous Peoples.” Indigenous Peoples may be referred to in different countries by such terms as “original peoples”, “autochthonous peoples” or any other formally recognized indigenous peoples in Latin America and the Caribbean. In the ESPF, the term “Indigenous Peoples” is used in a generic sense to refer to distinct social and cultural peoples possessing some of the following characteristics in varying degrees:

- i. Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others.
- ii. Collective attachment to geographically distinct habitats or ancestral territories in the Program area and to the natural resources in these habitats and territories.
- iii. Customary cultural, economic, social, or political laws and institutions are separate from those of the mainstream society or culture.
- iv. A distinct language or dialect, often different from the official language or language of the country or region in which they reside.

The objectives of this Standard are:

- To ensure that the development process fosters full respect for the human rights, collective rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.

- To anticipate and avoid adverse impacts of Programs on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts.
- To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.
- To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) in a culturally appropriate manner with the Indigenous Peoples affected by a Program throughout the Program's life cycle.

3.5.8. ESPS 8 - Cultural Heritage

Environmental and Social Performance Standard (ESPS) 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this ESPS aims to ensure that Borrowers protect cultural heritage during their Program activities. In addition, the requirements of this ESPS with respect to a Program's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

The objectives of this Standard are:

- To protect cultural heritage from the adverse impacts of Program activities and support its preservation.
- To promote the equitable sharing of benefits from the use of cultural heritage

For the purposes of this ESPS, cultural heritage refers to (i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological, paleontological, historical, cultural, artistic, and religious value; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and (iii) certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

3.5.9. ESPS 9 - Gender Equality

This ESPS recognizes, regardless of the cultural or ethnic context, the right to equality among genders as established in applicable international agreements. The pursuit of equality requires actions aimed at equity, which implies providing and distributing benefits and/or resources in a way that narrows existing gaps, recognizing that the existence of these gaps can harm people of all genders.

This ESPS aims at identifying potential gender-based risks and impacts and introducing effective measures to avoid, prevent, or mitigate such risks and impacts, thereby eliminating the possibility of reinforcement of pre-existing inequalities or creating new ones. For purposes of this ESPS, affirmative action specifically aimed at closing existing gender gaps, meeting specific gender-based needs, or ensuring the participation of people of all genders in consultations will not constitute discrimination or exclusion.

The objectives of this Standard are:

- To anticipate and prevent adverse risks and impacts based on gender, sexual orientation, and gender identity, and when avoidance is not possible, to mitigate and compensate for such impacts.

- To establish actions to prevent or mitigate risks and impacts due to gender throughout the Program cycle.
- To achieve inclusion from Program-derived benefits of people of all genders, sexual orientations, and gender identities.
- To prevent SGBV, including sexual harassment, exploitation, and abuse, and when incidents of SGBV occur, to respond promptly.
- To promote safe and equitable participation in consultation and stakeholder engagement processes regardless of gender, sexual orientation, and/or gender identity.
- To meet the requirements of applicable national legislation and international commitments relating to gender equality, including actions to mitigate and prevent gender-related impacts.

3.5.10. ESPS 10 - Stakeholder Engagement and Information Disclosure

This ESPS recognizes the importance of open and transparent engagement between the Borrower and stakeholders, especially Program-affected people, as a key element that can improve the environmental and social sustainability of Programs, enhance Program acceptance, and contribute significantly to the Program's successful development and implementation. This ESPS is consistent with the objective of implementing the rights of access to environmental information, public participation in the environmental decision-making process, and access to justice in environmental matters.

For this ESPS, "stakeholder" refers to individuals or groups who:

- Are affected or likely to be affected by the Program ("Program-affected people") and
- May have an interest in the Program ("other stakeholders").

The objectives of this Standard are:

- To establish a systematic approach to stakeholder engagement that will help the Borrower identify stakeholders, especially Program-affected people, and build and maintain a constructive relationship with them.
- To assess the level of stakeholder interest in and support for the Program and to enable stakeholders' views to be considered in Program design and environmental and social performance.
- To promote and provide the means for effective and inclusive engagement with Program-affected people throughout the Program's life cycle on issues that could potentially affect or benefit them from the Program.
- To ensure that appropriate information on environmental and social risks.

3.6. Summary of Compliance with IDB Environmental and Social Policy Framework

The Table below details the actions that will be conducted to ensure compliance with the requirements established in the Environmental and Social Performance Standards (ESPS) during the preparation and execution of the Project.

Table 19 - Summary of Compliance with the IDB Environmental and Social Policy Framework

IDB Environmental and Social Performance Standards (ESPS)	Applies?
ESPS 1 – Assessment and Management of Environmental and Social Risks and Impacts	
The executing agency (EA) will be Belize Water Services Limited (BWS). To meet the requirements of ESPS 1, this Environmental and Social Assessment (ESA) was prepared, which includes, in Chapter 5, the identification of the potential environmental and social impacts and risks of the works to be financed under the Project, with Mitigation Measures for the Construction and Operation Phase of the interventions. It also incorporates an Environmental and Social Management Plan (ESMP) to address these impacts and risks in accordance with the requirements established in the applicable ESPS in the Construction Phase and guidelines for the elaboration of operational management programs in Chapter 6. Additionally, an Environmental and Social Management System (ESMS) will be prepared prior to the approval of the IDB loan operation, which will incorporate the seven elements of an ESMS outlined in ESPS1: i) Project-specific environmental and social framework; (ii) identification of risks and impacts; (iii) Management programs; (iv) organizational capacity; (v) emergency preparedness and response; (vi) stakeholder engagement plan; and (vii) monitoring and evaluation.	YES
ESPS 2 - Labor and Working Conditions	
The infrastructure works to be financed under the Project, including the Wastewater Collection and Treatment System, have the potential to cause moderate to high impacts to workers and the community associated with accidents, injuries, and disease occurring in the course of work. This ESA includes a Labor Management Procedure - LMP (Annex 1), with a Code of Conduct and Grievance Redress Mechanism (GRM) for workers. The LMP incorporates requirements for ensuring compliance with ESPS 2 related to worker health and safety and working conditions, including: • Child and forced labor: This ESA includes a Labor Management Procedure (Annex 1) that incorporates measures to prevent child and forced labor. While Belizean legislation prohibits the employment of children under 12 years of age and establishes restrictions on child employment, the Project will apply the more stringent requirement of IDB ESPS 2 and will not employ or engage any person under 15 years of age in Project-related activities. • Occupational Health and Safety: In this type of Program, the risks of occupational accidents typical of civil and electromechanical works are expected. This ESA includes an assessment of worker health and safety risks and impacts associated with the construction works, and the ESMP establishes the corresponding management programs, aligned to international best practice and the requirements of ESPS 2.	YES
ESPS 3 - Resource Efficiency and Pollution Prevention	
During the construction stage, localized and temporary negative impacts and risks are expected, such as: (i) temporary increases in noise, vibrations, dust, and atmospheric emissions associated with the operation of machinery, excavation works, and	YES

IDB Environmental and Social Performance Standards (ESPS)	Applies?
transportation of materials; (ii) soil disturbance, alteration of natural drainage patterns, and erosion processes associated with land clearing, trenching, and earthworks; (iii) potential contamination of soil, surface water, and groundwater from accidental spills of fuels, oils, chemicals, wastewater, or other hazardous materials; and (iv) generation and inadequate management of solid and liquid waste, including construction debris, excavated materials, and hazardous waste). During the operation stage, the Project may generate impacts associated with the treatment and disposal of wastewater and sludge, including: (i) generation of odors and air emissions; (ii) generation and management of biosolids and other treatment residuals; (iii) potential impacts to soil and water resources from inadequate effluent or sludge management; and (iv) increased energy consumption associated with the operation of pumping stations and treatment systems. The ESA identifies direct, indirect, and cumulative environmental impacts and risks in Chapter 5 as well as specific measures for preventing or minimizing them. The Environmental and Social Management Plan (ESMP) in Chapter 6 includes management measures for their effective control, following the mitigation hierarchy. The ESMP includes the following programs: monitoring and control of compliance with mitigation measures; management of construction sites and works closure; air quality, noise, and vibrations management; environmental and social liabilities; flora and fauna management; energy and resource efficiency; waste management; effluent management; chemical substances management; occupational and community health and safety; traffic and pedestrian management; pest and vector control; socio-environmental training for construction personnel; disaster risk and climate change management plan; emergency preparedness and response program; community information and participation; chance find procedure; and coordination with service providers.	
ESPS 4 - Community Health, Safety, and Security	
The impacts and risks on Project-Affected People (PAPs) were assessed in this ESA based on the Project design available at the time of the assessment. The analysis considered potential community health and safety risks associated with construction activities, including increased traffic from construction vehicles and equipment, temporary disruptions to local access, noise and dust generation, the handling and storage of hazardous substances (such as fuels, lubricants and chemicals), and occupational and community exposure to accidents. Potential health risks associated with the temporary presence of non-local workers and interactions with local communities were also considered. During operation, potential risks related to the operation and maintenance of water supply and wastewater infrastructure, including the handling of treatment chemicals, were assessed. Appropriate mitigation measures have been incorporated into the ESMP through the Occupational and Community Health and Safety Program, Traffic and Pedestrian Management Program, Chemical Substances Management Program, Emergency Preparedness and Response Program, and Community Information and Participation Program to minimize risks to workers and communities. The overall disaster and climate risk of the Project has been identified as moderate, considering the exposure of the area to natural hazards, including hurricanes, tropical storms, flooding, coastal erosion, droughts, and extreme rainfall events. Special mitigation measures have been identified in the Disaster Risk and Climate Change	YES

IDB Environmental and Social Performance Standards (ESPS)	Applies?
Management Program, including specific requirements for the design phase of the infrastructure following the Belize Building Code of 2025 (see section 6.2.1).	
ESPS 5 - Land Acquisition and Involuntary Resettlement	
No physical or economic displacement was identified in the scope of the Project interventions or associated facilities, to the extent of current definition of the Project. However, the final engineering design of the sewerage network will be reviewed to confirm whether temporary economic displacement or livelihood impacts associated with construction activities (e.g., temporary access restrictions to businesses or commercial activities) may occur. Given the localized and short-term nature of the proposed works, any such impacts are expected to be minor and temporary. Specific measures have been incorporated into Program 16. Community Information and Participation to prevent and minimize potential temporary impacts on businesses and other economic activities, including measures related to communication, access, construction scheduling, and monitoring BWS must present property titles, or equivalent land ownership records certifying all infrastructure is located within government owned property (see section 7.2). Any other potentially impacted stakeholders identified after the finalization of final engineering designs are expected to be consulted (see Stakeholder Engagement Plan included as a separate document to this ESA/ESMP) to include necessary measures, program improvements, and management mechanisms that will ensure no adverse effects on their livelihoods and economic development occur due to the Program interventions.	NO
ESPS 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources	
The potential Project area is located within the Belize Coastal and Near Shore Islands Key Biodiversity Area (KBA) and is therefore considered a Critical Habitat. This ESA has included specific measures to be applied to effectively mitigate potential adverse impacts on local flora, fauna and ecosystem services in its Flora and Fauna Management Program, including assessment of the net loss of natural vegetation area, a Pre-Clearance Survey for flora and fauna species prior to any vegetation clearance. Furthermore, to ensure full compliance with IDB ESPS 6 requirements for operations within Critical Habitat, the Executing Agency (BWSL) must ensure a measurable Net Gain in Critical Habitat values. Once detailed engineering designs are finalized and the exact footprint and spatial extent of Critical Habitat affected by the project are conclusively determined, BWSL will prepare a definitive, site-specific Biodiversity Action Plan (BAP). This BAP will be developed with the assistance of qualified external experts, following the technical framework established in Annex 2 of this ESA (Biodiversity Action Plan Guidelines).	YES
ESPS 7 - Indigenous Peoples	
No settled and recognized Indigenous communities have been identified within the Project's Area of Influence. The baseline assessment identified the presence of Garifuna residing within the urban area, who are integrated into the broader population and urban fabric. They have been considered in the baseline assessment and stakeholder mapping; however, no distinct or recognized Garifuna community has been identified	NO

IDB Environmental and Social Performance Standards (ESPS)	Applies?
within the Project's Area of Influence, nor are differentiated impacts on people of Garifuna descent anticipated as a result of the Project interventions.	
ESPS 8 - Cultural Heritage	
No tangible cultural heritage sites have been identified regarding the area of influence of the Project interventions. However, given the important Cultural Heritage Found in Belize, as well as the existing archaeological sites from Mayan Civilization, there are potential risks of encountering cultural heritage of significance during construction. To prevent destruction of historical, cultural, archaeological and paleontological heritage, a Chance Find Procedure has been incorporated into the Environmental and Social Management Plan (ESMP) – Program 17.	YES
ESPS 9 - Gender Equality	
The presence of contractors in local communities during Project implementation may increase the risk of sexual exploitation and abuse, sexual harassment (SEA/SH), and gender-based violence (GBV) affecting women, girls, boys, LGBTQI+ individuals, and Project workers. To mitigate these risks, the Project ESMP incorporates a combination of preventive, awareness, and response measures, including: (i) adoption by contractors of a Code of Conduct prohibiting SEA/SH and GBV, together with disciplinary measures for non-compliance (Labor Management Procedure and Occupational and Community Health and Safety Program); (ii) mandatory training for Project personnel on the Code of Conduct, prevention of SEA/SH and GBV, and respectful engagement with local communities, including culturally appropriate interaction with vulnerable groups where applicable (Socio-Environmental Training for Construction Personnel Program and Labor Management Procedure); (iii) dissemination of information to communities regarding the expected standards of conduct for Project personnel and the available grievance channels (Community Information and Participation Program); (iv) implementation of a grievance mechanism to receive, register, and address SEA/SH- and GBV-related complaints in a confidential and survivor-centered manner, including referral pathways to appropriate GBV support services and competent authorities where required (Stakeholder Engagement Plan and Community Information and Participation Program); and (v) targeted engagement with women, vulnerable groups, and community organizations to promote their meaningful participation throughout Project implementation (Stakeholder Engagement Plan and Community Information and Participation Program).	YES
ESPS 10 - Stakeholder Engagement and Information Disclosure	
This ESA/ESMP includes a Stakeholder Engagement Plan (SEP) as a separate document to this ESA/ESMP, which establishes the overarching framework for engagement with all affected and interested parties throughout the Project's lifecycle. The SEP includes the mapping of stakeholders, community relations processes, the grievance redress mechanism (GRM). The Community Information and Participation Program (Program 16) for the construction phase also establishes measures to ensure timely, transparent, and accessible communication and engagement with affected communities and stakeholders throughout the Project lifecycle.	YES

4. Environmental and Social Baseline

4.1. Introduction

The main objective of this chapter is to characterize the area where the Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056) will be developed. The analysis conducted allows to know the location and description of the area of influence of the project, to determine its current situation and the relevant environmental and social aspects to consider.

This chapter analyzes general aspects and components of the natural and social environment and specifies the area of influence (Aoi) of the Project, to be able to analyze the potential environmental and social impacts attributable to, or derived from, project activities.

4.2. Definition of Area of Influence

This ESA considers both the construction and operational phases of the Project, and focuses mainly on the relevant existing physical, biological, and socioeconomic environments within the direct footprint of the Project, namely the area surrounding the proposed interventions, both a Direct Area of influence (DAoi) and an Indirect Area of Influence (IAoi) are defined for the Project as follows below.

4.2.1. Direct Area of Influence

The Direct Area of Influence (DAoi) is defined as the maximum area encompassing the project works and associated infrastructure within which environmental and social disturbances and impacts may directly affect sensitive receptors identified in the study area during the construction and operation phases of the Project. These may include, among others, noise and vibration disturbances; impacts on traffic and mobility; impacts on flora and fauna; and potential impacts on soil and surface and groundwater resources resulting from inadequate management of construction waste.

For the proposed “Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056),” the DAoi includes the area identified for the construction of the wastewater treatment plant (WWTP), located in Seine Bight, within the Placencia Peninsula, as well as the areas where the wastewater collection network and associated infrastructure will be constructed. The location of the potential project areas is shown in the figure below.

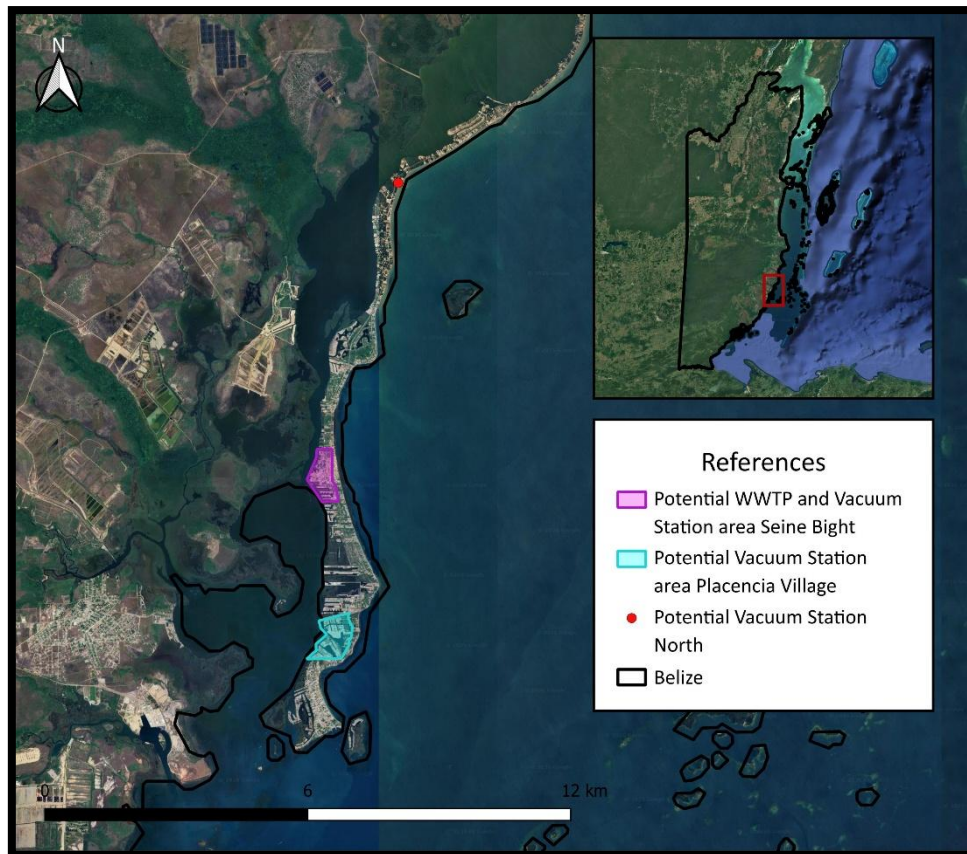


Figure 6 - Approximate DAoI. Source: PlanEHS, 2025.



Figure 7 – Placencia Peninsula network. Source: Cost Analysis - Vacuum Sewer System and WWTP, Placencia, 2026.

4.2.2. Indirect Area of Influence

The Indirect Area of Influence (IAoI) is the area within which indirect impacts are expected to occur, that is, those impacts that transcend the physical space of the project and its associated infrastructure.

For the purposes of this ESA, the IAoI has been defined at two complementary spatial scales. At the national level, Belize provides the broader environmental, social, institutional, and regulatory context relevant to the assessment of indirect Project impacts. At the local level, the Placencia Peninsula constitutes the primary IAoI, as it is the area where indirect effects associated with the Project interventions are expected to occur.

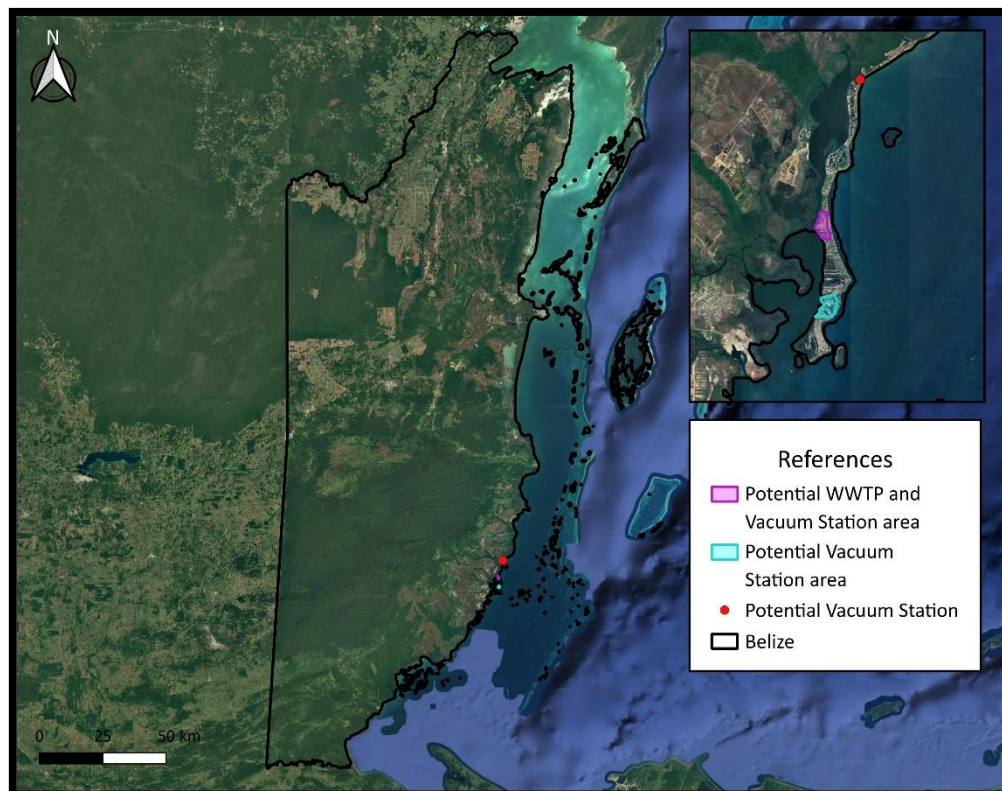


Figure 8 - Indirect Area of Influence (IAoI): Belize and Potential Project Areas in the Placencia Peninsula. Source: PlanEHS, 2026.

Belize is a country located on the northeast coast of Central America. Situated south of the Yucatán Peninsula, Belize is a land of mountains, swamps, and tropical jungle. It is bounded by Mexico to the north, Guatemala to the west and south, and the Caribbean Sea to the east. The country has a 174-mile (280-km) coastline.

The country is divided into **six districts**: Corozal; Orange Walk; Belize; Cayo; Stann Creek y Toledo.

Placencia Village is a coastal settlement located at the southern end of the Placencia Peninsula in the Stann Creek District, southeastern Belize. The village is bordered by the Caribbean Sea to the east and the Placencia Lagoon to the west, placing it within a sensitive coastal and marine environment. Placencia functions as a key tourism destination in southern Belize, with an economy centered on tourism, fisheries, and associated services. Development is concentrated along the narrow peninsula and includes hotels, guesthouses, restaurants, and residential areas, with sections of the coastline modified by coastal protection structures. The surrounding lagoon, mangroves, and nearby Cayes

support important ecological resources and contribute to the area’s vulnerability to coastal erosion, flooding, and climate-related hazards. The potential WWTP area is located in Seine Bight, on the Placencia Peninsula.

4.3. Physical Environment Baseline of Indirect Area of Influence

4.3.1. Climate

Belize has a tropical climate characterized by marked spatial variation in temperature and precipitation. Northern Belize is predominantly influenced by tropical monsoon and tropical savanna climates, whereas the southern region, including the Placencia Peninsula, is characterized by a tropical rainforest climate (**Figure 9**).

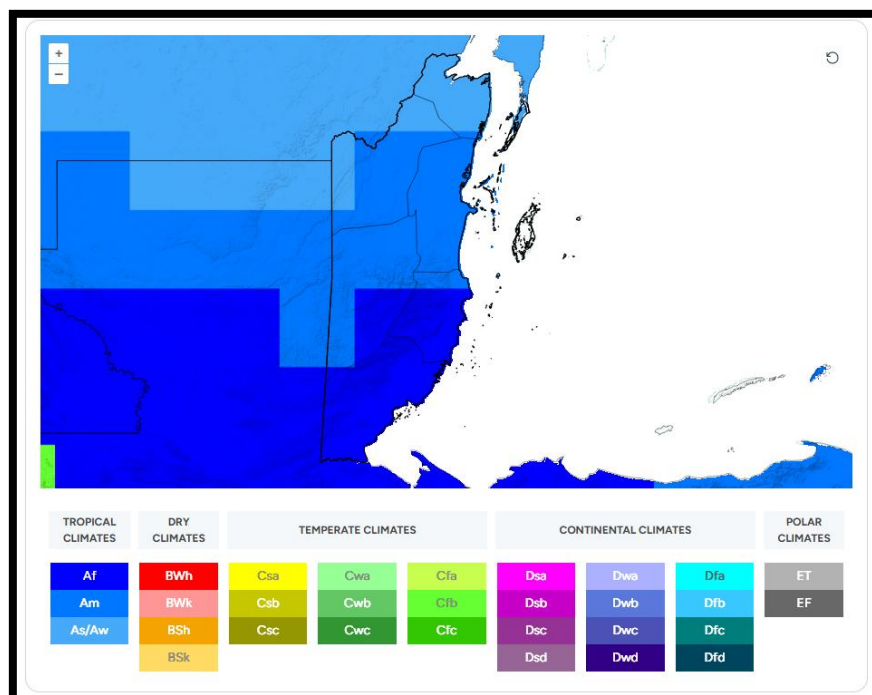


Figure 9 – Belize Climate. Source: World Bank Group¹⁴.

Belize’s climate is made up of two seasons, wet (rainy) and dry. Average annual temperatures generally range between 23 °C and 27 °C, while precipitation increases from north to south reflecting geographic gradients of moisture and topography. Annual rainfall varies from approximately 1,500 mm in northern Belize to more than 4,000 mm in the southern districts.

¹⁴ <https://climateknowledgeportal.worldbank.org/country/belize>

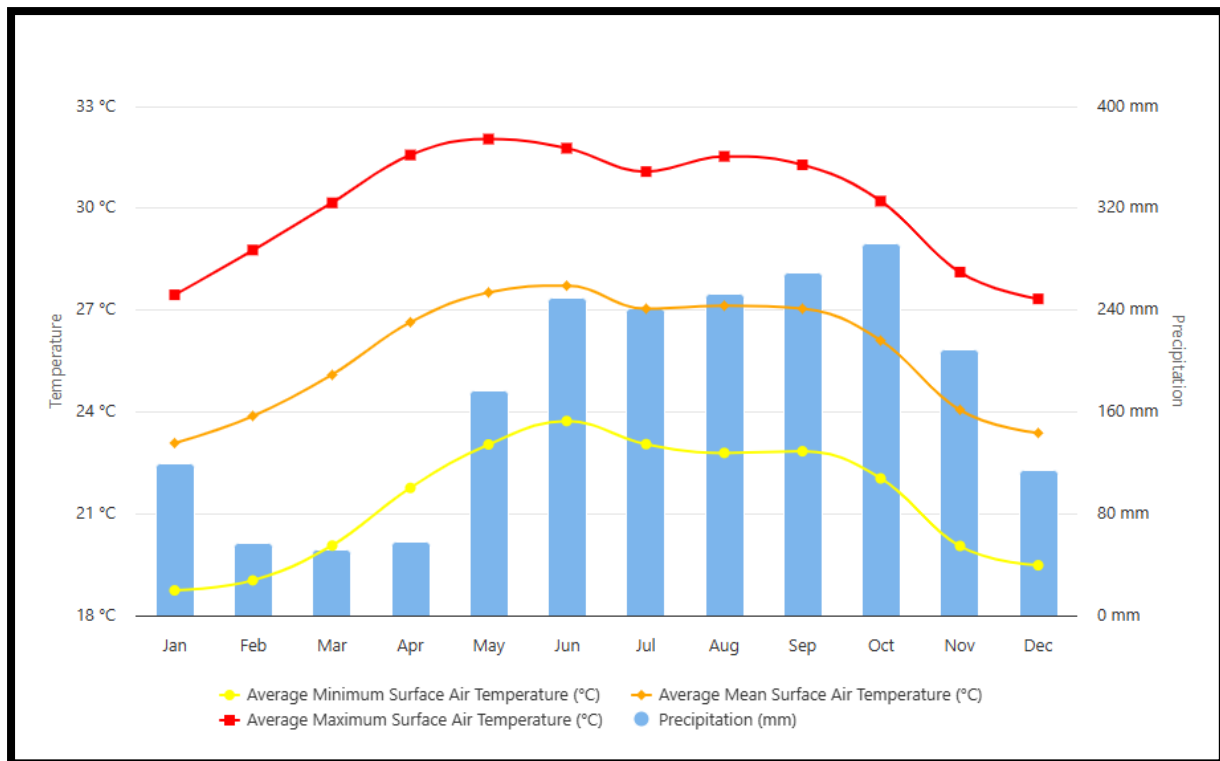


Figure 10 – Monthly Climatology of Belize Temperatures and Precipitations from 1991-2020.
Source: World Bank Group¹⁵.

In addition to the dry and wet seasons mentioned above, Belize has a hurricane season that runs from early June to the end of November and results in strong winds, heavy rainfall and flooding. It is a country vulnerable to tropical cyclones, being bordered on the East by the Caribbean Sea.

The **Placencia Peninsula**, where the project is located, has a tropical rainforest climate (Köppen-Geiger classification: Af), characterized by warm temperatures and high humidity throughout the year. The mean annual temperature is approximately 25.5 °C, and the average annual precipitation is approximately 2,843 mm. Although rainfall occurs throughout the year, precipitation follows the seasonal pattern observed across Belize, with higher rainfall generally occurring between June and November, coinciding with the wet and hurricane seasons. October typically receives the highest average precipitation, at approximately 361 mm, while April records the lowest, with an average of 68 mm of rainfall. Seasonal temperature variation is limited, with mean monthly temperatures ranging from approximately 23.2 °C in January to 27.1 °C in May¹⁶.

¹⁵ <https://climateknowledgeportal.worldbank.org/country/belize>

¹⁶ <https://en.climate-data.org/north-america/belize/stann-creek/placencia-873546/>

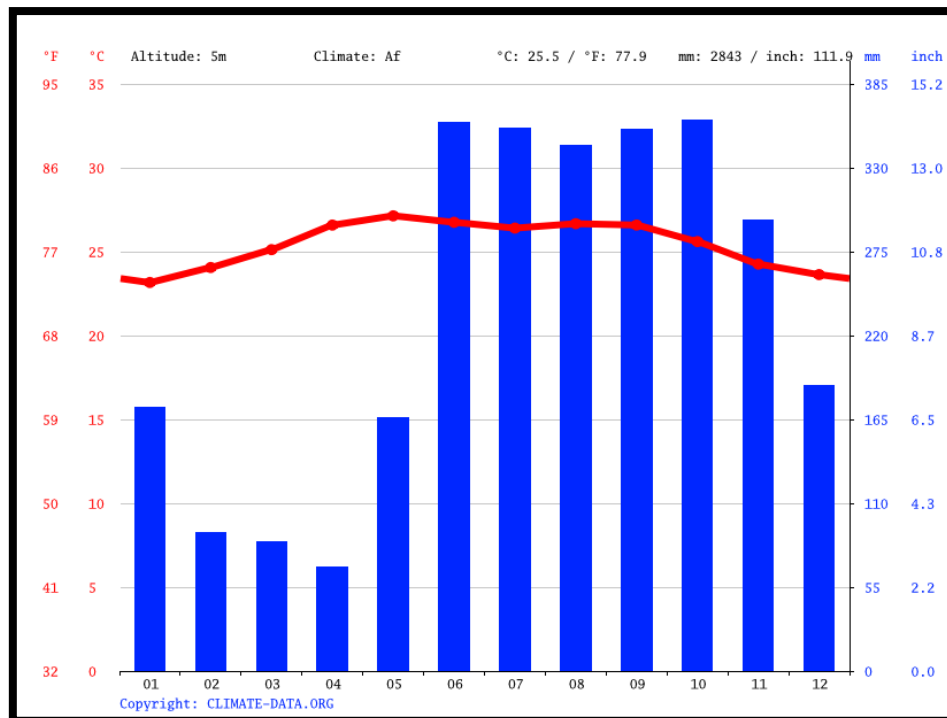


Figure 11 – Placencia Climograph. Source: Climate Data¹⁷.

4.3.2. Geology

Belize's geology is shaped by its location along the northernmost margin of the Yucatán Peninsula, where a broad carbonate platform meets low-relief coastal plains and offshore reef systems. The inland Maya Mountains are composed of older igneous, metamorphic, and sedimentary rocks, while much of the lowland and coastal region is underlain by limestone and other carbonate formations that accumulated during repeated periods of shallow marine conditions over millions of years.

Along the coast, these older geological formations are overlain by Quaternary alluvial and coastal deposits, which have been transported and reworked by rivers, tides, and coastal processes. These deposits are particularly prominent in the southern coastal plain. Offshore, the Belize Barrier Reef Reserve System, which forms part of the larger Mesoamerican Barrier Reef, represents one of the world's most extensive coral reef ecosystems. The reef system is built on a limestone platform and influences sedimentation along the coast and around the cays.

¹⁷ <https://en.climate-data.org/north-america/belize/stann-creek/placencia-873546/>

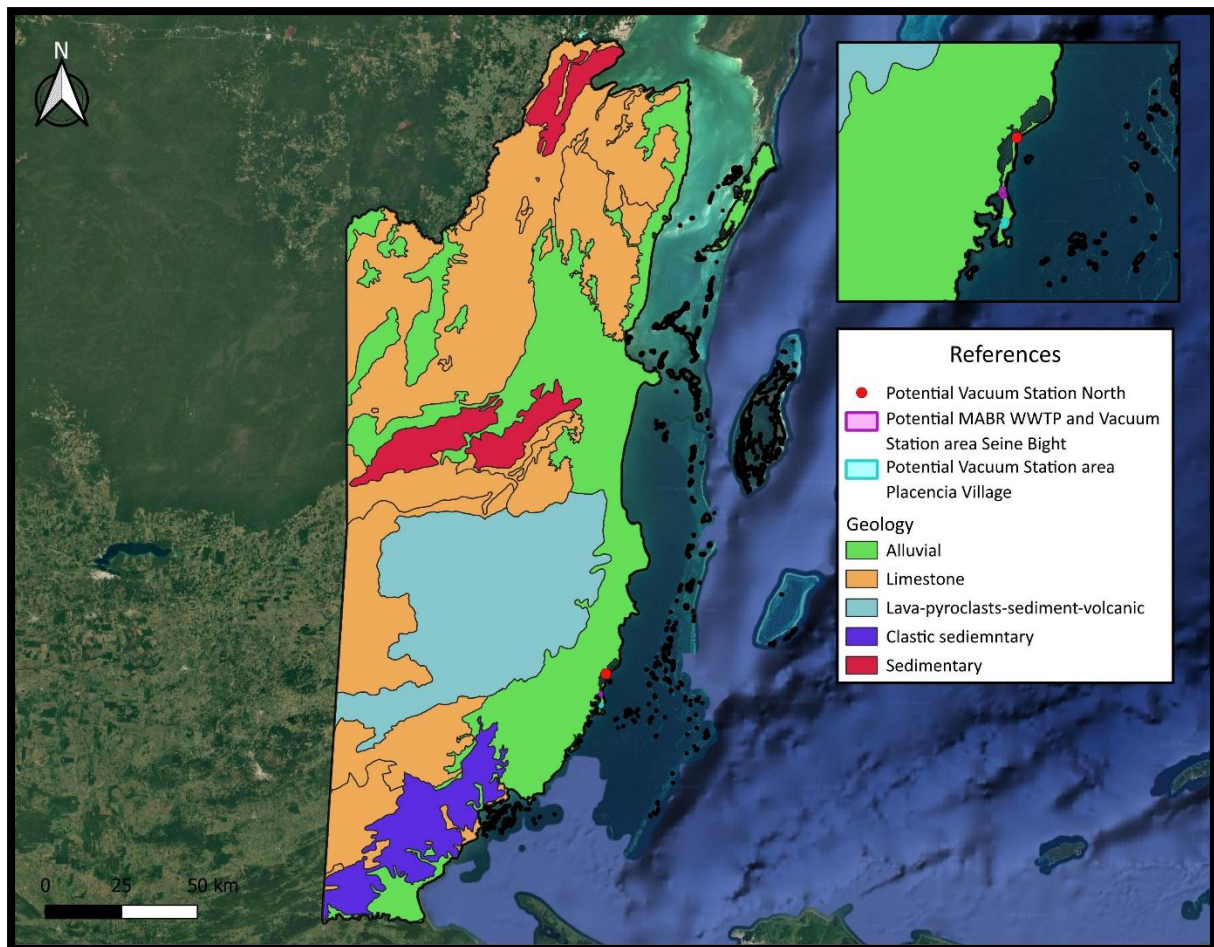


Figure 12 – Geology of Belize and potential project areas. Source:
<https://hub.arcgis.com/datasets/8a176dcae9024ee7b5e189d89d07fbd5/about>

The region around **Placencia** is predominantly mapped as **alluvial deposits**, unconsolidated sands, silts, clays, and organic material laid down by rivers and coastal processes along the low-lying southern coastal plain. These sediments originate from erosion in the interior highlands and are subsequently reworked by coastal currents and tides, contributing to the formation of a gently sloping landscape characterized by beaches, wetlands, and lagoons. This alluvial geological setting is typical of Belize's southern coast, where riverine influence is strong and carbonate bedrock is overlain by more recent sediments.

4.3.3. Topography

Belize's topography is composed of four main physiographic regions. The coastal plain extends inland for approximately 60 km and dominates the northern and central areas of the country. This region is generally low-lying (below 200 m above sea level) and includes wetlands and river systems. The northern lowlands are predominantly flat, with elevations rarely exceeding 76 m¹⁸.

The Maya Mountains occupy the south-central portion of Belize and represent the country's highest elevations, reaching 1,124 m at Doyle's Delight. This range forms part of the Central American mountain system and includes steep slopes and waterfalls, such as Thousand-Foot Falls. The southern

¹⁸ <https://lacgeo.com/geography-belize>

coastal plain extends along the Caribbean coast and includes mangrove swamps, lagoons and river deltas associated with low elevations and coastal processes¹⁹.



Figure 13 – Topography of Belize. Source: UNHCR, Belize Atlas Map (2007) (modified by PlanEHS, 2026).

Placencia is located within a relatively flat coastal setting in southern Belize, characterized by limited topographic variation and low elevations above mean sea level. The surrounding terrain is predominantly flat, reflecting the broader low-lying coastal conditions of southern Belize. Available

¹⁹ <https://lacgeo.com/geography-belize>

topographic data indicates that the area around Placencia has an average elevation of approximately 1 m above mean sea level, with elevations generally ranging from -1 m to approximately 9 m²⁰.

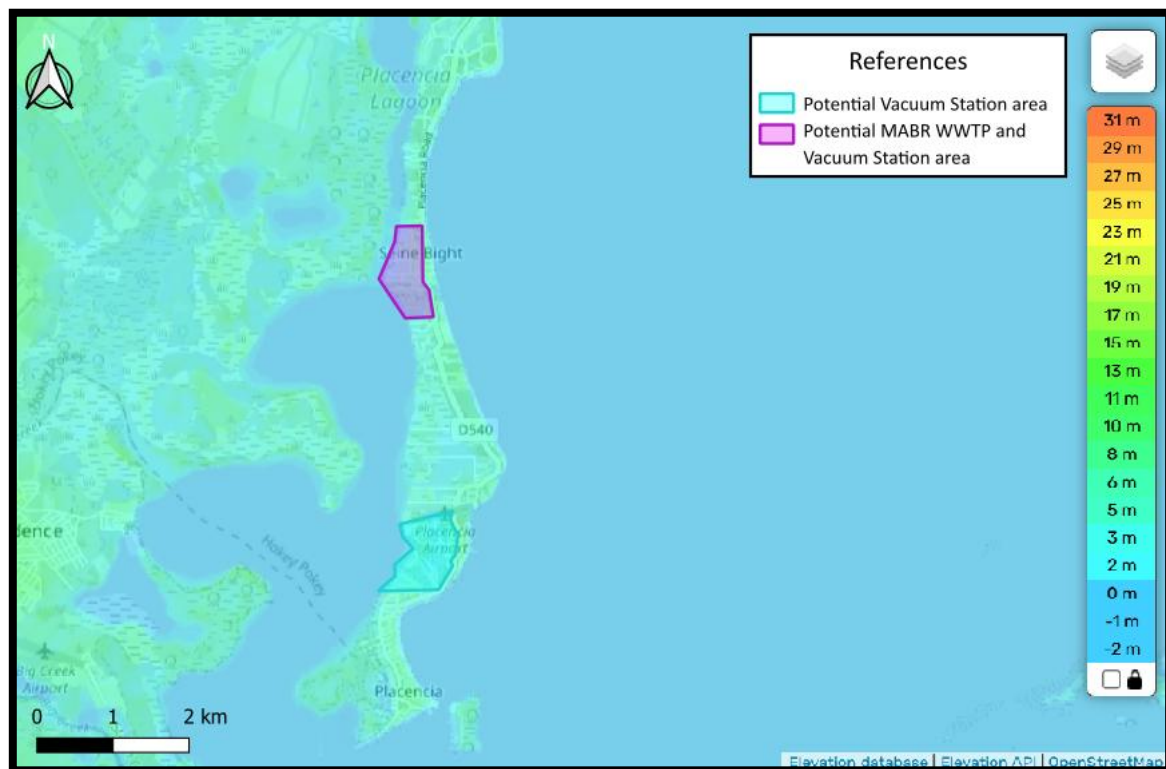


Figure 14 – Topography of Placencia. Source: <https://en-gb.topographic-map.com/map-3npn9m/Placencia/?center=16.55059%2C-88.37946&zoom=13>

4.3.4. Hydrology

Belize is divided into 33 watersheds. Most of these watersheds originate in the Maya Mountains and drain toward the Caribbean Sea. They include both **surface water systems**, such as springs, streams, rivers and lagoons, **and groundwater resources** stored within soil and rock formations. Watersheds are primarily recharged through rainfall, groundwater flow and surface water storage, particularly within the large lagoon systems of the northern lowlands²¹. All potential Project areas are located within the Placencia Peninsula Watershed²² (drainage basins).

²⁰ https://en-gb.topographic-map.com/map-3npn9m/Placencia/?utm_source=chatgpt.com¢er=16.52179%2C-88.41065&zoom=13

²¹ Department of Environment, Ministry of Natural Resources and the Environment. (2012). Wealth untold: A glimpse of Belize's natural resources. Government of Belize.

²² <http://www.biodiversity.bz/>

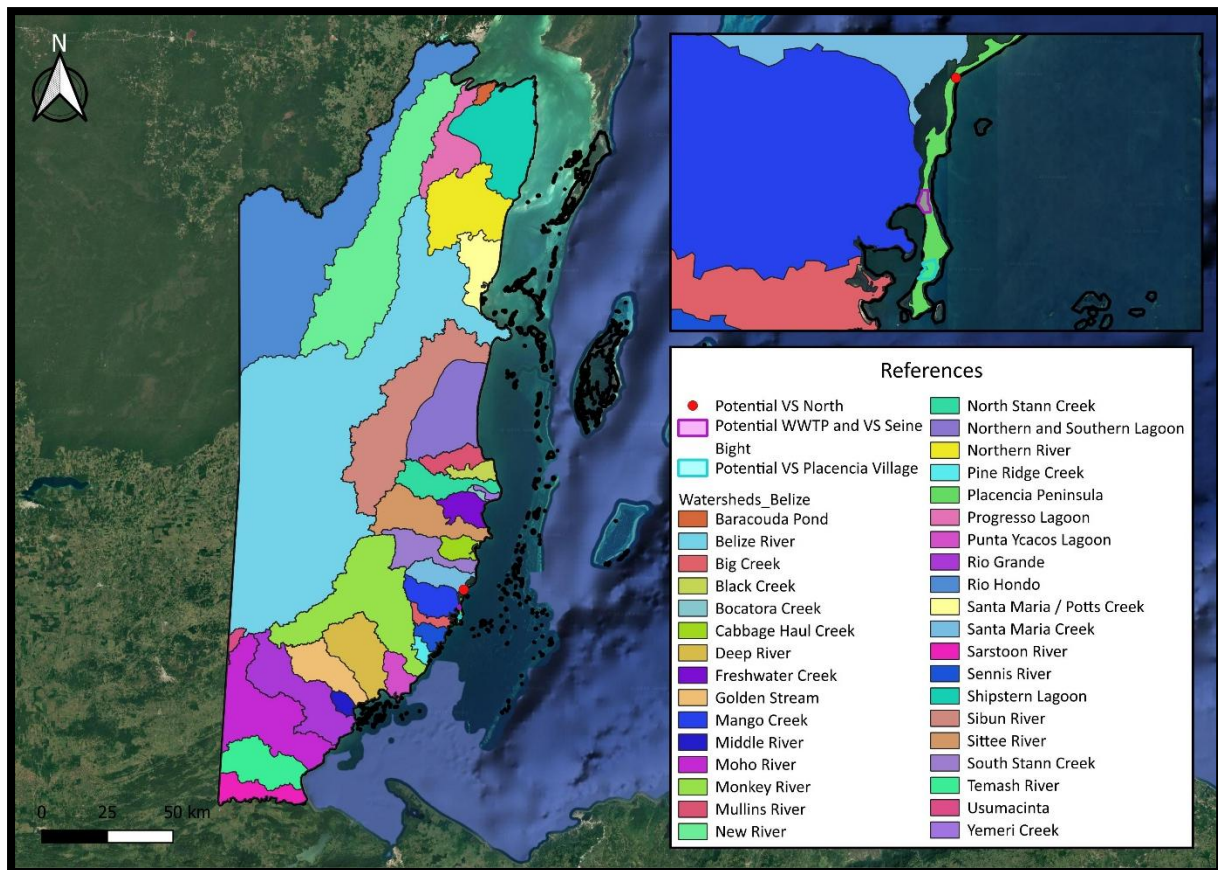


Figure 15 –Belize’s Watersheds. Source: <http://www.biodiversity.bz/>

4.3.4.1. Surface Water

Belize’s surface water resources are distributed across a network of major river basins and numerous streams, most of which originate in the Maya Mountains and drain into the Caribbean Sea. Freshwater and brackish lagoons are mainly concentrated in the central and northern coastal areas and in low-lying inland zones. Overall surface water availability is high across the country, except for the Vaca Plateau, where surface streams infiltrate into porous limestone formations.

River systems in northern Belize are characterized by low gradients and meandering channels, while southern rivers drain smaller basins and reach the coast more rapidly. The country’s river basins are grouped into six watershed regions, Northern, Northeastern, Central, Southeastern, Southwestern and Southern, based on physical and land use characteristics²³.

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<https://openknowledge.fao.org/server/api/core/bitstreams/185e755c-ed0c-4814-9926-01a869423d4f/content>



Figure 16 –Belize’s Rivers. Source: <https://maps-belize.com/belize-river-map>

4.3.4.2. Groundwater

Groundwater resources are generally available throughout the less mountainous areas of Belize, with yield characteristics largely influenced by geological and climatic factors. High groundwater permeability is observed in northern regions, dominated by calcareous sediments, and in southern areas, where limestone is found. In contrast, areas underlain by shales and slates exhibit low permeability and limited groundwater extraction.

Elevated concentrations of chlorides, hardness and sulfates have been reported in some coastal areas and inland wells in the northern region, particularly during periods of drought. Belize is divided into seven groundwater provinces, including the Savannah Province, where the **Placencia Peninsula** is located. This province is characterized by limited and generally unreliable groundwater resources²⁴.

²⁴ Department of Environment, Ministry of Natural Resources and the Environment. (2012). Wealth untold: A glimpse of Belize’s natural resources. Government of Belize.

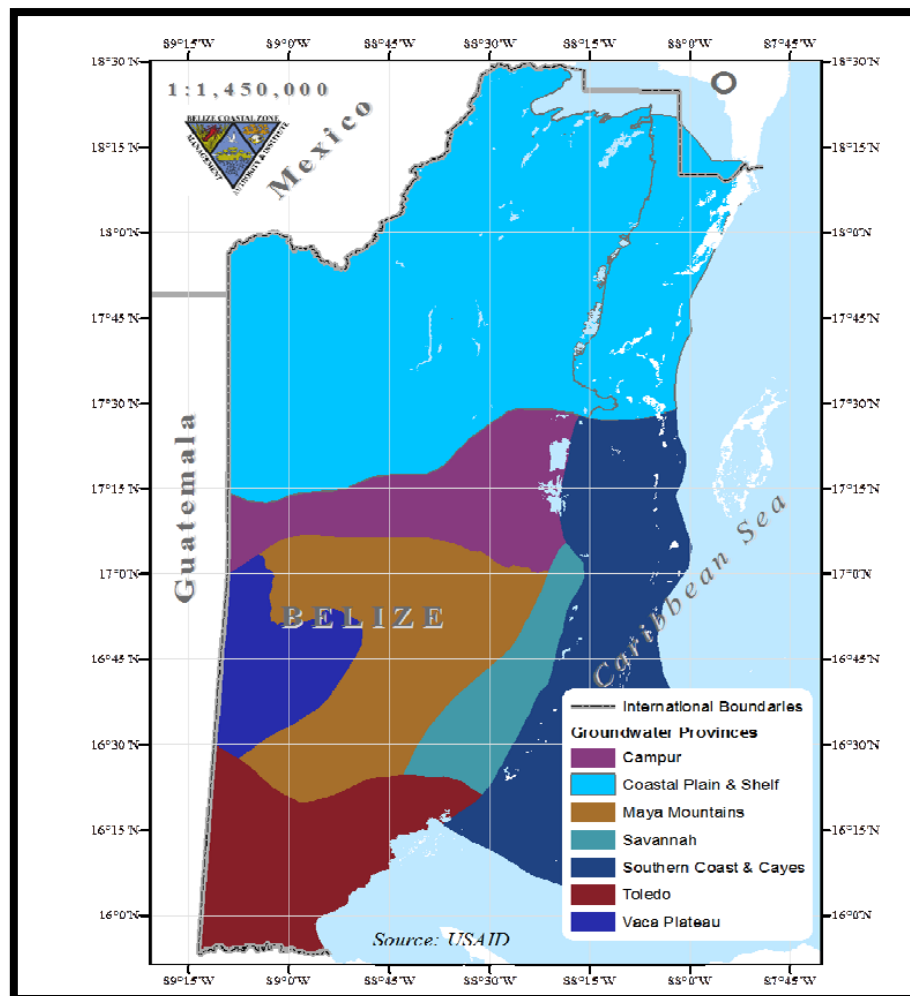


Figure 17 – Belize Groundwater Provinces. Source: Country Environmental Profile, 2006.

4.3.4.3. Oceanography

Belize's coastal zone comprises a diverse range of marine and coastal ecosystems, including coral reefs, mangroves, seagrass beds, coastal lagoons and sandy beaches. The Belize Barrier Reef Reserve System, a UNESCO World Heritage Site, forms part of the Mesoamerican Barrier Reef System and extends for approximately 280 km along the country's Caribbean coast. These ecosystems support high levels of biodiversity and provide important ecological functions, including coastal protection, fisheries habitat and nursery areas for numerous marine species.²⁵

The Placencia Peninsula is located on Belize's southern Caribbean coast, bordered by the Caribbean Sea to the east and the Placencia Lagoon to the west. Offshore, the peninsula is adjacent to the southern portion of the Mesoamerican Barrier Reef System. Placencia Lagoon is a semi-enclosed, shallow coastal estuarine system covering approximately 30 km² and extending approximately 24 km in a north–south direction. The lagoon reaches a maximum width of approximately 3.2 km and opens to the sea at its southernmost point. It is separated from the sea by a narrow sand spit extending

²⁵ <https://www.coastalzonebelize.org/wp-content/uploads/2021/01/BELIZE-Integrated-Coastal-Zone-Management-Plan.pdf>

approximately 25 km southward, which forms its eastern shoreline. The lagoon is surrounded by landscape comprising associated wetlands, mangroves, pine savanna, and tropical forest²⁶.

4.3.4.4. Water Demand and Quality

In Belize, the tourism sector represents a significant component of water demand, particularly in coastal and island destinations. In tourism centers, visitors consume on average three to four times more water than local residents, approximately 300 liters per person per day, and this demand is often concentrated during the dry season, when water availability is reduced²⁷, and is further intensified by tourism-related uses such as accommodation services, landscaped areas, swimming pools, and recreational facilities.

At the national level, wastewater treatment infrastructure remains limited, with only a small number of urban centers served by centralized lagoon-type wastewater treatment systems that do not provide nutrient removal²⁸. In unserved areas, including Placencia, untreated sewage and greywater are discharged directly into the environment, elevating nutrient levels in coastal and marine habitats²⁹.

Water pollution is a significant concern in the Placencia area. Nutrient and pathogen-laden wastewater discharges contribute to declining coastal water quality and may affect the health and resilience of nearby marine ecosystems³⁰. Studies conducted by the Belize Coastal Zone Management Authority and Institute and the Coral Reef Alliance in 2021 and 2022 identified nutrient pollution, particularly associated with untreated or inadequately treated wastewater, as a contributing factor to poor coastal water quality and reef degradation³¹. Concentrations of dissolved inorganic nitrogen of up to 4.7 mg/L and phosphorus of up to 0.96 mg/L were reported, with elevated nutrient levels particularly pronounced during the rainy season, potentially reflecting increased leakage from septic systems. Excess nutrient inputs can contribute to eutrophication, promote harmful algal growth, increase the prevalence of coral disease, and reduce coral reef resilience to thermal stress, including marine heatwaves and coral bleaching events³².

²⁶ https://ambergriscaye.com/art3/Placencia-Lagoon-Management-Plan_draft-2.pdf

²⁷ https://libstore.ugent.be/fulltxt/RUG01/002/274/878/RUG01-002274878_2016_0001_AC.pdf

²⁸ World Bank (2023). Belize Blue Economy Project (P181064)

²⁹ https://www.thegef.org/sites/default/files/documents/2023-10/GEF8_IP_Overview_2023_10.pdf

³⁰ Nutrient Fate and Transport Study of the Placencia Peninsula and Marine Environs, BWSL, 2020.

³¹ <https://coral.org/blog/marine-water-quality-protocol-now-available-for-mesoamerican-reef-system-comprehensive-guide/>

³² Vega Thurber, R. L., Burkepille, D. E., Fuchs, C., Shantz, A. A., McMinds, R., & Zaneveld, J. R. (2014). Chronic nutrient enrichment increases prevalence and severity of coral disease and bleaching. *Global Change Biology*, 20(2), 544–554. DOI: 10.1111/gcb.12450

4.3.5. Natural Hazards and Vulnerability

Belize is among the countries most affected by weather-related events and other natural hazards, incurring average annual losses of approximately 4% of GDP due to natural disasters³³. Key vulnerabilities include³⁴:

- Hurricanes and tropical storms
- Flood risk, particularly in Belize City and coastal areas
- Increasing extreme temperatures
- Climate change impacts on barrier reef ecosystems and associated species

Existing analyses indicate that several coastal communities and tourism areas, including the Placencia Peninsula, are located in zones that are highly sensitive to small increases in sea level, underscoring the significant physical vulnerability of the Belizean coast.

4.3.5.1. Rise in Sea Surface Temperature

Sea surface temperature is a key climatic variable influencing coastal and marine systems in Belize. Coral reefs in the region are particularly sensitive to relatively small increases in water temperature, with physiological stress observed when temperatures exceed the historical maximum monthly mean by approximately 1°C, a threshold commonly associated with coral bleaching. Prolonged exposure to elevated sea surface temperatures can lead to widespread bleaching events and increased coral mortality. The figure below shows the influence of increase exposure to elevated sea surface temperature (SST) on Belize's coral reefs (2006-2010)³⁵.

³³ Government of Belize. (2025). Belize's third nationally determined contribution (NDC 3.0).

³⁴ <https://unfccc.int/sites/default/files/NDC/2022-06/Belize%20Updated%20NDC.pdf>

³⁵ https://cdkn.org/sites/default/files/files/Vulnerability-assessment-report_final.pdf

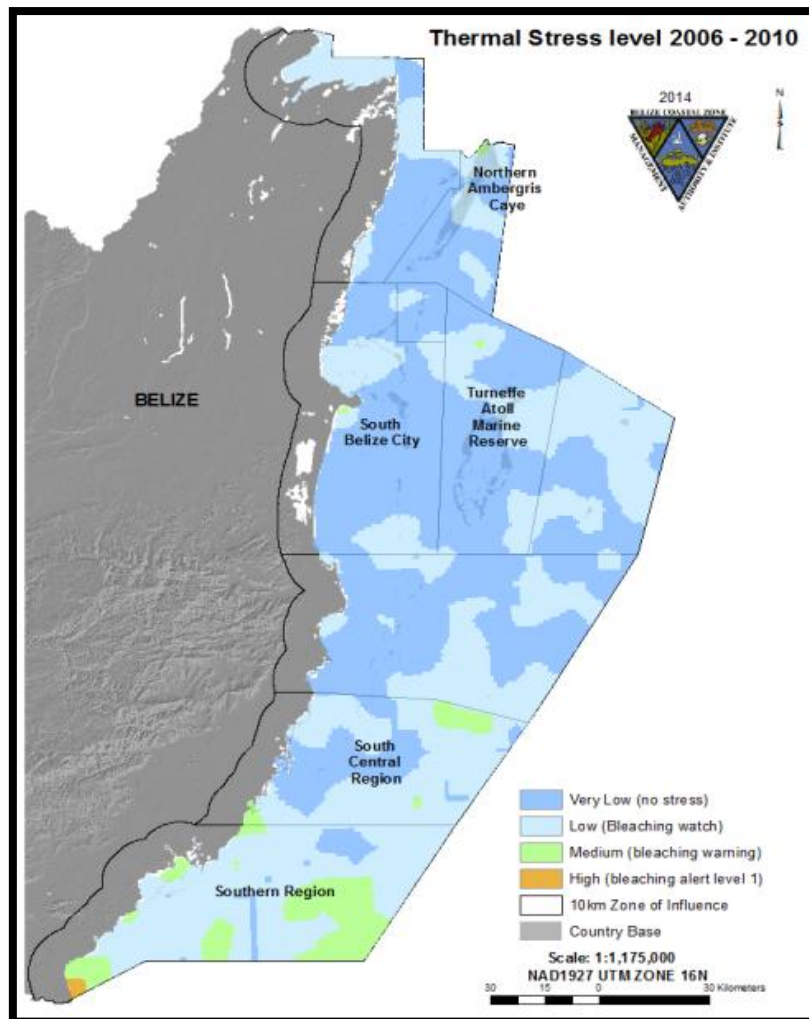


Figure 18 – Summary analysis of exposure to thermal stress. Source: Analyzing Vulnerability of the Belize Coastal Tourism Sector (2014)

4.3.5.2. Sea Level Rise

Global sea level rise represents a significant natural hazard for Belize due to the country's extensive low-lying coastline and the concentration of population and infrastructure in coastal and island areas. As Placencia is situated at sea level, it has a heightened physical vulnerability to gradual changes in sea level.

Current projections indicate that sea levels rise by the end of the century could reach up to 103.9 cm³⁶. Such an increase poses substantial risks to coastal communities, critical infrastructure, and ecosystems, particularly mangroves and coral reefs that function as natural buffers against storm surges. As sea levels rise, coastal erosion and saltwater intrusion into freshwater supplies are expected to intensify, threatening agricultural productivity and human settlements³⁷.

Coastal erosion is already recognized as one of the principal environmental challenges affecting the Placencia Peninsula. Recent studies have identified shoreline erosion as a key concern for local

³⁶ Government of Belize. (2025). Belize's third nationally determined contribution (NDC 3.0).

³⁷ <https://unfccc.int/sites/default/files/resource/blznc2.pdf>

communities, with erosion processes influenced by natural coastal dynamics as well as anthropogenic pressures, including land-use changes and coastal development. The peninsula's low-lying topography and unconsolidated alluvial and coastal sediments contribute to its susceptibility to shoreline retreat and erosion. In the context of projected sea level rise, these existing processes may be further intensified, potentially affecting beach stability, coastal ecosystems, infrastructure, and the long-term resilience of the peninsula's shoreline³⁸.

4.3.5.3. Extreme Rainfall and Flooding

Heavy rainfall events associated with cyclones and seasonal storms frequently generate surface flooding, particularly in areas with flat topography and limited drainage capacity. In coastal and island settings, the porous limestone substrate provides limited attenuation during extreme rainfall, resulting in localized waterlogging that can disrupt transport, damage property, and increase mosquito breeding. Increasing storm surge intensity, together with projected rises in torrential rainfall during the wet season, is expected to further increase the frequency and severity of flooding events³⁹.

According to ThinkHazard⁴⁰, river and urban flooding are classified as **high risk in Belize**, while coastal flooding is classified as **medium risk**. At the district level, **Stann Creek District** (where Placencia is located) presents a **high river flood risk**, with urban and coastal flood risks categorized as **medium**.

³⁸ <https://storymaps.arcgis.com/stories/778d78cdd7ca420297b9c7df5390b7f2>

³⁹ ESL. (2025). Environmental and Social Assessment, Environmental and Social Management Plan and Environmental and social Management System. Strengthening Marine Ecosystem Resilience by Enhancing Wastewater Infrastructure in Caye Caulker (BL-L1051) Program.

⁴⁰ <https://thinkhazard.org/en/>

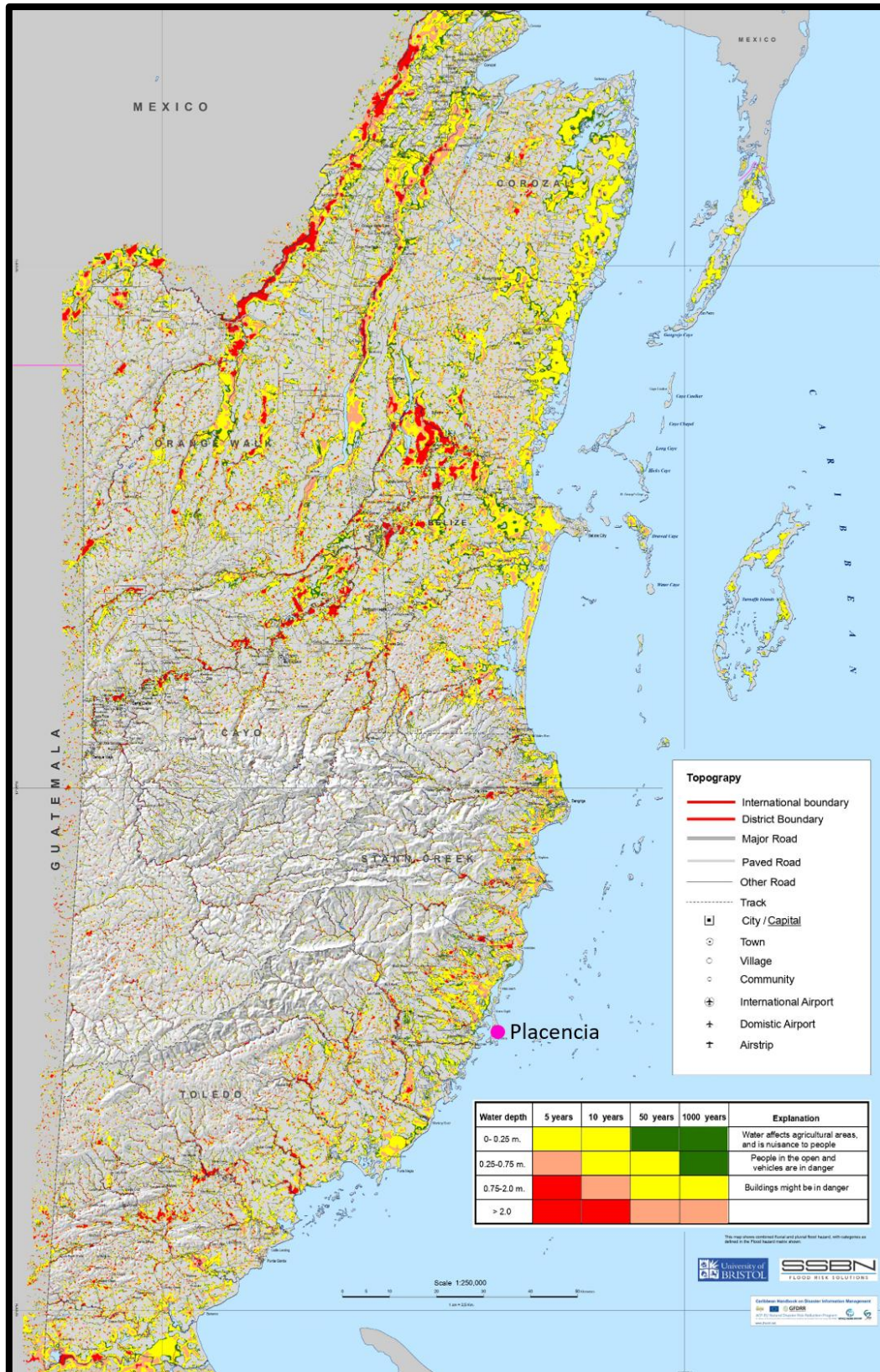


Figure 19 – Flood Hazard Map. Source:

https://ftp.itc.nl/pub/westen/PDF_files/maps/Belize%20Flood%20Hazard%20Map.pdf (modified by PlanEHS, 2026)

4.3.5.4. Tropical Storms and Hurricanes

Belize is located within the North Atlantic hurricane basin and has a long history of exposure to tropical storms and hurricanes. While there is no clear consensus regarding future changes in hurricane frequency, historical records indicate that Belize's coastal and island areas have experienced repeated exposure to high-intensity storm events. Long-term hurricane track and wind speed data show that coastal tourism areas and associated infrastructure have been among the most frequently affected⁴¹. Cyclone occurrence is classified as **high risk** both nationally and within Stann Creek District, where the Placencia Peninsula is located⁴².

4.3.5.5. Extreme Heat and Drought

Increasing temperatures and shifting rainfall patterns can place additional stress on water supplies, increase energy demand, and exacerbate public health risks. Drought conditions may reduce freshwater availability and impair the functioning of sanitation systems that rely on adequate water flow. Extreme heat can also contribute to higher sea surface temperatures, further increasing the risk of coral bleaching and thermal stress to marine organisms⁴³. Extreme heat risk is classified as **high** at the national level in **Belize**, while at the **district level** is categorized as **medium** in Stann Creek District⁴⁴.

4.3.5.6. Wildfires

Wildfires are uncontrolled fires that burn through natural vegetation such as forests, grasslands, and shrublands; they can be initiated by natural causes like lightning or by human activities such as land-clearing burns, agricultural fires, or discarded cigarettes. Wildfires can have wide-ranging effects including destruction of ecosystems, loss of biodiversity, soil degradation, air pollution from smoke, and damage to property and infrastructure. Weather conditions such as high temperatures, low humidity, and extended dry periods, associated with seasonal climate patterns and climate change projections, increase the potential for significant wildfire activity.

According to **ThinkHazard**⁴⁵ wildfire is classified as a **high** hazard at the national level in Belize, meaning there is a greater than 50 % chance of encountering weather that could support significant wildfire spread in any given year. However, the PDC National Disaster Preparedness Baseline Assessment⁴⁶ indicates that wildfire risk varies substantially within the country. Stann Creek has a **low wildfire risk index** relative to other districts, such as Cayo and Orange Walk.

⁴¹ https://cdkn.org/sites/default/files/files/Vulnerability-assessment-report_final.pdf

⁴² <https://thinkhazard.org/en/report/28-belize>

⁴³ ESL. (2025). Environmental and Social Assessment, Environmental and Social Management Plan and Environmental and social Management System. Strengthening Marine Ecosystem Resilience by Enhancing Wastewater Infrastructure in Caye Caulker (BL-L1051) Program.

⁴⁴ <https://thinkhazard.org/en/report/28-belize>

⁴⁵ <https://thinkhazard.org/en/report/28-belize/WF>

⁴⁶ <https://reliefweb.int/report/belize/belize-national-disaster-preparedness-baseline-assessment-data-driven-tool-assessing-risk-and-building-lasting-resilience>

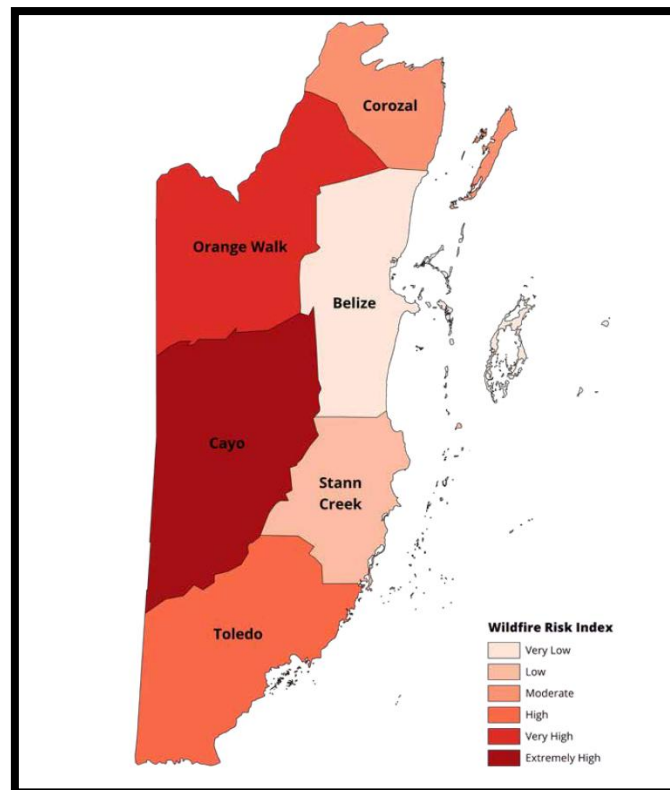


Figure 20 - PDC Wildfire Risk Index at the District Level in Belize. Source: PDC, (2024)⁴⁷.

4.3.5.7. Earthquake

Earthquake risk in Belize is relatively low at the national level. According to the World Bank's Hurricanes and Earthquakes Risk Profile, the Annual Average Loss (AAL) associated with earthquakes is estimated at US\$1.4 million, equivalent to approximately 0.08% of GDP, while the Probable Maximum Loss (PML) for a 250-year return period is estimated at US\$63 million, equivalent to approximately 3.7% of GDP⁴⁸. At the district level, Stann Creek has the second-lowest earthquake risk among Belize's districts, with estimated Annual Average Losses of approximately US\$56,000 and an estimated exposure of US\$466 million⁴⁹.

Furthermore, earthquake hazard is classified as **medium** for Belize (country) and Stann Creek District, where the Placencia Peninsula is located, according to **ThinkHazard!**⁵⁰. Nevertheless, earthquake hazards should be considered in relation to project planning decisions, project design, and construction methods.

⁴⁷ <https://reliefweb.int/report/belize/belize-national-disaster-preparedness-baseline-assessment-data-driven-tool-assessing-risk-and-building-lasting-resilience>

⁴⁸ <https://documents.worldbank.org/pt/publication/documents-reports/documentdetail/421591524237403194>

⁴⁹ <https://downloads.openquake.org/countryprofiles/BLZ.pdf>

⁵⁰ <https://thinkhazard.org/en/report/28-belize>

4.3.6. Climate Change

Global climate change represents one of the most serious threats to sustainable development in Belize. Impacts experienced to date include prolonged droughts, flooding events, increased coastal erosion, and changes in precipitation patterns. Taken together, these climate-related changes and associated phenomena are already exerting significant pressure on environmental, physical, social, and economic systems across the country. Looking ahead, these impacts are expected to intensify, posing growing risks to Belize’s physical and social infrastructure.

Projected climate change impacts for Belize include a rise in mean surface air temperatures of **1°C–2°C** over the next century and a **decline of up to 50% in mean annual rainfall** over the same period. The dry season is projected to be longer and hotter in the future. Drier regions in the north of the country (Orange Walk and Corozal Districts) will be at greater risk for **recurrent and prolonged droughts**. During the wet season, the country is expected to experience more **erratic and heavier rainfall**, which will be concentrated in mountainous areas in Southern Belize.

There is also a projected **increase in sea surface temperatures** of approximately 2°C by the end of the century; a gradual decrease of 0.02 in the mean pH of Belize’s coastal waters over the next 50 years; and sea-level rise exceeding 9 cm by 2050⁵¹.

Belize’s response to climate change is closely integrated into its broader development and national growth strategies, reflecting recognized synergies between environmental sustainability and socio-economic development. In particular, targets and actions related to coastal zones and marine environments are aligned with national policies and strategies, including the Sectoral Adaptation Plan. Belize’s Integrated Coastal Zone Management Plan (2016) emphasizes conservation, protection, and sustainable management to maintain critical ecosystem services. Similarly, the National Adaptation Plan for the Coastal Zone and Fisheries Sector of Belize (2024–2034) highlights the need to strengthen and enhance climate action to support a resilient and sustainable blue economy⁵².

4.4. Biological Environment Baseline of Indirect Area of Influence

4.4.1. Flora

Despite its relatively small size, Belize supports exceptionally high ecosystem diversity, with five global ecoregions and fourteen broad natural ecosystem types, further subdivided into 68 distinct ecosystems under national ecosystem mapping. Forests remain the dominant terrestrial ecosystem, covering over 61% of the country, and include lowland broad-leaved forests, pine forests, savannas, swamp forests, and coastal mangroves. These ecosystems provide habitat for keystone terrestrial species and maintain critical ecological functions such as watershed protection, climate regulation, and biodiversity connectivity, particularly within large, forested nodes such as the Maya Mountains Massif, Selva Maya, and Shipstern–Fireburn areas⁵³.

⁵¹ <https://www.iisd.org/system/files/2025-04/belize-climate-risk-profile.pdf>

⁵² Government of Belize. (2025). Belize’s third nationally determined contribution (NDC 3.0).

⁵³ National Biodiversity Strategy and Action Plan (2016 – 2020), Belize.

Belize's coastal and marine ecosystems form part of the Mesoamerican Barrier Reef System, the largest barrier reef in the Western Hemisphere and a globally significant biodiversity hotspot. Key coastal ecosystems include mangrove and littoral forests, wetlands, seagrass beds, coral reefs, and coastal lagoons, which are ecologically interconnected and essential for fisheries productivity, shoreline stabilization, and storm protection. Mangroves and littoral forests are identified as highly vulnerable ecosystems, particularly in areas experiencing rapid tourism-driven development. Wetlands also play a critical role in flood control and water regulation, especially in low-lying coastal areas.

All potential Project areas are situated within a landscape characterized by **Mangrove and Littoral Forest** and **Wetland** ecosystems. These coastal ecosystems are identified in the National Biodiversity Strategy and Action Plan as ecologically vital due to their role in fisheries nursery functions, filtration of land-based runoff, flood mitigation, and protection against coastal erosion and storm surges. These areas are also under increasing pressure from urban expansion and tourism development, making the conservation of remaining mangrove and wetland habitats particularly important.

According to the 2022 Nutrient Fate and Transport Study of the Placencia Peninsula and Marine Environs, the potential area would require mangrove removal, which could negatively affect the local ecosystem, as mangroves provide habitat for marine life and play an important role in nutrient uptake within the lagoon. In addition, the site is located along a narrow section of the lagoon where land reclamation would be required. Further narrowing of this channel could reduce water flushing in the northern lagoon, potentially resulting in adverse water quality impacts. These potential impacts should be further assessed if this location is selected.

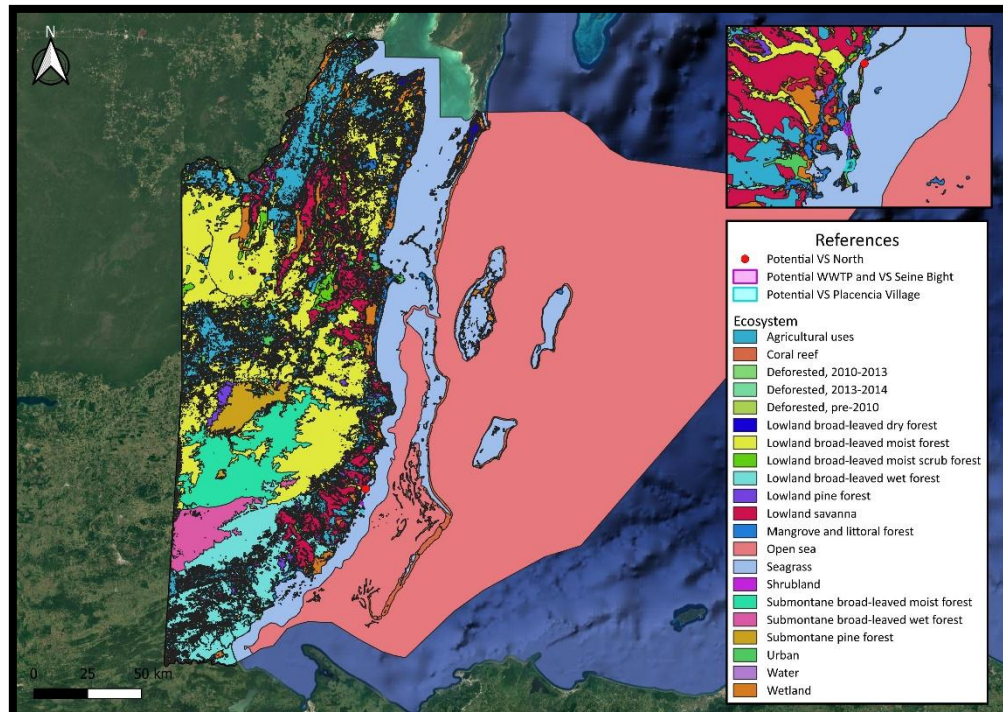


Figure 21 - Ecosystems of Belize. Source: DataBasin.org⁵⁴.

As for marine ecosystems, the selected project site is surrounded by extensive **seagrass meadows**, which constitute one of the most productive coastal habitats in Belize. These seagrass beds provide foraging, nursery, and shelter areas for a wide range of marine fauna, including West Indian manatees (*Trichechus manatus*), marine turtles, juvenile fish, crustaceans, and invertebrates, and play a key role in maintaining coastal food webs. In addition, seagrasses contribute to sediment stabilization, water quality regulation, and carbon sequestration, enhancing the resilience of the coastal environment.

4.4.2. Fauna

Belize supports a high diversity of terrestrial, freshwater, and marine fauna, including species that are ecologically significant at both national and regional levels. Large mammals and other keystone species continue to occur in Belize due to the extent and relative integrity of its natural ecosystems. These species play a critical role in maintaining ecosystem structure, ecological processes, and ecosystem services. At the same time, multiple faunal groups are experiencing population declines associated with habitat loss, habitat fragmentation, and unsustainable use of natural resources.

An analysis of the IUCN Red List assessments applicable to the country of Belize⁵⁵ shows 374 species classified as threatened or near threatened, including 38 Critically Endangered (CR), 90 Endangered (EN), 132 Vulnerable (VU), and 114 Near Threatened (NT) species. The majority of these species are associated with terrestrial systems, followed by marine systems, and a smaller but significant proportion dependent on freshwater or multiple interconnected systems (terrestrial–freshwater–marine). Threatened terrestrial fauna are dominated by mammals, birds, and reptiles, many of which depend on intact forest, savanna, and wetland mosaics. Freshwater-dependent threatened species include reptiles and fish associated with rivers, wetlands, and inland waters. Marine and coastal threatened fauna are primarily composed of fish, marine reptiles, and invertebrates, many of which rely on mangroves, seagrass beds, coastal lagoons, and coral reef systems during different life stages.

The Belize National Red List of Threatened Species of 2025 provides in turn the national assessment of extinction risk for terrestrial and freshwater fauna, focusing on mammals, birds, reptiles, and amphibians. A total of **106** faunal species are classified as threatened and, of these, 14 were mammals, 60 were birds, 18 were reptiles and 14, amphibians. 14.2% (15 of the 106 threatened species) were assessed as Critically Endangered, 22.6% (24) as Endangered and 64.2% (68) as Vulnerable, spread across the four species groups – mammals, birds, reptiles and amphibians⁵⁶.

⁵⁴ <https://databasin.org/maps/11e0a90b800a41819461bd48702df2db/active/#>

⁵⁵ <https://www.iucnredlist.org/search?landRegions=BZ&searchType=species>

⁵⁶ <https://forest.gov.bz/wp-content/uploads/2025/08/Belize-National-Red-List-2025-1-3.pdf>

SPECIES TAXA	TOTAL	CRITICALLY ENDANGERED	ENDANGERED	VULNERABLE
Mammals	14	1	4	9
Birds	60	13	11	36
Reptiles	18	1	5	12
Amphibians	10	0	4	10
	106	15	24	67

Figure 22 - Threatened Species on Belize’s National Red List. Source: Forest Department, 2025.

Birds account for the largest proportion of nationally listed fauna, followed by reptiles and mammals, reflecting the sensitivity of species associated with forest, savanna, wetland, and mangrove ecosystems. Many of the nationally threatened mammals are wide-ranging species that depend on extensive, contiguous habitats, while reptiles and amphibians are more closely associated with wetlands, riparian environments, and coastal ecosystems.

Among nationally threatened and conservation-relevant bird species, forest-dependent raptors such as the crested eagle (*Morphnus guianensis*) are indicative of the vulnerability of intact forest and forest–savanna mosaic habitats to fragmentation and land-use change. Likewise, reptiles such as the American crocodile (*Crocodylus acutus*), which occupies coastal wetlands, mangroves, intertidal zones, and nearshore marine environments, highlight the conservation importance of maintaining ecological integrity in mangrove and wetland systems.



Figure 23 - A) Crested Eagle, forest and savanna habitats; b) American Crocodile, marine coastal and wetland habitats. Sources: <https://dwazoo.com/animal/guiana-crested-eagle/> and https://creatures-of-the-world.fandom.com/wiki/American_Crocodile

4.4.3. Protected Areas, IBAs and KBAs

4.4.3.1. National Protected Areas

Belize is home to 103 nationally protected areas, categorized as: (a) national park; (b) nature reserve; (c) wildlife sanctuary 1; (d) wildlife sanctuary 2; (e) natural monument; (f) forest reserve; (g) fishery areas, marine and inland water reserves as defined under the fisheries resources act; (h) archaeological reserve; (i) private protected area; (j) protected landscape or protected seascape; (k) spawning aggregation site; (l) special management area; (m) scenic landscape of geomorphic significance.

Presently, the Forest Department manages five categories of protected areas: National Parks, Nature Reserves, Natural Monuments, Forest Reserves and Wildlife Sanctuaries (1 and 2). The Fisheries Department administers and manages marine reserves, spawning aggregation sites and fishery areas. The Institute of Archaeology manages archaeological reserves.

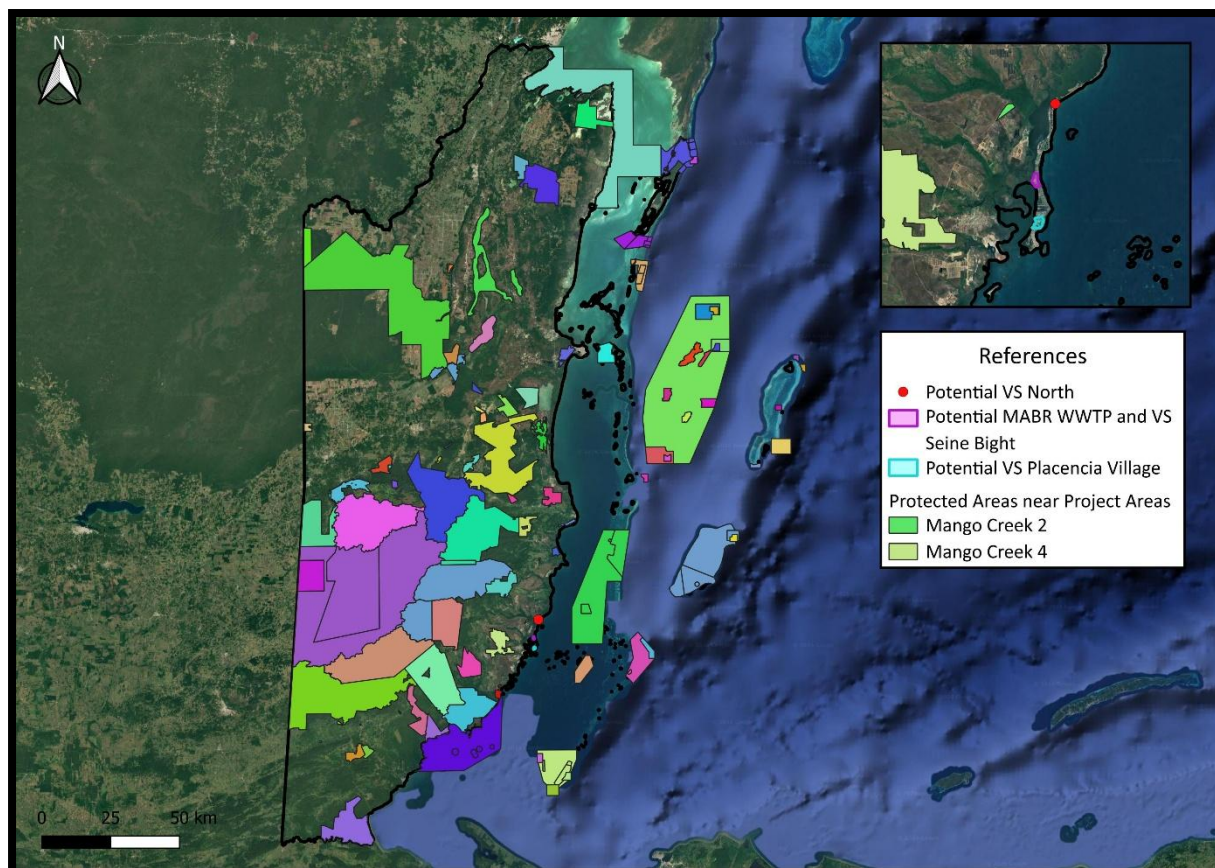


Figure 24 – National Protected Areas in Belize near the potential project areas. Source: <https://gis-education-tbsl.opendata.arcgis.com>

The two protected areas located closest to the potential project areas are 1) Mango Creek N° 2 Forest Reserve and 2) Mango Creek N°4 Forest Reserve. Both are designated Forest Reserves under Belize's forest management framework and are administered by the Belize Forest Department, which is responsible for implementing national policies and legal procedures governing the management and use of forest resources. Forest Reserves are managed through sustainable forest management instruments that include forest inventories, long-term planning, and measures to promote the conservation and protection of areas of ecological importance.

1. Mango Creek N°2 Forest Reserve, located approximately 6 km from the potential WWTP area, comprises 193 acres of protected pine forest habitat.

2. Mango Creek N°4 Forest Reserve, located approximately 8 km from the potential WWTP area, covers 12,608 acres of protected pine forest habitat.

Given their distance from all potential project areas, neither Forest Reserve is expected to be directly affected by the proposed project footprint. Given the small scale and localized nature of the proposed WWTP, no significant indirect impacts on the Forest Reserves are anticipated. Potential indirect

effects, if any, would be limited to localized and short-term disturbances associated with construction activities, such as noise, dust, and temporary access-related activities

4.4.3.2. RAMSAR Sites

Both declared RAMSAR Sites for Belize, Crooked Tree Wildlife Sanctuary and Sarstoon Temash National Park, are located outside Stan Creek district, where the potential project areas are located.

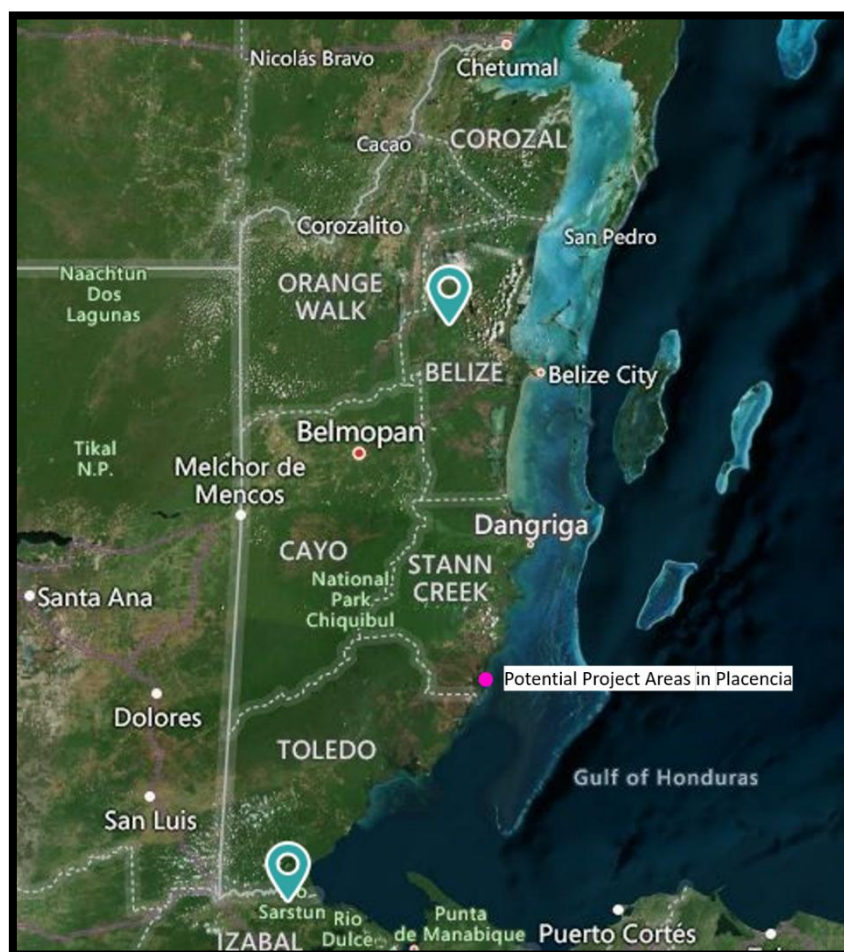


Figure 25 – RAMSAR Sites in Belize (from north to south): Crooked Tree Wildlife Sanctuary and Sarstoon Temash National Park. Source: <https://www.ramsar.org/country-profile/belize>

4.4.3.3. UNESCO World Heritage Sites

The Belize Barrier Reef Reserve System has been inscribed as a UNESCO World Heritage Site in 1996, it is comprised of seven protected areas: 1) Bacalar Chico National Park and Marine Reserve; 2) Blue Hole Natural Monument; 3) Half Moon Caye Natural Monument; 4) South Water Caye Marine Reserve; 5) Glover's Reef Marine Reserve; 6) Laughing Bird Caye National Park; and 7) Sapodilla Cayes Marine Reserve. It is the second largest reef system in the world, comprises 12% of the entire Reef Complex.

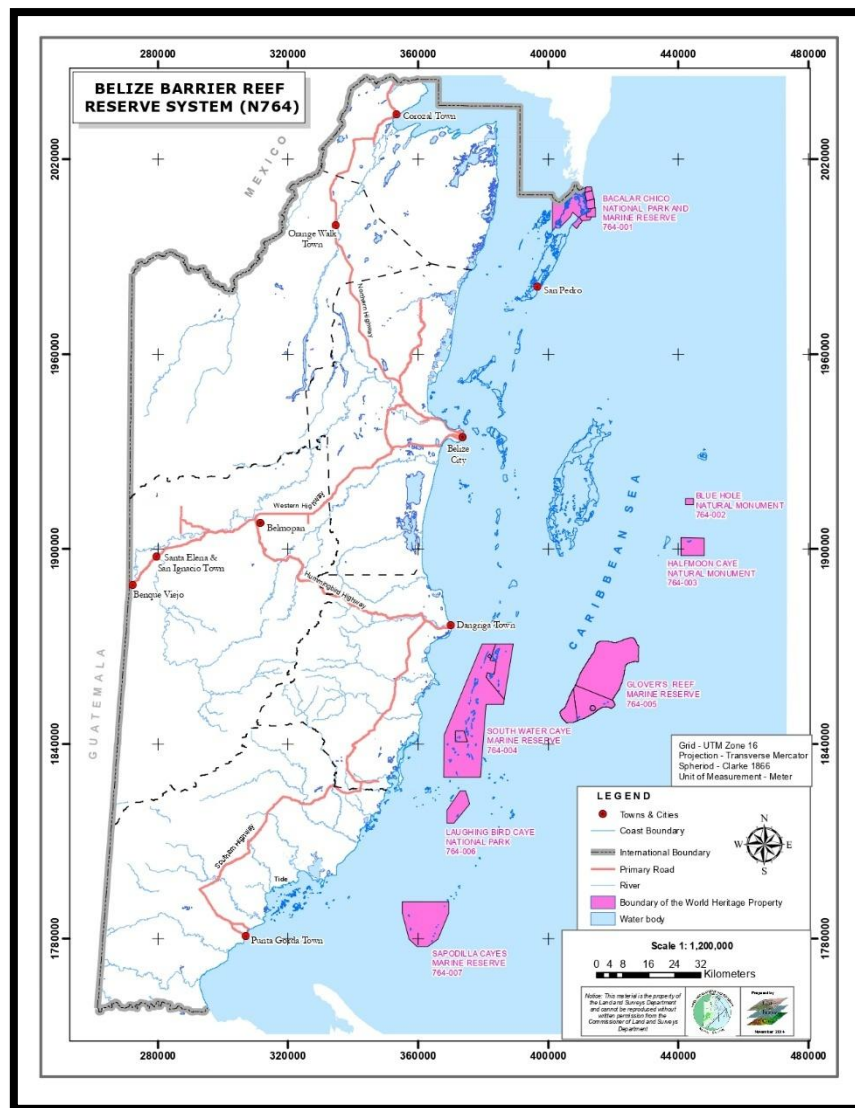


Figure 26 – Belize Barrier Reef Reserve System, UNESCO World Heritage Site. Source:
<https://whc.unesco.org/en/list/764/documents/>

The Belize Barrier Reef Reserve System (BBRRS) is globally unique due to the diversity of reef types occurring within a relatively small geographic area. As the longest barrier reef in the Northern and Western Hemispheres, the BBRRS is distinguished by its extensive size, diversity of reef types, and the high abundance and diversity of corals thriving in pristine conditions. It provides a representative example of the evolutionary history of reefs and reef systems. The rise and fall of sea levels over millennia, combined with the underlying natural karst topography and clear waters, have resulted in a diverse submarine seascape comprising patch reefs, fringing reefs, faros, pinnacle reefs, barrier reefs, off-shelf atolls, rare deep-water coral reefs, and other distinctive geological features, including the Blue Hole and Rocky Point, where the barrier reef reaches the shore.

The National Protected Areas Policy constitutes Belize's overarching policy framework for protected areas, while the National Protected Areas System Plan establishes, inter alia, specific requirements for protected-area resource management, planning, and management effectiveness evaluations. In addition to entrance fees, financial support for protected areas throughout Belize may be accessed through the national Protected Areas Conservation Trust. The sites and co-managers comprising the

BBRRS may also access funding through the Community Management of Protected Areas for Conservation (COMPACT) program and other international funding sources.

4.4.3.4. Key Biodiversity Areas (KBA)

As to Key Biodiversity Areas (KBA), all potential project areas are located within the **Belize Coastal and near shore islands KBA**, a 695,622 acres area, assessed in 2007, that is comprised of 3 Marine Reserves namely Hol Chan, Caye Caulker and Port Honduras; and seven Forest Reserves: Grants Works, **Mango Creek**, Swasey-Bladen, Machaca, Caye Caulker, Deep River and Manatee. There are also four Wildlife Sanctuaries: Aguascaliente, Gales Point, Swallow Caye, and Corozal Bay. There are two National Parks: Sarstoon-Temash and Payne's Creek. The four Bird Sanctuaries are Bird Caye, Monkey Caye, Los Salones and an un-named Caye. Altun Ha is the sole Archaeological Reserve and Burdon Canal is the sole Nature Reserve within this IBA. The IUCN Habitats present are Forest (61-70% coverage), Savanna (21-30% coverage) and Wetlands (15-20% coverage).

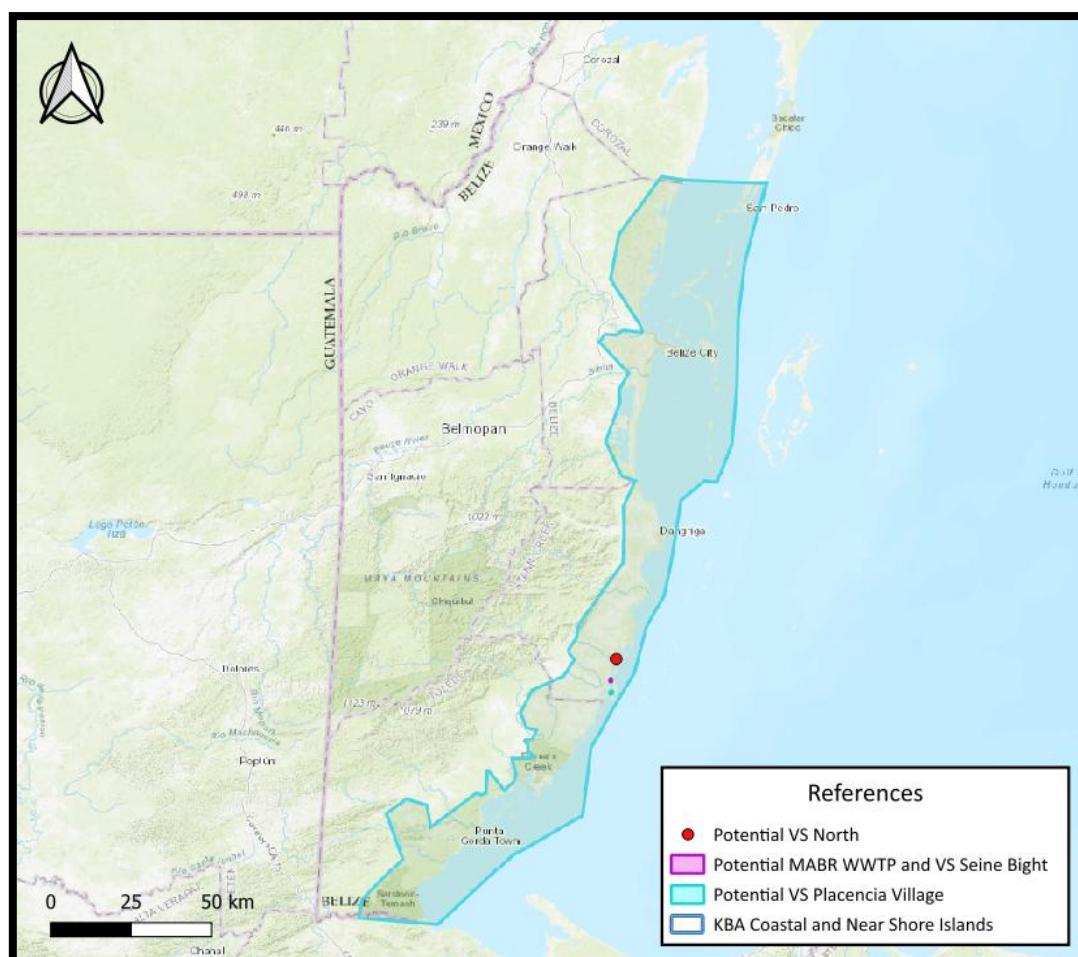


Figure 27 – KBA Belize Coastal and Near Shore Islands and Project potential Areas. Source: <https://www.keybiodiversityareas.org/site/factsheet/20764/assessment>

The site has 413 recorded species of which 262 are residents: 242 are known or thought to breed in the area, 171 are species not known to nest in the area and 151 that are considered migrants⁵⁷. All

⁵⁷ <https://www.keybiodiversityareas.org/en/site/factsheet/20764/site>

species triggering the **KBA criteria** belong to the bird taxonomic group. Of these species, only one, the **Reddish Egret**, is classified as threatened under the Belize National Red List, updated in 2025, where it is listed as Critically Endangered (CR). This species frequents shallow coastal waters, salt pans, open marine flats and shorelines. It breeds on islands and in mangrove and feeds on small fish and crustaceans. It breeds in almost all months of the year, with seasonal peaks that vary in timings. The species is partially migratory, with non-breeding birds dispersing to the south in the Caribbean and along the Pacific coast. Populations estimates round 1,000-2,500 individuals in northeastern Belize⁵⁸.

Table 20 – Species triggering the Belize Coastal and near shore islands KBA. Source:
<https://www.keybiodiversityareas.org/site/factsheet/20764/assessment>

Taxonomic Group	Scientific Name	Common Name	IUCN Red List Category	Year	KBA Criteria	Belize's National Red List	Trend
Bird	<i>Egretta rufescens</i>	Reddish Egret	LC	2006	D1a	CR	Decreasing
Bird	<i>Antrastomus badius</i>	Yucatan Nightjar	LC	2017	B1	-	Decreasing
Bird	<i>Laterallus ruber</i>	Ruddy Crake	LC	2006	B1	-	Stable
Bird	<i>Podilymbus podiceps</i>	Pied-billed Grebe	LC	2006	D1a	-	Increasing
Bird	<i>Nyctanassa violacea</i>	Yellow-crowned Night-heron	LC	2006	D1a	-	Stable

In accordance with IDB's Environmental and Social Performance Standard 6 (ESPS 6), the project area identified for the project is classified as Critical Habitat due to the triggering of Criterion **"Legally protected areas or internationally recognized areas of high biodiversity value"**, as the infrastructure footprint lies entirely within the mentioned Key Biodiversity Area (KBA). Additionally, Critical Habitat status may also be triggered under other ESPS 6 criteria (such as those related to threatened species, migratory species, or unique ecosystems), which will be conclusively determined once the detailed analysis is completed.

For this reason, it is necessary to ensure that there are no quantifiable adverse impacts on the ecological integrity of the KBA and to develop a Biodiversity Action Plan (BAP) that incorporates compensation measures to achieve a net gain in biodiversity. See the Guidelines for a Biodiversity Action Plan in Program 5 of the ESMP.

4.4.3.5. Important Bird Areas (IBA)

All proposed project areas are located within an Important Bird Area (IBA), the **Belize Coastal and near shore islands IBA**, which shares the same boundaries as the KBA, since the criteria for establishing the KBA was based on bird species on the same year of the IBA assessment (2007), although the IBA criteria was established for 21 species.

⁵⁸ <https://www.iucnredlist.org/species/22696916/154076472#geographic-range>

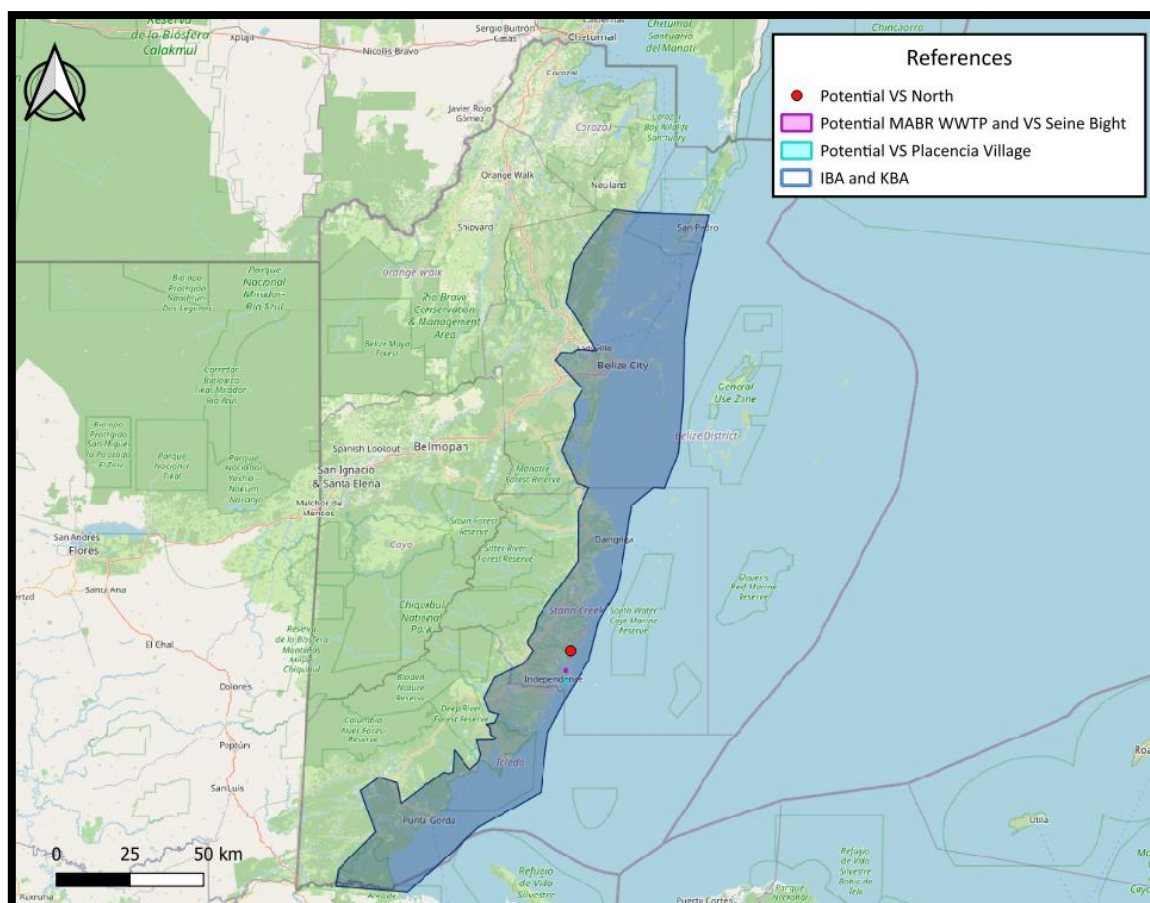


Figure 28 – IBA and KBA Belize Coastal and Near Shore Islands in relation to all potential project areas. Source: <https://datazone.birdlife.org/site/factsheet/20764-belize-coastal-and-near-shore-islands>

4.4.3.6. Important Bat Conservation Areas (IBCA)

There is only one declared Important Bat Conservation Area (IBCA) in Belize, **Toucan Ridge IBCA**, located on a 195 acre property on Stann Creek District and is located approximately **60 km** from the proposed WWTP area. The Toucan Ridge Ecology and Education Society (T.R.E.E.S) is a small grassroots ecological conservation organization that operates a biological field station on the Hummingbird Highway on a protected private preserve of 78,9ha. Currently about 2 hectares of this preserve is developed as eco-friendly housing and communal living facilities (including a camping area and bird banding station) for visiting students and researchers and another 4 hectares is being used for various organically grown food crops. An additional 4 hectares is successional second growth forest that was originally a citrus orchard. The remaining 66,4 hectares of the property is a mix of primary and secondary growth Lowland Broadleaf Forest with a large portion of it being composed of Riparian Broadleaf due to a large creek and several tributaries that run through the property.

Their 10 year bat monitoring efforts have revealed 61 recorded species, with 42 captured, 18 detected acoustically, and 1 observed roosting. Of these species, four (4) hold special conservation significance for Belize due to factors such as low population density, discontinuous distribution, or limited knowledge on the species. According to the IUCN Red List, *Bauerus dubiaquercus* is classified as Near Threatened (NT), *Mormoops megalophylla* is listed as Least Concern (LC) but shows declining population trends, *Thyroptera tricolor* is categorized as LC due to its widespread distribution but was deemed vulnerable in the Belize Protected Areas Policy and System (2005) report because of its

specialized ecological requirements, and *Vampyrum spectrum* is listed as vulnerable with decreasing populations⁵⁹.

4.5. Socioeconomic Environment Baseline of Indirect Area of Influence

The information presented in this section is based on 2022 Housing and Population Census of Belize⁶⁰.

4.5.1. Population and Growth

4.5.1.1. Political organization

Belize is a parliamentary democracy based on the Westminster system and a member of the Commonwealth. Executive authority is exercised by the Cabinet, which is headed by the Prime Minister, who serves as Head of Government. Cabinet ministers are typically members of the majority party in Parliament and concurrently hold elected seats in the National Assembly.

The Cabinet consists of 16 ministers, including the Prime Minister, who also serves as Minister of Finance, Investment, Economic Transformation, Civil Aviation and E-Governance, and the Deputy Prime Minister, who also serves as Minister of Natural Resources, Petroleum and Mining. The remaining portfolios are Infrastructure Development and Housing; Tourism, Youth, Sports and Diaspora Relations; Immigration, Labour and Governance; Health and Wellness; the Public Service and Disaster Risk Management; National Defense and Border Security; the Attorney General; Foreign Affairs, Foreign Trade, Education, Culture, Science and Technology; Sustainable Development, Climate Change and Solid Waste Management; Agriculture, Food Security and New Growth Industries; Rural Transformation, Community Development and Local Government; Public Utilities, Energy and Logistics; Blue Economy and Marine Conservation; and Home Affairs and Enterprise⁶¹.

Legislative authority is vested in the National Assembly, which comprises three components: the Governor-General, the Senate, and the House of Representatives. Members of the House of Representatives are elected through general elections under the Representation of the People Act, while senators are appointed by the Governor-General. One of the National Assembly's principal functions is to enact new legislation or amend existing laws to promote the peace, order, and good governance of Belize. Bills must be approved by both the House of Representatives and the Senate before being submitted to the Governor-General for Royal Assent. Once assented to, a bill becomes an Act and forms part of the laws of Belize⁶².

Administratively, Belize is divided into six districts: Belize, Cayo, Corozal, Orange Walk, Stann Creek (where Placencia is located), and Toledo. These first-order administrative divisions are further subdivided into local government units consisting of city councils, town councils, and village councils.

⁵⁹ <https://www.relcomlatinoamerica.net/%C2%BFqu%C3%A9-hacemos/conservacion/aicoms-sicoms/aicoms-sicoms-buscador/ad/aicoms,1/t-r-e-e-s,232.html#dj-classifieds>

⁶⁰ <https://sib.org.bz/census/2022-census/>

⁶¹ <https://www.pressoffice.gov.bz/the-cabinet/>

⁶² <https://www.nationalassembly.gov.bz/house-of-representatives/>

Belize has two cities—Belize City and Belmopan—governed by city councils, and seven towns: Benque Viejo del Carmen, Corozal Town, Dangriga, Orange Walk Town, Punta Gorda, San Ignacio–Santa Elena, and San Pedro. More than 180 villages are administered through village councils, including Placencia, which is officially classified as villages.⁶³

City and town councils are composed of a mayor and elected councilors (ten in Belize City and six in Belmopan and the remaining towns). Mayors and councilors are directly elected to three-year terms under the first-past-the-post electoral system. In all municipalities except Belize City, the mayor serves as the chief executive and assigns portfolios to the councilors. Rural villages are generally governed by elected village councils, while some communities also have an alcalde, a traditional local magistrate who performs both administrative and judicial functions.



Figure 29 – Belize’s Districts Source: <https://geology.com/world/belize-satellite-image.shtml>

4.5.1.2. Demographics

According to the 2022 Population and Housing Census, Belize had a total population of 397,483 inhabitants. The population is unevenly distributed across the country's six administrative districts, with Belize District (113,630 inhabitants) and Cayo District (99,105 inhabitants) accounting for more than half of the national population. In contrast, Stann Creek (46,342 inhabitants), Corozal (45,310

⁶³ https://www.dl1.en-us.nina.az/List_of_municipalities_in_Belize

inhabitants), and Toledo (38,944 inhabitants) have comparatively smaller populations, although all districts have experienced sustained demographic growth over recent decades. Within the project area, Placencia Village had a recorded population of 1,586 inhabitants in 2022.

Table 21 – Population of Belize per district. Source:
<https://www.citypopulation.de/en/belize/admin/> and <https://sib.org.bz/census/2022-census/>

Name	Status	Population Census 2000	Population Census 2010	Population Census 2022
Belize	District	69,041	95,292	113,63
Cayo	District	54,197	75,046	99,105
Corozal	District	33,846	41,061	45,31
Orange Walk	District	40,132	45,946	54,152
Stann Creek	District	25,228	34,323	46,342
Toledo	District	24,094	30,785	38,944
Belize	Country	248,916	324,528	397,483
Placencia	Village			1,586

Belize has experienced continuous demographic expansion over the past six decades. Between 1960 and 2022, the national population increased from approximately 90,500 to nearly 397,500 inhabitants, representing more than a fourfold increase. Although population growth has remained consistently positive, intercensal growth rates have gradually moderated, declining from a peak of 34% between 1991 and 2000 to 30% between 2000 and 2010, and to 23% between 2010 and 2022. This pattern indicates that Belize continues to grow steadily, albeit at a slower pace than in previous decades.

Table 22 -Population Change. 1960-2022. Source: <https://sib.org.bz/census/2022-census/>

Year	Census Population	Absolute Change	Intercensal Change (%)
1960	90,505		
1970	119,934	29,429	33%
1980	145,353	25,419	21%
1991	185,969	40,616	28%
2000	248,913	62,947	34%
2010	322,423	73,507	30%
2022	397,483	75,059	23%

Population growth has occurred across all districts, although at different rates. Belize District remains the country's largest population center, increasing from 69,041 inhabitants in 2000 to 113,630 in 2022 (64.6% growth). Cayo and Stann Creek recorded the most rapid demographic expansion over the same period, growing by approximately 82.9% and 83.7%, respectively. The strong population growth observed in Stann Creek is consistent with the district's increasing economic importance, driven largely by tourism, coastal development, and related service activities. Placencia, despite its relatively small permanent population, has emerged as one of Belize's principal tourism destinations and has experienced substantial residential and commercial development over the past two decades.

Population density has increased throughout Belize, reflecting sustained demographic growth. National density rose from approximately 36 inhabitants per square mile in 2010 to nearly 45 inhabitants per square mile in 2022. Belize District is the most densely populated district, with approximately 68 inhabitants per square mile, followed by Corozal (63 inhabitants per square mile). Cayo and Stann Creek exhibit intermediate densities (approximately 49 inhabitants per square mile), close to the national average, whereas Orange Walk (30 inhabitants per square mile) and Toledo (22

inhabitants per square mile) remain the least densely populated districts. These differences reflect the concentration of population in the country's principal urban and coastal areas, while the southern and northwestern regions continue to exhibit more dispersed settlement patterns.

Table 23 – Population Density per District. Source: <https://sib.org.bz/census/2022-census/>

District	Land Area (sq miles)	Population	Density (%)
Country Total	8867	397483,456	44,82
Corozal	718	45310,2172	63,10
Orange Walk	1790	54152,1521	30,25
Belize	1663	113630,217	68,32
Cayo	2006	99104,8887	49,40
Stann Creek	986	48162,0865	48,84
Toledo	1704	37123,8946	21,78

The 2022 Census indicates a balanced gender distribution across the country. Nationally, females represent approximately 51% of the population and males 49%, with similar proportions observed in Belize, Cayo, Corozal, and Toledo districts. Orange Walk and Stann Creek show an almost equal distribution between males and females, with no significant gender disparities evident across districts.

Table 24 – Gender and regional population 2022. Source: <https://sib.org.bz/census/2022-census/>

Name	Male	%	Female	%
Belize	55,276	49%	58,355	51%
Cayo	48,809	49%	50,296	51%
Corozal	22,231	49%	23,079	51%
Orange Walk	26,899	50%	27,253	50%
Stann Creek	23,232	50%	23,11	50%
Toledo	19,247	49%	19,697	51%

Belize is characterized by considerable ethnic diversity, reflecting its complex historical and cultural development. Nationally, the Mestizo/Hispanic/Latino population constitutes the largest ethnic group, followed by the Creole population and the Indigenous Maya groups. However, the ethnic composition varies substantially across districts, resulting in distinct regional demographic profiles.

Belize District differs from the national pattern in that the Creole population represents the largest ethnic group, while it also contains comparatively larger Garifuna, East Indian, and other minority populations. Conversely, Cayo and the northern districts exhibit a stronger predominance of Mestizo/Hispanic/Latino communities.

Stann Creek District, where the Project is located, presents one of the country's most diverse ethnic compositions. Although the Mestizo/Hispanic/Latino population remains the largest group, the district contains one of Belize's highest concentrations of Garifuna communities, whose cultural heritage is strongly associated with the southern Caribbean coast. Stann Creek also includes significant Maya Ketchi and Maya Mopan populations, reflecting the district's important Indigenous presence alongside Afro-descendant and Mestizo communities. This multicultural composition is an important

consideration for stakeholder engagement, cultural heritage management, and the design of inclusive communication and community participation strategies throughout project implementation.

Table 25 – Ethnicity in Belize. Source: <https://sib.org.bz/census/2022-census/>

Ethnicity	Total			Corozal			Orange Walk			Belize			Cayo			Stann Creek			Toledo		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	397,483	195,695	201,789	45,310	22,231	23,079	54,152	26,899	27,253	113,630	55,276	58,355	99,105	48,809	50,296	48,162	24,198	23,964	37,124	18,282	18,842
Mestizo/Hispanic/Latino	205,646	100,944	104,702	34,985	16,990	17,995	43,236	21,286	21,950	37,503	18,220	19,283	67,075	32,827	34,248	15,733	8,059	7,674	7,114	3,562	3,552
Creole	100,111	49,148	50,964	3,340	1,698	1,642	3,412	1,762	1,650	64,816	31,346	33,470	16,204	8,014	8,189	10,500	5,371	5,128	1,840	956	884
Maya Ketchi	26,230	12,824	13,407	126	72	54	188	99	89	959	511	448	2,574	1,229	1,345	4,031	1,957	2,074	18,352	8,955	9,396
Garifuna	15,845	7,545	8,301	275	151	124	311	176	136	3,766	1,804	1,961	1,448	712	736	8,530	3,978	4,552	1,515	724	792
Mennonite	15,249	7,702	7,546	4,009	1,982	2,027	5,831	2,942	2,890	385	184	201	4,126	2,144	1,983	168	84	84	729	367	362
Maya Mopan	15,932	7,875	8,057	104	56	48	105	57	48	517	206	311	2,427	1,172	1,255	7,097	3,673	3,424	5,682	2,711	2,972
East Indian	6,111	2,992	3,120	944	462	482	163	78	84	1,715	787	929	899	422	477	872	449	423	1,518	794	724
Chinese	1,344	734	610	236	115	121	170	101	68	379	214	164	340	183	157	156	83	73	63	36	27
Caucasian/White	2,905	1,540	1,365	436	236	200	90	43	46	887	468	418	912	497	415	449	216	232	132	80	52
Maya Yucatec	2,160	1,164	996	269	157	112	109	63	46	90	65	26	1,660	868	792	25	<10	16	<10	<10	<10
Indian	601	362	239	117	68	48	50	32	19	274	175	99	82	47	35	73	36	37	<10	<10	<10
Other	2,263	1,262	1,001	146	87	59	231	129	102	805	473	332	761	397	364	252	136	116	68	41	27
Don't Know/Not Stated	3,086	1,603	1,482	324	158	166	257	132	125	1,534	821	713	597	297	301	276	146	130	98	49	49

4.5.2. Infrastructure and Services

4.5.2.1. Housing

The housing stock in Belize is predominantly composed of undivided private houses, which represent by far the most common dwelling type in both urban and rural areas. According to the 2022 Population and Housing Census, there are 97,176 undivided private houses nationwide, accounting for the vast majority of residential units. Apartments and condominiums represent the second most common housing type and are primarily concentrated in urban areas, particularly in Belize District, reflecting higher-density residential development in the country's principal urban centers. Other dwelling types, including duplexes, dwellings attached to businesses, and combined residential-commercial units, constitute a relatively small proportion of the national housing stock and are generally associated with mixed-use or higher-density settlements.

Within the Project Area, Stann Creek District exhibits a predominantly low-density residential pattern similar to the national trend but with characteristics that distinguish it from more urbanized districts. Undivided private houses account for the overwhelming majority of dwellings (11,610 units), reflecting the district's predominantly residential and village-based settlement structure. Most of these dwellings are located in rural areas (9,005 units), indicating that the district's population remains concentrated in dispersed rural communities despite the continued growth of urban centers such as Dangriga and Placencia.

Unlike Belize District, where apartments and condominiums are largely concentrated, Stann Creek records a relatively modest number of apartment and condominium units (474), with nearly 88% located in rural areas. This distribution is largely attributable to the district's tourism-oriented coastal communities, where condominium developments, resort accommodations, and vacation residences have expanded outside traditional urban boundaries, particularly in and around Placencia.

Housing associated with commercial activities represents only a small proportion of the district's housing stock. Combined business-and-dwelling units (62) and dwellings attached to businesses (52) are limited in number but reflect the mixed residential-commercial character of tourism and local service economies. Similarly, duplexes (133 units) account for a relatively minor share of total housing, suggesting that multi-family housing remains limited and that detached housing continues to dominate residential development.

Table 26 - Type of Dwelling by district in Belize. Source: <https://sib.org.bz/census/2022-census/>

District	Area	Undivided Private House	Part of A Private House	Apartment/Condominium	Combined Business and Dwelling	Dwelling Attached To Businesses	Double House/Duplex	Other	Don't Know / Not Stated
Stann Creek	Urban	2,605	79	59	11	11	89	27	5
	Rural	9,005	337	415	51	41	44	391	32
	Total	11,610	415	474	62	52	133	417	37
Country Total	Urban	41,334	1,136	5,485	429	219	1,044	275	127
	Rural	55,842	1,689	1,203	605	232	352	625	120
	Total	97,176	2,825	6,689	1,034	451	1,396	900	247

4.5.2.2. Water Supply and Sanitation

Water supply and sewerage services in Belize are provided primarily by Belize Water Services Limited (BWS), the national water and wastewater utility. BWS operates within licensed service areas covering all municipalities and approximately 45 villages throughout the country. As of March 2023, the utility served more than 65,000 water connections, supplying approximately 294,000 consumers with an average monthly demand of about 240 million US gallons. More than 60% of the country's potable water is produced from surface water sources using conventional treatment processes, while groundwater supplies many inland systems.

According to the 2024 Belize Multiple Indicator Cluster Survey (MICS), access to basic drinking water services is nearly universal, with 98.6% of the national population having access to at least a basic drinking water source. Basic sanitation services are available to 85.4% of the population, while access to basic hygiene facilities remains comparatively lower at 73.5%. Although access to basic water services is high, only 61% of the population is served by safely managed drinking water services, defined as water that is available when needed, accessible on premises, and free from contamination. Coverage is higher in urban areas (68%) than in rural communities (57%), indicating persistent disparities in service quality despite broad infrastructure coverage.

Stann Creek District, where the Project is located, exhibits service levels comparable to the national average. Approximately 98.2% of households have access to basic drinking water services, while 85.9% have access to basic sanitation facilities. Access to basic hygiene facilities is comparatively lower (63.8%), one of the lowest coverage levels among Belize's districts. These indicators suggest that, despite the widespread availability of basic services, improvements are still needed in water, sanitation, and hygiene (WASH) infrastructure.

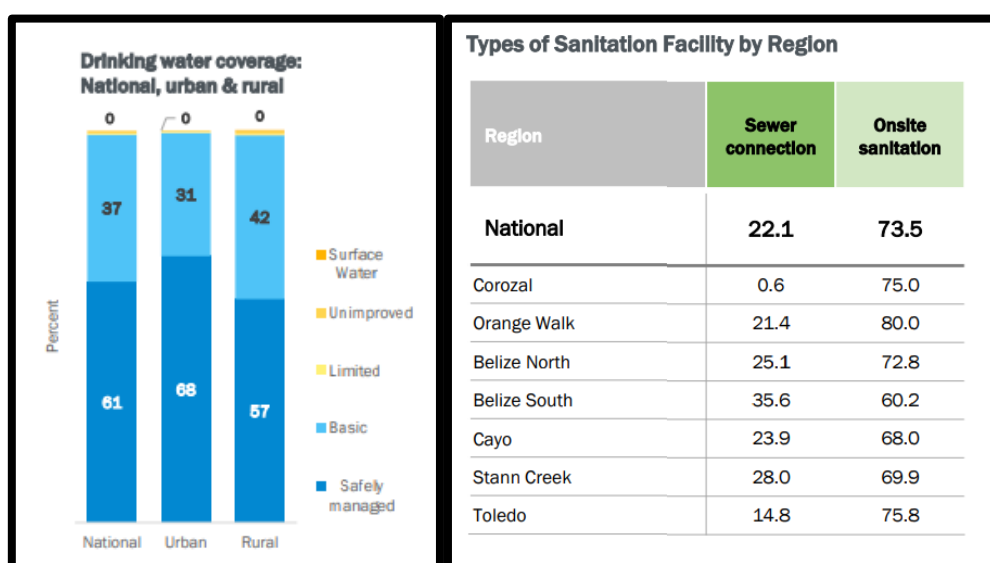
The Placencia Peninsula is supplied with potable water through the Belize Water Services (BWS) network. Over the last two decades, rapid population growth, tourism development, and increasing commercial activity have significantly increased water demand, requiring continuous expansion and upgrading of the water supply infrastructure. BWS has undertaken several investments to improve system capacity and reliability; however, the continued growth of tourism and residential development is expected to place additional pressure on water resources and associated infrastructure.

As for sanitation, there is a low percentage of population connected to the sewerage system, only 22.1% nationally, with the highest percentages for the south of the Belize District (25.1% and 35.6% for the North and South of the District, respectively) and lowest sewer system coverage for Toledo with 14.8%. Stann Creek is located with 28% as the second highest sewerage coverage in the country.

Wastewater management represents one of the principal infrastructure challenges within the Placencia Peninsula. While portions of Placencia Village are connected to a centralized sewerage network operated by BWS, many residential, tourism, and commercial developments outside the existing service area continue to rely on decentralized wastewater management systems, including septic tanks and individual package treatment systems. The effectiveness of these systems depends largely on their design, operation, and maintenance and may be affected by the peninsula's hydrogeological conditions, including a shallow groundwater table, sandy soils, and its proximity to environmentally sensitive coastal and marine ecosystems.

Table 27 – Percent Population using basic drinking water, sanitation and hygiene services by region. Source: UNICEF, 2024⁶⁴.

Region	Basic Drinking Water ⁶⁵	Basic Sanitation ⁶⁶	Basic Hygiene ⁶⁷
National	98.6	85.4	73.5
Corozal	99.1	91.1	57.9
Orange Walk	98.6	91.2	88.2
Belize North	99	91.2	76.9
Belize South	98.6	87.6	64.1
Cayo	99.3	76.1	78.9
Stann Creek	98.2	85.9	63.8
Toledo	96	80.9	72.7

**Figure 30 – Water services: a) National, urban and rural drinking water coverage; b) Types of Sanitation Facility by Region. Source: UNICEF, 2024.**

4.5.2.3. Solid Waste Management

Solid waste management in Belize is regulated by the Belize Solid Waste Management Authority (BSWAMA), which oversees the national solid waste management system and the operation of transfer stations throughout the country. There are currently 11 Transfer Stations operational: 1)

⁶⁴ <https://www.unicef.org/belize/media/8796/file/18%20MICS%20Statistical%20Snapshot%20WASH.pdf.pdf>

⁶⁵ Improved source provided collection time is not more than 30 minutes for a roundtrip including queuing.

⁶⁶ Use of improved facilities which are not shared with other households. Improved sanitation facilities are those designed to hygienically separate excreta from human contact, and include flush/pour flush to piped sewer system, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs

⁶⁷ Availability of a handwashing facility on premises with soap and water. Handwashing facilities may be fixed or mobile and include a sink with tap water, buckets with taps, tippy-taps, and jugs or basins designated for handwashing. Soap includes bar soap, liquid soap, powder detergent, and soapy water but does not include ash, soil, sand or other handwashing agents

Belmopan; 2) Burrel Boom; 3) Caye Caulker; 4) Corozal; 5) Dagranga; 6) Mile 3; 7) Orange Walk; 8) Placencia; 9) Punta Gorda; 10) San Pedro; 11) SISE.

Under this system, municipal solid waste is collected by local authorities or private contractors and delivered to designated transfer stations, where it is temporarily stored before being transported to the Mile 24 Regional Sanitary Landfill located along the George Price Highway. BSWAMA currently operates eleven transfer stations nationwide, including the facility located in Placencia, which serves the Placencia Peninsula and surrounding communities within Stann Creek District.

Within the Project Area, solid waste generated by households, commercial establishments, tourism facilities, and construction activities are managed through the Placencia Transfer Station. Waste collected on the peninsula is consolidated at this facility before being transported by road to the Mile 24 Regional Sanitary Landfill for final disposal. This integrated management system eliminates the need for local disposal sites or open dumps within the Placencia Peninsula and constitutes the principal waste disposal route for the area.

Despite the existence of an organized collection and disposal system, solid waste management continues to face operational challenges associated with the rapid growth of tourism and residential development in Placencia. Seasonal fluctuations in visitor numbers increase waste generation, placing additional pressure on collection services, transfer station capacity, and transportation logistics. During peak tourism periods, higher volumes of municipal waste require more frequent collection and transport to maintain adequate service levels.

Previous studies prepared under national solid waste management programs have also identified occasional informal disposal practices in coastal communities, including unauthorized burning of yard waste and illegal dumping of vegetation, construction debris, and other materials in undeveloped areas or mangrove ecosystems.



Figure 31 – Belize Waste Management System: Operational 11 Transfer Stations and Regional Sanitary Landfill. Source: BSWAMA, 2026⁶⁸.

Based on a report of the Asia Pacific Waste Consultants (APWC) contracted by the Commonwealth Litter Programme (CLiP), Belize produces at least 200,000tn/year of municipal and other wastes, with 50% percentage of that waste classified as municipal solid waste (MSW)⁶⁹.

The study also analyzed, by samplings performed in different districts, the household waste generation rates. Per capita solid waste generation in Belize varies by settlement type and level of urbanization. **Belize City** presents the highest generation rate, estimated at 0.86 kg/ person day, while other urban centers outside Belize City, including Belmopan, Corozal, Dangriga, and Orange Walk, generate similar quantities of solid waste, averaging approximately 0.5 kg/ person day. In contrast, peri-urban communities such as Bullet Tree Falls and Mahogany Heights generate lower amounts, at around 0.29 kg/person day, while rural communities in the Toledo District exhibit the lowest generation rates, estimated at approximately 0.15 kg/person day, consistent with lower population densities and more subsistence-based livelihoods.

From waste composition estimates, organics are the largest waste composition stream, at 40%, while recyclable materials in household waste (organics, plastic, metals, glass and paper) represent between 80 to 90% of the overall waste stream.

⁶⁸ <https://bswama.com/locations/>

⁶⁹ <https://doe.gov.bz/download/belize-waste-data-report-analysis-of-waste-generation-and-disposal-data-collected-in-belize/>

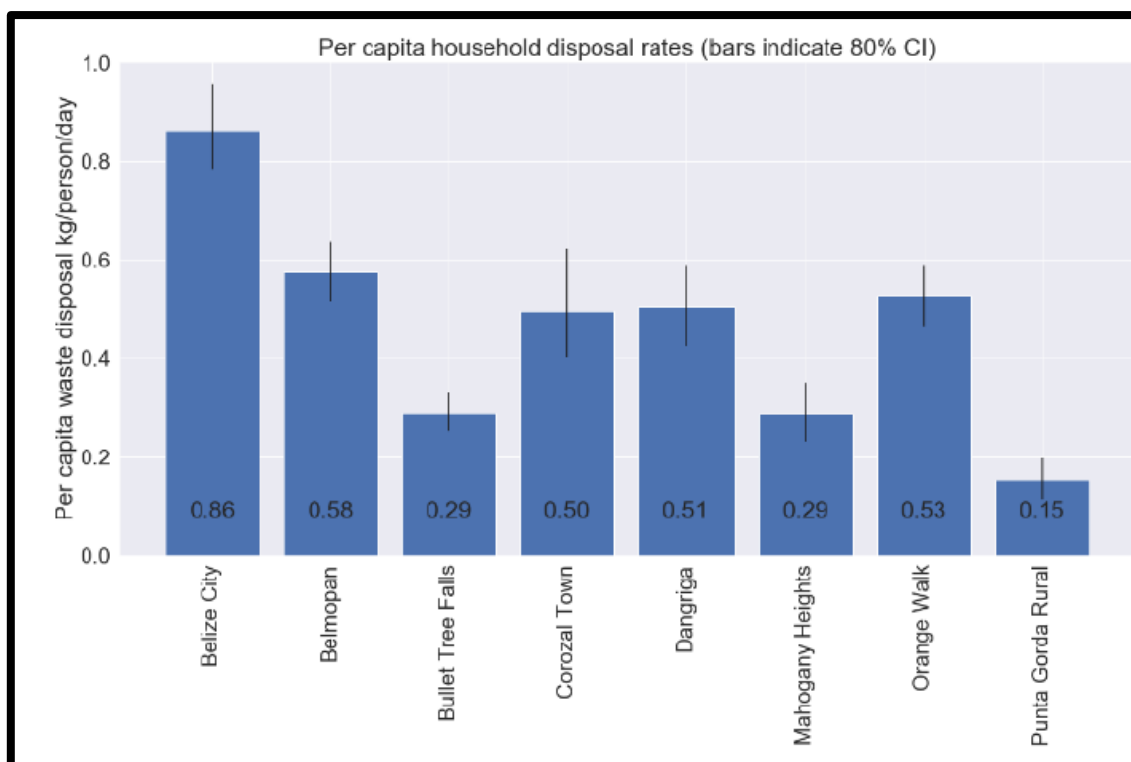


Figure 32 – Per capita waste generation rates in Belize. Source: APWC, 2020.

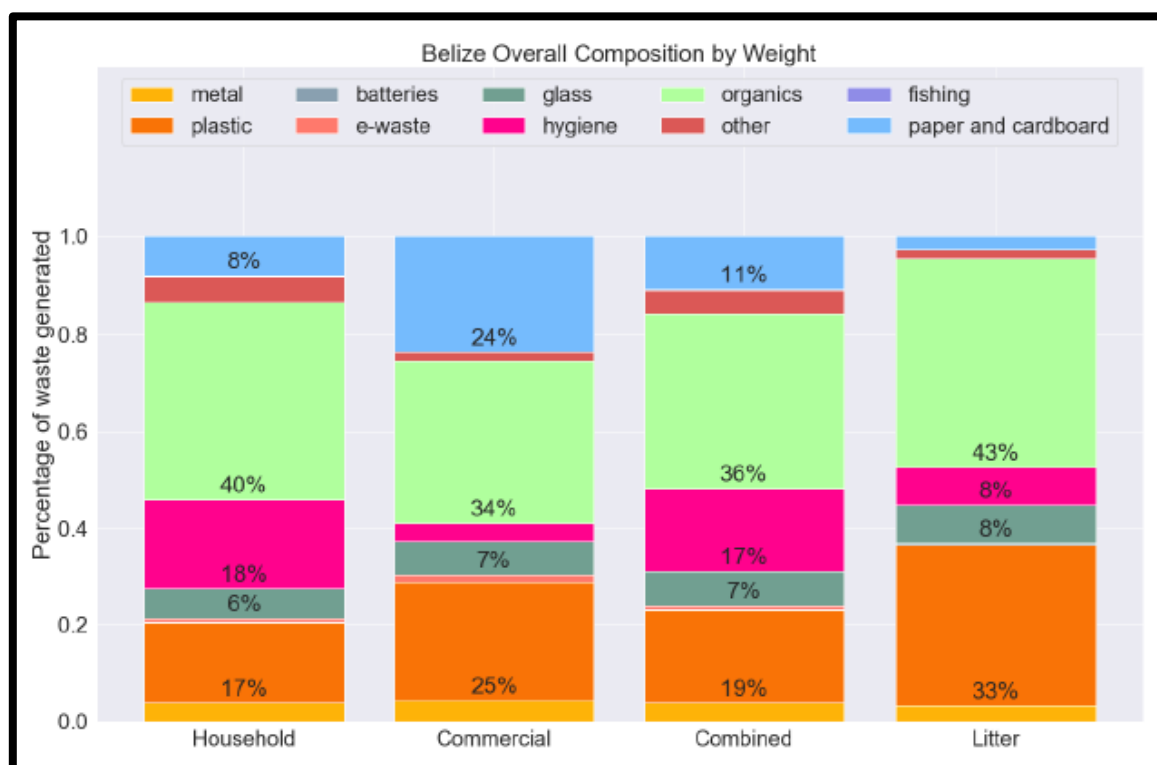


Figure 33 – Overall composition of waste streams by weight. Source: APWC, 2020.

4.5.3. Health

Belize's healthcare system comprises both public and private sectors. The public healthcare system is primarily government-funded and receives the third-largest share (30%) of the national budget.

However, the share of the national budget allocated to the health sector remains below the international benchmark of 15%, and the system continues to face challenges such as inadequate infrastructure, staff shortages, and limited availability of basic medical supplies in public facilities⁷⁰.

Belize continues to experience an epidemiological transition in which non-communicable diseases (NCDs) have become increasingly prominent, replacing communicable diseases as the main causes of morbidity and mortality. In 2023, NCDs accounted for six of the ten leading causes of death, representing 1,007 deaths or 44.7% of all fatalities⁷¹.

Cause of Death (2023)	2023 Total	%	Rate per 100k
Diseases of heart	365	15.83	90.30
Malignant neoplasms	323	14.01	79.91
Unintentional injuries	167	7.24	41.32
Diabetes mellitus	152	6.59	37.61
Cerebrovascular diseases	124	5.38	30.68
Influenza and pneumonia	122	5.29	30.18
Assault (homicide)	96	4.16	23.75
Human immunodeficiency virus (HIV) disease	78	3.38	19.30
Chronic liver disease and cirrhosis	74	3.21	18.31
Essential hypertension and hypertensive renal disease	71	3.08	17.57
Other Cause Groups	420	18.21	103.91
All other diseases (residual)	309	13.40	76.45
Signs, symptoms, and ill-defined causes	5	0.22	1.24
Total	2306	100.00	570.51

Figure 34 – Leading Cause of Death all ages and sex in 2023. Source: PHAO Strategic Plan 2025-2034.

Mortality patterns differ by sex: in 2023, 82% of female deaths were attributed to NCDs compared to 59% among males⁷².

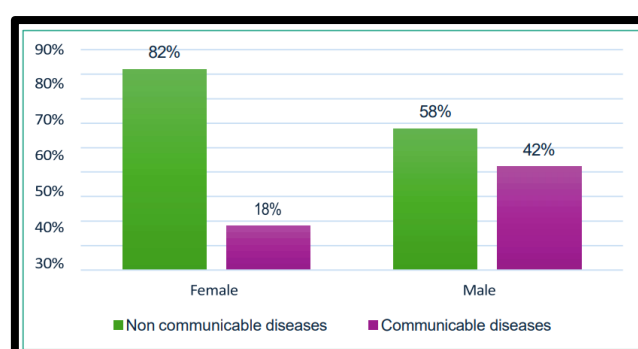


Figure 35 – Leading Cause of Death by Sex in 2023. Source: PHAO Strategic Plan 2025-2034.

Regarding communicable diseases, in 2022 Belize reported 19 new tuberculosis cases per 100,000 population, while the age-adjusted tuberculosis mortality rate in 2019 was 2.9 per 100,000 population

⁷⁰ UNICEF, Belize Health Sector Budget Analysis, available at: [https://www.unicef.org/belize/media/7366/file/Belize%20Health%20Budget%20Analysis%20\(Brief\).pdf.pdf](https://www.unicef.org/belize/media/7366/file/Belize%20Health%20Budget%20Analysis%20(Brief).pdf.pdf)

⁷¹ https://www.paho.org/sites/default/files/2025-03/blz-health-sector-strategic-plan-2025-2034_0.pdf

⁷² https://www.paho.org/sites/default/files/2025-03/blz-health-sector-strategic-plan-2025-2034_0.pdf

(0.9 in women and 5.0 in men). In 2022, the estimated HIV incidence rate was 39 new diagnoses per 100,000 population, while the age-adjusted HIV mortality rate was 33.6 per 100,000 population in 2019, representing a 34.1% decrease between 2000 and 2019. Belize has also made notable progress in public health, particularly with the elimination of mother-to-child transmission (MTCT) of HIV and syphilis, certified in late 2023⁷³.

Belize achieved a 100% reduction in local malaria cases between 2010 and 2021 (from 150 cases to zero), with the last reported case occurring in December 2018. The country has maintained zero local cases for three consecutive years, fulfilling a key requirement for malaria-free certification by the World Health Organization⁷⁴. Dengue remains a persistent public health concern, with major outbreaks recorded in 2017 (21,110 cases) and 2019 (3,070 cases), highlighting the need for sustained vector control measures, public awareness campaigns, and environmental management actions to reduce mosquito breeding sites⁷⁵.

Child and maternal health indicators show mixed trends. The infant mortality rate increased from 13.06 per 1,000 live births in 2018 to 15.48 in 2022, while the neonatal mortality rate rose from 7.89 to 11.64 per 1,000 live births over the same period. In contrast, the maternal mortality rate declined significantly from 53.75 per 100,000 live births in 2015 to 14.20 in 2022, indicating substantial progress in maternal health outcomes⁷⁶.

Vaccination coverage shows moderate differences between national and regional levels. For polio immunization (third dose), national coverage reaches 88%, while the regional level is lower at 79%, indicating a 9-percentage-point gap that suggests comparatively weaker regional uptake or access to immunization services. A similar pattern is observed for Diphtheria, Pertussis and Tetanus (DPT3) vaccination, where national coverage is 88% compared with 82% at the regional level, reflecting a 6-percentage-point difference and indicating that regional vaccination delivery may face operational or accessibility constraints relative to national averages. In contrast, tuberculosis (BCG) immunization shows slightly higher coverage at the regional level (87%) than at the national level (85%), suggesting relatively consistent implementation of neonatal vaccination programs across the assessed region⁷⁷.

Table 28 - Vaccination coverage (in the year 2024)

Vaccination coverage	National level	regional level
Polio Immunization (third dose)	88.0%	79.0%
Diphtheria, Pertussis and Tetanus Immunization, third dose (DPT3)	88.0%	82.0%
Tuberculosis Immunization	85.0%	87.0%

Source: UNICEF 2025⁷⁸.

In relation to the potential project areas, the closest health centers and related establishments that have been identified based on OCHA georeferenced information available are the following⁷⁹:

⁷³ PHAO, Belize Country Profile. Accessed at: <https://hia.paho.org/en/country-profiles/belize#determinants>

⁷⁴ PHAO, Belize Country Profile. Accessed at: <https://hia.paho.org/en/country-profiles/belize#determinants>

⁷⁵ https://www.paho.org/sites/default/files/2025-03/blz-health-sector-strategic-plan-2025-2034_0.pdf

⁷⁶ https://www.paho.org/sites/default/files/2025-03/blz-health-sector-strategic-plan-2025-2034_0.pdf

⁷⁷ <https://data.unicef.org/topic/child-health/immunization/>

⁷⁸ <https://data.unicef.org/topic/child-health/immunization/>

⁷⁹ <https://data.humdata.org/dataset/belize-healthsites/resource/6dda1f7e-5796-41ed-bd1f-351dd5ee2923>

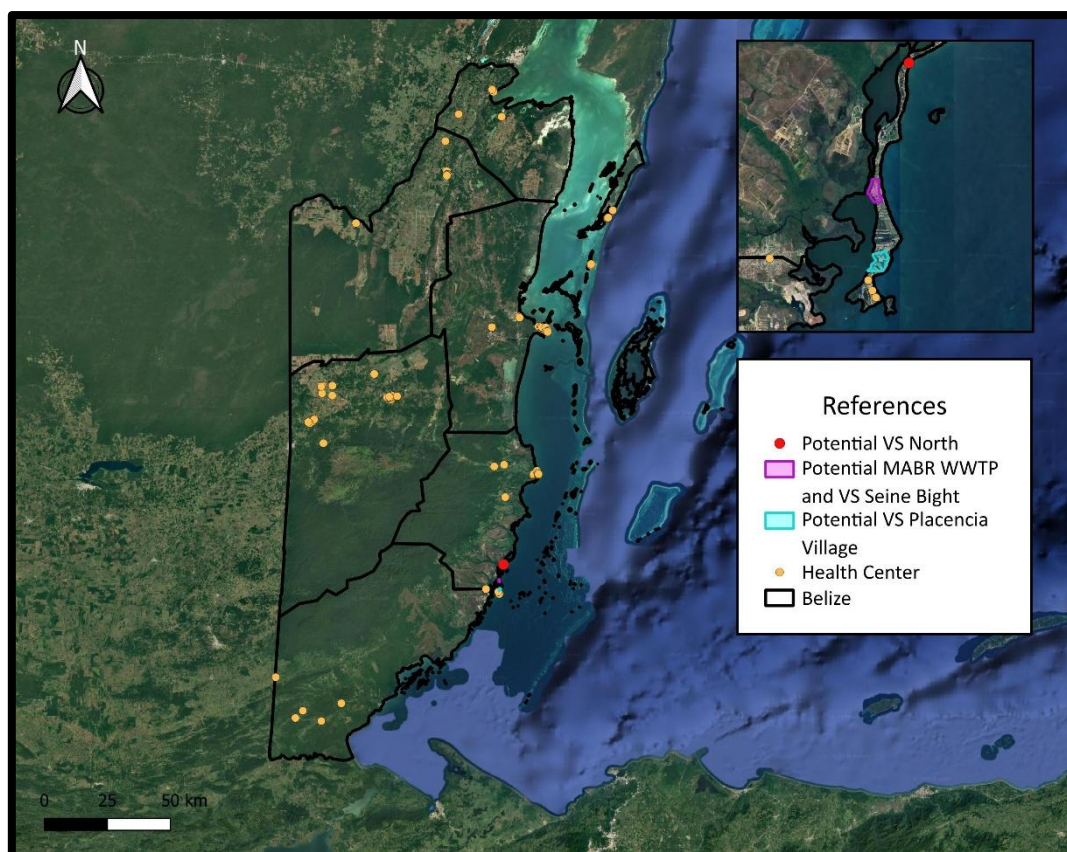


Figure 36 – Health Centers near Potential Project Areas. Source: <https://data.humdata.org/dataset/belize-healthsites/resource/6dda1f7e-5796-41ed-bd1f-351dd5ee2923>

4.5.4. Economy

4.5.4.1. Main Economic Activities

Belize's economy is organized into three main sectors: primary, secondary, and tertiary. The primary sector comprises agriculture, forestry, fisheries, and mining; the secondary sector includes manufacturing, construction, electricity generation, and water supply; while the tertiary sector encompasses trade, transport, tourism related activities, financial and insurance services, real estate, and other service industries⁸⁰. In 2024, the tertiary sector represented the largest share of national economic output, contributing 62.4% of GDP, followed by the secondary sector (13.6%) and the primary sector (8.9%).

Table 29 - Annual GDP by Activity, Percent Contribution in 2024. Data from the Statistical Institute of Belize, 2024.

Primary Industries		%
Agriculture, forestry and fishing		7,9
Mining		0,9
Total		8,9

⁸⁰

<https://unfccc.int/sites/default/files/resource/Belize%27s%20First%20BTR%20%2831%20Dec%202024%29.pdf>

Secondary Industries		%
Manufacturing		6,6
Electricity		1,2
Water supply		0,9
Construction		5,0
	Total	13,6
Tertiary Industries		%
Wholesale and retail trade		13,8
Transportation		4,5
Accommodation and food service activities		7,6
Financial and insurance activities		8,2
Real estate activities		4,4
Public administration and defense		6,9
Community, social and personal services		17,0
	Total	62,4

Agriculture continues to play a significant role within the primary sector, providing employment for approximately one fifth of the national workforce. Agricultural production combines traditional shifting cultivation, particularly in lowland areas with nutrient poor soils, with export oriented commercial farming focused on sugarcane, citrus, and bananas. Other productive activities have also expanded in recent years. During the third quarter of 2025, cattle production increased by 29.0% and marine exports grew by 25.6% compared with the same period in 2024.

Growth in the secondary sector has been supported primarily by construction and utilities. During the third quarter of 2025, construction output increased by 16.0%, rising from USD 65.8 million to USD 76.3 million, accompanied by higher imports of construction materials. Over the same period, electricity generation increased by 14.5%, while water consumption rose by 4.2%, reflecting increasing demand associated with economic activity and population growth.⁸¹

The services sector remains the principal driver of Belize's economy. Tourism is one of its most important components, particularly in coastal and island destinations such as Placencia, where it constitutes the main economic activity. Tourism demand is highly seasonal, reaching its peak between late November and April and generating temporary increases in population due to the arrival of expatriates, seasonal workers, and visitors. This seasonal dynamic stimulates employment and demand for housing and services, while also increasing pressure on local infrastructure and natural resources. Wholesale and retail trade also remains an important contributor to economic activity, with sectoral output increasing by 7.0% during the third quarter of 2025⁸².

Macroeconomic performance strengthened in recent years, with GDP growth estimated at 3.5% in 2024, up from 0.5% in 2023, driven mainly by expansion in tourism, trade, and transport. Inflation eased to 3.3% in 2024 and declined further to 0.8% by August 2025, while public debt fell from 71.8% to 68.1% of GDP, reflecting continued fiscal consolidation efforts⁸³.

⁸¹ https://sib.org.bz/wp-content/uploads/GDP_2025_03_Quarter.pdf

⁸² https://sib.org.bz/wp-content/uploads/GDP_2025_03_Quarter.pdf

⁸³ <https://www.worldbank.org/ext/en/country/belize#tab-economy>

Despite these improvements, Belize remains structurally vulnerable to external and structural risks. Over 50% of exports and the majority of tourist arrivals are linked to the United States. This vulnerability was reflected in a 3.0% decline in international stay-over arrivals between January and November 2025, following strong growth in the same period of 2024, influenced by changes in U.S. immigration policies, global uncertainty, and rising travel costs⁸⁴. Additional risk factors include the exchange rate peg to the U.S. dollar, dependence on imported energy, and high exposure to climate-related hazards. Persistent constraints to private investment (such as limited access to credit, infrastructure deficits, skills shortages, and elevated crime rates) continue to weigh on long-term economic resilience⁸⁵.

The Stann Creek District, where the project is located, is one of Belize's principal economic regions due to its concentration of agro industries and other income generating activities. Over the past decade, Stann Creek Valley has contributed more than BZ\$1.23 billion in citrus exports to the national economy. Beyond citrus exports, the valley also supports economic activity through local juice and citrus sales, animal feed production (citrus pellets), pepper sauce and jam exports, shrimp exports, mining materials, and service sectors such as tourism and agricultural services. Collectively, these activities are estimated to have contributed more than BZ\$2 billion to the Belizean economy over the last decade, equivalent to an average of over BZ\$200 million annually⁸⁶.

Placencia has undergone a gradual economic transition from a traditional fishing village to one of Belize's principal coastal tourism destinations. Historically, the local economy was based on fishing, small scale maritime trade, and other marine related activities. Improved road connectivity during the 1980s and 1990s facilitated greater economic diversification, promoting the expansion of tourism and supporting service industries. At present, tourism constitutes the primary economic activity, with hospitality, marine recreation, and local businesses representing the main sources of employment and income. Fishing continues to contribute to the local economy and remains an important component of community livelihoods⁸⁷.

4.5.4.2. Employment and labor market

Labour market indicators presented in this section are derived from the September 2025 and April 2026 Labour Force Survey from the Statistical Institute of Belize⁸⁸.

In September 2025, Belize's total labor force was estimated at 170,056 persons, with men accounting for nearly three-fifths of the total. The overall labor force participation rate reached 53.6%, representing a decrease of 5.5 percentage points from 59.1 percent in April 2025. Furthermore, significant gender disparities in participation persisted. Only 43.3% of working-age women were active in the labor force, compared to 74.7% of working-age men.

⁸⁴ https://www.centralbank.org.bz/docs/default-source/4.2.2-monthly-economic-reports/monthly-economic-highlights-november-2025.pdf?sfvrsn=e2b08119_1

⁸⁵ <https://www.worldbank.org/ext/en/country/belize#tab-about>

⁸⁶ <https://stanncreekvalley.weebly.com/economy.html>

⁸⁷ <https://www.oceanbreezebeachresort.com/post/history-of-placencia-belize>

⁸⁸ https://sib.org.bz/wp-content/uploads/LabourForce_2026-04.pdf
https://sib.org.bz/wp-content/uploads/LabourForce_2025-09.pdf

Participation levels also showed considerable geographic variation. In September 2025, Stann Creek District recorded the second highest participation rate (62%), showing an increase of 5.0% in comparison with the year before. Educational attainment was another key determinant of labor market engagement: individuals with tertiary education exhibited the highest participation rate (74.9%), compared to 49.8% among those with primary education only, underscoring the strong relationship between education levels and labor market participation.

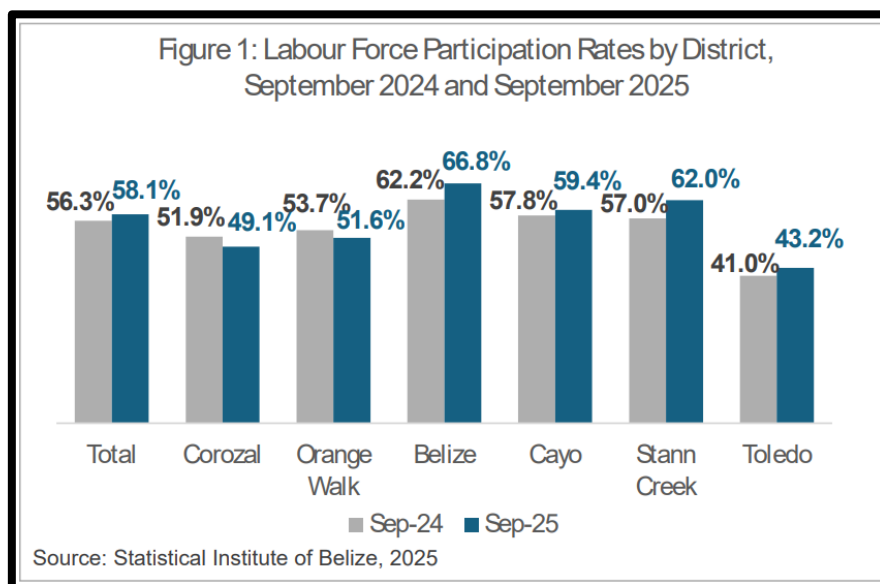


Figure 37 – Labour Force Participation Rates by District, September 2024 and September 2025.
Source: Labour Force Survey 2025.

The employment structure in April 2026 was primarily concentrated in the Wholesale and Retail Trade sector (16.4%), followed by Community, Social and Personal Services (14.5%). Compared to April 2025, employment in the tourism sector declined by 0.7 percentage points.

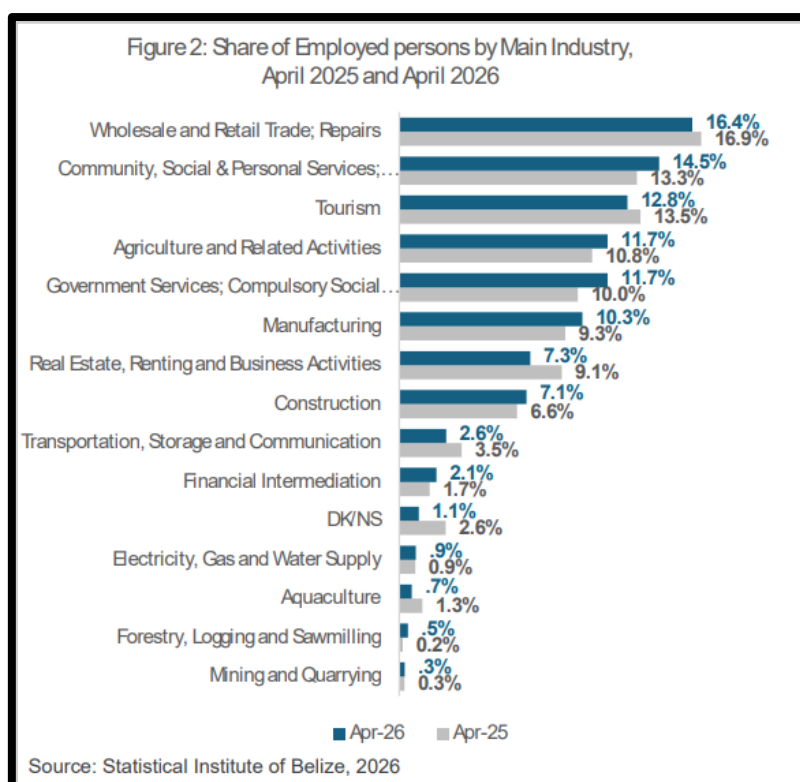


Figure 38 – Distribution of Employed Persons by Main Industry, April 2025 and April 2026. Source: Labour Force Survey 2026.

Average monthly earnings for employed persons reached USD 1,525 in April 2026, representing a USD 27 increase compared to the previous year. On average, employed individuals worked 42.5 hours per week, up from 41.5 hours in April 2025.

In April 2026, the number of unemployed people in Belize was estimated at 3,162, corresponding to an unemployment rate of 1.9% of the total labor force. Unemployment was higher among women (2.2%) than men (1.7%), while youth unemployment (ages 14–24) reached 5%. At the district level, in September 2025, Stann Creek recorded the highest unemployment rate (2.9%) among the districts.

4.5.4.3. Development Index and Poverty

The indicators presented in this section are based on the 2025 Multidimensional Poverty Index (MPI) published by the Statistical Institute of Belize.

The MPI provides a comprehensive measure of poverty by assessing deprivations across key dimensions of well-being, including health, education, employment, and living conditions. It considers both the incidence of poverty (share of people who are poor) and its intensity (degree of deprivation experienced).

As of September 2025, 19.1% of Belize's population was classified as multidimensionally poor, representing an improvement compared with 22.1% recorded in September 2024. While the incidence of poverty declined by three percentage points over the period, the intensity of deprivation among the multidimensionally poor remained relatively stable, decreasing only slightly from 38.0% to 37.8%. Consequently, the national MPI decreased from 0.084 in 2024 to 0.072 in 2025, indicating a moderate improvement in overall multidimensional poverty conditions.

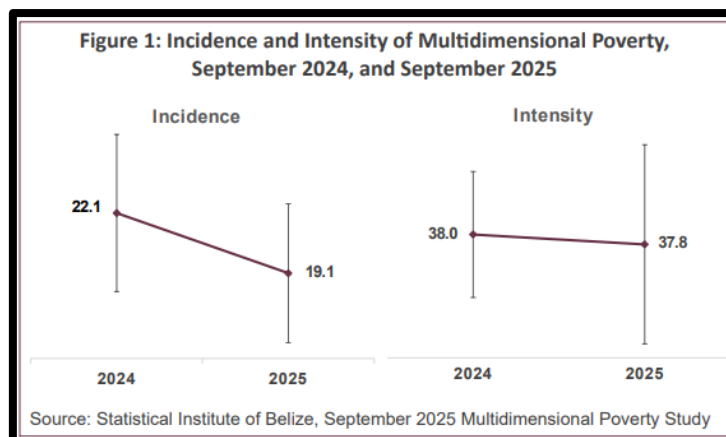


Figure 39 – Incidence and Intensity of Multidimensional Poverty, September 2024, and September 2025. Source: Multidimensional Poverty Index report 2025.

At the district level, multidimensional poverty generally declined between 2024 and 2025. However, Stann Creek was an exception, with the incidence of multidimensional poverty increasing from 14.8% to 23.0% during the same period.

Significant socio-demographic differences were also observed. Households headed by people of Maya ethnicity experienced the highest incidence of multidimensional poverty (60.7%), while Garifuna (6.5%) and Creole (6.3%) households recorded the lowest levels. Households headed by persons of Mestizo/Hispanic ethnicity showed an incidence of 16.0%.

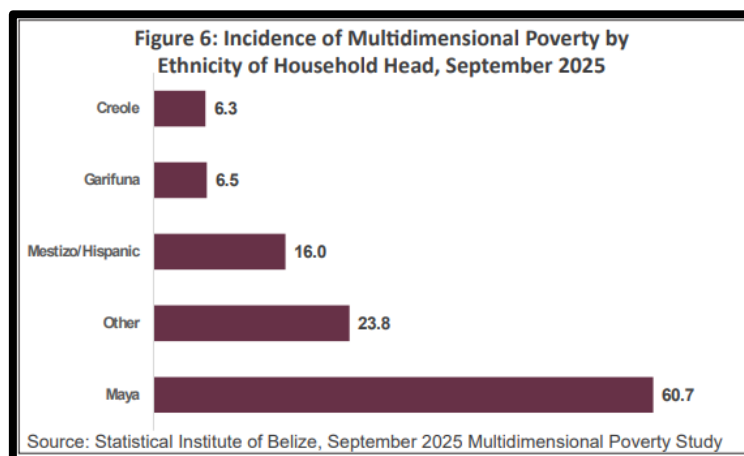


Figure 40 – Incidence of Multidimensional Poverty by Ethnicity of Household Head, September 2025. Source: Multidimensional Poverty Index report 2025.

Differences were also observed according to the sex of the household head. Male headed households presented a higher incidence of multidimensional poverty (22.2%) than female headed households (13.2%).

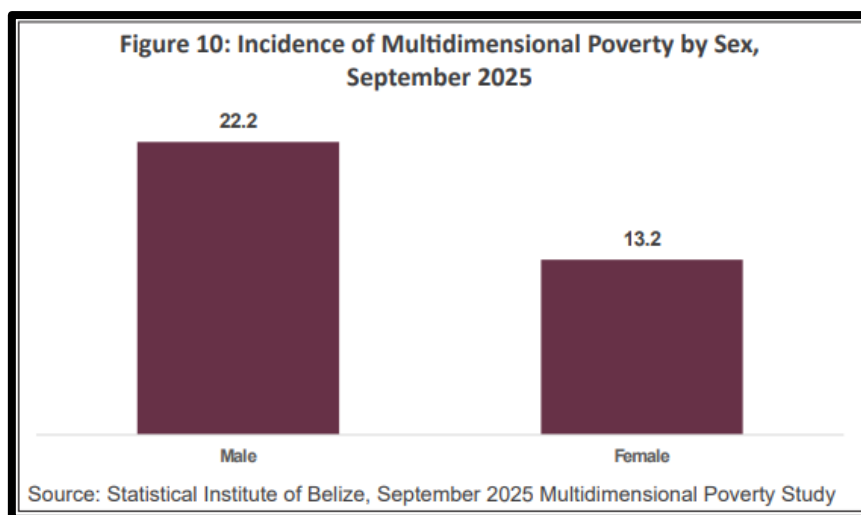


Figure 41 – Incidence of Multidimensional Poverty by Sex, September 2025. Source: Multidimensional Poverty Index report 2025.

4.5.5. Education

Three types of educational institutions operate in Belize: government, government-aided and private. Government schools are owned and funded by the Government of Belize.

Under the Laws of Belize, School attendance is compulsory for children 5-14 years of age (unless the child has completed primary school before the age of 14). People who have completed at least Standard Five at primary school are considered literate.

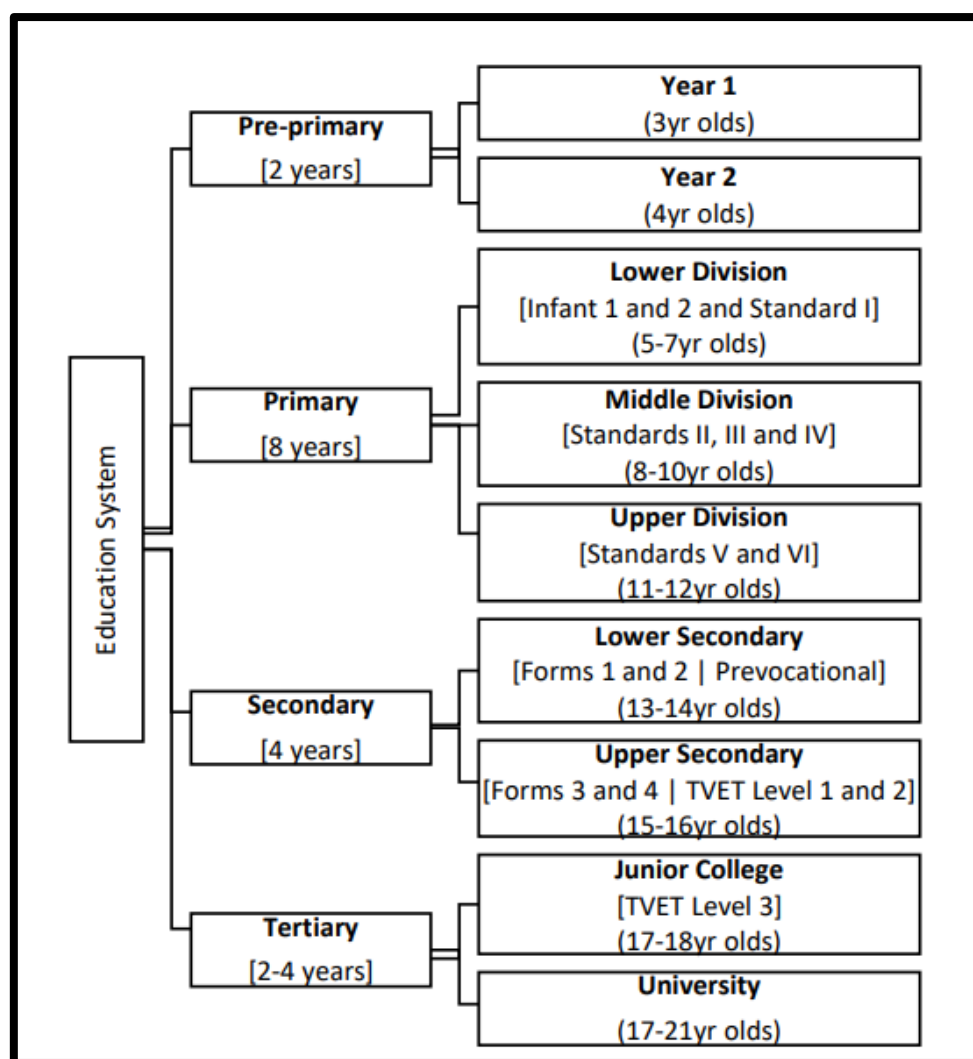


Figure 42 – Belize Education System. Source: Abstract of Education Statistics 2023-2024. Government of Belize⁸⁹.

There is a high literacy across Belize, particularly among younger cohorts. At the national level, adult literacy (population aged 15 years and over) stands at 87%, while youth literacy (ages 15–24) is substantially higher at 95%, reflecting improvements in access to and completion of basic education. In **Stann Creek** District, adult literacy is estimated at 83%, indicating that literacy levels remain below the national average.

Gender-disaggregated data indicate **minimal differences** in literacy outcomes at the national scale, with adult literacy rates of 87% for both males and females, and slightly higher youth literacy among females (96%) compared to males (94%). A similar pattern is observed in **Stann Creek**, where female literacy slightly exceeds male literacy in both age groups.

⁸⁹ <https://www.moecst.gov.bz/wp-content/uploads/2025/01/Abstract-of-Education-Statistics-2023-2024.pdf>

Table 30 – Adult and Youth Literacy Rates in Belize (country) and Stann Creek. Source: SIB, (2022)⁹⁰

Population Group	Geographic Area	Adult Literacy			Youth Literacy		
		Population 15+ years	Completed At Least Standard five	Literacy Rate	Population 15 to 24 years	Completed At Least Standard five	Literacy Rate
Total	Belize (Country)	279,452	242,292	87%	76,144	72,276	95%
Total	Stann Creek	31,471	26,268	83%	9,048	8,414	93%
Male	Belize (Country)	135,533	117,434	87%	37,938	35,787	94%
Male	Stann Creek	15,457	12,832	83%	4,614	4,261	92%
Female	Belize (Country)	143,918	124,858	87%	38,206	36,489	96%
Female	Stann Creek	16,014	13,436	84%	4,435	4,153	94%

In relation to the potential WWTP area, the closest school identified based on the available Open Data information⁹¹ is St. Alphonsus RC School .

⁹⁰ https://sib.org.bz/wp-content/uploads/Census2022_Education.xlsx

⁹¹ <https://gis-education-tbsl.opendata.arcgis.com>

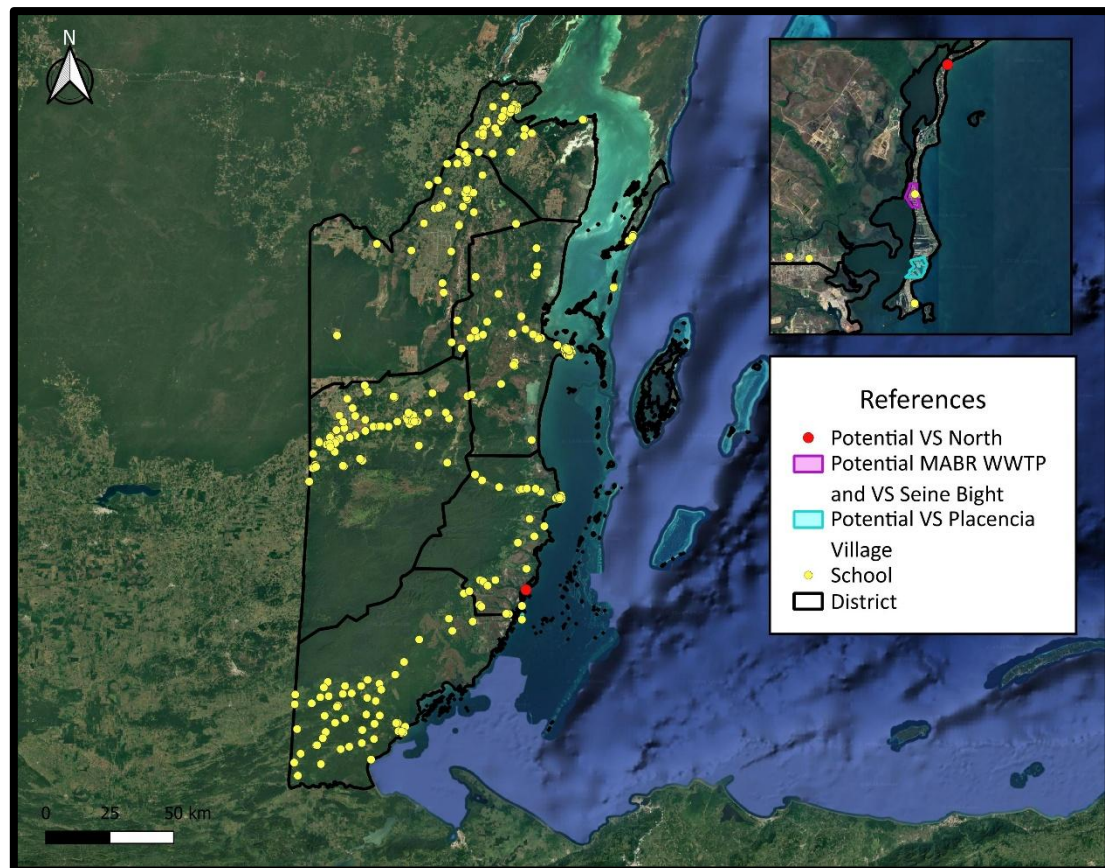


Figure 43 – School close to Potential Project Areas. Source: <https://gis-education-tbsl.opendata.arcgis.com>

4.5.6. Transport and Connectivity

Transport in Belize is administered primarily by two government institutions. The Department of Transport, under the Ministry of Public Utilities, Energy and Logistics, is responsible for transport regulations and operational policies governing road transport. The Ministry of Infrastructure Development and Housing oversees the planning, development, and maintenance of transport infrastructure, including the country's road, highway, and waterway networks⁹².

Belize's transport system is composed of road, maritime, and air network, with the road transport serving as the primary mode of domestic mobility. The national road network extends for approximately 13,000 km and includes around 601 km of primary highways, 1,831 km of secondary roads, and an extensive network of local access roads (CNTMP, 2018). The project site is accessed via Placencia Road, which constitutes the main transport corridor serving the Placencia Peninsula.

Public transport plays a significant role in daily mobility, accounting for approximately 34.6% of daily trips, with projections indicating continued growth in demand. Public bus services are largely provided by refurbished school buses imported from the United States, many of which are diesel powered and have remained in operation for several decades⁹³.

⁹² <https://unfccc.int/sites/default/files/resource/Belize%20National%20Communication.pdf>

⁹³ <https://unfccc.int/sites/default/files/resource/Belize%20National%20Communication.pdf>

Maritime transport is essential for both domestic connectivity and international trade. Belize has two principal commercial seaports: the Port of Belize, located in Belize City, and the Port of Big Creek, in the southern part of the country. The Port of Belize serves as the primary entry point for containerized cargo, consumer goods, and fuel imports, and also supports barge transport to the cayes. The Port of Big Creek mainly handles exports of bananas and other agricultural products, as well as crude oil, and is equipped to receive bulk carriers⁹⁴.

Air transport is provided through the Philip S. W. Goldson International Airport, Belize's principal international gateway, together with a network of regional aerodromes featuring both paved and unpaved runways that support domestic and regional air services. Domestic flights are mainly operated by Tropic Air and Maya Island Air, while airport infrastructure is managed by the Belize Airports Authority under the Civil Aviation Act⁹⁵. Based on the available Open Data information⁹⁶ the closest airport to the project site is Placencia Airport.

4.5.7. Indigenous Communities and Vulnerable Groups

In a general context, Belize has a population formed by several indigenous communities. According to the Statistics Institute of Belize 2022 Census, 52% of population are Mestizo/Hispano/Latino, 25% Creole, **12% are indigenous Maya (7% Q'etqchi, 4% Mopan and 1% Yucatec), 7% are Garifuna (descendants of black Africans and indigenous Kalinago)**, and 1% are white. The rest of the population comprises small communities of European, Mexican, Guatemalan, U.S., Honduran, Jamaican, East Indian, Chinese and Far Eastern origins⁹⁷.

There is no recognition, either Constitutional or in other domestic laws of indigenous land rights based on customary tenure. Indigenous communal lands are known as reservations and considered as State property. There are ten reservations covering a total of 70,000 acres, in which 51 per cent of the Maya population live. The Government reserves the right to administer them. Other Mayan customary lands outside reservations are also considered as State lands. Large tracts of forest lands in the district of Toledo were included in the Sarstoon-Temash National Park and the Columbia River Forest Reserve. Indigenous Maya peoples have had to fight for recognition of their territorial rights in court. According to MLA, Maya ancestral territory in southern Belize covers over one million acres⁹⁸.

4.5.7.1. Maya

Maya are the direct descendants of the original indigenous inhabitants of the Yucatán peninsula. Today there are **three Maya groups** in Belize, namely **Yucatec, Mopan, and Q'eqchi'** Maya and they are mainly subsistence farmers located in the south of the country.

⁹⁴ <https://unfccc.int/sites/default/files/resource/Belize%20National%20Communication.pdf>

⁹⁵ <https://unfccc.int/sites/default/files/resource/Belize%20National%20Communication.pdf>

⁹⁶ <https://gis-education-tbsl.opendata.arcgis.com>

⁹⁷ <https://www.ifad.org/es/w/publications/belize-country-technical-note-on-indigenous-peoples-issues>

⁹⁸ <https://www.ifad.org/es/w/publications/belize-country-technical-note-on-indigenous-peoples-issues>

The **Yucatec** originated from Yucatán Peninsula in Mexico and arrived in Belize in the mid-nineteenth century as refugees from the Guerra de Castes ('Caste War'). They now reside in the **Corozal, Orange Walk, and Cayo Districts**. Today the Yucatec Maya are primarily English and Spanish speakers⁹⁹.

The **Mopan Maya** moved to Belize in 1886 from the Petén region of Guatemala to escape taxation and forced labor. Mopan Maya settlements are located in San Antonio village in **Toledo District** and there are also other villages in the **Cayo District**¹⁰⁰.

Q'eqchi' Maya arrived in Belize in the 1870s in order to escape enslavement by German coffee growers in Verapaz, Guatemala. They settled in the lowland areas along rivers and streams and established 30 small, isolated villages throughout **Toledo district**. Because of their isolation, Q'eqchi' have remained the country's poorest and most neglected minority¹⁰¹.

According to information on Mayan areas in Belize extracted from a Technical Country Note on Indigenous Issues of 2022 done by FIDA and IWGIA¹⁰², **there are no Mayan communities close to Potential Project Areas**.

⁹⁹ <https://minorityrights.org/communities/maya/>

¹⁰⁰ <https://minorityrights.org/communities/maya/>

¹⁰¹ <https://minorityrights.org/communities/maya/>

¹⁰² <https://www.ifad.org/es/w/publications/belize-country-technical-note-on-indigenous-peoples-issues>



Figure 44 – Mayan Areas close to Potential Project Areas. Source: FIDA, 2022¹⁰³.

4.5.7.2. Garifuna

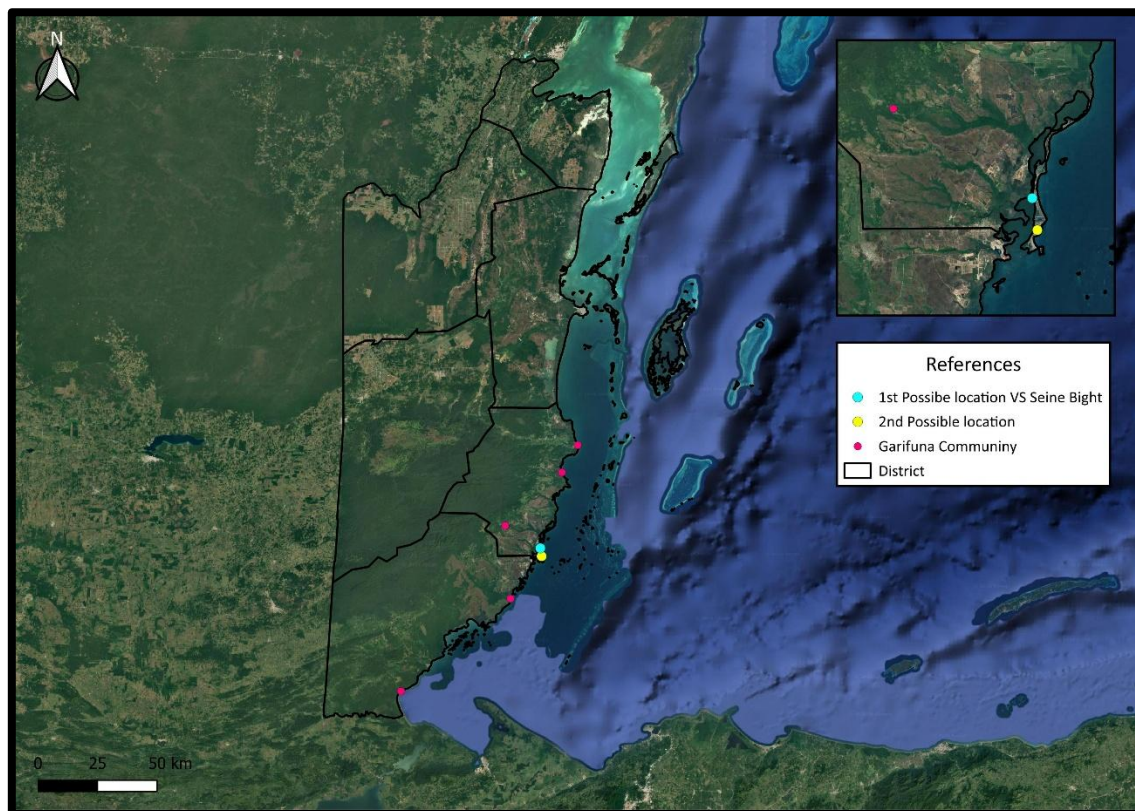
Garifuna are an Afro-indigenous community resulting from the inter-marriage of African maroons (escaped slaves) and indigenous Kalinago-Taino (Carib-Arawak). They are the descendants of the African survivors of human cargo ships that were wrecked off the island of St Vincent around 1675.

¹⁰³ <https://www.ifad.org/es/w/publications/belize-country-technical-note-on-indigenous-peoples-issues>

These West Africans, along with the steady stream of maroons escaping slavery on other Caribbean islands, found refuge and started families with the indigenous Kalinago (Carib) population. An Afro-indigenous culture developed that existed independently of the region's colonial forced labor plantation system. They became known as the Black Caribs or Garifuna.

After resisting British colonization, they were forcibly exiled in 1796 off St Vincent and eventually, after enduring a tragic journey that led them to Roatán, Honduras, found their way to the shores of Belize. The first settlement in Belize was established at **Dangriga**, which still holds the largest Garifuna population in the country. In their communities' women did agricultural work; men engaged in fishing and artisan activities and traded their produce along the Central American coast. In Belize, Garifuna men also worked as loggers in mahogany camps and earned positions of responsibility within the company hierarchies. They also sought income opportunities in US banana enclaves in Guatemala and Honduras and became merchant mariners on fruit company boats or migrated to the US¹⁰⁴.

The Garifuna in Belize now have **six communities** which have taken a leadership role in maintaining global Garifuna culture. There has been some cultural assimilation into the dominant Creole culture. However, in their communities Garifuna have continued to maintain their other traditions¹⁰⁵. According to georeferenced information obtained from Open Data¹⁰⁶, there are no close Garifuna communities to Potential Project Areas.



¹⁰⁴ <https://minorityrights.org/communities/garifuna-garinagu/>

¹⁰⁵ <https://minorityrights.org/communities/garifuna-garinagu/>

¹⁰⁶ <https://gis-education-tbsl.opendata.arcgis.com>

Figure 45 – Garifuna Communities and Potential Project Areas. Source: <https://gis-education-tbsl.opendata.arcgis.com>

4.5.7.3. Mennonite

Mennonites are a Dutch/German descent community. They emerged in The Netherlands in 1520s during the Radical Reformation period in Europe and the sect derives its name from the reformist Protestant Leader of the movement, Menno Simons. The Mennonites are a radical Protestant group known for rejecting state religion, advocating the separation of church and state, and opposing slavery. Their pacifist beliefs, including refusal to bear arms or perform military service, led to long-standing persecution in Europe. Over the 18th and 19th centuries, Mennonites migrated from the Netherlands, Switzerland, and Germany to Eastern Europe, Russia, Canada, and the United States, with later waves moving to Paraguay, Brazil, and Mexico after World War II. Distinctive subgroups, such as the Hutterites and Amish, followed different leaders but shared similar religious principles.

Throughout these migrations, Mennonites typically settled on unoccupied, remote rural land, which naturally shaped them into a farming community. While they generally obey the civil laws of the countries where they live, they continue to refuse involvement in military or judicial roles, violent activities, or public office, maintaining a lifestyle centered on pacifism, community, and agriculture.

In 1959 about 3,000 mennonites from Canada (Manitoba) and Mexico (Chihuahua) relocated to Belize along the River Hondo under a special agreement signed with Belizean government where they were exempted from military service, certain taxes and freedom to establish their own form of local government and run their own schools, businesses and banks. Although isolating themselves from the other cultures of Belize, the Mennonites can provide essential services and agricultural products to the local markets. They specialize in the production and sale of poultry and dairy products and distinctive wooden furniture.

The Mennonites in Belize have six communities located between **Orange Walk** and **Cayo** Districts: Blue Creek, Shipyard, Little Belize, Progreso, Spanish Lookout and Barton Creek. **There are no communities located near Potential Project Areas.**

4.5.7.4. Gender Analysis

Following Georgetown's Institute for Women, Peace and Security (WPS), which assesses women's status across inclusion, justice and security on a scale from worst (0) to best (1), Belize's overall WPS Index score is **0.667, 104th out of 181 countries**, establishing a **moderate performance** in women's wellbeing¹⁰⁷.

In terms of inclusion, Belize shows positive outcomes: **formal employment among women increased** from about 50.5 % in 2023 to **60.9 %** in 2025, and over half of women (52.3 %) have financial accounts, while cellphone use among women is relatively high at 84 %. However, women's representation in national parliament dropped slightly, from 23.9 % to 19.6 %, indicating continued under-representation in political leadership¹⁰⁸.

Improvements in **maternal mortality** reflect better health outcomes, with numbers decreasing from 129.8 in 2023 to 67 in 2025, over **48% decrease**.

¹⁰⁷ <https://giwps.georgetown.edu/the-index/country/belize>

¹⁰⁸ <https://giwps.georgetown.edu/the-index/country/belize>

On justice, Belize has room for improvement. The absence of legal discrimination against women, measuring women's rights in the law (100% indicates a full equal legal code), scored higher in 2025 (82.5%) than in 2023 (79.4%), suggesting legal reforms may be advancing gender equality under the law, but access to justice remains limited. However, the access to justice, an indicator that captures women's abilities to exercise these rights in public and ability to bring cases to court, seek fair trials, and obtain legal redress, on a scale of zero to four, scored **2.1**¹⁰⁹.

Measures of security show relatively low levels of intimate-partner violence (7.8 %) and a majority of women reporting feeling safe in their communities, but there's an uptick in political violence targeting women in 2025 (1.5) in relation to 2023 (0.496), shown from the indicator that measures the number of political violence events targeting women¹¹⁰.

In terms of gender-based violence, reports from the Belize Crime Observatory for 2024 show **domestic violence reports decreased 7%** relative to the same period in 2023. There was also a **decrease of 17,5% on rape cases** relative to the same period in 2023¹¹¹.

During 2024, approx. 8 in 10 reports were made by females. Most reports were filled by females aged 20 to 44 years, which accounted for 74% (1,658) of the female complaints. Similarly, the largest percentage of Domestic Violence male complainants were between the ages of 20 and 44 years. This accounted for 63% (348) of the male complainants¹¹².

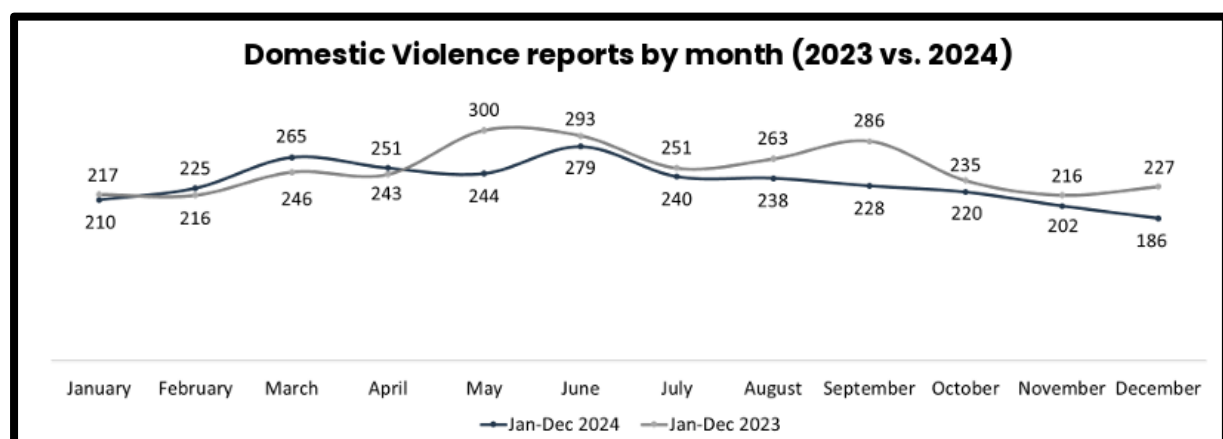


Figure 46 – Domestic Violence Reports by month 2023 vs 2024. Source: Belize Crime Observatory Report 2024¹¹³.

¹⁰⁹ <https://giwps.georgetown.edu/the-index/country/belize>

¹¹⁰ <https://giwps.georgetown.edu/the-index/country/belize>

¹¹¹ <https://bco.gov.bz/bco/annual-analysis/>

¹¹² <https://bco.gov.bz/bco/annual-analysis/>

¹¹³ <https://bco.gov.bz/bco/annual-analysis/>

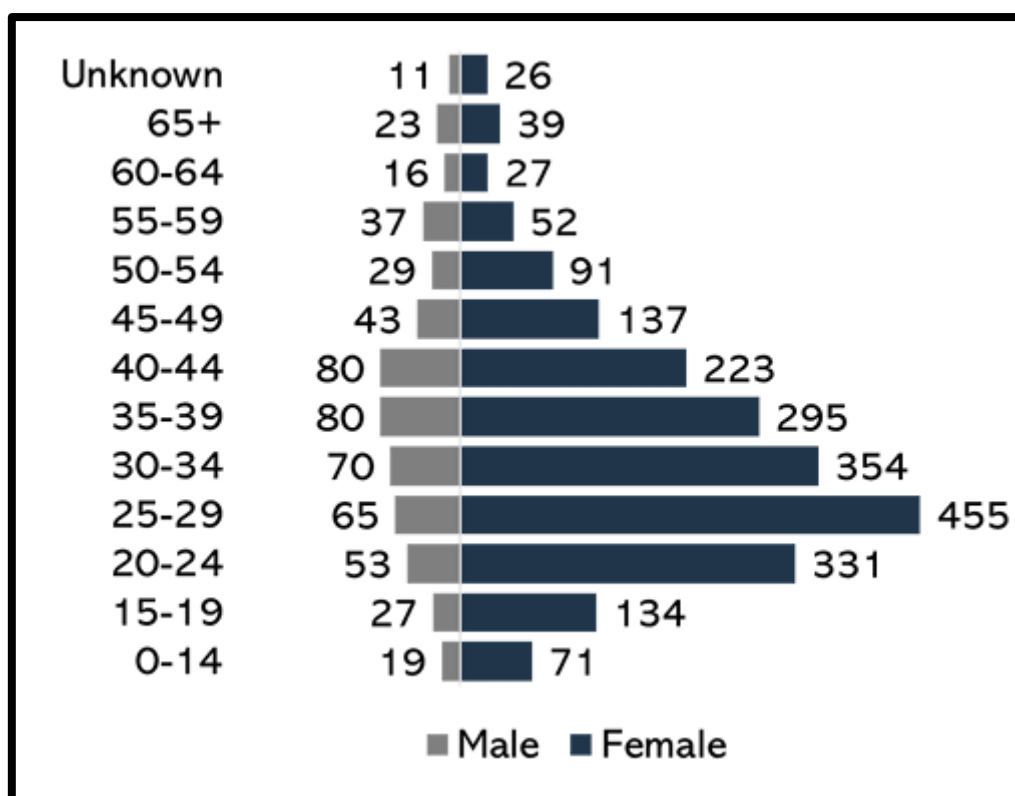


Figure 47 – Domestic Violence reports by age group and sex in 2024. Source: Belize Crime Observatory Report 2024¹¹⁴.

These mixed results reveal that while Belize has made gains in certain areas of women's inclusion and wellbeing, significant gaps remain in political participation, justice accessibility, and some aspects of safety that affect women's full empowerment and equality.

Moreover, UNICEF Belize Gender Analysis 2023 reveals that there are several gender data gaps that are material for monitoring: lack of granular data on women's poverty across different groups of women, limited gender-disaggregated data on social protection access and impacts, and limited data on gender-responsive budgeting. Within this context, the project provides an opportunity to strengthen practical gender evidence. Specifically, the project can systematically collect and report sex-disaggregated participation and beneficiary data across core activities (training, outreach, access to financing mechanisms, and adoption of practices) to identify unequal uptake early and adjust implementation approaches accordingly¹¹⁵.

Belize has a **National Gender Policy 2024-2030**, which builds on the previous Gender Policy of 2013. Its overarching goal is to achieve gender equity and equality and end discrimination against women and girls in Belize.

Belize has a **National Women's Commission of Belize (NWC)** that serves as an advisory body to the Government on issues relating to women. It was established as an overall effort to meet a series of International commitments, commencing in 1975 when Belize participated in the United Nations First World Conference on Women and in 1990 when Belize signed and ratified the Convention on the

¹¹⁴ <https://bco.gov.bz/bco/annual-analysis/>

¹¹⁵ <https://www.unicef.org/belize/media/8056/file/Belize%20Gender%20Analysis%202023.pdf.pdf>

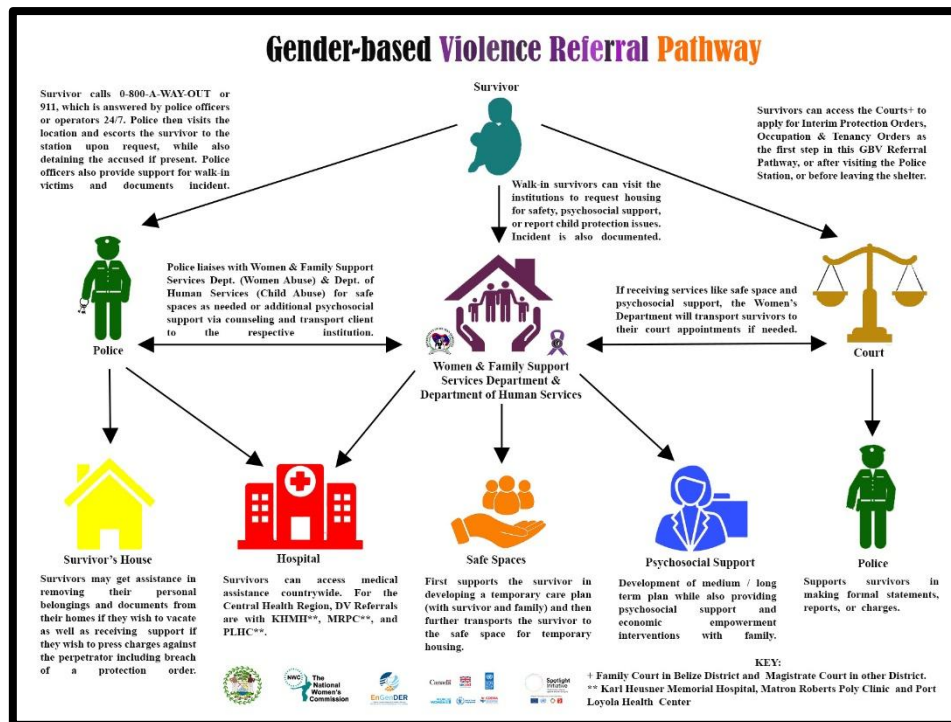


Figure 49 – Gender Violence Referral Pathway in Belize. Source: NWC, 2026.

4.5.8. Archaeological, Historical and Cultural Heritage

Belize has a unitary system for the protection and management of cultural heritage, under which ownership of archaeological, historical, and other cultural resources is vested in the Government and people of Belize. The principal institution responsible for the protection, conservation, and promotion of the country's tangible and intangible cultural heritage is the National Institute of Culture and History (NICH), established in 2003 under the National Institute of Culture and History Act (Chapter 331 of the Laws of Belize). NICH coordinates the management of Belize's cultural heritage through its constituent institutes, including the Institute of Archaeology, the Institute for Social and Cultural Research, the Institute of Creative Arts, and the Museum of Belize and Houses of Culture.

Belize possesses an exceptionally rich cultural heritage resulting from the interaction of Maya, Garifuna, Creole, Mestizo, East Indian, Mennonite, and other cultural traditions. The country also contains one of the highest concentrations of Maya archaeological sites in Central America, many of which are legally protected under the Ancient Monuments and Antiquities Act. In addition, Belize is home to the Belize Barrier Reef Reserve System, the country's only UNESCO World Heritage Site, comprising seven protected marine areas recognized for their outstanding biodiversity and ecological significance.

Within **Stann Creek** District, cultural heritage is closely associated with the Garifuna culture, particularly in communities such as Dangriga and Hopkins, where traditional music, dance, language, and cultural practices remain an important component of local identity. The district also contains several archaeological sites and historic landmarks, although these are generally located inland and outside the Placencia Peninsula.

A review of publicly available archaeological and cultural heritage databases maintained by the Government of Belize indicates that no recorded archaeological sites or designated cultural heritage resources are located within or immediately adjacent to the Project footprint. The nearest registered

heritage resource is the **Serpon Sugar Mill Historical Reserve**, located approximately 30 km northwest of Placencia. This nineteenth-century industrial archaeological site preserves the remains of Belize's first steam-powered sugar mill and is protected as a national historical reserve.

Based on the available information, no direct impacts on known archaeological or historical resources are anticipated during Project implementation. Nevertheless, because previously undocumented archaeological materials may be encountered during excavation activities associated with the wastewater infrastructure, all ground-disturbing works should be undertaken in accordance with a Chance Finds Procedure consistent with Belizean legislation and international good practice. Such procedures should include the immediate suspension of works in the discovery area, notification of the Institute of Archaeology (NICH), protection of the find, and implementation of any measures required before construction resumes.

4.6. Direct Area of Influence of the Interventions

The baseline assessment presented below is based on field observations conducted during the July 7-9 technical mission, consultations with key stakeholders, and publicly available information. Several sites between Riversdale and Placencia Village, including Maya Beach and Seine Bight, were visited during the mission.

During the technical mission, several potential locations between Riversdale and Placencia Village were visited and assessed. Although a number of alternatives were considered, many were privately owned and unavailable for development. A potential project area for the WWTP was identified in the Seine Bight area, along with three potential areas for vacuum stations (VS) in the northern part of the Placencia Peninsula, Seine Bight, and Placencia Village.

4.6.1. Potential WWTP area in Seine Bight



Figure 50 – Potential WWTP area in Seine Bight. Source: PlanEHS, 2026.

The potential area for the construction of the WWTP is located in Seine Bight. According to the Nutrient Fate and Transport (NFT) Study¹¹⁶, site preparation and development could directly affect estuarine wetlands dominated by mangrove stands. Additionally, the project footprint must extend into the adjacent shallow shoreline margin of the Placencia Lagoon, requiring technical land reclamation (fill).

In order to characterize the mangrove ecosystem present within the potential WWTP and Vacuum Station Area, mangrove extent was mapped using the Global Mangrove Watch (GMW) dataset, corresponding to the year 2020 (see **Figure 51**). Mangrove is concentrated along the western margin of the area facing the Placencia Lagoon, with additional isolated patches within the already urbanized central portion of Seine Bight Village. It must be emphasized that this polygon delimits the area within which the WWTP, the vacuum station and associated infrastructure may be sited; it does not represent the Project footprint. **Consequently, the extent of mangrove requiring removal is expected to be substantially smaller than the total mangrove present within the potential area.**

¹¹⁶ Belize Water Services Limited. (2020, June). *Nutrient fate and transport study of the Placencia Peninsula and marine environs* (Report No. 181100.00; Final Project Report).

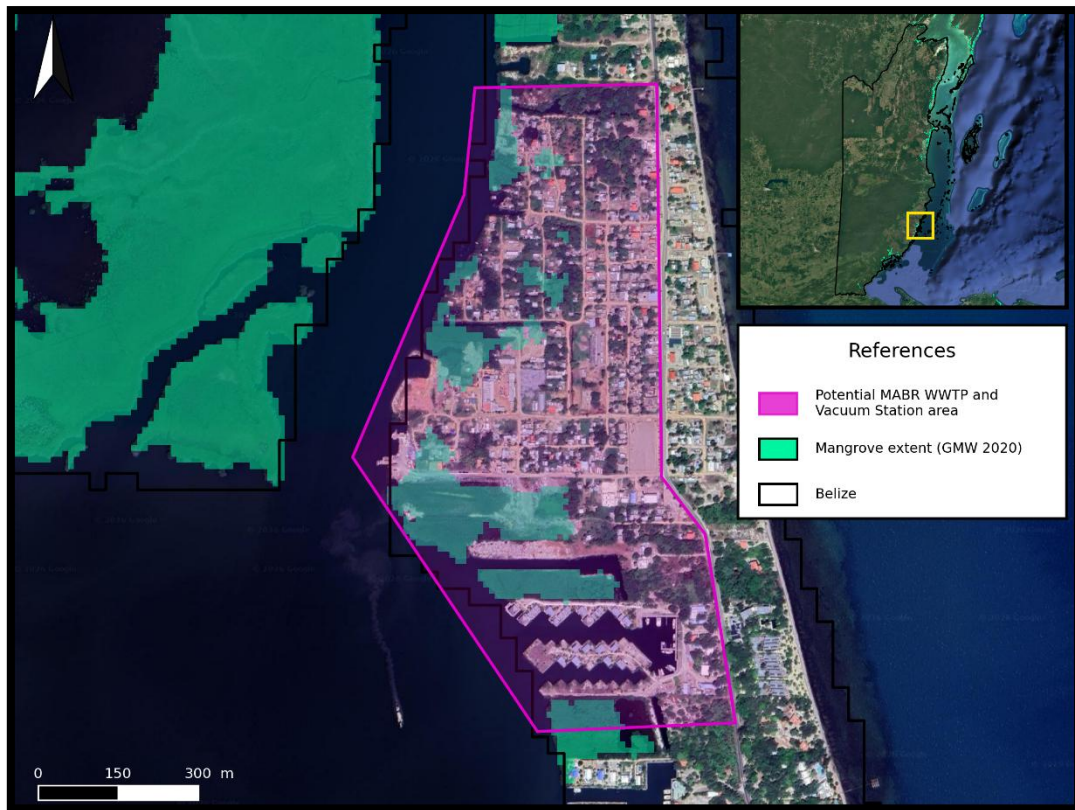


Figure 51 - Mangrove extent within the extended MABR WWTP and Vacuum Station area, Seine Bight. Source: PlanEHS, 2026, based on GMW (2020).

The area is accessible through the existing local road network, which may facilitate the movement of construction equipment and materials and support future operation and maintenance activities. The availability of existing access and utility infrastructure may also reduce the need for additional ancillary infrastructure.



**Figure 52 – Placencia Road, the main transportation corridor serving the Placencia Peninsula.
Source: PlanEHS, 2026.**

The potential area is located in a predominantly residential area, situated within the central portion of Seine Bight Village.



Figure 53 – Residential properties in the vicinity of the potential area. Source: PlanEHS, 2026.

Given its location within the center of Seine Bight Village, the site is surrounded by several community assets that support recreational, educational, and cultural activities. These include the Seine Bight Police Station, the Seine Bight Community Center, and a recently inaugurated children's football field.

During the mission it was explained that the Seine Bight Football field was recently inaugurated and serves as the primary outdoor venue for football matches, training sessions, and community sporting events. It is used predominantly by children, youth, and local sports teams, while also attracting spectators during organized competitions and community gatherings. Its central location makes it an important recreational asset for the village.



Figure 54 – Football Field. Source: PlanEHS, 2026.

Furthermore, the Seine Bight Community Center is a multipurpose public facility that was constructed in the late 2000s as part of the Placencia Road improvement program, and serves as a venue for community meetings, cultural events, educational activities, and public consultations. The facility is regularly used by residents, community organizations, and the Village Council, and plays an important role in supporting social cohesion and local governance.

The nearest educational facility is St. Alphonsus School. It is an early childhood education facility serving pre-primary children from Seine Bight and surrounding communities. The facility operates under the local Catholic education system and experiences regular activity during school hours, regularly occupied by children, teaching staff, and parents or caregivers during school hours.

Three religious establishments are also located in or near the potential WWTP and Vacuum Station area in Seine Bight: Christ Lutheran Church, Calvary Chapel Seine Bight, and St. Alphonsus Church. The presence of these facilities should be considered during the detailed assessment of potential construction-related noise, dust, traffic, and access impacts, as well as potential operational impacts such as odors and noise.

Other businesses and establishments located within the potential project area include: Itz'ana hanas lagoon event venue, Thunderbirds Marine, Insurance Corporation of Belize & Nationwide Cash Express Seine Bight Agency, Jenny's Trending Salon, Lola's Art Gallery and Convenience Shop, Accounting Firm of Jose A. Vasquez, Cutting Edge Woodworks, Anna's Pizza, Ashton Shopping, Finger Foods Delightz, John's Auto Rental, Sleeping Giant View Resort, Me & You Restaurant and Emy's Authentic Belizean Style Restaurant.

Community representatives highlighted the importance of minimizing odors, ensuring compliance with treated effluent standards and maintaining transparent communication throughout project preparation.

Based on the current level of Project definition, no physical displacement has been identified within the Area of Direct Influence (ADI), as no residential structures or housing infrastructure have been identified within the areas proposed for the Project infrastructure. Likewise, no permanent economic displacement has been identified at this stage. However, the final engineering design of the sewerage network will confirm whether temporary impacts on economic activities, such as temporary restrictions to access to commercial properties during construction, may occur. If identified, these impacts will be assessed in the Updated ESA and appropriate mitigation and management measures will be incorporated into the ESMP, in accordance with the IDB Environmental and Social Policy Framework (ESPF).



Figure 55 – Field photographs of the surroundings of the potential project area. Source: PlanEHS, 2026.

Furthermore, several businesses and establishments are located within the potential area for the vacuum station in Placencia Village, including Casa Valencia, La Casa Bonita Feliz, Travel Mar, Splash Dive Centre, Placencia Medical Services, Allamanda Del Mar, Placencia Fishing Charters – Belize, SeaBelize Adventures – Placencia Belize Tours, San-Sun Estates Vacation Rentals, Siripohn's Thai Massage, Island Pool Supply, and Tides Dive Shop by Coppola.

Finally, several businesses and establishments are located near the potential area for the vacuum station in the northern part of the Peninsula, including Don Tonito's, Formas Europeas, Umayá Resort & Adventures, and Ocean's Edge Beach Houses.

5. Environmental and Social Impacts and Risks

This chapter focuses on the identification and assessment of potential environmental and social impacts and risks that could be derived from the implementation of the **Belize Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)**.

The analysis was conducted with consideration for the scope and physical interventions of the Project's components. Environmental and social impacts are primarily associated with **Component 1 (Wastewater Collection and Treatment System for Placencia Peninsula)**, which entails physical infrastructure investments, including the construction and commissioning of a sewerage system and a wastewater treatment plant (WWTP) for the Placencia Peninsula.

Conversely, activities under **Component 2 (BWS's Planning and Service Management Strategy)** are not expected to cause environmental risks and impacts, given that no infrastructure or installation of equipment is included within the scope.

5.1. Methodology for the Impact and Risk Assessment

5.1.1. Impact and Risk Assessment Process

The impact and risk assessment process follows a structured approach, consisting of the following steps:

- 1 **Impacts Identification:** Identify potential environmental and social effects on various components, resulting from project activities and associated infrastructure.
- 2 **Impact Assessment:** Evaluate the significance of predicted impacts and risks by considering their magnitude, probability of occurrence, and the sensitivity, value and importance of the affected environmental and social components.
- 3 **Mitigation Measures:** Define appropriate measures to mitigate negative impacts and enhance positive ones.
- 4 **Residual Impact Assessment:** Evaluate the significance of residual impacts after implementing mitigation and improvement measures.

5.1.2. Phases Analyzed

To identify environmental and social impacts and risks, the analysis considers three key project phases:

- **Construction**
- **Operation and Maintenance**
- **Decommissioning or abandonment**

The projects that involve infrastructure with a long service life, such as the sewerage system and a wastewater treatment plant, will be permanently integrated into the service provider's operational systems. Therefore, the decommissioning or abandonment phase on these components **was not included in the impact assessment**.

5.1.3. Project Activities Summary

This section outlines the primary physical activities and operational processes associated with Component 1 of the Belize Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056).

Project Activities in the Construction Phase

Work Preparation

- A. Transport, movement, and stockpiling of materials, equipment, and machinery. Mobilization of the workforce.
- B. Installation and operation of the construction sites and work fronts, installation of fencing, and perimeter barriers.
- C. Potential Land reclamation, grading, and removal of vegetation for the Wastewater Treatment Plant (WWTP) site.
- D. Excavation, trenching, and soil works along existing urban road corridors for the installation of sewer collection networks and conveyance force mains

Main work

- E. Excavation, trenching, and soil works along existing urban road corridors for the installation of sewer collection networks and conveyance force mains.
- F. Construction and electromechanical installation of sewage pumping stations along the peninsula.
- G. Civil, structural, and electromechanical construction of the WWTP.

Work demobilization

- H. Demobilization of equipment, facilities, and personnel, proper disposal of construction waste, and complete cleanup and restoration of all disturbed roadways, pavements, and vegetated areas.

Project Activities in the Operational Phase

For the purposes of the analysis, the operational phase was divided into:

- I. Operation of the sewer collection network, pumping stations, and Wastewater Treatment Plant (WWTP).
- J. Maintenance of the sewer collection network, pumping stations, and Wastewater Treatment Plant (WWTP).

5.1.4. Physical, Biological and Socioeconomic Environment Components Summary

The components of the physical, biological, and socioeconomic environment likely to be affected by the project include:

Physical Environment

1. Air. Gaseous emissions and particulate matter.
2. Air. Noise and vibrations.
3. Water. Water table and groundwater. Surface water courses.
4. Soil.

Biological Environment

5. Flora.
6. Wildlife and Aquatic Fauna.

Socioeconomic Environment

7. Infrastructure and services. Road network and traffic.
8. Infrastructure and services. Mains utilities (Water, sewage, energy, gas).
9. Infrastructure and services. Waste Management. Municipal solid waste.
10. Infrastructure and services. Waste Management. Special and hazardous waste.
11. Infrastructure and services. Waste Management. Construction and demolition waste.
12. Health and Safety. Occupational Health and Safety.
13. Health and Safety. Community Health and Safety.
14. Socio-Economic development. Labor employment.
15. Socio-Economic development. Commercial and service activities.
16. Cultural, Archaeological and Paleontological Heritage.
17. Land Use and Activities in the Area. Residential Use.
18. Landscape. Visual impact. Landscape perception.

5.1.5. Impacts Identification and Assessment

For the impact identification, the interactions between the project actions (identified above) and the environmental components (physical, biological, and socioeconomic environment) were analyzed.

As a representative graphic synthesis of this process a matrix was constructed, which reproduces in a simplified way the conditions of the studied system and allows to visualize with simple symbology the representative interactions.

5.1.6. Matrix construction and impact attributes

The matrix provides a simplified representation of the studied system, using clear symbology to illustrate key interactions. It is a double-entry table, where columns correspond to project actions, both direct or induced, that have environmental or social implications, while rows represent the physical, biological, and socioeconomic components that may be affected.

The intersections between project actions and environmental components highlight interaction relationships, allowing the evaluation between the "without project" and "under project" scenarios, thus identifying potential impacts and risks.

Further details on the impact assessment can be found in the matrix report. Each matrix cell assigns an impact rating based on the attributes outlined below:

1. **Impact Sign:** indicates whether the impact is positive or negative.
2. **Impact Magnitude (scale):** qualitatively assessed as high, medium, or low significance (**Table 31**).
3. **Impact Scope:** defines the spatial extent of the impact: 1. restricted to the Operational Area (OA), 2. Limited to the Direct Area of Influence (DAOI), or 3. Extended beyond an Indirect Area of Influence (IAOI), affecting neighboring areas.
4. **Impact Duration (persistence):** determines if the impact is transitory or permanent.
5. **Impact probability:** assesses the likelihood of impact occurrence.
6. **Accumulation:** for the most significant impacts, an analysis will be conducted on cumulative effects from project execution and operation in relation to existing or potential projects

Table 31 provides definitions that serve as a basis for determining the magnitude of the impact.

Table 31 - Keys to determine the impacts magnitude.

Impact Magnitude	Physical and Biological environment	Socio-economic environment
High	An impact is deemed significant (high) if it substantially alters the characteristics of the environment or any of its subcomponents, to the extent that the affected component can no longer be used under its existing conditions, intended use, or level of availability.	An impact is considered significant if it persists across multiple generations, or if it affects a specific group of people to such an extent that it causes a significant decline in quality of life or disrupts culturally and socially valued patterns of activity. These impacts do not revert to pre-project conditions for several generations.
Medium	An impact is considered moderate when it partially affects the environment or one of its subcomponents, resulting in a noticeable but not extensive alteration of its characteristics. Such an impact does not significantly impair the use of the resource under current environmental conditions, nor the manner or extent to which it is presently utilized.	An impact is considered moderate when it affects a defined group of people with sufficient magnitude to alter their quality of life or to disrupt culturally and socially valued patterns of activity that are regarded as positive or appropriate.

Impact Magnitude	Physical and Biological environment	Socio-economic environment
Low	An impact is defined as low when it affects the environment or one of its subcomponents only partially and to a limited extent, without significantly altering its characteristics. It is assumed that such an impact will not impede the continued use of the environment under current conditions, nor affect the manner or quantity in which it is presently utilized.	An impact is defined as low when it is of short duration or affects a limited group of people within a localized area, without causing a discernible change in quality of life or in culturally and socially valued patterns of activity regarded as positive or appropriate.

5.1.7. Mitigation Measures Identification

Once impacts are identified and assessed, mitigation measures are proposed to avoid, reduce, correct or compensate for them.

All negative impacts identified in this study require preventive, mitigatory, corrective or compensatory measures, which must be integrated to minimize environmental impact and ensure the sustainable performance of the project.

Within the **mitigation hierarchy**, preventive (pre-impact, avoid impact at source) and mitigatory measures (minimize impact, reduce impact at source, or on the receiving body) are prioritized over treatment-based approaches (post-impact), such as restoration and compensation.

5.1.8. Residual Impact Determination

Once mitigation measures have been identified, the next step in the assessment process is to determine the residual impact value. This step essentially involves a reassessment of impacts, considering the effective implementation of the proposed mitigation measures.

5.1.9. Management, Monitoring and Audit

The final stage of the impact assessment process involves defining monitoring and management measures to ensure that identified impacts remain within applicable regulatory standards, and that mitigation measures are effectively implemented, reducing impacts as originally predicted in the analysis.

A summary of these management processes is included in the Environmental and Social Management Plan (ESMP), which is discussed in the next chapter (**Chapter 6**).

5.2. Environmental and Social Impacts

5.2.1. Environmental and Social Impact Matrix

As an initial step in the analysis, a matrix was developed to identify the potential environmental and social impacts and risks associated with the Facilities. The matrix outlines both nature (positive or negative) and the magnitude of each identified impact. This matrix is presented in Figure 56.

Figure 56 - Environmental and Social Impacts and Risks Matrix

Matrix for the Identification of Environmental and Social Impacts and Risks Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)				PROJECT ACTIVITIES WITH ENVIRONMENTAL AND SOCIAL IMPACT										PHASE																									
														CONSTRUCTION PHASE								OPERATIONAL PHASE																	
				WORK PREPARATION				MAIN WORK				WORK DEMOBILIZATION				OPERATION AND MAINTENANCE																							
				Transport, movement and stockpiling of materials, equipment, machinery. Mobilization of the workforce.				Installation and operation of the construction sites and work fronts, installation of fencing and perimeter barriers.				Land reclamation, grading, and removal of vegetation for the WWTP site				Excavation, trenching, and soil works along existing urban road corridors for the installation of sewer collection networks and conveyance force mains				Installation of sewer collection networks and conveyance force mains				Construction and electromechanical installation of sewage pumping stations along the peninsula				Civil structural, and electromechanical construction of the WWTP and treated effluent discharge				Demobilization of equipment, facilities, and personnel, proper disposal of construction waste, and complete cleanup and restoration of all disturbed roadways, pavements, and vegetated areas				Operation of the sewer collection network, pumping stations, and Wastewater Treatment Plant (WWTP). ¹²			
ENVIRONMENTAL COMPONENTS LIKELY TO BE AFFECTED BY THE PROJECT																A	B	C	D	E	F	G	H	I	J														
PHYSICAL AND BIOLOGICAL MEDIA	AIR	Gaseous emissions and particulate matter		1																																			
		Noise and vibrations		2																																			
	WATER	Water table and groundwater. Surface water. Sea water.		3																																			
	SOIL	Soil		4																																			
	BIOTA	Flora		5																																			
		Wildlife		6																																			
SOCIO-ECONOMIC MEDIA	INFRASTRUCTURE AND SERVICES	Road network and traffic		7																																			
		Main utilities (water, energy)		8																																			
		WASTE MANAGEMENT	Solid waste	9																																			
			Hazardous or Special Waste	10																																			
			Construction and demolition waste	11																																			
	OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY	Risk of occupational accidents, injuries, and health hazards		12																																			
		Risks to community health, safety, and security (exposure to construction hazards, communicable diseases, and SGBV)		13																																			
	SOCIO-ECONOMIC DEVELOPMENT	Labor Employment		14																																			
		Commercial and Service Activities		15																																			
	CULTURAL HERITAGE	Cultural, Archaeological and Paleontological Heritage		16																																			
	LAND USE	Activities in the Area and Land Use		17																																			
	LANDSCAPE	Visual Impact. Landscape Perception		18																																			

Sign and Magnitude of the Impact

Negative	High	
	Medium	
	Low	
Positive	High	
	Medium	
	Low	

5.2.2. Environmental and Social Matrix Report

This technical report details the criteria applied for the weighted assessment of environmental and social impacts, as represented in the Impacts and Risks Matrix. It also provides a detailed explanation of additional impact attributes—namely spatial scope, temporal duration, recurrence, and intensity. Furthermore, it outlines the proposed mitigation strategies and assesses the residual impacts anticipated following the effective implementation of these measures.

Impacts - Construction Phase

Air. Gaseous Emissions, Particulate Matter and Greenhouse Gases

Impact Assessment

Impact Description	Air quality impacts of gaseous emissions and particulate matter		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The construction phase activities for the Placencia Resilient and Sustainable Sanitation Infrastructure Project will involve material storage, operation of heavy machinery and vehicles, site clearance, excavation, earthworks, and infrastructure development. These activities are associated with the generation of particulate matter (dust) and gaseous emissions (including greenhouse gases) from combustion engines, temporarily contributing to local air pollution.

Due to the nature of the project, these impacts will manifest differently depending on the infrastructure component:

Wastewater Treatment Plant Construction: The construction of the centralized WWTP in the Seine Bight area may require land clearing and the removal of vegetation. Furthermore, since the site lacks sufficient land, it may also require land reclamation (fill). The movement of earth, hauling of fill materials, and civil construction will generate substantial dust and vehicle emissions. Since the area is located in the central portion of Seine Bight Village, these impacts will directly affect nearby sensitive receptors, including adjacent residential properties such as the Seine Bight Community Center, a frequently used football field, St. Alphonsus Preschool, and local churches.

Sewerage System Construction: The installation of the sewer collection networks and conveyance force mains will require excavation, trenching, and soil works along existing urban road corridors throughout the Placencia Peninsula. This will generate highly localized particulate matter and engine emissions from construction vehicles operating directly in front of houses, commercial establishments, and hotels, causing temporary interruptions and exposure to air pollutants.

Since the project areas for both the WWTP and the sewerage network are located near sensitive receptors (residential properties such as, St. Alphonsus Preschool, the Seine Bight Community Center,

the children's football field, local churches, health centers, and commercial tourism establishments) and densely populated urban corridors, these impacts are assessed as negative, of medium magnitude primarily with regard to site preparation activities (clearing, excavation, trenching, etc.), limited to the indirect area of influence (IAoI), and transitory in nature (they only occur during the construction phase and are reversible).

Mitigation Measures

- All dust-generating materials will be transported in vehicles covered with tarpaulins and maintained at an appropriate humidity level to reduce dispersion.
- During on-site storage at WWTP, dust-generating materials will be regularly moistened, and stockpile volumes will be kept to a minimum, whenever operationally feasible.
- Unpaved on-site roads and areas of exposed soil (especially in the WWTP area after vegetation clearance) will be watered at least twice daily to control dust emissions.
- The speed of construction vehicles on unpaved access roads and residential streets will be limited (between 20 and 40 km/h), depending on site-specific conditions.
- During excavation, trenching along urban corridors, and soil handling, materials will be sprayed with water to suppress dust.
- All construction machinery, heavy equipment, and generators will be maintained in good working order and subject to regular technical inspections to optimize combustion efficiency and minimize gaseous emissions and greenhouse gases.
- Establish an **Air Quality, Noise and Vibrations Management Program** in the ESMP.

Residual Impact

Following the implementation of mitigation measures, the residual impact on air quality is expected to be of low magnitude.

Air. Noise and vibration

Impact Assessment

Impact Description	Impacts by noise and vibration generation		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The construction phase activities for the Placencia Resilient and Sustainable Sanitation Infrastructure Project, including land clearing, earthworks, excavation, transportation of materials, and the operation of heavy machinery, are associated with the generation of increased noise and vibrations.

Due to the nature of the project, these impacts will manifest differently depending on the infrastructure component:

Wastewater Treatment Plant Construction: The construction of the centralized WWTP in the Seine Bight area will require use of heavy machinery for land reclamation (fill), mangrove removal, and civil and electromechanical construction. Since the area is in the central portion of Seine Bight Village, these noise and vibration impacts could directly affect nearby sensitive receptors. These receptors include residential properties such as, the Seine Bight Community Center, a frequently used football field, St. Alphonsus Preschool, and local churches.

Sewerage System Construction: The installation of the sewer collection networks, pumping stations, and conveyance force mains will require excavation, trenching, and soil works along existing urban road corridors throughout the Placencia Peninsula. This will generate localized noise and vibration from construction equipment operating directly in front of houses, commercial establishments, and hotels, causing temporary disturbances to residents, tourists, and pedestrians.

Since the project areas for both the WWTP and the sewerage network are located near sensitive receptors and densely populated urban corridors, these impacts are assessed as negative, of medium magnitude, limited to the indirect area of influence (IAoI), and transitory in nature (they only occur during the construction phase and are reversible).

Mitigation Measures

- To manage and minimize noise-related impacts, the following measures will be implemented: Incorporate a **Community Information and Participation Program** within the Environmental and Social Management Plan (ESMP), to inform nearby stakeholders about the nature, schedule, and expected duration of construction activities.
- Incorporate an **Air Quality, Noise and Vibrations Management Program** within the Environmental and Social Management Plan (ESMP).
- Ensure all construction machinery and equipment are properly maintained and operated in good working conditions to reduce noise emissions.
- Careful scheduling of high noise generating activities in collaboration with the community to avoid impacts during sensitive hours and prioritize times that minimize disturbance to residents.
- Regular inspections and upkeep of construction machinery and equipment to maintain optimal condition and mitigate noise emissions originating from the equipment.
- Adhere to IFC Environmental, Health, and Safety (EHS) Guidelines for noise levels: Daytime (07:00–22:00): ≤ 55 dBA – Nighttime (22:00–07:00): ≤ 45 dBA. These international standards are adopted as they are more protective and conservative than applicable national limits (Belize Environmental Protection Act CAP 328) and apply to equivalent continuous noise levels in residential, institutional, and educational receptors.

Residual Impact

Following the implementation of mitigation measures, the residual impact on noise and vibration is expected to be of low magnitude.

Water table and groundwater. Surface water.

Impact Assessment

Impact Description	Impacts on groundwater and surface water resources		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium (Sewerage System)	High (WWTP)
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative	Cumulative	

Impact Discussion

According to the Nutrient Fate and Transport (NFT) Study¹¹⁷, the peninsula is characterized by highly permeable sandy material at the ground surface and a very shallow freshwater lens that is in direct connection with the sensitive nearshore marine habitat of the Placencia Lagoon and the Caribbean Sea. The NFT study emphasizes that the lagoon is currently in a critical state and exhibits a low flushing capacity. Due to these environmental vulnerabilities, the impacts will manifest differently depending on the infrastructure component:

Wastewater Treatment Plant Construction: The potential area to build the infrastructure is close to a narrow portion of the lagoon, which may require land reclamation (fill) and mangrove removal. Reclaiming land in this zone could reduce the channel's cross-sectional area, restricting tidal circulation and resulting in reduced flushing capacity and increased water residence times in the northern portion of the lagoon. Additionally, any accidental spills of construction fluids (hydrocarbons, chemicals) on the permeable sandy soil could rapidly infiltrate the groundwater and contaminate the lagoon.

Sewerage System Construction: Excavation and trenching along the peninsula would intercept the shallow water table, requiring continuous dewatering. The primary risks involve localized erosion and contaminated overland flow entering the lagoon during high-intensity rainfall events. Pumping untreated, sediment-laden groundwater from trenches directly into the drainage system could introduce heavy suspended solid loads into the marine environment, exacerbating water quality deterioration in a lagoon already stressed by historical nutrient loading.

Considering the highly sensitive coastal environment these impacts are assessed as negative, of high magnitude in the case of the wastewater treatment plant and of medium magnitude in the case of the sewer system, limited to the direct area of influence (DAoI), transitory (occurring mainly during active construction), and of medium probability.

Mitigation Measures

- Implement a comprehensive **Erosion and Sediment Control Plan** in the ESMP. Physical barriers such as turbidity curtains and silt fences must be strictly deployed during mangrove removal and land reclamation to prevent suspended sediment plumes from migrating into the sensitive nearshore marine habitat.

¹¹⁷ Belize Water Services Limited. (2020, June). *Nutrient fate and transport study of the Placencia Peninsula and marine environs* (Report No. 181100.00; Final Project Report).

- Carefully design and execute the land reclamation footprint to minimize any further restriction of the lagoon's natural flushing capacity, ensuring that hydrodynamic flows are not severely permanently altered.
- Store all fuels, lubricants, and hazardous chemicals in secure, secondary containment areas located far from the lagoon shore to protect the vulnerable freshwater lens and highly permeable sandy soils from contamination.
- Develop a rigorous Emergency Spill Response Plan to immediately address and contain any accidental leaks from construction machinery before they can infiltrate the groundwater regime.
- Incorporate mangrove habitat restoration or replanting initiatives into the ESMP, as the NFT study highlights that mangroves play a critical role in consuming large amounts of nutrients in the lagoon and maintaining water quality.

Residual Impact

Following the strict implementation of the proposed mitigation measures, sediment control, and spill prevention protocols, the residual impact on surface water and groundwater resources during construction is expected to be low for the sewer system and moderate for the wastewater treatment plant.

Soil

Impact Assessment

Impact Description	Impacts on soil resources from conversion, erosion, sediment runoff, and/or pollution		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium (Sewerage System)	High (WWTP)
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory (Sewerage System)		Permanent (WWTP)
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The construction phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project may involve land reclamation, trenching, and large-scale fill operations. According to Nutrient Fate and Transport (NFT) Study, the soil profile of the Placencia Peninsula consists of sandy soil that forms a highly permeable unconfined aquifer. Due to these specific geological conditions, the impacts on soil resources will manifest differently depending on the infrastructure component:

Wastewater Treatment Plant Construction: According to the NFT study, the WWTP area may require land reclamation and mangrove removal. This introduction of fill material for land reclamation represents a permanent modification of the existing soil and sediment profile.

These impacts are assessed as negative, of high magnitude, permanent, limited to the direct area of influence (DAoI), and of medium probability.

Sewerage System and Pipeline Construction: The trenching within the barrier beach deposit of sand could cause localized soil disturbance.

These impacts are assessed as negative, of medium magnitude, transitory, limited to the direct area of influence (DAoI), and of medium probability.

Mitigation Measures

To minimize soil-related impacts, the following mitigation measures will be included in the Environmental and Social Management Plan (ESMP):

- Develop and implement an **Erosion and Sediment Control Plan** in the ESMP to manage soil disturbance and prevent the loss of the highly permeable sandy soils during the "trenching along a longer length" in the developed portions of land.
- Develop and implement a **Chemical substances management Program** in the ESMP to establish secure storage areas with secondary containment and prevent accidental spills of fuels, oils, and chemicals from rapidly infiltrating the highly permeable sandy soils and shallow unconfined aquifer during the construction of the facilities.
- Strictly limit the land reclamation footprint and mangrove clearing, avoiding any unnecessary expansion into adjacent undisturbed soils.
- Ensure that all fill material used for the land reclamation is clean, structurally suitable, and free of contaminants to protect the underlying natural soil and the adjacent lagoon bed.
- Ensure that all construction fill materials, earth, aggregates, and stone are sourced exclusively from licensed local suppliers holding valid environmental and extraction permits.
- After the completion of the construction phase and trench closures, rehabilitate and restore the disturbed sandy soil along the pipeline route to their original profile and stabilize the ground to prevent further erosion.

Residual Impact

Assuming full implementation of the proposed mitigation measures, the residual impact on soil during construction is expected to be low for the sewer system and moderate for the wastewater treatment plant.

Flora

Impact Assessment

Impact Description	Impacts on Flora due to construction activities		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low (Sewerage System)	Medium	High (WWTP)
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory (Sewerage System)		Permanent (WWTP)
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The construction phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project may involve land clearing and vegetation removal. It is imperative to highlight that, according to the preliminary Critical Habitat assessment, the project area is located within the Belize Coastal and Near Shore Islands Key Biodiversity Area (KBA) and is therefore considered a **Critical Habitat** under IDB Environmental and Social Performance Standard 6 (ESPS 6). Due to the nature of the project, the impacts on flora will manifest differently depending on the infrastructure component:

Wastewater Treatment Plant Construction: WWTP construction in Seine Bight may require the clearing and permanent removal of mangroves. The potential area lies in the central, already developed portion of Seine Bight Village, on the margin of the Placencia Lagoon, and forms part of a preliminarily identified Critical Habitat within the Belize Coastal and Near Shore Islands KBA.

The loss of mangrove cover is permanent and irreversible, and the ecological functions affected extend well beyond the area physically cleared. These stands contribute to shoreline stabilization and erosion control along a low-lying peninsula exposed to wave energy and coastal retreat; they retain sediment and filter land-based runoff, assimilating nutrients that would otherwise reach the Placencia Lagoon; they act as natural buffers against storm surges and hurricane-induced coastal flooding for adjacent residential areas; and they constitute long-term "blue carbon" sinks.

Beyond the direct removal of vegetation, construction activities may generate indirect effects on adjacent habitats. Excavation and fill placement could increase turbidity and sediment loads in surrounding waters and, if uncontrolled, sediment plumes or accidental chemical and fuel spills could reach undisturbed mangrove stands, coastal wetlands and contiguous benthic seagrass beds, impairing photosynthetic capacity and degrading nearshore aquatic flora habitats.

The mangrove cover review presented in Section 4.6 (see Figure 51) establishes the extent of mangrove present within the potential area, which constitutes the upper limit of what could be affected rather than an estimate of clearing. The plant and its ancillary works will occupy only a portion of that area, and the MABR technology selected for the Project has a compact footprint. The extent of mangrove that would effectively be removed depends on the final siting of these works, which the detailed engineering design has yet to define. In the absence of a confirmed footprint, and given the irreversible character of the loss within Critical Habitat, the magnitude of this impact has been assessed conservatively; it will be reassessed once the final layout is confirmed and the extent of clearing is quantified through the Biodiversity Action Plan. Such a reassessment would not alter the mitigation hierarchy or the Net Gain obligations applicable under ESPS 6 within Critical Habitat.

Sewerage System Construction: Significant land clearing of natural habitats is not anticipated for this component, as the trenching and excavation works will be carried out primarily within existing urban corridors, roads, and previously modified habitats along the peninsula. Vegetation removal will be limited to localized sections, potentially disturbing landscape gardens, isolated patches of vegetation, and small trees along the pipeline right-of-way.

These impacts are assessed as negative; of high magnitude and permanent in the case of the WWTP, and of low magnitude and transitory for the sewerage system; they are cumulative, since the construction of the WWTP contributes to the historical fragmentation of coastal forests; and they have a high probability of occurring. Mitigation Measures

The following measures will be included in the construction-phase Environmental and Social Management Plan (ESMP) to mitigate impacts on vegetation and associated habitats:

- Establish a **Flora and Fauna Management Program** with detailed protocols to avoid or minimize impacts on local biodiversity.
- Develop and implement a Biodiversity Action Plan (BAP) with the assistance of retained external experts. Since the project operates in a Habitat, the BAP must be designed to achieve a Net Gain of the biodiversity values for which the critical habitat was designated (e.g., in situ enhancement programs or threat reduction initiatives).
- Strictly adhere to IDB ESPS 6 guidelines which dictate that biodiversity offsets are not an acceptable mitigation measure for impacts on Critical Habitat values. Mitigation must focus on avoidance, minimization, and in situ restoration/enhancement.
- Strictly limit the vegetation clearing and mangrove removal footprint to the minimum necessary footprint, physically demarcating the construction boundaries to avoid any unnecessary damage to adjacent undisturbed mangrove stands.
- After closing the trenches for the sewerage system, immediately restore the disturbed areas by redistributing topsoil and replanting with appropriate native species to match pre-construction conditions.

Enforce a strict Code of Conduct for all construction workers and contractors, explicitly prohibiting the unauthorized cutting of vegetation, harvesting of wood, or clearing of flora outside the approved project footprint.

Residual Impact

With the effective application of the above mitigation measures, the residual impact on vegetation and habitat is expected to remain negative, but of medium magnitude in the case of WWTP, and of low magnitude in the case of the sewerage system.

Wildlife and Aquatic Fauna

Impact Assessment

Impact Description	Impacts on wildlife and aquatic fauna due to construction activities		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low (Sewerage System)	Medium	High (WWTP)
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory (Sewerage System)		Permanent (WWTP)
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The construction phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project may involve land clearing, earthworks, operation of heavy machinery, and increased human presence. It is imperative to highlight that, according to the baseline assessment, the project area is located

within both the **Belize Coastal and Near Shore Islands Key Biodiversity Area (KBA)** and the **Belize Coastal and Near Shore Islands Important Bird Area (IBA)**. Because of these designations, which share the exact same boundaries, the area is formally classified as a **Critical Habitat** under IDB Environmental and Social Performance Standard 6 (ESPS 6). Due to the nature of the project, the impacts on fauna will manifest differently depending on the infrastructure component:

Wastewater Treatment Plant Construction: The IBA criteria for this area were established based on 21 bird species, and the KBA designation is triggered by highly sensitive avifauna, most notably the Critically Endangered Reddish Egret (*Egretta rufescens*), as well as the Yucatan Nightjar, Ruddy Crake, and Pied-billed Grebe. Furthermore, the Placencia Lagoon and its surrounding mangrove ecosystems provide habitats for marine life. These ecosystems frequently function as critical nursery, breeding, and feeding habitats for juvenile fish, marine reptiles (American Crocodile *Crocodylus acutus*, sea turtles), and marine mammals like the West Indian Manatee (*Trichechus manatus*). The proposed construction of the WWTP could require direct removal of mangroves and land reclamation (fill) within the shallow lagoon margin, which could cause direct habitat loss and physical disruption to these essential nursery and foraging grounds. The potential removal of mangrove prop-root systems could reduce nursery shelter, potentially producing adverse impacts on local fisheries and aquatic population dynamics that could extend beyond the project's physical footprint into the broader lagoon and coastal waters. While the potential disruption of this sensitive habitat, combined with the noise and vibrations from heavy machinery, could cause the direct displacement of wildlife, it is crucial to highlight that the maximum intervention area of the project represents a negligible fraction of the total 695,622 acres of the KBA and IBA. Furthermore, the potential project area is in the central portion of Seine Bight Village, an already developed area. Therefore, this highly localized disturbance within an already intervened area helps minimize the overall significance of the conversion in relation to the overall extent of the available habitat.

Nevertheless, because this area supports highly sensitive and threatened avifauna and serves as a vital aquatic nursery, this localized disturbance remains ecologically sensitive. Consequently, these impacts must be carefully managed through strict mitigation protocols and the implementation of a site-specific Biodiversity Action Plan (BAP) designed to achieve a Net Gain in the biodiversity values.

Sewerage System Construction: The excavation and trenching work will be carried out primarily within existing urban corridors and paved roads. Impacts on fauna in these areas will be limited to the temporary displacement of common, urban-adapted wildlife due to localized noise, dust, and equipment operation.

These impacts are assessed as negative; of high magnitude and permanent in the case of the WWTP, and of low magnitude and transitory for the sewerage system; they are cumulative, since the construction of the WWTP contributes to the historical loss of migratory bird habitat and the fragmentation of coastal forests in the peninsula; and they have a high probability of occurring.

Mitigation Measures

To minimize adverse impacts on fauna, the following mitigation measures will be integrated into the construction-phase Environmental and Social Management Plan (ESMP):

- Establish a Flora and Fauna Management Program with detailed protocols to avoid or minimize impacts on local biodiversity.
- Develop and implement a **Biodiversity Action Plan (BAP)** with the assistance of external experts.

- Strictly adhere to IDB ESPS 6 guidelines which dictate that **biodiversity offsets are not an acceptable mitigation measure** for impacts on Critical Habitat values.
- Time construction activities, particularly the mangrove clearing and land reclamation, at the least sensitive times for at-risk or endangered species (e.g., avoiding peak nesting or breeding seasons for KBA/IBA trigger bird species).
- Enforce a strict Code of Conduct for all project employees, contractors, and subcontractors, explicitly prohibiting the hunting, fishing, capturing, or harassing of wildlife, as well as the unauthorized collection of plants.
- Strictly limit the mangrove removal footprint, further minimizing this area where feasible by adjusting the project layout, and physically demarcating the construction boundaries to avoid any unnecessary damage to adjacent undisturbed habitats that serve as refuges for displaced fauna.
- Implement noise and vibration control measures to minimize acoustic disturbance to wildlife in the adjacent undisturbed lagoon and mangrove areas.

Residual Impact

With full and effective implementation of the proposed mitigation measures, the residual impact on wildlife and biodiversity is expected to be negative, but of low magnitude for sewerage system and medium for the WWTP.

Road and Traffic Impacts

Impact Assessment

Impact Description	Traffic disruptions, increased congestion, and road safety risks		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low (WWTP)	Medium (Sewerage System)	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

During the construction phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project, adverse impacts are expected due to increased traffic volume, temporary road blockages, and competition for the use of the local road network. The peninsula is primarily connected to the mainland by a single transportation corridor, the Placencia Road, which currently handles private vehicles, taxis, public buses, and tourism shuttles. Due to the nature of the project, these impacts will manifest differently depending on the infrastructure component:

Wastewater Treatment Plant Construction: The continuous trucking movements to haul in road fill and construction materials could increase traffic volume and heavy vehicle interactions on Placencia Road and the local streets of the densely populated Seine Bight Village.

Sewerage System Construction: The installation of the sewer collection networks and conveyance force mains will require extensive trenching, excavation, and soil movement directly along existing urban road corridors and Placencia Road. These activities will result in the temporary blocking of traffic lanes, detours, and restricted access to private yards, commercial premises, and hotels.

These impacts are assessed as negative; of medium magnitude for the sewerage system due to the extensive footprint of trenching along the peninsula's main road, and of low magnitude for the WWTP; they are transitory, as they occur only during the construction period; they are cumulative, as the construction traffic will compound the existing pressure on the peninsula's single transportation corridor during peak tourism seasons; and they have a high probability of occurring.

Mitigation Measures

- Implement an **Information and Community Participation Program** as part of the ESMP, to inform nearby residents about the duration and schedule of the construction works, as well as the mitigation measures to address associated risks and impacts.
- Establish a **Road Safety and Traffic Management Program** within the ESMP to ensure the safe and efficient movement of vehicles and pedestrians in the vicinity of the construction site.

Residual Impact

With the effective application of the above mitigation measures, the residual impact on road safety and traffic management is expected to be negative, but of low magnitude.

Main Utilities (water, energy)

Impact Assessment

Impact Description	Interference with existing public services, accidental breaking of utility lines, and increased energy demand		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The installation of the sewer collection networks and conveyance force mains requires extensive trenching along the main road and existing urban corridors. These ground-disturbing activities carry a high risk of accidentally striking and breaking existing underground utility lines, such as Belize Water Services (BWS) water mains and Belize Electricity Limited (BEL) power conduits. Such incidents could cause temporary, yet highly disruptive, interruptions to essential public services for residents, commercial establishments, and hotels. Furthermore, the potential WWTP area in Seine Bight contains an existing BWS water distribution facility. The heavy machinery operation, possible land

clearing, and fill hauling required for the WWTP construction must be carefully managed to prevent any structural damage or operational interference with this existing water infrastructure.

These impacts are assessed as negative, of medium magnitude, limited to the direct area of influence (DAoI), strictly transitory (as they will only occur during the active construction and trenching periods), non-cumulative, and have a high probability of occurring due to the extensive footprint of the excavation works within developed areas.

Mitigation Measures

- Establish a **Coordination with Service Providers Program** to ensure all required permits for electricity and water resource use have been acquired and that no interferences shall be disrupted during construction work.
- Establish physical barriers and safe working perimeters at the Seine Bight WWTP construction site to ensure that earthworks and heavy machinery do not interfere with BWS potable water reservoir and distribution facility.

Residual Impact

With the effective application of the above mitigation measures, the residual impact on main utilities is expected to be negative, but of low magnitude.

Waste Management

Impact Assessment

Impact Description	Soil, water, and landscape contamination due to the generation of solid, hazardous, and construction waste.		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The operation of construction sites and active work zones will generate solid waste similar in nature to domestic waste. In addition, all construction activities are expected to produce surplus construction materials and green waste (e.g., from vegetation clearing, weeding, land preparation, etc.). The Placencia Peninsula has an organized waste management system utilizing the Placencia Transfer Station for consolidation and subsequent transport to the Mile 24 Regional Sanitary Landfill. However, this system currently faces operational challenges due to rapid tourism growth, and seasonal fluctuations in visitor numbers already place additional pressure on collection services and transfer station capacity. The additional MSW from construction activities will place a cumulative pressure on these local municipal services.

Given the nature of the activities involved in the project, the generation of special or hazardous waste is not anticipated, except for small quantities derived from the maintenance of machinery and vehicles used on-site (e.g., lubricating oils, etc.). Nevertheless, given the project's highly sensitive coastal environment and direct adjacency to the Placencia Lagoon, improper disposal, leaks, or inadequate management of these wastes pose a high contamination risk to the environment. These waste streams

must be disposed of in accordance with current regulations, using licensed transporters and authorized disposal facilities, in compliance with local environmental legislation.

The earthworks required for the project, including excavation, trenching along the peninsula, and potentially land reclamation for the WWTP, will generate substantial volumes of construction debris, rubble, and excavated soils. Additionally, land clearing will generate green waste. Previous studies have identified unauthorized informal disposal practices in coastal communities, including the illegal dumping of vegetation and construction debris in undeveloped areas or mangrove ecosystems. Unauthorized dumping of these materials could block natural drainage patterns, smother sensitive habitats, or cause unsightly landscape degradation.

These impacts are assessed as negative, of medium magnitude, transitory (limited to the construction phase), cumulative (adding to the existing baseline pressure on the Placencia Transfer Station), and have a high probability of occurring.

Mitigation Measures

- Establish a **Waste Management Program** as part of the Environmental and Social Management Plan (ESMP), detailing procedures for the proper management of all waste streams generated on-site, including surplus excavation material, in line with current legislation and best practices.
- Develop a **Socio-Environmental Training Program for Construction Personnel**, including modules on appropriate construction waste management.
- Establish an **Environmental and Social Liabilities Program** that includes protocols for assessing potential soil contamination resulting from excavation activities.
- Implement a **Pest and Vector Control Program** within the ESMP to prevent infestations associated with poor waste management.
- Ensure the removal of pre-existing waste from surrounding areas to the project site prior construction activities.

Residual Impact

With the implementation of the proposed mitigation measures, the residual impact associated with solid waste management is expected to be low.

Occupational Health and Safety

Impact Assessment

Impact Description	Risk of occupational accidents, injuries, and health hazards		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The execution of construction activities carries inherent risks, primarily related to occupational health and safety. These risks are attributed to the high-risk nature of various construction operations, exposing workers to accidents, physical injuries, and health hazards.

Due to the nature of the project, these OHS risks will manifest in specific ways depending on the infrastructure component:

Wastewater Treatment Plant (WWTP) Construction: Activities at the WWTP site may involve land clearing, mangrove removal, and land reclamation (fill material) within a flooded environment. Workers will be exposed to risks associated with the continuous operation of heavy earth-moving machinery, noise-induced hearing loss, ergonomic strain, and potential exposure to biological agents and hazardous materials (such as fuels and oils).

Sewerage System Construction: The installation of the sewer collection networks, force mains, and pumping stations involves extensive excavation and trenching along existing urban road corridors. This exposes workers to severe high-risk situations, including potential trench cave-ins, hazards associated with confined space entry during sewer and wet well installation, and electrical hazards during the electromechanical outfitting of pump stations. Furthermore, because these works will occur directly on the Placencia Road and local streets, workers face a high risk of traffic-related accidents.

These impacts are classified as negative, of high magnitude during peak construction activities (particularly during deep excavations and heavy lifting operations), restricted to the operational area (OA), transitory (occurring exclusively during the execution phase of the works), and non-cumulative.

Mitigation Measures

- Implement an **Occupational Health and Safety Program** within the Environmental and Social Management Plan (ESMP) and a **Labor Management Procedure (See Annex 1)**, aligned with applicable national and local legislation and incorporating principles from globally recognized occupational health and safety management systems (ISO 45001:2018).
- Develop a **Socio-Environmental Training Program** for on-site personnel as part of the ESMP, including training on the proper use of personal protective equipment (PPE), identification and management of occupational hazards, emergency response procedures, and safe handling of hazardous substances.
- Establish a **Road Safety and Traffic Management Program** within the ESMP to minimize the risk of traffic-related incidents involving construction personnel and vehicles. This program should include safe driving practices and proper signage at work zones and detours.
- Create a **Construction Sites Management Program** as part of the ESMP to ensure adequate fencing, access control, and clear signage at campsites, active work areas, trenches, and other sensitive locations.
- Develop an **Emergency Preparedness and Response Program** within the ESMP to ensure prompt and effective medical emergency response on-site.

Residual Impact

As a result of the effective implementation of the proposed mitigation measures, the residual impact associated with occupational health and safety risks is expected to be reduced to medium magnitude during peak construction activities and low magnitude during preparatory and demobilization phases.

Community Health and Safety

Impact Assessment

Impact Description	Risks to community health, safety, and security, including exposure to construction hazards, communicable diseases, and sexual and gender-based violence (SGBV)		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative	Cumulative	

Impact Discussion

The installation of sewer networks and conveyance force mains requires extensive trenching and excavation directly along urban road corridors and the Placencia Road. This creates physical hazards such as open trenches, operation of heavy machinery, and increased traffic, posing direct safety risks to pedestrians and residents. Furthermore, the potential area of the WWTP in Seine Bight contains or is in proximity to community facilities, including the Seine Bight Community Center, a frequently used children's football field, and St. Alphonsus Preschool, potentially exposing vulnerable populations to construction-related hazards.

Additionally, the presence of non-local (foreign) workers may increase the risk of communicable disease transmission, place additional pressure on local healthcare services and increase the risk of sexual and gender violence against women, girls, boys, LGBTQI+ people in the community and project workers.

This impact is classified as negative, of medium magnitude during peak construction activities and low magnitude during site preparation and demobilization phases. The impact is considered temporary, occurring exclusively during the execution phase of the works.

Mitigation Measures

- Require all contractors to adopt and sign a strict **Code of Conduct** that explicitly prohibits acts of sexual harassment, sexual exploitation, and gender-based violence (SGBV), establishing clear and proportional disciplinary measures for violations.
- Ensure the project's Grievance Mechanism includes specific, confidential, and safe procedures for reporting SGBV incidents, minimizing the reporting burden on survivors and defining referral protocols to direct victims to appropriate support services (e.g., healthcare, psychosocial, legal).
- Develop a **Socio-Environmental Training Program** for on-site personnel as part of the ESMP, including training on Code of Conduct, SGBV prevention, respectful interaction with local communities, and the prevention of communicable diseases.
- Implement an **Occupational and Community Health and Safety Program** within the Environmental and Social Management Plan (ESMP) to ensure that all construction sites and open

trenches are properly secured, barricaded, and illuminated at night to prevent unauthorized public access and accidents.

- Establish a **Road Safety and Traffic Management Program** within the ESMP to minimize the risk of traffic-related incidents.
- Create a **Construction Sites Management Program** as part of the ESMP to ensure adequate fencing, access control, and clear signage at campsites, active work areas, trenches, and other sensitive locations.
- Develop an **Emergency Preparedness and Response Program** within the ESMP to ensure prompt and effective medical emergency response on-site.

Residual Impact

As a result of the effective implementation of the proposed mitigation measures, the residual impact associated with community health and safety risks is expected to be reduced to low magnitude.

Economic development. Labor employment

Impact Assessment

Impact Description	Impacts on employment, business, and services		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The activities planned during the construction phase will require both skilled and unskilled labor, as well as the procurement of construction materials and related services. This is expected to generate positive socio-economic impacts, mainly through job creation and the stimulation of local commerce in goods and services. Sectors likely to benefit include suppliers of construction materials and inputs, equipment, vehicles, machinery, spare parts and accessories, mechanical services, fuel, logistics, and food services, among others.

These impacts are classified as positive of low magnitude, temporary in nature, and geographically dispersed across the project's indirect area of influence. An exception may occur during the demobilization phase, when the conclusion of construction activities may result in low-magnitude negative impacts due to the withdrawal of labor and reduced local economic activity.

Enhancement Measures

- Prioritize the hiring of local workers from the Placencia Peninsula (including Seine Bight and the town of Placencia) and nearby communities. Actively promote local entrepreneurship by purchasing goods and services from local suppliers whenever possible.

- Ensure all hiring and procurement practices strictly adhere to the principles of **non-discrimination and equal opportunity**. Specific measures must be included to ensure that women and vulnerable groups have equitable access to project-related employment, training, and enterprise opportunities.

Economic development. Commercial and service activities

Impact Assessment

Impact Description	Disruption to commercial and service activities, loss of revenue, and reduced access to businesses		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

During the construction phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project, commercial and service activities will face negative disruptions. These impacts will be primarily driven by the construction of the sewerage system. The installation of the sewer collection networks and conveyance force mains requires extensive excavation and trenching directly along existing urban road corridors and the main Placencia Road. These activities could cause temporary blockages of traffic lanes and restrict physical access to private commercial premises, hotels, and restaurants. Furthermore, the generation of dust, noise, and vibrations from heavy machinery and earthworks can create an unsightly and uncomfortable environment, potentially deterring tourists and customers, thereby temporarily affecting local business revenues. Additionally, the construction of the Wastewater Treatment Plant (WWTP) will require continuous trucking movements to haul road fill and construction materials, which may indirectly disrupt local commerce by exacerbating traffic congestion along the peninsula's single main transportation corridor.

These impacts are assessed as negative, of medium magnitude due to the economic reliance on tourism and services, limited to the direct area of influence (DAoI), transitory (occurring strictly during the active construction period in front of or near the establishments), non-cumulative, and of high probability.

Mitigation Measures

- Always Guarantee continuous access to commercial premises and hotels (day and night) by implementing safe pedestrian crossings and covering open trenches with steel plates during the night.
- Implement an **Information and Community Participation Program** to notify business owners, hotel operators, and the public well in advance regarding the construction schedule, planned road closures, and expected durations of localized works.

- Establish a **Grievance Redress Mechanism** as part of the Project’s environmental and social framework to address concerns related to economic impacts and ensure inclusive stakeholder engagement.

Residual Impact

Following the implementation of the proposed measures, the residual impact is expected to be reduced to a low magnitude.

Cultural and Archaeological Heritage

Impact Assessment

Impact Description	Negative impacts on cultural and archaeological heritage		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative	Cumulative	

Impact Discussion

The Placencia Peninsula and the wider Stann Creek District possess a rich cultural heritage resulting from the interaction of Garifuna, Maya, Creole, and Mestizo traditions. A review of archaeological databases indicates that there are no recorded archaeological sites, traditional Maya stone structures, or designated cultural heritage resources located within or immediately adjacent to the direct footprint of the Placencia Resilient and Sustainable Sanitation Infrastructure Project. The nearest registered heritage resource is the Serpon Sugar Mill Historical Reserve, located approximately 30 km away. Consequently, direct impacts on known archaeological or historical resources are not anticipated.

Nevertheless, the potential for chance findings must be considered. Earth-moving activities could entail a risk to cultural, historical, or archaeological heritage through potential degradation or loss resulting from the improper handling of archaeological assets encountered during construction.

This risk is characterized as negative, low in magnitude, and irreversible (permanent).

Mitigation Measures

- Incorporate a Chance Find Procedure into the ESMP to ensure the appropriate handling, protection, and reporting of any items of potential archaeological significance discovered during project implementation.

Residual Impact

Following implementation of the mitigation measure, the residual risk of negative impacts on the archaeological heritage is expected to remain low.

Land use

Impact Assessment

Impact Description	Conversion of land use and alteration of socially valuable community spaces		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory (sewerage system)		Permanent (WWTP)
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

Wastewater Treatment Plant Construction: the potential area contains or is near sensitive receptors of social cohesion and daily village life, including the Seine Bight Community Center, a recently inaugurated children's football field, and the St. Alphonsus Preschool. Converting this central area into WWTP permanently alters the urban and social landscape of the village, potentially changing how the community perceives and interacts with these adjacent social and recreational assets. .

Sewerage System Construction: The installation of underground sewer pipes will occur primarily within existing urban corridors. The social impact on land use is restricted to the temporary inability of residents to fully utilize their private yards, driveways, or landscaped gardens during the active trenching phase. Once the trenches are closed, the original social use of the land is fully restored. The permanent land use impacts are restricted to the small footprints required for localized pump stations.

These impacts are assessed as negative of low magnitude; permanent in the case of the WWTP, and transitory for the sewerage system; they are restricted to the direct area of influence (DAoI); and they have a high probability of occurring.

Mitigation Measures

- Implement an Information and Community Participation Program to engage the Seine Bight community regarding the facility's design, ensuring the architectural and landscaping integration of the plant into the village's urban fabric does not degrade the social value of the area.
- Immediately upon completion of underground pipe installation, refill the trenches, redistribute topsoil, and fully restore the disturbed private residential yards and landscaped gardens to their original condition to allow the rapid resumption of normal household land use.

Residual Impact

After implementation of the proposed mitigation measure, the residual impact is considered to remain low.

Landscape and Public Space

Impact Assessment

Impact Description	Visual degradation, alteration of the local landscape, and disruption of the aesthetic and recreational quality of public spaces		
Impact Nature	Negative	Positive	Neutral

Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative	Cumulative	

Impact Discussion

The Placencia Peninsula is a highly valued tourist destination recognized for its sandy beaches and the Placencia Lagoon. Within this setting, public spaces and community facilities are essential for local social cohesion and recreational enjoyment. The implementation of the proposed infrastructure will alter the visual landscape and interact with these public spaces differently depending on the component.

Wastewater Treatment Plant Construction: Siting the WWTP in the central portion of Seine Bight Village introduces a large industrial utility footprint into a predominantly residential and scenic coastal area. Furthermore, the potential area contains or is near public spaces, including the Seine Bight Community Center, a recently inaugurated children's football field, and the St. Alphonsus Preschool. The presence of the work activities, along with potential visual intrusion and odors, could degrade the aesthetic quality and the community's recreational experience of these adjacent cultural and public assets.

Sewerage System Construction: The installation of underground sewer pipes will occur primarily within existing urban corridors and paved roads. The impacts on the landscape and public space during the construction phase will be driven by the presence of heavy machinery, open trenches, excavated soils, and dust production, creating an unsightly environment for both residents and tourists. Additionally, the trenching activities will directly disturb landscape gardens, private yards, and fences along the public right-of-way.

These impacts are assessed as negative; of medium magnitude and transitory; restricted to the direct area of influence (DAoI); and have a high probability of occurring.

Mitigation Measures

- Ensure the architectural design of the localized sewage pumping stations integrates seamlessly with the surrounding urban landscape, and landscape their immediate surroundings (e.g., planting ornamental plants) immediately after completion
- Immediately upon completion of underground pipe installation, remove all construction rubble, refill the trenches, redistribute topsoil, and fully restore the disturbed landscaped gardens, private yards, and fences to their original aesthetic condition or better.
- Implement strict housekeeping at all construction sites and enforce dust control measures, such as the use of sprinkler systems (wetting the soil), to prevent the visual degradation of the surrounding public and tourist environment.

Residual Impact

Following the implementation of the mitigation measures, is expected to reduce the residual impact on the landscape and public spaces to a low magnitude.

Impacts - Operational Phase

Air. Gaseous Emissions, Particulate Matter and Greenhouse Gases

Impact Assessment

Impact Description	Generation of nuisance odors, greenhouse gas (GHG) emissions, and alteration of local air quality		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

Wastewater Treatment Plant (WWTP): The operation of the proposed Membrane Aerated Biofilm Reactor (MABR) wastewater treatment plant and its associated facilities has the potential to generate localized air emissions and nuisance odors due to the biological breakdown of organic matter during treatment. Since the potential WWTP area is located in the central portion of Seine Bight Village, near residential properties, the Seine Bight Community Center, a football field, and a preschool, control of odor emissions is a highly sensitive concern. If the biological processes are not strictly managed, uncontrolled odors could degrade the quality of life and the aesthetic environment for the adjacent community. Furthermore, the continuous treatment of wastewater and the degradation of sludge will generate Greenhouse Gas (GHG) emissions (such as methane and carbon dioxide), contributing cumulatively to climate change impacts.

Sewerage System: While underground sewer pipes generally do not affect air quality, odors may occasionally occur at localized sewage pumping stations, manholes, or along the collection network. This is particularly relevant in pressure force mains at the extreme ends of the system, where low population density and low flow rates can lead to prolonged retention times, causing the wastewater to become septic and generate odors.

These impacts are assessed as negative; of medium magnitude; extending to the indirect area of influence (IAoI); permanent; and of medium to high probability if maintenance protocols fail.

Mitigation Measures

- Ensure rigorous daily management of the MABR units to maintain optimal biological conditions (e.g., regulating dissolved oxygen levels, monitoring biofilm thickness on membrane surfaces, and optimizing aeration scour/supply rates) and minimize the occurrence of foul odors.
- Ensure proper management of wastewater sludge to minimize the generation and dispersion of odors.
- Maintain an active Grievance Mechanism allowing residents and businesses to rapidly report the occurrence of odors from pump stations, triggering immediate corrective maintenance procedures by Belize Water Services (BWS).

Residual Impact

The associated residual impact is expected to be reduced to a low magnitude.

Air, Noise and vibration

Impact Assessment

Impact Description	Impacts by noise and vibration generation		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative	Cumulative	

Impact Discussion

Wastewater Treatment Plant (WWTP) Operation: The centralized WWTP requires the operation of inlet pumps, mechanical screens, and potentially other electromechanical treatment equipment. Because the plant contains or is near sensitive receptors, including the Seine Bight Community Center, a children's football field, and the St. Alphonsus Preschool, the continuous hum of pumps or the loud, intermittent noise from operating or testing heavy backup generators could cause acoustic nuisance.

Sewerage System Operation: The operation of the collection network involves multiple localized sewage pumping stations (lift stations) distributed across the peninsula. These stations will produce localized acoustic disturbances for nearby residential, commercial, and tourist receptors when activated.

These impacts are assessed as negative, of low magnitude, permanent; and of high probability.

Mitigation Measures

- Maintain machinery and equipment in proper working conditions.
- Apply the noise level limits established in the IFC Environmental, Health and Safety Guidelines: 55 dBA during daytime, and 45 dBA at night (equivalent continuous sound levels, Leq) in residential, institutional, and educational areas. .
- In case of surpassing the applicable noise level limits, mitigation measures should be implemented, such as noise barriers and enclosures for noise producing equipment, specific operational scheduling, etc.
- Maintain an active Grievance Mechanism allowing residents and businesses to rapidly report the occurrence of odors from pump stations, triggering immediate corrective maintenance procedures by Belize Water Services (BWS).

Residual Impact

Provided that the mitigation measures are effectively implemented, the residual impact is expected to remain low in magnitude and negative.

Soil.**Impact Assessment**

Impact Description	Impacts on soil from operation and maintenance		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative	Cumulative	

Impact discussion

During the operational phase, accidental leaks from sewer force mains, or overflows at localized pumping stations and the WWTP due to power outages or severe weather events, represent a potential risk of acute, localized releases of untreated wastewater. Additionally, sludge handling, treatment, and dewatering activities at the WWTP carry an inherent risk of generating highly concentrated leachate and contaminated runoff. If sludge drying beds or temporary storage areas lack proper biological and physical containment, this organic- and nutrient-rich leachate can run off during heavy rainfall or percolate directly into the ground. The peninsula's soil profile consists of highly permeable sandy soil. In the event of a terrestrial spill of untreated sewage, raw sludge, or uncontained leachate, these pollutants would rapidly infiltrate the ground, causing localized biological, chemical and nutrient contamination of both the soil resources and the shallow freshwater aquifer.

These impacts are assessed as negative; of medium magnitude; they are restricted to the Direct Area of Influence (DAoI); transitory in duration; non-cumulative; and have a medium probability of occurring.

Mitigation Measures

- Equip the WWTP and all key pumping stations with automatic backup power generators (with at least 48 to 72 hours of fuel autonomy) and emergency wet wells to prevent overflows during severe weather or grid failures.
- Implement a rigorous Preventive Maintenance Program, including routine inspections of force mains, pump seals, and wet wells to detect weaknesses early.
- Maintain a rapid-response Emergency Preparedness and Response Plan (EPRP) to immediately isolate compromised pipe sections, deploy spill kits (absorbent booms/pads), excavate contaminated sandy soil, and transfer it to licensed disposal facilities via the Placencia Transfer Station.
- Operate all sludge processing, dehydration, drying and temporary storage strictly within impermeable and compartmentalized containment areas. Ensure that all sludge and stormwater leachate from sludge treatment areas is continuously collected through dedicated sinks and returned to the main WWTP plant for complete treatment, thus preventing soil infiltration or surface runoff from the site.

- Store stabilized dewatered sludge under impermeable covers during heavy rainfall events and transport biosolids off-site exclusively in sealed, leak-proof vehicles to approved disposal or beneficial reuse locations.

Residual Impact

Following the effective implementation of the proposed mitigation and contingency measures the residual negative impact on soil resources is expected to be of low magnitude.

Surface water and groundwater resources.

Impact Assessment

Impact Description	Impacts on groundwater and surface water resources from operation and maintenance		
Impact Nature	Negative (overflow risks; Non-Compliance with Effluent Discharge Standards)	Positive (interception and treatment)	Neutral
Magnitude	Low	Medium (overflow risks)	High (interception and treatment)
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory		Permanent
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

During the operation and maintenance phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project, the most significant impacts on the physical environment will occur within the regional water resources (groundwater, the Placencia Lagoon, and the Caribbean Sea). Due to the nature of the project, these impacts encompass both substantial environmental benefits and operational risks:

Sewerage System and WWTP Operation: Historically, the absence of a centralized sewerage system on the peninsula resulted in the widespread use of inadequate on-site sanitation systems (septic tanks, soak-away pits, and direct discharges). Given the high groundwater table and highly permeable sandy soils, these practices have severely contaminated the shallow groundwater lens, which subsequently leaches pathogen- and nutrient-laden waters into the Placencia Lagoon and the Caribbean Sea. The continuous operation of the new collection network and the centralized Wastewater Treatment Plant (WWTP) will intercept this raw sewage, providing a positive impact by reducing the bacteriological (e.g., *E. coli* and enterococci) and nutrient loading (nitrogen and phosphorus) entering the regional water bodies. This will halt ongoing groundwater contamination and foster the long-term ecological recovery of the lagoon and nearshore reef ecosystems.

Non-Compliance with Effluent Discharge Standards: routine operation of the WWTP poses a significant environmental and regulatory risk if treated effluent fails to consistently comply with the permissible parameters established by Belizean legislation, specifically the Environmental Protection (Effluent Limitations) Regulations (including applicable Class I water standards for sensitive marine and lagoon environments). Irrespective of whether the final discharge point is located in the Placencia

Lagoon or the nearshore coastal waters of the Caribbean Sea, releasing non-compliant effluent would constitute a breach of national environmental law. Such discharges would introduce residual pathogen and nutrient loads into receiving water bodies, resulting in chronic water quality degradation, cumulative ecological damage to sensitive aquatic habitats, and potential regulatory sanctions and legal liabilities for the Executing Agency under the Department of the Environment (DOE).

System Failures: Despite the overall positive purpose of the project, operational risks exist. Accidental leaks from sewer force mains, or overflows at the localized pumping stations and WWTP due to power outages or severe weather events, could result in the acute, localized release of untreated wastewater into the environment. Because the final effluent discharge and outfall location remains undefined in the current preliminary design, the long-term operational and failure-related impacts will ultimately depend on which receiving environment is selected: the Placencia Lagoon, or the nearshore marine coastal waters of the Caribbean Sea. If the discharge is routed to the Placencia Lagoon, which is characterized by extremely limited tidal flushing, such discharges would trigger rapid eutrophication, macroalgal blooms, and critical dissolved oxygen depletion. Conversely, if the outfall is located in the nearshore marine environment, the release would introduce high pathogen and nutrient loads, posing acute public health and sanitary risks for local communities and beach tourism, degrading extensive seagrass beds, and threatening the fragile coral structures of the Belize Barrier Reef Reserve System with nutrient stress and algal overgrowth. Furthermore, uncontained runoff or leachate from sludge treatment, dewatering, and temporary handling areas poses a significant risk of biological and nutrient contamination, permitting rapid infiltration into the highly permeable sandy soils of the peninsula and the underlying shallow freshwater aquifer. Additional operational risks are associated with the potential reuse of treated effluent if it fails to consistently meet the required water quality standards and permissible microbiological and chemical limits, which could lead to public health hazards, pathogen exposure, and localized environmental degradation.

These impacts are assessed as high positive regarding the regional reduction of untreated sewage, but present medium-magnitude negative risks associated with accidental system overflows, potential non-compliance with Belizean effluent discharge standards, and improper sludge leachate management; they are of permanent duration; they extend to the indirect area of influence (IAoI) due to coastal hydrodynamic dispersion; they are cumulative, contributing to the long-term recovery of the broader marine ecosystem while compounding climate change resilience; and they have a medium probability of occurring.

Mitigation Measures

- Equip the WWTP and all localized sewage pumping stations with permanent, automatic backup power generators and adequate emergency storage capacity (wet wells) to prevent raw sewage overflows during national grid power outages or severe weather events.
- Implement a rigorous Preventive Maintenance Program for the sewer network, pumping stations, and WWTP equipment (including routine inspections of force mains and pump seals) to minimize the risk of accidental leaks and structural failures.
- Develop an Emergency Preparedness and Response Plan detailing exact protocols for containing, cleaning, and reporting any accidental sewage spills or chemical leaks during the maintenance of the WWTP and pumping stations.
- Ensure the proper handling, temporary storage (in impermeable, bunded areas), and final disposal of the biological sludge and biosolids generated by the WWTP to prevent secondary

contamination of soil and groundwater and to minimize pathogen risks through appropriate stabilization and pathogen reduction measures.

- Implement a continuous Water Quality Monitoring Program to regularly test the treated effluent, ensuring it strictly complies with the Belize Environmental Protection (Effluent Limitations) Regulations and IDB standards.

Residual Impact

Assuming effective implementation of the mitigation measures, the negative risks of water contamination will be reduced to a low magnitude. Consequently, the project will maintain a high positive residual impact on the region's groundwater, the Placencia Lagoon, and the coastal Caribbean waters.

Flora, Wildlife and Aquatic Fauna

Impact Assessment

Impact Description	Recovery of aquatic flora, reduction of eutrophication, and protection of critical marine wildlife habitats		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative	Cumulative	

Impact Discussion

Historically, the absence of a centralized sewerage system has resulted in the direct discharge of untreated wastewater, contributing to increased nutrient loading (nitrogen and phosphorus), which triggers algal blooms and the subsequent eutrophication of the Placencia Lagoon. The continuous operation of the new sewerage system and the centralized Wastewater Treatment Plant (WWTP) will intercept this raw sewage, ceasing direct discharges into the environment. This intervention will have interconnected benefits for both flora and fauna.

The significant reduction in nutrient loading and eutrophication will positively impact aquatic flora by fostering the recovery and expansion of seagrass meadows within the Placencia Lagoon and nearshore areas.

The improvement in water quality and the restoration of seagrass beds will directly favor regional wildlife. Seagrass meadows constitute one of the most productive coastal habitats and are essential for maintaining coastal food webs. Their recovery will protect the critical habitat of marine mammals, which relies heavily on specific seagrass species as a major dietary item. Furthermore, the improved lagoon conditions will safeguard the ecosystem's role as a crucial nursery, shelter, and foraging area for numerous commercial fish species, marine turtles, crustaceans, and invertebrates.

Nevertheless, during the operational phase, potential localized risks related to water quality must be considered. The continuous discharge of treated WWTP effluent into the receiving water body could cause minor localized alterations in nutrient concentrations, salinity, or dissolved oxygen near the outfall point. Furthermore, operational upset conditions, improper maintenance, or emergency overflows could temporarily increase sediment loads, turbidity, or bacteriological contamination, potentially posing localized risks to adjacent mangrove fringes and sensitive aquatic biota. However, provided that the WWTP consistently achieves high-efficiency nutrient removal and stringent discharge standards, these potential localized negative risks are expected to be negligible compared to the substantial regional benefits of eliminating untreated raw sewage.

These impacts are assessed as positive; of medium magnitude; extending to the indirect area of influence (IAoI) across the lagoon and coastal waters; permanent; cumulative, as they contribute to the progressive restoration of the Mesoamerican Barrier Reef System's health; and of high probability.

Enhancement Measures

To minimize adverse impacts on fauna, the following mitigation measures will be integrated into the operational-phase Environmental and Social Management Plan (ESMP):

- Ensure the strict implementation of operational, data-driven, and preventive maintenance protocols at the WWTP to continuously meet the required effluent standards for nutrient removal.
- Implement a continuous Water Quality Monitoring Program to regularly test the treated effluent and the receiving marine waters to confirm the reduction of bacteriological and nutrient loads.

Main Utilities

Impact Assessment

Impact Description	Expansion and modernization of public utility services through the provision of centralized sewerage		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

The commissioning of the new infrastructure will generate a highly positive impact by introducing a formal, centralized wastewater utility service. This transition from inadequate, individual disposal methods to a safely managed public sanitation network will effectively close the sanitation gap on the peninsula. It will provide modern utility coverage to an estimated 1,844 direct residential beneficiaries, approximately 245 commercial establishments, and a large floating tourist population, fundamentally upgrading the structural capacity of the peninsula to support sustainable Blue Economy development.

These impacts are assessed as positive, of high magnitude, limited to the direct area of influence (DAoI), permanent, non-cumulative, and have a high probability of occurring.

Enhancement Measures

- Execute a comprehensive public awareness campaign targeting residents, hotel operators, and commercial establishments regarding the proper use of the new centralized sewer system to prevent blockages caused by improper waste disposal (e.g., fats, oils, and grease).
- Develop and execute a program to safely decommission, clean, and backfill the redundant individual septic tanks and soak-away pits once properties are connected to the new public utility.

Occupational Health and Safety

Impact Assessment

Impact description	Risk of accidents in maintenance and operation tasks		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

During the operation and maintenance phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project, occupational health and safety (OHS) risks are permanently associated with the daily tasks required to operate a centralized sanitation utility. Workers will be exposed to severe hazards associated with confined space entry (e.g., entering wet wells or manholes to clear blockages or service submersible pumps), where toxic, asphyxiating, or explosive gases can accumulate. Additionally, the operation of the biological wastewater treatment processes and the handling, processing, and final disposal of sludge and biosolids will continuously expose facility operators to biological hazards (pathogens, bacteria, and viruses present in raw wastewater) and potential chemical hazards.

These impacts are classified as negative; of medium magnitude; restricted to the operational area (OA); permanent; non-cumulative; and of medium probability due to the continuous nature of the required maintenance.

Mitigation Measures

- Reinforce occupational health and safety signage and protocols at all operational facilities.
- Develop and implement an **Occupational Health and Safety Program** within the operational phase of the ESMP, ensuring compliance with national and local regulations, and integrating principles from internationally recognized occupational health and safety management systems such as ISO 45001: 2018.

- Establish a **Contingency and Emergency Response Plan** within the ESMP to ensure a timely response to medical emergencies.
- Implement strict, mandatory **Confined Space Entry Procedures** for all work involving manholes and wet wells, requiring atmospheric gas testing, mechanical ventilation, and the use of safety harnesses and standby personnel.

Residual Impact

Assuming full and effective implementation of the proposed mitigation measures, the residual impact associated with occupational health and safety is expected to be negative and of low magnitude.

Community Health and Safety

Impact Assessment

Impact Description	Reduction of waterborne diseases, improvement of public health		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

During the operation and maintenance phase of the Placencia Resilient and Sustainable Sanitation Infrastructure Project, the impact on community health and safety will be predominantly positive, fundamentally transforming the sanitary conditions of the peninsula.

Historically, the absence of a centralized sewerage system forced residents and businesses to rely on inadequate soak-away pits and septic tanks in highly permeable sandy soils with high groundwater tables. During high tides and heavy rains, contaminated effluent frequently overflowed into low-lying residential areas, putting the community at direct risk of exposure to fecal coliforms and waterborne diseases. The operation of the centralized Wastewater Treatment Plant (WWTP) will effectively intercept this raw sewage, achieving a reduction in fecal coliforms. By reducing these bacterial concentrations, the project will virtually eliminate the severe human health risks associated with exposure to contaminated marine and lagoon waters.

This impact is classified as positive, of high magnitude, permanent and they have a high probability of occurring.

Enhancement and Mitigation Measures

- Ensure that the WWTP and all localized sewage pumping stations are permanently equipped with automatic backup power generators and adequate fuel reserves (sufficient for at least 48 hours) to guarantee uninterrupted operation and prevent sewage overflows during power outages or extreme weather events.
- Implement a comprehensive Emergency Preparedness and Response Plan (including hurricane protocols) detailing the logistics to immediately shut off compromised system sections, dispatch 24/7 standby crews to repair broken pipes, and safely contain and remediate any terrestrial sewage spills before they affect the community or marine environment.

- Maintain a Grievance Mechanism for residents to immediately report system failures, sewage leaks, ensuring rapid response and repair.

Economic development. Commercial and service activities

Impact Assessment

Impact Description	Enhancement of commercial and service activities, protection of the tourism industry, and increase in property values due to improved environmental sanitation		
Impact Nature	Negative	Positive	Neutral
Magnitude	Low	Medium	High
Scope	Restricted (OA)	Direct Area of Influence (DAoI)	Indirect Area of Influence (IAoI)
Duration	Transitory	Permanent	
Probability	Low	Medium	High
Accumulation	Non-cumulative		Cumulative

Impact Discussion

During the operation and maintenance phase, the project will generate a strongly positive impact on local commercial and service activities, which are fundamentally driven by coastal tourism. Historically, reliance on inadequate on-site wastewater disposal threatened this industry by causing foul odors, unsanitary conditions, and the degradation of marine ecosystems. The continuous operation of the new centralized Wastewater Treatment Plant (WWTP) and collection network will remove these localized discharges, creating a cleaner and healthier environment.

These impacts are classified as positive; of medium magnitude due to the region's economic dependence on tourism; extending across indirect area of influence; permanent; and of high probability.

Enhancement Measures

- Strictly implement the preventive maintenance program and ensure all pumping stations and the WWTP are equipped with automatic backup generators to prevent accidental sewage overflows that could temporarily harm the tourist experience.
- Execute targeted awareness campaigns for hotels, restaurants, and commercial establishments regarding the proper use of the new sewer system, particularly enforcing the proper disposal of fats, oils, and grease to prevent localized blockages.

5.2.3. E&S Residual Impacts Matrix

Following the application of the identified mitigation measures for Project's environmental and social impacts and risks, the resulting matrix of residual environmental and social impacts is presented in the next figure.

Figure 57 - Residual Environmental and Social Impacts and Risks Matrix

Residual Matrix for the Identification of Environmental and Social Impacts and Risks				PROJECT ACTIVITIES WITH ENVIRONMENTAL AND SOCIAL IMPACT										
ENVIRONMENTAL COMPONENTS LIKELY TO BE AFFECTED BY THE PROJECT				PHASE										
				WORK PREPARATION				MAIN WORK			WORK DEMOBILIZATION	OPERATION AND MAINTENANCE		
				Transport, movement and stockpiling of materials, equipment, machinery. Mobilization of the workforce.	Installation and operation of the construction sites and work fronts, installation of fencing and perimeter barriers.	Land reclamation, grading, and removal of vegetation for the WWTP site	Excavation, trenching, and soil works along existing urban road corridors for the installation of sewer collection networks and conveyance force mains	Installation of sewer collection networks and conveyance force mains	Construction and electromechanical installation of sewage pumping stations along the peninsula	Civil, structural, and electromechanical construction of the WWTP and treated effluent discharge	Demobilization of equipment, facilities, and personnel, proper disposal of construction waste, and complete cleanup and restoration of all disturbed roadways, pavements, and vegetated areas	Operation of the sewer collection network, pumping stations, and Wastewater Treatment Plant (WWTP). ²³	Maintenance of the sewer collection network, pumping stations, and Wastewater Treatment Plant (WWTP).	
				A	B	C	D	E	F	G	H	I	J	
PHYSICAL AND BIOLOGICAL MEDIA	AIR	Gaseous emissions and particulate matter		1										
		Noise and vibrations		2										
	WATER	Water table and groundwater. Surface water. Sea water.		3										
	SOIL	Soil		4										
	BIOTA	Flora		5										
		Wildlife		6										
SOCIO-ECONOMIC MEDIA	INFRASTRUCTURE AND SERVICES	Road network and traffic		7										
		Main utilities (water, energy)		8										
		WASTE MANAGEMENT	Solid waste	9										
			Hazardous or Special Waste	10										
			Construction and demolition waste	11										
	OCCUPATIONAL AND COMMUNITY HEALTH AND SAFETY	Risk of occupational accidents, injuries, and health hazards		12										
		Risks to community health, safety, and security (exposure to construction hazards, communicable diseases, and SGBV)		13										
	SOCIO-ECONOMIC DEVELOPMENT	Labor Employment		14										
		Commercial and Service Activities		15										
	CULTURAL HERITAGE	Cultural, Archaeological and Paleontological Heritage		16										
	LAND USE	Activities in the Area and Land Use		17										
	LANDSCAPE	Visual Impact. Landscape Perception		18										

Sign and Magnitude of the Impact

Negative

High

Medium

Low

Positive

High

Medium

Low

Sign and Magnitude of the Impact	
Negative	High
	Medium
	Low
Positive	High
	Medium
	Low

5.3. Disaster and Climate Change Risks Assessment

The purpose of this section is to conduct a simplified and qualitative assessment of the hazards that the project may encounter or generate, with a particular focus on natural hazards that could structurally and/or operationally affect the project.

The evaluation also considers the potential impacts the project may have on surrounding communities, assets, and the environment as a result of failures in any of its components. Furthermore, it seeks to identify pre-existing natural hazards that pose risks to communities and the environment, which could be worsened by the implementation of the project.

Based on this assessment, each project intervention is assigned a risk level (high, medium, or low). For all identified hazards, corresponding mitigation measures are proposed to reduce the associated risks to acceptable levels.

5.3.1. Legal, Regulatory and Institutional Framework

The principal regulatory instruments relevant to the project's risk management are:

- **Disaster Preparedness and Response Act.** Establishes an effective organization of the mitigation, preparedness and response to and recovery from emergencies and disaster in Belize. It creates the National Emergency Management Organization and a National Disaster Preparedness and Response Advisory Committee. The National Emergency Coordinator shall prepare annually a National Disaster Preparedness and Response Plan. The Plan has not been finalized as of this date.
- **Environmental and Social Performance Standard (ESPS) 4, 'Community Health and Safety,'**. In accordance with this standard, all infrastructure-related activities financed under the Project must be subjected to a Disaster Risk Analysis using the Inter-American Development Bank (IDB) methodology.

As for institutional framework, Belize has established a **National Emergency Management Organization (NEMO)** to prepare and respond to hurricanes and floods, although it has now expanded its mandate to include other hazards. NEMO is the sole Government of Belize Department and authority responsible mandated to keep Belize in a state of preparedness for any emergency that may require a national response.

NEMO includes members of the Cabinet, with the Prime Minister as the Chairperson, the Cabinet Secretary as Secretary, the NEMO Department, 15 national operational committees (chaired by Chief Executive Officers (CEOs) and Heads of Departments (HODs): 1) Education, Information Communication and Warning; 2) Search & Rescue; 3) Maritime Coordinating Committee; 4) Transport & Evacuation; 5) Housing and Shelter; 6) Human Resources Management; 7) Relief & Supplies Management; 8) Special Needs and Disability; 9) Medical Care & Public Health; 10) Damage Assessment & Needs Analysis; 11) Foreign Assistance; 12) Restoration of Utilities; 13) Mitigation, Access and Infrastructure & Works; 14) Environment & Solid Waste; 15) Economic & Recovery.

They are supported by the public sector, the private sector and civil society, **9 District Emergency Committees** (chaired as appointed by the Prime Minister, by the senior Minister or Area Rep or Mayor in each district, represented: Corozal, Orange Walk, Belize, Belmopan, Cayo, Stann Creek, Toledo, San Pedro & Caye Caulker. They are set up along the lines of the 15 national operational committees.

While supporting members of NEMO can be identified as well: 1) Belize Red Cross; 2) Public Officers; 3) Chief Meteorological Officer; 4) Commandant BDF, Coast Guard and the Commissioner of Police; 5) Unions; 6) BCCI; 7) Any other entity or person needed to support NEMO.

5.3.2. Reference Methodology

The methodology applied in this evaluation follows the guidelines established in the IDB document “Disaster and Climate Change Risk Assessment Methodology for IDB Projects” (IDB, 2019). This methodology is structured around three core pillars:

- **Identification of Hazards and Vulnerabilities:** This involves pinpointing the natural hazards that could affect the project, as well as assessing the physical, social, and economic characteristics that may increase its vulnerability to such hazards.
- **Risk Assessment:** This consists of estimating the probability of adverse events and evaluating the potential consequences for the project.
- **Risk Management:** This includes the implementation of measures aimed at reducing disaster and climate change risks through prevention, mitigation, and preparedness strategies.

The IDB methodology is designed to be adaptable and scalable, allowing it to be tailored to the specific needs of each project. It comprises several phases and steps, with the scope of analysis and allocation of resources adjusted according to the level of risk identified. The steps outlined in the IDB methodology are illustrated in the accompanying figure.

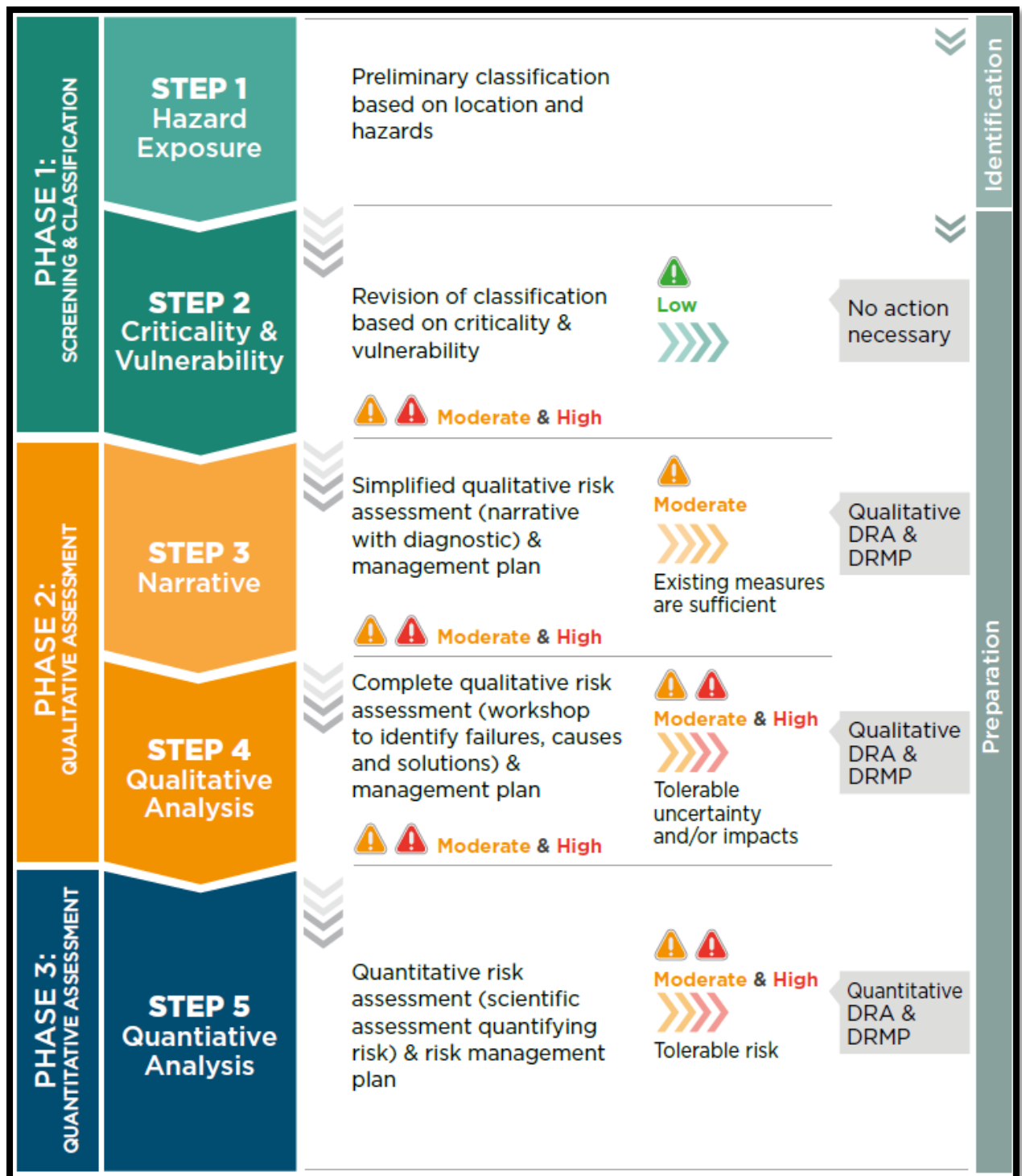


Figure 58 - Disaster and Climate Change Risk Assessment Methodology (IDB, 2019).

5.3.3. Procedure

In accordance with the IDB Methodology, the process is developed through the following steps:

Step 1: Exposure to Threats

Current and future threats are identified, and the level of exposure of the project to each threat is determined.

Step 2: Criticality and Vulnerability

The levels of vulnerability and criticality are assessed by evaluating the potential losses and damage that could result from project failures, in relation to the existing physical, environmental, and socioeconomic conditions.

Step 3: Narrative

A simplified and qualitative analysis of the project risk is conducted, considering the findings from the previous steps and available information on project design and environmental context.

Based on this analysis, risk mitigation measures are proposed and integrated into the Disaster Risk and Climate Change Management Plan.

The activities undertaken as part of the risk assessment, along with the corresponding findings, are presented below.

5.3.4. Hazard Exposure

Table 32 summarizes the identified natural hazards to which projects under the Project could be exposed. **Section 4.3.5** provides a comprehensive description of these hazards.

Table 32 – Relevant hazards for the project

Hazard	Magnitude	Cause	Potential Impacts on the environment
Sea Level Rise and Coastal Erosion	High (Long-term)	Global climate change leads to thermal expansion of oceans and melting of glaciers and polar ice caps. High exposure due to low-lying topography of Belize's coastal and island communities.	Permanent or periodic inundation of low-lying areas, coastal erosion, saltwater intrusion into freshwater lenses, damage to coastal infrastructure, reduced land availability, and degradation of mangroves and coral reefs that provide natural coastal protection.
Flooding	High - river flood risk Medium - urban and coastal flood risks	Intensification of tropical rainfall events due to climate change, cyclones, flat topography, limited drainage capacity, and porous limestone substrate	Surface flooding, waterlogging, infrastructure damage, service disruption, contamination risks due to overflow of sanitation systems, restricted access to facilities, increased vector breeding (mosquitoes), and economic losses.

Hazard	Magnitude	Cause	Potential Impacts on the environment
		in island environments.	
Tropical Storms and Hurricanes	High	Belize's location within the North Atlantic hurricane basin; exposure to high-intensity cyclones and storm surges.	Structural damage to buildings and utilities, debris generation, coastal erosion, storm surge inundation, power outages, disruption of transport and maritime operations, and risks to worker and community safety.
Extreme Heat and Drought	Medium	Rising average temperatures, changing rainfall patterns, and regional climate variability.	Increased stress on freshwater availability, reduced efficiency of sanitation systems relying on adequate water flow, higher evaporation rates, heat stress risks for workers, increased energy demand, and accelerated material degradation. Drought conditions may affect operational stability of wastewater treatment processes and reduce dilution capacity in receiving environments.

5.3.5. Project Criticality and Vulnerability

Criticality refers to the degree of importance of a structure or system within a broader context, as determined by the scope and nature of the services or functions it provides. On the other hand, vulnerability describes the inherent characteristics that influence the susceptibility to damage of a structure or system.

This phase of the analysis seeks to deepen the understanding of the criticality and vulnerability levels of the project. It builds on the previous assessment by contributing to a comprehensive classification of disaster and climate change risks, with a particular focus on the project's operational aspects rather than exclusively on external threats. The main objective is to analyze the project's attributes to determine its susceptibility to natural hazards, the criticality of potential service interruptions or failures, and the benefits the project delivers. This approach, crafted from a bottom-up perspective, aims to evaluate, at the project level, the expected response and vulnerability of the infrastructure to potential damage.

In this stage of the analysis, criticality is assessed based solely on the characteristics of the infrastructure component under review, without accounting for the specific external threats (which were addressed in the previous phase).

The IDB Methodology recommends evaluating criticality and vulnerability across three key dimensions, namely: 1) the potential adverse impacts of infrastructure failure on the services provided by the project, 2) the potential negative effects of such failures for the environment and/or the population, and 3) the vulnerability of each infrastructure based on its complexity and scale.

To support this evaluation, the IDB Methodology provides guiding criteria that help streamline the analysis. These criteria are illustrated through diagrams that demonstrate the interplay of the three dimensions, tailored to specific types of infrastructure projects (particularly those that deliver essential services).

For these Projects, it is particularly relevant to use the **Criticality Table for drainage infrastructure, water supply, and wastewater management** infrastructure (Figure 59) for the construction of the WWTP and the sewerage system. This table defines the assessment criteria for each of the three dimensions: Loss of essential services (dimension 1), impact on the population (dimension 2), and physical characteristics (dimension 3). To ensure methodological alignment, the physical characteristics dimension (dimension 3) has been adapted to the specific scope of this project, focusing on the compact biological reactor tanks of the WWTP and subsurface pipeline networks rather than large-scale water-retaining reservoirs or dams.

They serve as a reference point for evaluating the infrastructure included in the project. The overall criticality level assigned to each project component corresponds to the highest category identified obtained among the three dimensions.

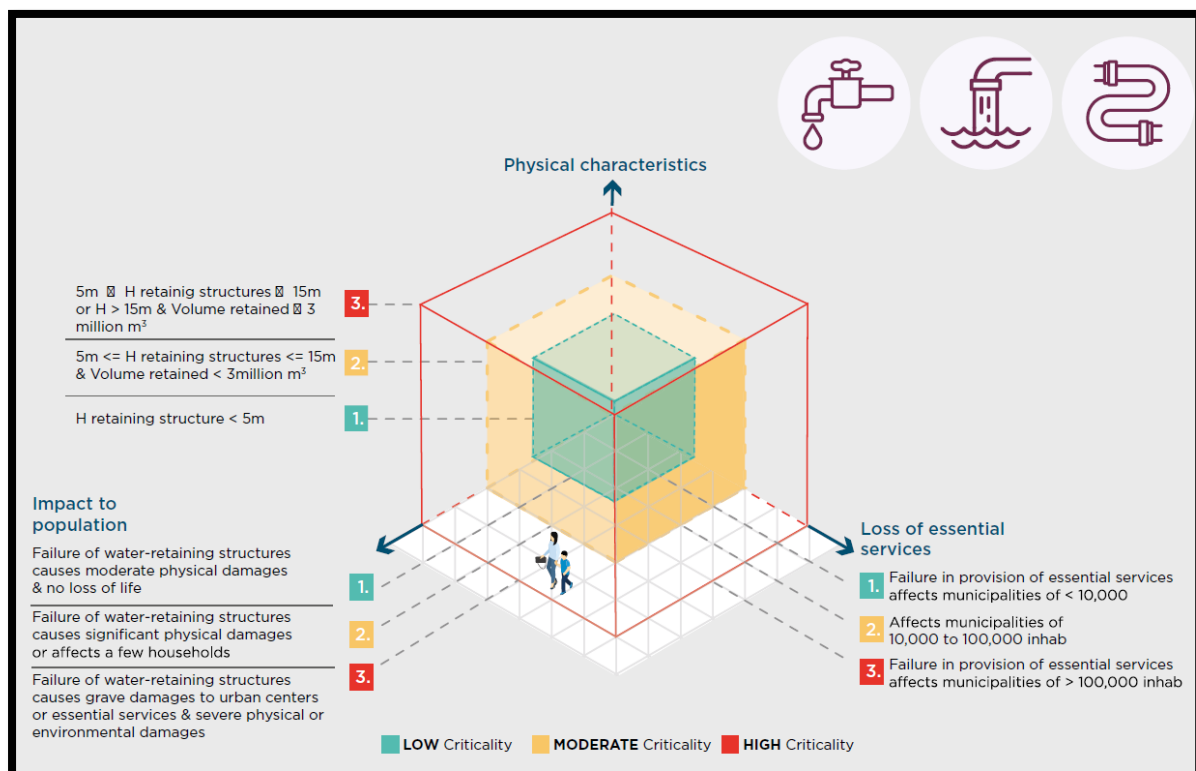


Figure 59 - Criticality and Vulnerability Table for Drainage and Water and Wastewater Infrastructure (IDB, 2019).

Based on the criteria outlined above, the preliminary criticality assessment results for WWTP and sewerage system is presented below.

Criticality and Vulnerability Assessment Results

The following section presents the criticality assessment of the project (WWTP and sewerage system infrastructure) based on the three dimensions established by the IDB methodology. For each dimension, the corresponding evaluation is conducted, and the resulting classification—high, moderate, or low—is indicated, concluding with the determination of each element category and, subsequently, the project’s overall criticality category.

Table 33 - Criticality assessment for the Project's Infrastructure Works (WWTP and sewerage system).

	Dimension 1	Dimension 2	Dimension 3		
Project type	Loss of Essential Services/Service Level	Impacts to population	Physical Characteristics	Criticality Classification	Justification
WWTP	The current Project is designed to provide access to safely managed wastewater collection and treatment services for a specific demographic footprint on the Placencia Peninsula. In the event of a WWTP failure or severe service interruption, the loss of sanitation services would impact approximately 1,844 direct residential beneficiaries. Furthermore, the service loss would affect a floating population, averaging 300 tourists per day, alongside 245	The potential area is located within a predominantly residential setting and is surrounded by highly frequented community assets. It sits near the Seine Bight Community Center and a children's football field. If the Membrane Aerated Biofilm Reactor (MABR) units or associated containment systems were to experience structural failure, leakage, or overflows, it could result in the acute release of raw or partially treated wastewater.	The selected wastewater treatment technology for the project is an aerated membrane biofilm reactor (MABR). While detailed engineering designs are still under development, commercial MABR installations typically employ compact, deep reactor tanks. Conceptual references for these modular systems indicate a water depth of approximately 2 to 5 meters, with module widths and lengths on the order of 1 to 3 meters (with a typical	Moderate	Even though Dimensions 1 and 3 meet the criteria for a "Low" classification, the "Moderate" rating obtained in Dimension 2 (driven by the potential for significant environmental and localized physical damages in the event of reactor system failures) dictates the final overall classification for the facility. This classification remains preliminary and must be updated once final reactor designs are completed.

Project type	Dimension 1	Dimension 2	Dimension 3	Criticality Classification	Justification
	Loss of Essential Services/Service Level	Impacts to population	Physical Characteristics		
	commercial establishments located within the project's direct area of influence. Because the total combined demographic served by the project (1,844 residents plus 300 tourists) is significantly below the 10,000-inhabitant threshold, the criticality for this specific dimension is categorized as Low.	While such a failure is not expected to cause loss of human life, it could result in localized environmental contamination of adjacent properties and community assets, exposing the local population to public health risks associated with fecal coliforms and waterborne pathogens. Based on the above, the criticality level of this specific dimension is classified as Moderate.	length-to-width ratio of 1:1 to 3:1). Since the structures are expected to have a total height of less than 5 meters, the criticality for this specific dimension is categorized as Low. <i>Note: This qualitative analysis must be revised once the final detailed engineering designs and reactor dimensions are available, as <u>any changes in structural height or storage volume could modify this classification</u>.</i>		
Sewerage system and sewage pumping stations	The current Project is designed to provide access to safely	While a systemic failure (such as a pump malfunction or the	This infrastructure consists of subsurface pipelines and	Low	This final rating was determined because the three assessed

Project type	Dimension 1	Dimension 2	Dimension 3	Criticality Classification	Justification
	Loss of Essential Services/Service Level	Impacts to population	Physical Characteristics		
	managed wastewater collection and treatment services for a specific demographic footprint on the Placencia Peninsula. In the event of a WWTP failure or severe service interruption, the loss of sanitation services would impact approximately 1,844 direct residential beneficiaries. Furthermore, the service loss would affect a floating population, averaging 300 tourists per day, alongside 245 commercial establishments located within the project's direct area of influence.	rupturing of a pressurized force main) could result in localized raw sewage overflows and environmental contamination, it does not present a risk of a catastrophic structural collapse. Consequently, an operational failure would not cause significant physical or structural damage to surrounding community assets, nor does it pose any risk of loss of human life. The criticality for this specific dimension is categorized as Low.	underground concrete wet wells. There are no above-ground water-retaining structures associated with this collection network that could physically collapse and release large volumes of water into the surrounding environment. The criticality for this specific dimension is categorized as Low.		dimensions were classified as “Low” risk.

	Dimension 1	Dimension 2	Dimension 3		
Project type	Loss of Essential Services/Service Level	Impacts to population	Physical Characteristics	Criticality Classification	Justification
	Because the total combined demographic served by the project (1,844 residents plus 300 tourists) is significantly below the 10,000-inhabitant threshold, the criticality for this specific dimension is categorized as Low .				

5.3.6. Risk Narrative (Disaster and climate change risk assessment)

In accordance with the Inter-American Development Bank (IDB) Methodology, a qualitative risk assessment is required for projects with **moderate to high criticality**. This assessment constitutes the third step of the methodology and involves summarizing the identified risks through narrative descriptions. These narratives are based on the analysis of threats, vulnerabilities, and criticality levels established in the preceding steps.

Based on the outcomes of this risk analysis, appropriate risk mitigation measures have been proposed. These are presented in the Disaster Risk Management Plan found in ESMP (chapter 6). The aim is to minimize potential impacts and ensure the safety and climate resilience of the proposed project interventions.

The analysis determined that only the wastewater treatment plant (WWTP) presents a **moderate level of criticality**. A detailed description of the risks associated with this component is provided below.

Wastewater Treatment Plant (WWTP)

The proposed infrastructure consists of a centralized Wastewater Treatment Plant (WWTP) located in Seine Bight, on the Placencia Peninsula. The selected wastewater treatment technology is a compact **Membrane Aerated Biofilm Reactor (MABR)** biological treatment system.

The overall criticality of the WWTP is classified as **Moderate** based on a three-dimensional evaluation. **Dimension 1 (Loss of Essential Services)** is categorized as **Low**, given that the system will serve approximately 1,844 direct residential beneficiaries, an average of 300 tourists per day, and 245 commercial establishments, which is significantly below the 10,000-inhabitant threshold. **Dimension 2 (Impacts to Population and Environment)** is classified as **Moderate** because the facility is located in a predominantly residential setting closely surrounded by community assets, including the Seine Bight Community Center and a children's football field. While a structural failure or containment leak within the MABR units would not cause loss of human life, it would precipitate the uncontrolled release of partially treated or raw wastewater, flood adjacent urban properties and expose the local population to health risks associated with waterborne pathogens and fecal coliforms. **Dimension 3 (Physical Characteristics)** is categorized as **Low**, as the facility utilizes MABR biological reactors. Although final detailed engineering designs and exact dimensions are pending, commercial MABR reactors typically feature water depths of approximately 2 to 5 meters, with module widths and lengths on the order of 1 to 3 meters and a typical length-to-width ratio of 1:1 to 3:1. Since the structures are expected to have a total height of less than 5 meters, the physical scale and structural vulnerability of the units remain limited. However, this classification is preliminary and must be updated once finalized structural calculations and reactor dimensions are available, as changes in overall height, tank configuration, or storage volume could modify the physical criticality classification. Ultimately, the **Moderate** rating in Dimension 2 dictates the final overall criticality classification for the facility.

The WWTP is exposed to several natural hazards driven by its location within the North Atlantic hurricane basin and its low-lying coastal setting. Key threats include high-intensity tropical storms and hurricanes, coastal erosion, sea level rise, and riverine, urban, and coastal flooding exacerbated by flat topography and limited drainage capacity. During the **construction phase**, earthworks, land clearing, and vegetation removal could temporarily disrupt natural drainage patterns and exacerbate local waterlogging risks during intense rainfall events if stormwater runoff is not properly managed on site. During the **operational phase**, the centralized WWTP significantly reduces systemic environmental risk by providing safely managed sanitation and replacing inadequate decentralized systems that

contribute to coastal water pollution. However, extreme heat and prolonged dry spells could elevate water temperatures, potentially affecting biofilm viability, oxygen transfer efficiency, and the overall operational stability of the MABR biological treatment processes. Furthermore, an operational breakdown or a reactor tank leak could lead to localized wastewater overflows, temporarily exacerbating microbiological contamination risks for adjacent vulnerable residents and community facilities.

In a severe **combined failure scenario**—such as an intense tropical cyclone generating extreme rainfall and storm surge, coupled with a prolonged electrical grid failure— the MABR facility could experience structural tank damage, piping failures, or localized containment breaches. This event would paralyze conveyance pumps, causing raw or partially treated wastewater to overflow from the reactor units into adjacent properties, affecting the Seine Bight Community Center and the children's football field. While this scenario would not cause a catastrophic structural collapse of the surrounding area or loss of human life, it would lead to a temporary disruption of essential sanitation services for the local and tourist populations, creating localized acute public health hazards and environmental contamination.

Based on the **Moderate** overall criticality, high exposure to coastal hydrometeorological hazards, and the necessity to manage localized environmental risks to nearby community assets, the overall disaster and climate change risk level for the Wastewater Treatment Plant is evaluated as **Moderate**. The structural and non-structural mitigation measures integrated into the Disaster Risk and Climate Change Management Plan (Program 14 of the ESPM) are deemed sufficient to mitigate the identified risks to acceptable levels. Consequently, the project does not require the development of a detailed Step 4 to complete qualitative risk assessment.

6. Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) is a tool that guides the incorporation of environmental and social considerations during the different phases of implementation of the Project.

This Plan will guide the Executing Agency to ensure an adequate level of environmental and social management in the implementation of the activities of the project. ESMP outlines necessary environmental and social mitigation measures required during the implementation stages of the project and its components.

6.1. Roles and Responsibilities

6.1.1. Design

During the design phase of the interventions, Belize Water Services Limited (BWS) acting as both the Borrower and the Executing Agency (EA) of the Project, will prepare the bidding documents for the contractor to undertake the detailed engineering designs, as well as prepare the site-specific Environmental and Social Assessment (ESA) with its corresponding Environmental and Social Management Plan.

The ESA and its corresponding Environmental and Social Management Plan will evaluate the site-specific risks of the interventions and identify mitigation measures.

BWS will prepare the bidding documents for the work. It will be responsible for its own technical implementation, financial management, procurement, and reporting. Additionally, it will incorporate the necessary environmental, social, and occupational health and safety clauses and requirements, both general and specific to the projects, which arise from this ESA and ESMP.

The bidding documents must contain Environmental and Social Technical Specifications, outlining the minimum content required for the Construction Environmental and Social Management Plan (ESMPc).

The proposals received during the bidding process for the works must contain a budget that includes the cost of implementation and compliance with the environmental, social, and occupational health and safety mitigation measures required by the project, guaranteeing compliance with the IDB ESPF and applicable national and local regulations.

6.1.2. Construction Phase

Prior to the start of the works, the EA will conduct the due diligence with the applicable environmental authorities (Department of Environment-DOE, Forest Department, Fisheries Department, etc.) to obtain any required environmental clearance for the works.

During the Construction Phase (or Installation Phase), the Contractor Company will be responsible for preparing and implementing the Construction Environmental and Social Management Plan (ESMPc), as well as obtaining the environmental and occupational health and safety qualifications and insurance required according to the national and local regulatory framework.

The Contractor will also need to obtain other applicable permits, which could include tree removal permits, easements, excavation permits, construction permits, public road occupancy permits, waste disposal permits, permits for works near monuments, etc.

Before the start of the works, the Contractor must submit to BWS, for its approval, a Construction-level Environmental and Social Management Program (ESMPc). This ESMPc will contain, as a minimum, the programs and subprograms detailed in the following section of this ESA/ESMP, together with the specific recommendations that arise from the analysis of the project and as reflected in the Environmental and Social Technical Specifications of the bidding documents.

Once the ESMPc is approved, the Contractor Company will be responsible for its compliance, using all resources needed to implement the Programs that are formulated within its framework. The Contractor Company must have an environmental and social representative and a person responsible for hygiene and safety, who will be responsible for conducting the implementation of the ESMPc. Likewise, the contractor must comply with and make the operators and subcontractors comply with all the provisions contained in said Plan, national and local environmental legislation, appropriate construction codes and best practices and the IDB Environmental and Social Policy Framework, during all stages of the execution of the works.

The Contractor Company will prepare **monthly reports for the BWS**, detailing the actions and results of the ESMPc implementation.

The inspection, control, and monitoring activities of the ESMPc will be conducted by BWS. It may conduct inspection visits, prepare reports for internal use for the Project, and determine and impose corrective measures based on the stipulations of the bidding documents. The environmental authority may also conduct control audits of the works.

Upon completion of the work, the Contractor must submit a **Final Environmental and Social Report**, which includes the information corresponding to the implementation of ESMPc, including records of implementation of plans and programs, and a report on compliance with all environmental and social indicators considered at various stages of the project cycle.

6.1.3. Operation and Maintenance

During the operational stage, Belize Water Services Limited (BWS) will be responsible for the operation and maintenance of the infrastructure built under the Project, which includes the sewerage system and the wastewater treatment plant for the Placencia Peninsula. BWS will carry out these activities in accordance with its environmental policies and its Environmental and Social Management System (ESMS), including the Environmental and Social Management Plan (ESMP) for the operational and maintenance stage of the works.

6.1.4. Role of IDB

The IDB will oversee and supervise the implementation of the environmental and social management system for the Project. This includes the review and approval of the **semi-annual environmental and social compliance reports** submitted by BWS, as well as conducting environmental and social supervision missions. This is expected to last throughout the project implementation.

Table 34 summarizes the environmental and social management responsibilities of the entities involved in the different phases of the projects.

Table 34 - Roles and Responsibilities for E&S Management of the Projects

Project Cycle Phase	Activity	Responsible Party	Monitoring	Supervision
Design	Grievance Redress Mechanism (for the duration of the Program)	BWS	---	IDB
	Executive Project / Engineering Design	BWS	---	IDB
	Environmental and Social Assessment	BWS	---	IDB
	Public Consultation	BWS	---	IDB
	Preparation of E&S Technical Specifications for Bidding Documents	BWS	---	IDB
	Environmental Permits	BWS	---	DOE, Fisheries Department, Forest Department
Construction	ESMPc: Preparation and Implementation	Contractors	BWS	IDB
	Environmental and Social compliance during construction	Contractors	BWS	IDB
	E&S Progress Reports	Contractors to BWS (monthly)	BWS	---
	E&S Progress Reports	BWS to IDB (half-annually)	---	IDB
	Final E&S Report	Contractors	BWS	---
	Final E&S Report	BWS	---	IDB
Operation	Operation and maintenance of the infrastructure	BWS	---	IDB (for 3 years post-commissioning)

6.2. Environmental and Social Management Plans

Mitigation measures were grouped into two different ESMPs, each one targeting different phases of the project:

- **Construction ESMP:** aimed at mitigating the impacts and risks of construction activities.
- **Operational ESMP:** aimed at mitigating the negative impacts and risks of the operational stage.

6.2.1. Construction Environmental and Social Management Plan

This Environmental and Social Management Plan (ESMP) establishes the minimum environmental and social guidelines to be implemented during the construction of the project's infrastructure.

Based on these guidelines, the contractor shall develop the final Construction ESMP, which must incorporate, at least, all the program outlines below.

Table 35 - ESMP Programs for the Construction/Installation Phase.

Program Number	Program
1	Monitoring and Control of Compliance with Mitigation Measures
2	Management of Construction Sites
3	Air Quality, Noise and Vibrations Management
4	Environmental and Social Liabilities
5	Flora and Fauna Management
6	Energy and Resource Efficiency
7	Waste Management
8	Effluent Management
9	Chemical Substances Management
10	Occupational and Community Health and Safety
11	Traffic and Pedestrian Management
12	Pest and Vector Control
13	Socio-Environmental Training for Construction Personnel
14	Disaster Risk and Climate Change Management Plan
15	Emergency Preparedness and Response
16	Community Information and Participation
17	Chance Find Procedure
18	Coordination with Service Providers

Below are the guidelines for each of the Construction ESMP programs.

Program 1: Monitoring and Control of Compliance with Mitigation Measures, Permits and Authorizations

Program 1: Monitoring and Control of Compliance with Mitigation Measures	
Socio-environmental effects to be prevented or corrected:	Deviations in implementation of mitigation measures
Management Measures To ensure effective oversight of compliance with the identified mitigation measures, the contractor will establish and maintain a comprehensive "compliance monitoring system". This system will oversee the implementation of each mitigation measure during the construction phase. The compliance monitoring system will include, but is not limited to, the following elements: • Actions to be Implemented: A detailed description of specific actions and steps to be taken to execute each mitigation measure. • Materials and Resources: An inventory of the materials, equipment, and resources required to carry out mitigation measures effectively. • Responsible Staff: Identification of personnel responsible for execution and supervision of each mitigation measure, including their roles and responsibilities. • Indicators of Compliance: Establishment of clear and measurable indicators that will be used to assess the degree of compliance with each mitigation measure. • Target and Monitoring Frequency: Defined objectives for achieving compliance, along with the frequency and methodology for monitoring progress towards these goals. This structured compliance monitoring system will ensure that the construction project adheres to the established mitigation measures and operates minimizing potential environmental or regulatory impacts.	
Licenses, Permits and Authorizations • The contractor shall conduct an analysis of the necessary environmental licenses according to the final executive projects. • Before commencement of work, all necessary permits, certificates and authorizations according to the specific works and/or activities to be carried out must be obtained. Amongst permits that may be required, the following is a non-exclusive list: 1. Environmental Clearance / Environmental Compliance Plan (ECP) issued by the Department of the Environment (DOE) under the Environmental Protection Act; 2. If necessary, a Certificate of Land Ownership / Lease Agreement for the BWS-owned project site in Seine Bight; 3. Construction and Building Permits under the 2025 Belize Building Code; 4. If necessary, a Mangrove Alteration / Clearance Permit issued by the Forest Department pursuant to the Forests Act (Forest Mangrove Protection Regulations) for site preparation at the Seine Bight WWTP site; 5. Water Use, Effluent Discharge, and Trench Dewatering Permits issued by the Department of the Environment (DOE); 6. Solid and Hazardous Waste Transport and Disposal Agreements with the Belize Solid Waste Management Authority (BSWAMA), designating temporary storage at the Placencia Transfer Station and final disposal at the Mile 24 Regional Sanitary Landfill (if applicable); 7. Electrical Grid Connection and Utility Interference Permits from Belize Electricity Limited (BEL) and other service providers;	

Program 1: Monitoring and Control of Compliance with Mitigation Measures**8. Notification to Authorities regarding Chance Finds** submitted to the Institute of Archaeology / National Institute of Culture and History (NICH).

- It is recommended to begin consultation early on with environmental authorities regarding the project sites and their possible impacts on sensitive ecosystems. Key agencies include:
 - **Department of the Environment (DOE)** regarding overall environmental compliance and ECP commitments;
 - **Forest Department** regarding site clearing of mangrove ecosystems situated within the *Belize Coastal and Near Shore Islands Key Biodiversity Area (KBA)*;
 - **Fisheries Department** and the **Coastal Zone Management Authority and Institute (CZMAI)** due to the project's direct interface with the *Placencia Lagoon* and coastal marine waters;
 - **Seine Bight Village Council** and **Placencia Village Council** for local community coordination, public notification, and traffic management.
- Moreover, the design and location siting of the infrastructure projects must incorporate all necessary measures identified in Belize's 2025 Building Code, especially pertaining flood hazard areas and hurricane prone areas¹¹⁸. Design considerations detailed in the Environmental and Social Assessment, mitigation measures outlined in the *Disaster Risk and Climate Change Management Plan (Program 14 of this ESMP)*, and commitments derived from community consultations under the *Stakeholder Engagement Plan (SEP)* must be fully integrated. If any proposed measure cannot be incorporated, the Contractor and Design Team must draft a technical report justifying why it was excluded from final designs.
- The contractor must ensure all legal obligations applicable to the project have been fulfilled before the commencement of tasks, establishing a schedule clearly detailing the necessary licenses and their status.
- The cost of all actions and permits must be included in the ESMP allocated budget.

Monitoring and Compliance**Indicators**

- Number of ESHS Non-Conformities (environmental, social and safety and hygiene) identified during the inspections.
- Number of ESHS Non-Conformities closed on time.
- Licenses and Permits obtained/Licenses and permits required by the project
- Technical Report on Design Considerations and Final Designs of Projects

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 2: Management of Construction Sites and Works Closure**Program 2: Management of Construction Sites and Works Closure**

Socio-environmental effects to be prevented or corrected:	Minimize the environmental and social impacts of preparatory work activities.
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Management Measures

The site location for the construction camp installation area must ensure minimal impact on the socioeconomic dynamics of the area, whether through the use of public services (from connecting the facilities to available networks) or due to potential interferences with traffic. The construction camp installation area must have:

1. Adequate site lighting for nighttime security and safe operation.
2. Portable sanitary toilets for construction personnel with regular certified maintenance.
3. Dedicated, covered material storage areas.
4. Spill containment equipment and emergency spill kits (absorbent pads, neutralizers, drip trays).
5. Designated aggregate and fill material storage area with containment bunds.
6. Controlled security access and perimeter fencing.
7. Construction utilities (safe electrical connections and potable/service water supply).
8. Clear construction, hazard, and safety signage.
9. Waste storage and segregation area, with separate containers for recyclables, organic waste, construction debris, and hazardous materials.
10. Manual flaggers/signaling personnel for entry/exit of heavy trucks and equipment.
11. Fully stocked emergency first aid kits and trained first aid personnel.
12. Electric backup generators positioned on impermeable, bunded (waterproof) bases.
13. Certified fire protection and suppression systems (fire extinguishers, sand buckets).
14. Emergency alarm systems.
15. Adequate regulatory, speed limit, and occupational safety signage.

Among the specific recommendations, the following guidelines have been established:

- **Location:** The main Construction Camp and material laydown areas must be located as far as possible from sensitive natural ecosystems and community receptors. Facilities must be established on previously intervened land (preferably within the BWS Seine Bight site footprint), avoiding unnecessary clearing of coastal vegetation or mangrove ecosystems situated within the *Belize Coastal and Nearshore Islands Key Biodiversity Area (KBA)*. Safe buffer distances must be maintained from the *Placencia Lagoon* shoreline and nearby sensitive village receptors in Seine Bight (such as residential properties, the Seine Bight Community Center, the children's football field).
- **Construction sites, worker camps, and laydown areas** will be properly fenced and secured to prevent unauthorized access.
- **Adequate Communication Equipment:** All work sites should be equipped with reliable communication tools, such as radios, to facilitate prompt requests for assistance during emergencies.
- **Fire Safety Measures:** Work sites must have fire extinguishers or other appropriate fire suppression systems.
- **Emergency Response Training:** Personnel shall undergo comprehensive training in emergency response procedures, first aid, and proper hygiene practices.
- **Site Cleanup:** Upon completion of construction activities at each work site, all residual materials must be promptly removed, ensuring a clean and organized environment.

Program 2: Management of Construction Sites and Works Closure

- **Machinery Maintenance and Compliance:** Regular maintenance checks and technical verifications will be conducted to ensure construction machinery remains in good working condition.
- **Runoff Management:** Drainage of excess water, soil movement, and stockpile management shall prioritize the preservation of natural drainage patterns and land runoff levels to prevent erosion and associated environmental impacts.
- **Efficient and Authorized Resource Use:** Resources shall be used efficiently and in compliance with regulatory requirements.
- **Covered Transportation and Material Handling:** Materials prone to dust generation will be transported in tarpaulin-covered vehicles and maintained at appropriate humidity levels to minimize dispersion. On-site stockpiles of such materials will be regularly wet, and efforts will be made to minimize stockpile quantities whenever operationally feasible.
- **Dust Control and Speed Regulations:** Unpaved access tracks and exposed earthworks at the Seine Bight WWTP site must be dampened at least twice daily. Vehicle speed limits will be strictly regulated and enforced (20 km/h in village/residential zones and maximum 40 km/h along main haul corridors). Wet suppressants will be applied during major land grading and fill extraction.
- **Water:** Drinking water for construction personnel consumption will be provided in containers suitable for human consumption. Water required during the execution of infrastructure works will be provided from authorized suppliers or approved source. Water will be used for compacting tasks, for irrigation and humidification of soil to be compacted, and for preparation of concrete for service works and plaster mixtures.
- **Energy:** During the construction stage, electrical supply for camps and works shall be contracted from Belize Electricity Limited (BEL) where available. Standby generators must be sound-attenuated and placed on secondary containment bunds to prevent soil or water contamination from fuel leaks.
- **Raw Materials:** Civil construction materials (cement, rebar, pipes, aggregates) must be procured from licensed local businesses. Suppliers must hold valid environmental and extraction permits (including quarry/mining licenses issued by the Ministry of Natural Resources). Where mangrove or vegetation clearance is required at the WWTP site, the Contractor must obtain a Mangrove Alteration Permit from the Forest Department (under the Forests Act / Forest Mangrove Protection Regulations) and implement corresponding ecological offsets.

Works Closure Measures

- All temporary installations used during project execution will be systematically dismantled and removed.
- An exhaustive assessment of environmental and social liabilities will be conducted, with any identified issues promptly addressed and remediated.
- Waste and solid material disposal must comply with environmental and social supervision guidelines, ensuring proper transportation and disposal at authorized sites.
- Disturbed areas and cleared vegetation zones outside the permanent facility footprint must be rehabilitated and re-vegetated using native coastal and mangrove species, aligning with the project's Biodiversity Action Plan (BAP) (see the BAP guidelines in Program 5 of this ESMP).
- Surplus reusable or recyclable materials may be donated, whereas the transfer of materials classified as environmental liabilities is strictly prohibited.
- The incineration of waste during the dismantling process is strictly prohibited.
- All dismantled sites must be restored to an optimal, ensuring seamless integration with the surrounding environment.

Program 2: Management of Construction Sites and Works Closure**Monitoring and Compliance****Indicators**

- The proportion of work sites where management measures have been implemented to the total number of active work sites.
- Absence of claims or complaints from authorities, the surrounding population, or the community.
- Photographic documentation before and after project completion that exhibits no environmental or social liabilities.

Responsible for implementation	Works Director
Responsible for control	Works Inspector

Program 3: Air Quality, Noise and Vibrations Management

Program 3: Air Quality, Noise and Vibrations Management	
Socio-environmental effects to be prevented or corrected:	Impacts on air quality, dust, and noise in community or urban areas.
Management Measures	
Emissions Control Measures: • Ensure all construction equipment is maintained according to the manufacturer's specifications. • Implement dust suppression measures as needed in unpaved areas. • Prohibit incineration of waste at construction sites. • Reduce unnecessary idling of construction equipment and delivery trucks when not in active use. • Maintain cleanliness of work vehicles, especially tires, to prevent tracking dirt within and outside the construction site. • Cover work vehicles transporting friable materials to prevent material dispersion beyond the site. • Minimize drop heights of materials during construction operations to reduce airborne dust. • Establish and implement a comprehensive grievance procedure for complaints related to dust and exhaust emissions, identifying required measures for emissions reduction in an Action Plan.	
Noise Control measures: • Ensure all construction equipment is maintained according to the manufacturer's specifications to minimize noise emissions. • Strategic Work Scheduling: Schedule construction, modification, and rehabilitation activities during daylight hours when increased noise levels are generally more acceptable to the surrounding community. • Develop and implement a comprehensive Construction Communications Plan to proactively notify neighboring receptors, such as residents, commercial establishments, religious institutions, and hotels, about upcoming construction activities. • Consider Acoustic Enclosures: Assess the need for acoustic enclosures where applicable to mitigate noise from construction activities. • Minimize unnecessary idling of construction equipment and trucks to reduce noise emissions and environmental impact. • Establish a baseline of ambient noise levels prior to the start of construction and adhere to IFC Environmental, Health, and Safety (EHS) Guidelines for noise levels: Daytime (07:00–22:00): ≤ 55 dBA – Nighttime (22:00–07:00): ≤ 45 dBA. These thresholds apply to equivalent continuous noise levels in residential, institutional, and educational receptors. In all cases, national and local legal noise standards will also be observed • Establish and implement a comprehensive grievance procedure for complaints related to noise, identifying required measures for noise reduction in an Action Plan.	
Monitoring and Compliance	
Indicators • Absence of grievances reported by neighboring businesses or the local community. • Action Plan with corrective measures in case of a reported complaint/grievance.	
Monitoring Regular daily site inspections shall be conducted to assess the following critical aspects: • Visual assessment of dust dispersion to identify any instances of dust crossing site boundaries.	

Program 3: Air Quality, Noise and Vibrations Management

- Visual inspection of high-risk areas for dust emissions, such as haul roads, stockpiles, and operational zones.
- Review of equipment and machinery service records.
- Recordkeeping of applied measures in Action Plans through reports with date, time, photographs and applied measures.

Responsible for implementation	Works Director
Responsible for control	Works Inspector

Program 4: Environmental and Social Liabilities

Program 4: Environmental and Social Liabilities	
Socio-environmental effects to be prevented or corrected:	Adverse effects on flora, fauna, water, soil, landscape, and occupational and community health and safety caused by pre-existing environmental liabilities resulting from unauthorized informal disposal practices, including micro-dumps and illegal dumping of vegetation, municipal solid waste, and construction debris in undeveloped plots or mangrove ecosystems.
Management Measures	
This program will be implemented at the start of construction, to ensure that the project sites are free of environmental and social liabilities. For liabilities management, the implementation of management measures is divided into three stages: Stage 1 Stage 1 consists of a preliminary assessment of the site and/or project intervention area. A visual survey of the entire site must be conducted, documented with photographic records, to detect the presence of potential environmental liabilities. In the case of social liabilities, the application of the Community Information and Participation Program will serve as a source of information regarding existing social liabilities, which will have to be recorded and assess to establish mitigation measures. If liabilities are detected, they must be pre-classified (solid waste similar to household waste, possible hydrocarbon residues, aggregates, hazardous waste, wastewater infiltrations, among others), and the degree of magnitude or severity determined qualitatively (low, medium, or high)¹¹⁹. Regarding social liabilities, the following will be identified: (i) informal occupations at work sites; and (ii) complaints and claims regarding the operation of the infrastructure to be intervened. Stage 2 If special/hazardous waste (hydrocarbon residues, unidentified chemical substances, or others) is detected in the initial site analysis and there is evidence of seepage or leaching to bare soil, laboratory characterization of soils, groundwater, and surface water (as applicable) will be conducted to determine the presence of contaminants and their concentrations¹²⁰. The analytical determination results can be compared to internationally recognized soil quality standards such as US EPA Regional Screening Levels for residential or industrial land use, as well as other international limit parameters¹²¹. Alternatively, results can be sent to the DOE for review and determination of appropriate action. Where contamination is detected that poses risks to human health or the environment, or where contaminant concentrations significantly exceed environmental screening levels/limit parameters, the soil will be considered contaminated. Additional parameters for soil	

¹¹⁹ The ASTM E1527-21: Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process methodology may be used.

¹²⁰ The ASTM E1903-19 Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process methodology may also be used as a guide.

¹²¹ US EPA Regional Screening Levels (RSLs) for residential or industrial land use. <https://www.epa.gov/risk/regional-screening-levels-rsls>

Program 4: Environmental and Social Liabilities

remediation assessment may be incorporated from chemical safety data sheets, research sources, and nationally or internationally recognized scientific publications.

In the case of social liabilities, an analysis on potential solutions needs to be performed in order to correctly solve the issues with the available measures at disposal and presented to the PEU in case the measures are out of scope for the Contractor.

Stage 3

Based on the results of Stages 1 and 2, removal and/or remediation of identified environmental and liabilities will proceed. For the cleanup of different solid waste and hazardous waste, an Action Plan will be defined, which must receive the Banks No Objection.

All workers participating in remediation tasks must work under the guidelines of the Occupational and Community Health and Safety Program of this ESMP.

Regarding social liabilities, the contractor's social specialist, together with the Executing Agency's environmental and social team, will define an Action Plan, which must receive the Bank's No Objection.

Monitoring and Compliance**Indicator**

- Environmental and Social Liabilities remediated/Total Existing Environmental and Social Liabilities

Monitoring

- Reports detailing Environmental and Social Liabilities identified.
- Concentrations Measured/Concentrations from International Guidelines
- Action Plans for removal/remediation of Environmental and Social Liabilities.

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 5: Flora and Fauna Management Program**Program 5: Flora and Fauna Management Program****Socio-environmental effects to be prevented or corrected:**

Impacts on vegetation cover (broadleaf forest and mangrove ecosystems), loss of natural habitats, disruption of wildlife populations, and potential degradation of ecosystem services within the Belize Coastal and Nearshore Islands Key Biodiversity Area (KBA) during land clearing, trenching, and construction of the Seine Bight Wastewater Treatment Plant (WWTP) and associated sewerage infrastructure.

Management Measures

This Program incorporates measures to mitigate impacts on local flora, fauna and ecosystem services while fostering a shared responsibility among all stakeholders in their protection and preservation. Throughout its execution, regular audits will be conducted throughout its implementation to ensure compliance, with necessary adjustments made based on monitoring results and stakeholder feedback. Additionally, comprehensive training sessions will be provided to construction personnel, highlighting the importance of biodiversity conservation and the application of mitigation measures. Awareness activities will also be organized for both workers and local communities.

Flora Management Measures

- Assess the net loss of natural vegetation area (specifically broadleaf forest and mangrove cover at the Seine Bight WWTP potential area) and conduct a Pre-Clearance Survey for flora and fauna species prior to site clearing. For flora, survey and map protected species and critical mangrove zones once construction sites and the project footprints are defined, obtaining a Mangrove Alteration Permit from the Forest Department under the Forests Act prior to any vegetation removal.
- Whenever possible, contractors shall prioritize previously disturbed or environmentally degraded sites (such as existing BWS property footprints) for the establishment of camps and material laydown facilities, avoiding unnecessary clearing of intact mangrove ecosystems.
- The Contractor must implement a Site Restoration and Mangrove Compensation Plan to achieve No Net Loss for natural habitats and Net Gain for Critical Habitat (per IDB ESPS 6), prioritizing the retention of mature and ecologically significant trees and mangrove buffer belts along the Placencia Lagoon interface. Clear criteria must be established to justify tree/mangrove removal only when necessary. Compensatory measures must include the planting and restoration of native coastal and mangrove species in nearby areas, with a required minimum compensation ratio of 3:1 for mangrove clearance (or as determined by the Forest Department) and a minimum 80% survival rate, with the specific conditions of the revegetation plan adjusted by consulting and soliciting permits from the Forest Department, Fisheries Department, and/or CZMAI.
- Ensure that only native coastal and mangrove species are used in landscaping and rehabilitation efforts.
- Assess the success of revegetation and mangrove restoration efforts four months after planting and periodically up to 24 months by evaluating surviving vegetation and replacing lost seedlings to ensure target survival rates.
- Remove vegetation cover only immediately before construction begins to minimize habitat disruption.

Program 5: Flora and Fauna Management Program

- Reduce the duration of activities at construction sites to limit disturbances to the natural habitat.
- Store topsoil and organic overburden separately in bunded areas away from the Placencia Lagoon for later use in site restoration, maintaining the original soil profile and composition.
- Strictly prohibit the introduction of invasive plant species into the project area. Conduct regular inspections and implement preventive measures to ensure that only native species are used in landscaping and rehabilitation efforts.
- Establish proactive communication channels with local communities to share information about planting initiatives and encourage community involvement in vegetation conservation.
- The use of pesticides listed in Annex III of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade is strictly prohibited in this project.

Fauna Management Measures

- Ensure all personnel receive proper training in identifying and protecting native fauna, as well as protocols for handling potentially hazardous animals. If endangered species listed on the IUCN Red List have been reported in the area, ensure that they are properly identified to prevent disturbance and enhance their protection.
- Map nesting, roosting sites and feeding grounds that could have been found during the pre-clearance survey and avoid their disruption.
- Prohibit construction activities during key biological periods, particularly breeding and migratory seasons to prevent disturbance of nesting of Reddish Egret, Yellow-crowned Night heron and other sensitive species found in the KBA Belize Coastal and Near Shore Islands (see section 4.4.3.4).
- Implement strategies to discourage wildlife from entering areas designated for vegetation clearance, prioritizing species with greater mobility, such as medium to large mammals, birds, and large lizards. Encourage their natural relocation to adjacent areas without the need of capture.
- Limit construction hours to reduce disturbance at dawn/dusk.
- For less mobile species, facilitate rescue and relocation to nearby suitable habitats. Any bird nests found within designated clearing areas must be preserved and left undisturbed.
- Recommend reduced vehicle speeds within the project area to minimize the risk of wildlife collisions.
- Plan activities to limit the presence of workers in undisturbed natural habitats if any are found surrounding the project sites. Whenever feasible, restrict use of machinery or prioritize equipment with lower noise emissions.
- Enforce strict prohibition on hunting within the project area.
- Establish clear protocols for wildlife encounters, including the use of protective gear, availability of first aid kits and medical support, and avoidance of known wildlife habitats.
- When planning activities in areas influenced by migratory birds, take breeding seasons into account to minimize disturbances.
- Establish buffer zones between work areas and adjacent water bodies (rivers, lagoons, coastal zones) to prevent sedimentation, contaminant discharge, or alteration of water quality.
- Avoid direct disturbance, capture, or handling of aquatic fauna during construction activities. Where in-water works are unavoidable, implement appropriate fauna rescue and relocation measures in coordination with qualified personnel and the relevant authorities.

Monitoring and Compliance

Program 5: Flora and Fauna Management Program**Indicators**

- Proof of Consultation and Response of the Forest and Fisheries Departments
- Pre-Clearance Survey report
- Reduction in vegetation cover area (acres of broadleaf forest and mangrove cleared)
- Number of mangrove seedlings and native trees planted as part of the 3:1 compensation ratio and total acreage under restoration.
- Growth status of revegetated cover after four months of planting (% trees that survived).
- Evidence of institutional and legal arrangements for the implementation of compensation measures.
- Final approved Biodiversity Action Plan (BAP) demonstrating Net Gain compliance under IDB ESPS 6.

Responsible for implementation	Works Director/ Qualified Fauna & Flora Specialist.
Responsible for control	Works Inspector / Supervising Engineer / BWS Project Implementation Unit (PIU) / Forest Department / Fisheries Department.

Program 6: Energy and Resource Efficiency

Program 6: Energy and Resource Efficiency	
Socio-environmental effects to be prevented or corrected:	Prevent or minimize adverse impacts on human health and the environment by limiting pollution and resource consumption from project activities.
Management Measures	
The following measures should be included in project design and project execution.	
General Requirements: • Personnel Training: All personnel must receive adequate training in sustainable practices, including energy conservation, water and materials management and waste reduction. Training should focus on minimizing material and water use and maximizing reuse and recycling. • Material Register: Maintain a detailed register documenting material quantities, sources and usage. • Sustainable Sourcing: All materials must be procured from quarries holding valid permissions issued by the competent authority and in compliance with environmental regulations. • Resource Monitoring: Implement systems to monitor and control energy and water consumption, establish a baseline, and identify opportunities for efficiency improvements. • Greenhouse Gas (GHG) Emissions Assessment: Estimate total project-related GHG emissions to establish a baseline and quantify reductions achieved through energy-saving measures.	
Specific Measures for Water, Materials and Energy Conservation: • Use environmentally friendly, sustainable sourced, recycled (e.g., reclaimed wood and steel), and/or recyclable materials to promote a closed-loop material cycle whenever possible. • Capture and use rainwater for construction activities, such as dust control and equipment washing, where feasible. • Store materials in temporary, weatherproof facilities to prevent damage and minimize waste during construction. • Employ modular construction techniques to reduce waste and improve efficiency through off-site prefabrication. • Develop a comprehensive waste management plan to minimize single-use materials and maximize recycling and composting.	
Monitoring and Compliance	
Indicator • Number of mitigation measures applied to the project.	
Monitoring • Energy and water consumption via monitoring systems. • Waste generation • GHG emissions • Records of materials used: their sources and storage.	
Responsible for implementation	Works Director
Responsible for control	Works Inspector

Program 7: Waste Management

Program 7: Waste Management	
Socio-environmental effects to be prevented or corrected:	Pollution resulting from improper on-site waste management.
Management Measures	
Waste generated during the construction phase falls into three categories, according to Belizean Legislation: non-hazardous (assimilable to municipal solid waste), hazardous waste and construction and demolition waste. Assimilable Municipal Solid Waste includes materials such as packaging waste, plastics, pipe cuttings, wood, cardboard, food scraps, and similar items. Hazardous waste comprises any material or substance characterized as being toxic, corrosive, flammable, reactive, explosive, infectious or pathogenic that may pose a threat to the environment and human health and includes wastes that are listed in Table 1, defined by criteria in Table 2 of the Hazardous Waste Regulations, Chapter 328¹²² or listed in Annex 1 of the Basel Convention on the Transboundary Movement of Hazardous Waste¹²³. This includes materials contaminated with oils, hydrocarbons, traces of solvents, varnishes, heavy metals and paints, such as wood, filters, gloves, or other solid objects exposed to these substances, as well as waste from coatings, used oils, welding electrodes, containers or packaging with residual hazardous materials, as well as infectious waste containing disease-causing microorganisms. Construction and Demolition Wastes comprise materials resulting from construction activities, including wires, bags containing lime and cement, cables, bricks, construction debris, and similar items. Demolition waste may be generated during the construction of the wastewater collection network, particularly from the removal or breaking of existing road surfaces, sidewalks, or other hard surfaces required to install the sewerage infrastructure. Such waste may include concrete, asphalt, paving materials, bricks, and other similar materials. Assimilable Municipal Solid Waste Management Measures • Personnel Training and Waste Management: All personnel must be trained to differentiate between hazardous and non-hazardous waste and to ensure strict segregation throughout the project. This includes proper handling and management practices. • Waste Storage and Segregation: Waste materials must be segregated based on their properties, such as reusability and recyclability. Segregation should occur under controlled conditions to maintain material integrity and prevent unintended dispersion. Separated containers must be present at the construction site to allow for separation of recyclable materials from non-recyclable materials. If recyclable materials are valuable for residents, they will be made available to those in need, following consultations and mutual agreement with the community. • Waste Disposal Prohibitions: No waste generated during the construction phase, whether general or hazardous, may be incinerated, buried, or discharged into water bodies or soil. Strict compliance is mandatory. Any unutilized waste materials within the project area must be securely stored, covered and promptly removed upon the completion of each project phase	

¹²² <https://doe.gov.bz/wp-content/uploads/2024/02/Hazardous-Waste-Regulations.pdf>

¹²³ Annex I to the Basel Convention lists the categories of wastes to be controlled under the Basel Convention, including both specific waste categories (Y1 to Y18) and wastes having specific constituents (Y19 to Y45).

Program 7: Waste Management

- Prevention of Unattended Waste: Waste must never be left unattended at construction sites, where it may be accessible to both wildlife and personnel.
- Waste Documentation: A detailed record of waste generated at each site must be maintained, documenting type, volume, and characterization.
- Effluent Management: Whenever feasible, washing tools and machinery on the construction site should be avoided. If necessary, a designated area must be provided for temporary storage, with proper removal at the end of each work phase.

Construction and Demolition Waste Management Measures

- It shall be the responsibility of contractors to remove and dispose of all construction waste material resulting from new construction or other works.
- Recycling construction waste will be implemented when it is both technically and economically feasible.
- If recyclable materials are valuable for residents, they will be made available to those in need, following consultations and mutual agreement with the community.
- Waste should be segregated, if possible, pertaining the probable reuse (metal wires, cement debris, etc.)
- Waste containers should be covered daily to prevent water leaching and minimize particulate matter generation
- Avoid obstruction to pedestrian or vehicular traffic due to container locations.
- Prohibition of dumping or stockpiling in green areas.
- Plan removal and transport to authorized final disposal sites and/or treatment plants to recover construction materials.

Hazardous Waste Management Measures

- Hazardous waste must be securely stored in appropriate containers, considering the nature of the substances. Storage should ensure any leakage is contained, with containment structures that provide volume capacity for liquid hazardous waste.
- All hazardous waste must be properly labelled, and incompatible waste streams must be stored separately (e.g, acids and bases).
- Storage sites must be equipped with emergency situations equipment (first aid kits, spill kits, fire extinguishers, etc.)
- All personnel must be trained in hazardous waste management and measures to respond to emergency situations.
- Transporters of hazardous waste authorized by the DOE shall provide certificates of collection to generators and obtain a Manifest from the Generator which shall be signed by both, and which shall accompany all collection, transport and final disposal process.
- In the event of accidental spills, the DOE must be immediately notified, and appropriate containment and cleanup measures must be implemented. Immediate absorption using suitable materials (e.g., absorbent cloths or clay) shall be applied. Any contaminated soil or vegetation shall be classified and managed as special waste.
- Any pathological/infectious waste generated due to personnel accidents requiring first aid must be carefully separated, stored, and treated in strict compliance with applicable legislation related to medical waste.

Monitoring and Compliance**Indicators**

- Hazardous waste managed in compliance with applicable standards / hazardous waste generated by the project.

Program 7: Waste Management

- Properly managed dry waste and construction surplus / total dry waste and construction surplus generated by the project.

Monitoring

- Training key personnel in the supervision and documentation of hazardous waste.
- Maintaining records of hazardous waste removal and final disposal.
- Reviewing hazardous waste removal records to ensure compliance.
- Verifying accreditation certificates for hazardous waste disposal.

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 8: Effluent Management

Program 8: Effluent Management	
Socio-environmental effects to be prevented or corrected:	Pollution resulting from the inadequate management of effluent generated by work activities.
Management Measures	
Effluent Management Measures - Identify and classify potential effluent sources. - Implement specific handling protocols for different effluent types (domestic wastewater, construction runoff, and stormwater). - Provide regular training for construction personnel on the proper handling, storage, and disposal of hazardous substances to prevent spills or leaks. - Monitor, test, and treat effluents discharged from the construction site on a regular basis. - Prioritize water drainage, soil stabilization, and material stockpile management in alignment with natural flow patterns and land runoff levels. - Install impermeable flooring in high-risk areas, with surrounding drainage channels connected to an autonomous system to direct rainwater to treatment facilities. - Provide an adequate number of portable toilets or equivalent facilities, prioritizing models with efficient waste management and low-water-consumption systems. Effluents from these facilities must be removed and sanitized daily by licensed operators. - Implement wastewater recycling systems for sanitation facilities, where feasible, using greywater treatment for non-potable applications such as irrigation or construction. - Establish a Tools and Machinery Maintenance Protocol. On-site washing of tools and machinery should be minimized. Where unavoidable, designated washing areas must be equipped with containment measures to prevent affecting the environment. The use of eco-friendly cleaning agents should be encouraged to reduce environmental impact.	
Erosion and Runoff Control Measures - Minimizing the disturbance area will be a primary objective, with clear demarcation to define its boundaries. - All activities will be strictly confined to the designated work zone, to ensure operations remain within the approved area. - Vehicle movements will be restricted to predefined roads and tracks to mitigate potential off-road impacts. - Management of Runoff water, soil displacement and accumulation will be managed to preserve natural flow patterns and maintain the terrain's natural runoff levels. - Monitoring and periodic inspections will assess the effectiveness of sediment controls, particularly after rainfall events exceeding 10mm in 24hours.	
Monitoring and Compliance	
Indicator - Effluent management according to standards / Total effluents generated by the project. - Absence of Significant Sediment Deposition: No perceptible accumulation of sediment should occur beyond the designated work area.	
Monitoring - The work site will be inspected daily. - Record sheet documenting the withdrawal and inspection of portable toilets by the contractor.	

Program 8: Effluent Management

- Sediment control measures will be assessed during site inspections and after significant rainfall events (defined as more than 10 mm of rainfall within 24 hours, resulting in site runoff). Assessments will also include the removal of accumulated sediment as needed.

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 9: Chemical Substances Management

Program 9: Chemical Substances Management	
Socio-environmental effects to be prevented or corrected:	Pollution resulting from inadequate management of chemical substances used in work activities.
Management Measures	
- If the contractor refuels heavy machinery near the worksite, tanker trucks must be used, and the following procedures must be considered: • Park the vehicle in a designated area with an unobstructed exit. • Keep fire extinguishers within 3 meters of the refueling site. • Ensure there are no potential ignition sources in the surrounding area. • Check that hose connections are properly secured before refueling. • Use spill containment trays to prevent ground contamination. • Immediately report any spills or fuel contamination to the DOE. • Maintain a refueling report and obtain authorization before fueling operations. - Place polyethylene material over areas where any corrective maintenance on heavy machinery (greasing and checking oil levels) will take place. The Site Supervision must be notified in advance, including details on the date, location, and reason for maintenance. - The designated Site Manager must report and clean up any fuel, oil, or hazardous substance spills. In the event of an accidental spill on the ground, they must be immediately cleaned up, and Site Supervision must be notified. If spills exceed approximately 5 liters, it must be treated as special waste and the affected soil must be removed for proper disposal. Small spills may be absorbed using synthetic absorbent materials, rags, sawdust, or sand. Final cleaning can be performed with water and detergent. - The maximum allowable daily fuel storage within the work area must be agreed upon with competent authority. Fuel and lubricant storage tanks must be located at least 6 meters from any building. Storage containers must be made of metal with spring-closed lids or plastic tanks properly labeled with the substance name and hazard warnings (“flammable” and “no smoking”). - An inventory of chemical products must be prepared before starting work, classifying them by type and associated physical and health risks. - All flammable substances must be securely stored under controlled conditions, with access restricted according to their hazard level. - Materials Safety Data Sheets (MSDS) must be available on-site, and employees must be informed about them during induction training. These sheets should include details on product identification, supplier information, hazard classification, safety measures, and emergency procedures. A registry of MSDS must be created and made accessible to all interested workers and representatives. Implement decontamination procedures for the equipment that has contained chemicals, ensuring that chemical residues are neutralized before their removal or recycling. - All liquid chemical substances used must be stored in containment berms and strict compliance with incompatibility. - When transferring chemicals to secondary containers, labels must be maintained with full identification and safety precautions. - Conduct training on safe chemical handling, emergency protocols, and proper use of Personal Proper Equipment.	
Monitoring and Compliance	
Indicator	• Percentage of compliance in inspections conducted on facilities and chemical substance management procedures.
Monitoring	

Program 9: Chemical Substances Management

- Registration forms for training key personnel in chemical substance management.
- Registration forms for chemical substances stored on-site.
- Report and authorization forms for fuel refilling.

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 10: Occupational and Community Health and Safety

Program 10: Occupational and Community Health and Safety	
Socio-environmental effects to be prevented or corrected:	Accidents and incidents impacting affect occupational and community health and safety
Management Measures	
The contractor shall ensure compliance with relevant standards and regulations, including best international practices (e.g., International Finance Corporation guidelines¹²⁴) by retaining a team of qualified professional advisors. All personnel must receive training on equipment operation, machinery use, and vehicle handling, in accordance with prevailing regulations and site safety protocols. All equipment and materials must be clearly and permanently identified, with appropriate signage and instructional materials for educational purposes. The contractor must supply Personal Protective Equipment (PPE) and provide comprehensive induction training, covering PPE types, proper usage, characteristics, and limitations.	
Occupational Health and Safety Subprogram A comprehensive assessment of job-specific risk factors, including an enumeration of the workers exposed to them, must be carried out. The following measures are recommended to enhance workplace safety: • Conduct Daily 5-Minute Safety Talks before starting work, focusing on risks associated with ongoing activities. • Develop and implement Safe Work Procedures for the safe execution of tasks, emphasizing adherence to established safety guidelines. • Regularly inspect and verify proper functioning of equipment, machinery, and essential safety equipment, such as fire extinguishers. • Ensure Materials Safety Data Sheets (MSDS) for chemical substances are readily accessible to workers. • Provide appropriate Personal Protective Equipment (PPE) to all workers on the construction site based on job-specific requirements and enforce its proper use. • Clearly mark work areas and storage zones using appropriate signaling to enhance awareness and prevent accidents. • Develop a comprehensive Emergency Preparedness and Response Plan (Program 15) and ensure that all workers receive training in its implementation. • Implement proper Waste Management (Program 7) by exercising control over the collection, treatment, and disposal of residues and waste, in compliance with sanitation and environmental regulations. • Verify that personnel operating machinery and vehicles hold the required licenses and certifications.	
<u>High-Risk Construction Activities & Specialized Protocols</u> Conduct training in Environmental, Health, Hygiene, and Occupational Safety. The following activities are classified as high-risk within the occupational context of this wastewater project, and demand a diligent commitment to safety protocols, continuous training, Work Permits, and strict adherence to established guidelines: • Deep Trenching, Excavation, and Shoring (crucial for sewer line installation along the narrow Placencia Road corridor to prevent soil collapse).	

¹²⁴ <https://www.ifc.org/en/insights-reports/general-environmental-health-and-safety-guidelines>

Program 10: Occupational and Community Health and Safety

- Confined Space Entry (mandatory atmospheric testing, continuous ventilation, and safety harness retrieval systems for workers entering sewage lift station wet wells, manholes, or underground vaults).
- Work at Heights and on Scaffolding (building construction at WWTP and lift station structures).
- Hot Work (Welding and pipe cutting).
- Electrical Work and Electromechanical Installations.
- Machinery Maintenance and Heavy Equipment Operation.
- Hazardous Wildlife Encounters (e.g., snakes, crocodiles in lagoon/mangrove areas, biting insects).
- Work over/adjacent to Water (life jackets and flotation equipment during WWTP platform reclamation or civil construction works and work near Placencia Lagoon).

Community Health and Safety Subprogram

This subprogram aims to address potential risks and impacts on the health and safety of communities affected by the project. The Contractor is required to conduct a comprehensive evaluation of the project's potential effects on the health and safety of these communities, with particular focus on vulnerable individuals. Based on this evaluation, the Contractor is expected to propose mitigation measures in strict adherence to the mitigation hierarchy. The assessment will cover the following key aspects:

- Comprehensive assessment of **traffic and road safety** to minimize adverse effects on the community.
- Implementation of clear and effective **signaling** and delineation measures at work sites to enhance safety and minimize potential hazards.
- Strict management and safety protocols for handling **hazardous materials** to prevent risks to public health and community safety.
- Evaluation of the project's **impact on natural habitats**, identifying potential risks and adverse effects on the environment and the community.
- Development and execution of a robust **Emergency Preparedness and Response plan** (Program 15) to ensure swift and effective actions in unforeseen circumstances.

The Contractor shall integrate these measures into project execution, demonstrating a commitment to responsible and conscientious management.

Labor Management Procedure Subprogram

The Contractor must develop and execute a comprehensive **Labor Management Procedure (LMP)** aligned with IDB ESPS 2, defining the roles and responsibilities of both the employer and the workers. This procedure applies to all personnel directly employed by the contractor as well as sub-contractors.

The LMP ensures that employment practices adhere to principles of equal opportunity, fair wages, reasonable working hours, and non-discrimination. Employing children or forced labor is strictly prohibited. The contractor and its subcontractors are expressly barred from employing individuals below the minimum age.

Additionally, the LMP must include:

- A mandatory Code of Conduct signed by all workers prohibiting Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), Gender-Based Violence (GBV), and illicit substance use.
- Mandatory GBV/SEA awareness training for all construction personnel during inductions.
- The establishment of an effective Worker Grievance Redress Mechanism (WGM), providing workers, and where applicable, their representative organizations, a formal channel to raise workplace concerns. This mechanism must feature confidential, anonymous intake channels

Program 10: Occupational and Community Health and Safety

capable of handling complaints related to sexual and gender-based violence with clear referral pathways to survivor support services in Belize. The contractor is responsible for ensuring that the system is accessible, transparent, and capable of delivering timely and fair resolutions.

Protection of Community Critical Infrastructure

For all works carried out under the Program, particularly the greenfield WWTP in Seine Bight, sewage pumping station plots, and pipe trenching along the Placencia Road corridor, the following measures will be implemented to protect sensitive receptors in the project area, including schools, health clinics, community centers, religious institutions, tourism resorts, and residential properties:

- **Identification and Mapping:** Clearly identify and map all sensitive receptors within the project area, ensuring their protection throughout the construction phase.
- **Communication and Notification:**
 - Inform affected communities and institutions about the project timeline, potential impacts, and mitigation measures.
 - Provide regular updates through community meetings, flyers, and digital communication platforms.
- **Noise and Vibration Control:**
 - Implement noise barriers where feasible and schedule high-noise activities during less sensitive times (e.g., outside school hours and hospital visiting hours).
 - Use low-vibration equipment and construction techniques to minimize disturbances.
- **Dust and Air Quality Management:**
 - Implement dust suppression measures, including water spraying and material covering to maintain air quality.
- **Traffic and Access Management:**
 - Develop and implement a traffic management plan to ensure safe and continuous access to sensitive receptors.
 - Coordinate with local authorities to regulate traffic flow and minimize congestion.
- **Emergency Response Planning:**
 - Establish emergency response protocols to address potential incidents promptly.
 - Maintain clear and unobstructed access routes for emergency vehicles (ambulances, police, fire services) at all times.

These measures shall be integrated into the project execution to minimize disruption and safeguard the well-being of the affected communities.

Monitoring and Compliance

Indicators

- Frequency rate (Total number of accidents x 200,000/Total man-hours worked in the period).
- Severity Index (Total number of serious accidents x 200,000/Total man-hours worked in the period).
- Fatal Accident Incidence Rate (Total number of fatal accidents x 200,000/Total number of exposed workers).
- PPE Compliance Rate (Total number of personnel using PPE according to the risk of the activity / Total number of workers).
- Insurance Coverage Rate (Total number of workers with Medical and Labor Insurance / Total number of workers).

Monitoring

- Workplace accident/incident formal investigation reports.

Program 10: Occupational and Community Health and Safety

- PPE distribution and inventory log forms.
- Daily Toolbox Talk sign-in sheets and OHS induction training records.
- High-Risk Activity Permits to Work (Confined Space Entry, Deep Trenching, Hot Work).
- Machinery and Lifting Equipment Technical Certification records.
- Job Safety Analysis (JSA) and risk inspection checklists.
- Signed Worker Codes of Conduct and WGM Grievance Logs.

Responsible for implementation	Works Director
Responsible for control	Works Inspector

Program 11: Traffic and Pedestrian Management

Program 11: Traffic and Pedestrian Management	
Socio-environmental effects to be prevented or corrected:	Accidents and incidents that affect occupational and community health and safety
Management Measures	
Contractors will prepare and implement the Traffic and Pedestrian Management Program in consultation with key stakeholders before the finalization of the Project. The Contractors will be responsible for ensuring the effective execution of this Program. The Traffic and Pedestrian Management Program will: • Identify the sensitive location along site access roads, including religious institutions, educational facilities, healthcare centers, and commercial areas. • Assess road conditions, traffic congestion points, and peak traffic periods. • Ensure availability of spill kits and emergency response equipment on vessels transporting fuels and/or hazardous materials. • Develop procedures to prevent accidental discharge of solid waste, sludge, wastewater, or hazardous materials into marine environments. • Pinpoint traffic hotspots such as road junctions, market areas, and school zones. • Deploy traffic marshals (signalmen) at identified high-risk locations. • Identify any necessary road repairs along site access routes. • Develop a Management Plan that considers local sensitivities, including religious gatherings, school hours, market activities and peak traffic times. • Establish procedures to ensure drivers, vessel operators and assistants comply with road safety requirements. • Implement measures to verify vehicle fitness certifications and vessel maintenance records to minimize air and noise pollution. • Monitor road conditions, promptly addressing any damage of roads, docking structures or public infrastructure to prevent significant impacts on local communities. If port, dock, or barge operations are required for the transport of materials or equipment, the following measures will apply: • Assess port conditions, peak traffic periods, loading and unloading areas and navigation constraints. • Consult with port authorities on scheduling materials and equipment to minimize disturbance to regular operating conditions and tourism-related services. • Implement safe loading and unloading procedures for equipment, fuel and hazardous materials, including spill prevention and containment measures at docks and barges. Contractors must ensure that all drivers are instructed on maintaining appropriate speeds in accordance with the Traffic and Pedestrian Management Program. Similarly, vessel operators must comply with established maritime speed limits, safe navigation practices, and weather advisories. Induction and training sessions shall be conducted for drivers, equipment operators, and vessel crews to promote safe transport practices. Strict enforcement of compliance with all applicable legal and project-specific safety regulations is mandatory to uphold safety standards.	
Monitoring and Compliance	
Indicators • Ratio of work fronts with signage in compliance with the approved Traffic and Pedestrian Management Program to the total number of work fronts requiring such signage. • Number of reported road accidents. • Number of reported maritime/spill accidents	
Monitoring	

Program 11: Traffic and Pedestrian Management

- Weekly inspection program
- Monthly inspection report
- Road safety accident records

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 12: Pest and Vector Control

Program 12: Pest and Vector Control	
Socio-environmental effects to be prevented or corrected:	Proliferation of pests and disease vectors
Management Measures	
To protect public health, the Contractor is strongly advised to engage a certified and experienced company responsible for the following tasks: Prevention (Primary Control Strategy) Priority shall be given to non-chemical preventive measures, including: • Elimination of standing water and waste materials that may serve as vector breeding grounds • Proper storage and daily removal of food waste • Sealing of structural gaps and openings to prevent rodent entry • Vegetation control around work areas • Maintenance of drainage systems • Coordination with Local Authorities: The contracted company must collaborate with local authorities to prevent the illegal dumping of solid waste on undeveloped neighboring properties and adjacent streets, ensuring a clean and sanitary environment. Monitoring • Regular inspection and monitoring of pest presence shall be conducted and documented. • Chemical control measures shall only be applied when monitoring indicates that pest populations exceed defined action thresholds posing public health or safety risks. • Monitoring records shall be maintained and made available for supervision. Chemical Use and Restrictions When chemical pesticides are required: • Products classified as WHO Class Ia (extremely hazardous) or Class Ib (highly hazardous) are strictly prohibited. • Preference shall be given to WHO Class III or U products. • Only nationally authorized pesticides shall be used. • Application shall be performed by certified personnel. • Material Safety Data Sheets (MSDS) must be available on site. • The company conducting pest disinfection must properly manage and dispose of all waste generated during operations. This includes the prompt removal of pest control containers, with documented evidence of proper disposal • PPE shall be mandatory for applicators. • The contractor must maintain records of pest monitoring, justification of chemical application recording type, quantity, date and location of application.	
Monitoring and Compliance	
Indicators • Threshold for pests (Number of Rodents, Number of mosquitos, etc.) • Ratio of completed pest and vector disinfection/control applications to the total planned applications outlined in the Program. Monitoring • Records of prevention measures	

Program 12: Pest and Vector Control

- Records of monitoring results pertaining number of pests and whether thresholds have been surpassed
- Verification of disinfection certificates to ensure compliance with the approved disinfection schedule, including planned fumigation dates, designated products, outlined safety protocols, Contingency Plan, etc.
- Confirmation of bait withdrawal and proper final disposal with proper documentation.

Periodicity of Supervision of the degree of Compliance and Effectiveness of the Measure

Monthly

Head of Audit

Construction Inspection

Program 13: Socio-Environmental training for construction personnel**Program 13: Socio-Environmental Training for Construction Personnel****Socio-Environmental effects to be prevented or corrected:**

Insufficient awareness among personnel regarding their role in environmental preservation, mangrove and marine ecosystem protection, and conservation, as well as their responsibility for maintaining occupational and community safety, preventing Gender-Based Violence (GBV) / Sexual Exploitation and Abuse (SEA) / Sexual Harassment (SH), respecting local Garifuna cultural dynamics in Seine Bight, while performing their duties.

Management Measures**Socio-Environmental Training**

To ensure all construction personnel are well-prepared for their roles and compliant with IDB Environmental and Social Performance Standards (ESPS 1 to 10), mandatory pre-operational EHS and Social Induction training sessions will be carried out before workers are granted access to project sites. Additionally, ongoing knowledge exchange, weekly toolbox talks, and training meetings will be held, tailoring content to meet the specific environmental and social requirements of each project work front (WWTP site in Seine Bight, lift stations, and pipeline trenching along Placencia Road). Emergency response protocols will also be conducted.

The planning and execution of these training sessions will be overseen by qualified safety, hygiene, and environmental and social professionals employed by the Contractor. The training program will cover a comprehensive range of topics, including, but not limited to:

- Basic environmental protection and pollution prevention.
- Risk assessment and control, with a focus on personnel safety, including high-risk operations (confined space entry in lift stations, deep trenching/shoring along Placencia Road, and exposure to untreated sewage/biological hazards).
- Environmental contingency management of spills, fires and other environmental incidents, including proper use of Personal Protective Equipment (PPE), first aid kits and spill kits.
- Fire prevention, suppression and safety measures.
- Waste management procedures.
- Protection of local ecosystem flora and fauna, especially related to threatened species and delicate mangrove habitats within the Belize Coastal and Nearshore Islands Key Biodiversity Area (KBA) and wildlife encounters (e.g., crocodiles, boa constrictors, manatees, and trigger bird species like the Reddish Egret).
- Safe handling of hazardous substances and chemical management.
- Awareness on Cultural Heritage and the Chance Find Procedure.
- Sociocultural sensitivity and respectful behavior toward local communities, with special emphasis on the Garifuna population in Seine Bight.
- Familiarization with the company's Code of Conduct awareness to understand workplace ethics and gender-related policies.
- Orientation on the Worker Grievance Redress Mechanism (WGM) and Community Grievance Redress Mechanism (GRM).

The implementation of this training program will ensure personnel possess a thorough understanding of critical environmental, social, health and safety protocols, thereby enhancing effective management of potential risks and emergencies.

Program 13: Socio-Environmental Training for Construction Personnel**Code of Conduct**

The Contractor is required to develop and enforce a comprehensive Code of Conduct for Site Personnel, as detailed in **Annex 1, Appendix A**. This code shall be integrated into employment contracts for both the Contractor and Subcontractors, in compliance with the Labor Management Procedures (LMP). To mitigate potential conflicts related to gender, social, political, cultural, or racial differences, the Contractor must implement appropriate measures to maintain order and discipline. These include preventing disorder among construction personnel, employees and Subcontractors, while safeguarding residents and ensuring the security of public and private property within the project's area of influence.

The Code explicitly prohibits harassment, violence, exploitation, and discrimination/racism. Adherence to this Code is mandatory for all project personnel, both during and outside of working hours. Violations will be subject to disciplinary actions, including sanctions, fines, or dismissal, depending on the severity of the infraction. All personnel, regardless of their position, must participate in training sessions and discussions related to the Code.

Furthermore, the Contractor is required to conduct, at least, two awareness activities on non-discrimination and gender equity, focusing on: 1) Prevention of child and adolescent sexual exploitation, including legal and criminal consequences under Belizean law; and 2) Promotion of positive workplace relationships, encouraging respectful interactions between men and women at the workplace and within surrounding communities.

Prior to these activities, the Contractor must submit an Action Plan for approval by Construction Management. This plan must outline those responsible for its implementation, methodology, and schedule. Upon completion, a comprehensive evaluation report with attendance lists signed by participants must be submitted.

Additionally, the Contractor must establish a workplace sexual harassment protocol, in coordination with Construction Management, to ensure a safe and respectful working environment.

Monitoring and Compliance**Indicators**

- Percentage of personnel trained in compliance with the Training Program (Target: 100% of inducted workers prior to site work).
- Percentage of completed training sessions relative to the total sessions required by the Training Program.

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 14: Disaster Risk and Climate Change Management Plan

Program 14: Disaster Risk and Climate Change Management Plan	
Socio-environmental effects to be prevented or corrected:	Human, economic, and environmental losses associated with natural hazards classified as critical, which may result in an emergency
Management Measures	
The Disaster Risk Management and Climate Change Plan is structured according to the different identified hazards. For each of these, strategies and action measures are established to mitigate or prevent the associated risks. In addition, a series of specific characteristics are defined for each hazard, such as: • Type: Measures may be Structural, involving civil works or physical control devices, or Non-Structural, related to the implementation of systems, programs, risk response and contingency action plans for the identified risks. • Application Stage: The proposed measures may be implemented during the Design, Construction, or Operation stages within the program development cycle. • Responsible Party and Stakeholder Engagement: Identifies the institution or individual responsible for the development and implementation of risk mitigation measures. It also considers the participation of third parties to ensure the sustainable implementation of the measures over time. The following sections present a portfolio of measures, including those to be considered during the engineering design, construction, and operation and maintenance (O&M) stages of the works. It is important to note that all the infrastructure components must be designed following the 2025 Belize Building Code, with special considerations for flood hazard areas and hurricane-prone regions¹²⁵. Prior to the commencement of works and throughout their execution, a direct communication channel will be established with the National Emergency Management Organization (NEMO)¹²⁶ to periodically monitor its official bulletins, alerts, and hazard maps. These will be integrated into the project's risk management system, assigning a responsible party to keep the information updated and coordinate the activation of emergency protocols upon the issuance of alerts by the institution.	

¹²⁵ https://www.agm.gov.bz/uploads/laws/686ef7234045c_BELIZE_BUILDING_CODE_2024_schedule_to_SI_No._80_of_2025_.pdf

¹²⁶ <https://site.nemo.org.bz/>

Program 14: Disaster Risk and Climate Change Management Plan							
Measures	Description	Design	Construction	O&M	Type of Project	Type of Measures (Structural / Non Structural)	Responsible for Execution
Measures against Flooding	Conduct hydrological and geotechnical investigations ¹²⁷ prior to final engineering designs to establish specific locations for new infrastructure that avoid flood hazard areas ¹²⁸ , determine specific foundation requirements, land stabilization, and surface water drainage systems for the wastewater infrastructure.	X			WWTP, Sewerage system and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection
	Design and construct the concrete Membrane Aerated Biofilm Reactor (MABR) tanks with sufficient structural freeboard above the Design Flood Elevation (DFE). Incorporate watertight seals, hydrostatic pressure relief valves, and waterproof coatings to prevent raw or partially treated wastewater	X	X		WWTP	Structural	Design Team, Contractor, Inspection

¹²⁷ As indicated in Section 1803 “Geotechnical Investigations” of the 2025 Belize Building Code, geotechnical investigations shall be conducted in accordance with Sections 1803.3 through 1803.5 and, where required by the building official or where geotechnical investigations involve in-situ testing, laboratory testing or engineering calculations, such investigations shall be conducted by a registered design professional.
https://www.agm.gov.bz/uploads/laws/686ef7234045c_BELIZE_BUILDING_CODE_2024_schedule_to_SI_No.80_of_2025_.pdf

¹²⁸ As indicated in the 1612 Section “Flood Loads” of the 2025 Belize Building Code, building officials are authorized to require the applicant to obtain and utilize any design flow elevation and floodway data available from a governmental or other source and determine the design flood elevation or floodway in accordance with accepted hydrologic and hydraulic engineering practices.
https://www.agm.gov.bz/uploads/laws/686ef7234045c_BELIZE_BUILDING_CODE_2024_schedule_to_SI_No.80_of_2025_.pdf

Program 14: Disaster Risk and Climate Change Management Plan								
	overflows or groundwater infiltration during extreme flood events.							
	Install differentiated site stormwater drainage and collection systems to capture, divert, and discharge surface runoff away from the MABR reactors and pumping infrastructure, sized for intense rainfall scenarios (design rainfall based on extreme tropical events incorporating climate change variability).	X	X		WWTP and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection	
	Elevate critical electromechanical components, transformers, control panels, and emergency standby generators above the Design Flood Elevation (DFE) incorporating long-term sea level rise projections.	X	X		WWTP and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection	
	Waterproof all underground concrete wet wells, electrical components, control panels, and wiring junctions to prevent water ingress and damage during flood events or groundwater level peaks.	X	X		Sewerage system, Sewage Pumping Stations, and WWTP	Structural	Design Team, Contractor, Inspection	
	Implement temporary erosion control, sediment retention ponds, and controlled trench dewatering during excavation, trenching, and site fill operations to prevent localized waterlogging and sediment runoff into		X		WWTP and Sewerage System	Structural	Contractor, Inspection	

Program 14: Disaster Risk and Climate Change Management Plan								
	adjacent residential areas and the Placencia Lagoon.							
	Equip all sewage pumping stations and the WWTP with automatic backup power generators (with at least 48 hours of fuel autonomy) and emergency retention capacity (wet wells) to maintain continuous conveyance/pumping during storm-induced power grid outages, preventing raw sewage overflows into nearby urban areas or receiving waters.	X	X	X	WWTP and Sewage Pumping Stations	Structural	Design Team, Contractor (Construction), EA (BWS) (O&M)	
	Develop and implement an Operational Emergency Response Protocol for flood and extreme weather events, including 24/7 standby repair crews, automated sensor monitoring, containment/cleanup procedures for potential wastewater spills, and Damage Assessment and Needs Analysis (DANA) protocols.			X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	EA (BWS) / Operator	
Measures against Storms and Hurricanes	Apply wind-resistant structural design standards for all above-ground control buildings, electrical panels, transformer housing, and lift station structures. Design heavy ballasting and anchored foundation systems for all subsurface/surface wet wells and tanks to prevent flotation, soil liquefaction, or lateral movement caused by severe	X	X		WWTP, Sewerage system and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection	

Program 14: Disaster Risk and Climate Change Management Plan

	storm surge and high groundwater table conditions.						
	Preserve existing mangrove and broadleaf vegetation buffer belts around the WWTP perimeter and incorporate native windbreak shelterbelts where feasible to reduce cyclone wind speeds, protect MABR tanks, blower housing, and control buildings from flying debris and wind-driven waves, and intercept airborne coastal debris.	X	X		WWTP	Structural	Design Team, Contractor, Inspection
	Incorporate storm surge protection, slope armoring (e.g., riprap, geotextile lining, or turf reinforcement mats), and soil stabilization on the WWTP reclaimed platform boundaries to prevent wave scouring, structural erosion, and breaches during severe cyclone events.	X	X		WWTP	Structural	Design Team, Contractor, Inspection
	Install heavy-duty, weather-enclosed automatic backup generators equipped with elevated fuel storage tanks (sized for a minimum of 48 to 72 hours of continuous operation) positioned above projected storm surge levels at the WWTP and all sewage lift stations to ensure uninterrupted pumping and MABR process aeration during power grid blackouts.	X	X	X	WWTP and Sewage Pumping Stations	Structural	Design Team, Contractor (Construction), EA (BWS) (O&M)
	Develop and implement an Operational Hurricane Preparedness and Lockdown Protocol within the ESMP, detailing pre-storm actions (e.g., securing loose materials, locking down chemical/fuel			X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	EA (BWS) / Operator

Program 14: Disaster Risk and Climate Change Management Plan								
Measures against Sea Level Rise and Coastal Erosion	storage areas, pre-testing backup generators, and pre-positioning emergency repair crews) prior to storm landfall.							
	Execute post-event structural, operational, and environmental inspections immediately after tropical storms or hurricanes to evaluate physical damage to force mains, lift stations, and MABR reactor units (including membranes and blowers). Implement Damage Assessment and Needs Analysis (DANA) protocols, rapid pipe/pump repairs, containment of potential raw sewage spills, and water quality testing in the Placencia Lagoon and coastal waters.			X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	EA (BWS) / NEMO Operational Committees	
	Incorporate downscaled long-term climate projections for Sea Level Rise into final engineering designs, establishing required hydraulic head, finished floor elevations, and infrastructure setbacks away from shoreline erosion zones.	X			WWTP, Sewerage system and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection, BWS	
	Elevate concrete MABR reactor tanks, structural platforms, and critical mechanical equipment above projected mean sea level rise and extreme tide levels. Implement slope armoring (riprap, geotextiles) and conserve/replant native mangrove buffer strips along the Placencia Lagoon shoreline to provide natural coastal	X	X		WWTP	Structural	Design Team, Contractor, Inspection	

Program 14: Disaster Risk and Climate Change Management Plan								
	defense against wave erosion and long-term shoreline loss.							
	Utilize high-density polyethylene (HDPE), marine-grade concrete, stainless steel/fiberglass fittings, and specialized anti-corrosion coatings for subsurface pipes, force mains, wet wells, and pumping equipment to prevent accelerated deterioration caused by saltwater intrusion into the shallow unconfined freshwater aquifer.	X	X		WWTP, Sewerage system and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection	
	Install water-tight pipe joints, sealed manholes, and tidal backflow/check valves on effluent overflow lines and stormwater outlets to prevent high-tide/SLR saltwater ingress into the sewage collection network and treatment facilities.	X	X		WWTP, Sewerage system and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection	
	Establish an operational groundwater and salinity monitoring network (piezometers/salinity sensors) around the WWTP site and coastal pipeline corridors to track sea level rise-induced saltwater intrusion dynamics, water table rises, and potential impacts on biological wastewater treatment processes.			X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	EA (BWS) / Operator	

Program 14: Disaster Risk and Climate Change Management Plan

	Conduct regular physical inspections of shoreline positions and embankment stability along the WWTP lagoon interface and coastal utility corridors. Implement an adaptive shoreline management protocol to deploy supplementary coastal protection (e.g., living shorelines, localized armoring) as sea level rise advances over the operational life cycle.			X	WWTP and Sewerage System	Non-Structural	EA (BWS) / Operator
Measures against Extreme Heat and Drought	Implement dust suppression protocols during dry periods, including regular water spraying of unpaved access roads and exposed soils at the WWTP site, covering transported materials with tarpaulins, and keeping stockpile volumes to a minimum to mitigate atmospheric particulate emissions.		X	X	WWTP and Sewerage System	Non-Structural	Contractor, Inspection (Construction), EA (BWS) (O&M)
	Establish occupational health and safety protocols for construction and operational personnel during high-temperature periods, including mandatory hydration stations, shaded rest areas, work rotation during peak solar hours, and heat stress monitoring.		X	X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	Contractor, Inspection (Construction), EA (BWS) (O&M)
	Develop an Operational Emergency Response and Fire Prevention Protocol within the ESMP, incorporating regular clearing of dry brush and dead			X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	EA (BWS) / Operator

Program 14: Disaster Risk and Climate Change Management Plan

	vegetation around the WWTP site perimeter and pumping stations, creating firebreaks, and maintaining on-site fire suppression equipment to address bushfire risks during severe dry spells.							
	Specify heat-resistant, UV-stabilized materials and thermal insulation or protective shading covers for exposed control panels, electrical wiring junction boxes, back-up generators, and mechanical equipment to prevent thermal degradation and heat-induced system trips.	X	X		WWTP, Sewerage system and Sewage Pumping Stations	Structural	Design Team, Contractor, Inspection	
Early Warning Systems	Implement monitoring systems based on hydrometeorological variables to establish early warning mechanisms and define coordinated response protocols involving relevant stakeholders.			X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	EA, Local Government, BWS	
Regular Maintenance and Inspection	Conduct regular maintenance and inspections of critical structures, with a focus on structural anchors and safety measures to ensure resilience to natural hazards.		X	X	WWTP, Sewerage system and Sewage Pumping Stations	Non-Structural	EA, Local Government, BWS	

Program 15: Emergency Preparedness and Response**Program 15: Emergency Preparedness and Response****Socio-environmental effects to be prevented or corrected:**

Mitigate human, economic, and environmental losses associated with natural hazards (hurricanes, tropical storms, coastal storm surges, heavy rainfall/flooding, bushfires, extreme heat) and construction site operational emergencies (trench collapse/cave-in along Placencia Road corridor, hazardous material/fuel spills from heavy machinery, confined space accidents in pump station wet wells, fire at staging areas, accidental strikes on existing public utility lines, worker injuries). Protect areas of social, economic, and sensitive environmental interest (Seine Bight and Placencia communities, tourist corridors, Placencia Lagoon, and adjacent mangrove ecosystems) within the direct area of influence of construction works.

Management Measures**Strategic Plan: Contingency Prevention and Control Strategies.**

The Contractor and Operating Agency shall establish a site-specific Emergency Preparedness and Response Plan prior to physical mobilization. This plan must establish direct communication channels and active coordination with the National Emergency Management Organization (NEMO), the Belize National Fire Service, Belize Police Department, Belize Coast Guard / Port Authority, Department of the Environment (DOE), and local health facilities (Placencia and Seine Bight Health Clinics).

Contractor Responsibilities:

- Ensure full compliance with all applicable regulations, rules, procedures, and instructions related to occupational health and safety.
- Identify and mitigate potential risks that could result in workplace accidents or occupational illnesses.
- Detect and promptly address unsafe conditions within work areas.
- Implement and enforce the standards and procedures outlined in the Environmental Management Plan.
- Develop and execute programs to improve working conditions and enhance safety measures during project implementation.
- Conduct training and awareness campaigns for workers on occupational health and safety protocols.
- Regularly communicate job-specific risks to workers, including environmental hazards, extreme weather alerts, and preventive measures.
- Ensure that the design, engineering, construction, operation, and maintenance of equipment comply with approved safety standards and procedures.
- Establish and implement preventive and routinary maintenance programs for machinery, equipment, and facilities.

Program 15: Emergency Preparedness and Response

- Facilitate inspections and investigations related to occupational health and safety, as required by competent authorities.
- Provide appropriate personal protective equipment (PPE) based on risk assessments, according to Industrial Safety regulations.
- Develop a **site-specific** emergency response plan prior to operations and update it dynamically during construction phases.
- **Coordinate emergency procedures with the National Emergency Management Organization (NEMO), Fire Department, Police, Coast Guard, DOE, and local health services.**
- Ensure the availability of necessary resources and materials for an effective emergency response.
- Identify evacuation routes, safe assembly points, and **official NEMO** hurricane shelters in Seine Bight and Placencia.
- Establish a clear chain of command and emergency response brigade.
- Implement Hurricane Preparedness Protocols that include securing loose materials and containers, anchoring lightweight structures and temporary shutdown of procedures before storm landfall.
- Maintain spill kits and establish immediate containment procedures, including temporary storage of hazardous materials.
- Ensure all contracted transportation (land and maritime) comply with safety regulations and avoid transport during severe weather alerts.

Employee Responsibilities:

- Perform all tasks with the highest level of care, ensuring compliance with safety standards, environmental regulations, and the guidelines outlined in the management plan programs.
- Continuously monitor machinery and equipment to promptly identify and report potential risks or hazards to supervisors. Address any human, physical, mechanical, or environmental issues that arise during operations.
- Operate only authorized machinery and prevent unauthorized personnel from handling equipment under their responsibility.
- Strictly prohibit the possession and consumption of alcoholic or intoxicating substances in the workplace and ensure no work is conducted under their influence.
- Workers operating machinery with moving parts must avoid loose clothing, jewelry, or accessories that could give rise to safety risks. Long hair must be securely tied back with a cap or hairnet.
- Properly use, maintain and safeguard company-provided tools, safety devices, and PPE. Ensure workplaces remain clean and organized.
- Actively participate in company-approved programs aimed at preventing occupational accidents, illnesses, and community health risks.
- Immediately report any procedures or operations that violate safety regulations or pose a risk to individuals, colleagues, or company assets.
- Vehicle drivers must comply with internal traffic regulations and all applicable rules within protected areas during work.
- Propose activities to enhance occupational health and workplace safety.
- Implement emergency response actions as specified in established protocols and strategies.

Action Plan

Program 15: Emergency Preparedness and Response

1. Hurricane and Severe Storm Response:

The Contractor is responsible for Hurricane and Severe Storm prevention and control in the workplace. In the event of a Hurricane or Severe Storm, the following actions must be taken:

- **Early Warning & Alert Activation:** Establish continuous monitoring of official NEMO bulletins and meteorological advisories. Automatically activate phased construction shutdown upon NEMO Warning Stage.
- **Construction Site Lockdown:** Secure all scaffolding, formwork, cranes, temporary perimeter fencing, and site trailers. Store all diesel fuels, lubricants, and construction chemicals in covered, secondary containment structures far from the lagoon shoreline.
- **Trench & Soil Stabilization:** Prior to storm arrival, backfill completed pipe trenches or install rigid shoring along the Placencia Road corridor; cover exposed earth stockpiles and filled areas at the WWTP site in Seine Bight with geotextiles/tarpaulins to prevent sediment erosion into Placencia Lagoon.
- **Equipment Relocation:** Move heavy machinery, vehicles, and portable generators to elevated, pre-designated safe staging grounds away from storm surge inundation zones.
- **Evacuation:** Order orderly evacuation of construction personnel to official NEMO shelters in Seine Bight and Placencia Villages.
- **Post-Storm Construction Site DANA Protocol:** Immediately following cyclone passage, execute a Damage Assessment and Needs Analysis (DANA) across all active construction fronts (WWTP site, lift station plots, and pipe trenches) to verify structural stability before resuming civil works.

2. Flooding, Intense Rainfall, and Trench Inundation Response:

- **Controlled Dewatering & Sediment Retention:** Deploy heavy-duty submersible dewatering pumps with sediment trap filter bags during intense rainfall events to pump out infiltrated groundwater/rainwater from open sewer trenches. Prevent sediment-laden runoff from entering Placencia Lagoon or surrounding residential areas in Seine Bight.
- **Trench Inundation Safety:** Immediately suspend all work inside open excavations during heavy downpours. Inspect trench walls for signs of water saturation, erosion, or imminent collapse before allowing workers to re-enter.
- **Electrical Safety:** Automatically disconnect and isolate temporary electrical distribution panels and generators on flooded work fronts to eliminate electrocution hazards.

3. Deep Trench Collapse and Excavation Emergency Response:

(Specific to pipe network installation along Placencia Road and pump station wet wells)

- **Work Stoppage & Isolation:** In the event of a trench wall collapse or soil cave-in, immediately shut down all adjacent heavy equipment to eliminate ground vibrations.
- **Emergency Rescue Protocol:** Activate the Site Emergency Response Brigade. Deploy specialized trench shoring, rescue ladders, and manual excavation tools. **Machinery must never be used for direct digging near trapped personnel.**
- **Medical Response:** Provide immediate CPR/first aid on site and dispatch the victim via emergency vehicle to the Placencia Health Clinic or Southern Regional Hospital.

4. Hazardous Material & Fuel Spill Emergency Response:

- **Source Shutdown:** Instantly shut off engine/valve source and eliminate all ignition sources within 50 meters.

Program 15: Emergency Preparedness and Response

- **Spill Kit Containment:** Immediately deploy oil-absorbent booms and pads from on-site spill kits to contain fuel/oil spills on the permeable sandy soil.
- **Waterbody Protection:** Place physical barriers or absorbent booms around drainage inlets, culverts, and lagoon shorelines to prevent fuel/chemical infiltration into the shallow freshwater lens or Placencia Lagoon.
- **Remediation & Disposal:** Excavate contaminated sand/soil, package it in sealed hazardous waste drums, and transfer it to licensed facilities via the Placencia Transfer Station. Submit an Environmental Incident Report to the Department of the Environment (DOE) within 24 hours.

5. Confined Space Rescue Protocol during Lift Station Construction:

- **Atmospheric Testing:** Mandatory continuous gas testing (oxygen, H_2S , combustible gases) prior to and during worker entry into wet wells or deep vaults.
- **Emergency Retrieval:** All workers entering confined spaces must wear full-body harnesses connected to an external rescue tripod and mechanical winch.
- **Rescue Operation:** In case of worker collapse or gas alarm, pull the worker out using the mechanical winch from outside the confined space. **Direct unequipped entry by rescuers is strictly prohibited without Self-Contained Breathing Apparatus (SCBA).**

6. Construction Site Fire Prevention and Emergency Response:

- **Fire Suppression:** Utilize portable Type A:B:C fire extinguishers pre-positioned at construction staging areas, fuel storage depots, and heavy machinery to extinguish localized fires.
- **Fire Department Activation:** Immediately call the Belize National Fire Service if a fire cannot be contained within the first 60 seconds using portable extinguishers.
- **Site Evacuation:** Sound site emergency sirens and evacuate all workers upwind to designated assembly points.

7. Accidental Public Utility Line Strike Emergency Protocol:

- **Water Main Rupture:** If a BWS water main is struck during trenching, immediately shut down excavation, isolate the area, and notify BWS emergency repair teams while managing localized flooding using trench pumps.
- **Electrical Cable Strike:** If an underground electrical cable or overhead line is contacted, immediately freeze equipment, keep personnel at a safe distance (minimum 10 meters), and contact Belize Electricity Limited (BEL) for immediate line de-energization.

8. Extreme Heat and Worker Health Emergencies:

- **Heat Exhaustion Protocol:** Move affected workers showing dizziness, confusion, or weakness to shaded rest areas, remove heavy PPE, apply cool water compresses, and provide hydration.
- **Medical Evacuation:** In cases of heat stroke or severe traumatic injury, transport the worker immediately to the nearest health center using the dedicated site emergency transport vehicle.

Monitoring and Compliance

Program 15: Emergency Preparedness and Response**Indicators**

- Ratio of environmental and health incidents managed according to established procedures to the total number of environmental and health incidents recorded in the project.
- Number of operational emergency brigades in the Project relative to the total brigades defined in the Natural Disaster Preparedness and Response Plan.
- Number of trained emergency brigades relative to the total brigades defined in the Natural Disaster Response Plan.
- Number of drills conducted relative to the total number of scheduled drills.

Responsible for implementation	Works Director
Responsible for control	Works Inspector

Program 16: Community Information and Participation

Program 16: Community Information and Participation	
Socio-environmental effects to be prevented or corrected:	Public misinformation regarding the progress and tasks of the project.
Management Measures	
Scope The Community Information and Participation Program shall be implemented throughout the Project lifecycle.	
Measures - The Contractor shall implement the Community Information and Participation Program consistently throughout the Project lifecycle, ensuring clear, transparent, and timely communication with all beneficiaries and stakeholders. - Information disclosure shall include the installation of one or more visible Project information boards within the area of intervention. These boards shall contain, at minimum: (i) a brief description of the Project; (ii) start and anticipated completion dates of each phase of works or specific temporary impacts; and (iii) detailed information on the Grievance Redress Mechanism (GRM), including contact details. - The Contractor shall provide advance notice, at least three (3) days prior where applicable, of planned public service interruptions, traffic diversions, or other temporary disruptions associated with construction activities. Brief notices may be disseminated through municipal social media platforms, local radio stations, and other locally appropriate communication channels. - Accessible communication channels should be established and maintained throughout the construction period. These shall include a contact telephone number, a dedicated email address, a web-based interface where feasible, and a physical suggestion and complaint box located in a safe, visible, and accessible location near each construction front. The physical suggestion box shall be clearly signposted and placed in a secure location. - A publicly accessible complaints log or register shall be maintained. This register shall record the date of submission, the nature of the complaint or suggestion, the actions taken, the date of response, and the resolution status. All grievances, comments, and suggestions shall be reviewed promptly and responded to in a timely manner. Records shall be made available for review by the Works Inspection and relevant authorities upon request. - The Contractor shall implement a structured community engagement framework for stakeholders affected by the Project during construction activities. Engagement activities may include door-to-door outreach in directly affected areas, distribution of informational leaflets, and periodic updates regarding construction schedules, restrictions, and progress. Communication shall clearly inform stakeholders of access restrictions, potential hazards, and safety measures including but not limited to: i) businesses located within the direct area of influence of the construction fronts; ii) nearby schools and healthcare facilities; iii) commercial transport operators, including water taxis that may be affected by the increased maritime traffic during transportation of equipment and materials; iv) residents and property owners in the direct area of influence. - Special consideration shall be given to ensuring equal access to information for all interested social sectors, promoting gender equality and inclusive participation.	

Program 16: Community Information and Participation

- In cases where construction activities temporarily affect formal or informal economic activities, the Contractor shall implement measures to avoid and minimize disruptions to businesses, vendors, and other income-generating activities. Measures shall include:

- Prior to works: identify potentially affected businesses and economic activities; provide advanced information on the location, schedule, expected duration, potential access restrictions, and mitigation measures; and coordinate the timing of works, where feasible, to avoid peak commercial periods.
- During works: maintain continuous communication with affected parties and ensure safe and continuous pedestrian access to businesses and properties. Where regular access is temporarily obstructed, temporary walkways, crossings, ramps, or alternative access routes shall be provided and clearly signposted. Access for deliveries and essential business activities shall also be maintained where feasible.
- Construction methods: minimize the duration of each construction front and, where technically feasible, apply methods allowing trenches to be opened, pipes installed, and trenches backfilled within the same day. Construction materials and equipment shall not unnecessarily obstruct commercial areas or access points. Measures to control dust and noise shall be implemented, particularly in areas with businesses adjacent to construction fronts.
- Vulnerable activities: particular attention shall be given to businesses and economic activities operated by vulnerable persons or households, with additional measures implemented where necessary to avoid disproportionate impacts.
- Monitoring and reinstatement: the Contractor shall maintain records of affected businesses, communications, construction periods, access restrictions, and complaints received. Regular field inspections shall verify that access is maintained and that mitigation measures are effective. Any temporary relocation shall be coordinated with the affected party, and affected areas shall be promptly reinstated upon completion of the works.

- Prior to commencement of works, the Contractor shall coordinate with local authorities regarding potential traffic circulation modifications. Adequate signage shall be installed to indicate detours, normal circulation routes, and emergency exits in accordance with applicable regulations. All vehicles used for transporting excavated material shall comply with traffic regulations, load limits, cargo transport permits, and all other applicable legal requirements.

- The Contractor shall maintain accurate and up-to-date records of Project implementation, community engagement activities, grievances received, and corrective actions taken. The Contractor shall promptly respond to inquiries, observations, complaints, and claims from the Works Inspection and shall proactively identify and address any emerging social concerns.

Monitoring and Compliance**Indicators**

- Percentage of complaints properly managed during the month in accordance with the defined mechanism, relative to the total number of complaints received.
- Percentage of public consultations carried out relative to the total number of required public consultations.

Responsible for implementation

Works Director

Responsible for control

Works Inspector

Program 17: Chance Find Procedure

Program 17: Chance Find Procedure	
Socio-environmental effects to be prevented or corrected:	Destruction of historical, cultural, archaeological, and paleontological heritage.
Management Measures	
This program will be systematically implemented throughout the duration of the project, with the following key provisions: • Continuous Monitoring: A permanent monitoring initiative will be maintained across all areas directly affected by the project to identify any archaeological remains. • Immediate Response to Discoveries: If any objects or structures of potential archaeological significance are discovered, the construction team must immediately halt all activities that could impact the affected area. Appropriate security measures will be implemented to prevent unauthorized access and looting. • Consideration of Alternative Worksite: If necessary, the project team will evaluate alternative locations for activities to minimize potential impacts on archaeological resources. • Notification of Competent Authorities: The National Institute of Culture and History will be promptly informed of any findings within 14 days of the discovery, and the project will comply fully with their instructions regarding further actions. • Inspection: The Director of the Institute of Archaeology typically inspects the find and can decide whether the national interest would be served by acquiring the monument or antiquity. The Ministers decision is formalized by publishing a notice in the Belize Gazette. • Comprehensive Reporting: Upon project completion, a final report will be prepared, detailing the quantity, nature and cultural significance of the materials recovered. Consultation with Authorities: The competent authority will be consulted on the appropriate procedures for the documentation, handling and delivery of archaeological materials, ensuring full compliance with legal and ethical standards.	
Monitoring and Compliance	
Indicators	
• Number of archaeological and cultural resources found and managed according to the defined procedures relative to the number of archaeological and cultural resources found.	
Responsible for implementation	Works Director
Responsible for control	Works Inspector

Program 18: Coordination with Service Providers

Program 18: Coordination with Service Providers	
Socio-environmental effects to be prevented or corrected:	Disruption of services caused by infrastructure damage during construction activities.
Management Measures	
Service Providers The Contractor shall establish clear and efficient coordination mechanisms with utility service providers to manage potential interferences between construction activities and existing infrastructure. In consultation with the Site Inspection team, the Contractor will develop and propose the most appropriate solutions, reaching a consensus with the relevant utility companies (BWS, Belize Electricity Limited) to ensure minimal disruption to users. Additionally, contingency measures will be put in place to promptly address any unforeseen interferences that may compromise service provision. From the outset of the project, the Contractor will be responsible for obtaining the necessary permits for use of services and coordinating with the technical teams of the utility service providers. The Contractor shall conduct a comprehensive inventory of existing public utility networks in accordance with the contract specifications and project plans, ensuring the identification and precise location of any lines that may be affected by construction activities. Each utility company shall designate a coordinator to participate in project oversight committees, facilitating effective communication and efficient management of all expansion, repair, or replacement work within the project intervention area. In cases where the removal or relocation of utility infrastructure is required, the Contractor shall first identify the precise locations of affected public utility lines within the intervention area, following project design plans and utility company records. Before proceeding with any modifications, the contractor shall obtain formal approval of relocation plans from the respective utility companies before proceeding with any modifications.	
Monitoring and Compliance	
Indicators Ratio of network service interruptions caused by construction activities to those coordinated with service providers.	
Responsible for the measure implementation	Works Director
Responsible for the control of the measure	Works Inspector

6.2.2. Operational Environmental and Social Management Plan

This ESMP provides mitigation measures for the negative impacts and risks for **the operation and maintenance phase** of the implementation of the projects.

Table 36 outlines the minimum requirements that the Environmental and Social Management Plan must meet for the Operational Phase.

During the Operational Phase, the Executing Agency (EA) will oversee the operation and maintenance of the infrastructure to be built and of the equipment and machinery, according to the guidelines presented below.

Table 36 - Operational Environmental and Social Management Plan

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
Preventive Maintenance Program	Placencia Peninsula WWTP and Sewerage System	Accidental leaks, raw sewage overflows, structural failures, and the generation of nuisance odors that could lead to microbiological and nutrient contamination of groundwater, the Placencia Lagoon, and/or the Caribbean Sea.	-Ensure the strict implementation of operational, data-driven, and preventive maintenance protocols at the WWTP to continuously meet the required effluent standards for nutrient removal. -Ensure rigorous daily management of the MABR units to maintain optimal biological conditions (e.g., regulating dissolved oxygen levels, optimizing air scour/supply rates, and monitoring biofilm thickness on the membrane surfaces) and minimize the occurrence of foul odors. - Conduct regular maintenance and structural inspections of critical assets, pipelines, MABR reactor tanks, focusing on structural anchors, seals, blowers, and safety devices to ensure long-term resilience against natural hazards.	Belize Water Services Limited (BWS)	Recordkeeping of: -Routine inspections of force mains, pump seals, MABR reactor tanks. -Maintenance and testing logs for all machinery and backup generators (including monthly testing and fuel checks). -Grievance Mechanism records demonstrating the absence or rapid resolution of complaints related to system failures, sewage leaks, or odors.	DOE / BWS

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			-Maintain machinery, equipment, and automatic backup power generators in proper working condition, including sufficient fuel reserves (at least 48 hours) to guarantee uninterrupted operation during power outages. - Asses the addition of stabilization and pathogen reduction measures for wastewater sludge prior to its reuse or final disposal, as appropriate. Treatment methods may include composting, anaerobic digestion, or thermal drying systems achieving sufficient time-temperature conditions for pathogen reduction. - Ensure that Wastewater sludge is stored, handled, and treated in designated areas with appropriate containment and impermeable surfaces, as applicable to the selected			

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			sludge management system, to prevent direct contact with soil and infiltration into groundwater. Storage and treatment areas must be located away from drainage channels, surface water bodies, and areas vulnerable to groundwater contamination. Ensure that Wastewater sludge is handled, stored, and treated in a manner that minimizes the generation and dispersion of odors.			
Water Quality Monitoring Program	Placencia Peninsula WWTP and Sewerage System	Contamination of the Placencia Lagoon, the Caribbean Sea, and the shallow groundwater lens due to inadequate wastewater treatment, which could	- Ensure the effluent strictly complies with the Belize Environmental Protection (Effluent Limitations)¹²⁹ Regulations for Class I Waters and IDB standards. -Class I Effluent Limits: Mandatory parameters must not exceed: Total Suspended Solids: 30 mg/L	Belize Water Services Limited (BWS)	Key Indicators: - Compliance Rate with Class I effluent parameters (Target: 100% compliance). - Number of non-conformities identified and average time to resolve corrective actions. - Frequency of submitted monitoring reports.	Department of the Environment (DOE) / Ministry of Health

¹²⁹ [Environmental Protection \(Effluent Limitations\) Regulations, Chapter 328 \(1995\).](#)

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
		lead to eutrophication, coral reef degradation, and severe public health risks.	- Biochemical Oxygen Demand (BOD₅): 30 mg/L - PH: 5-10 pH units - Fats, Oil and Grease: 15 mg/L - Faecal Coliform (<i>E.coli</i> (freshwater) and <i>Enterococci</i> (saline water))): - Faecal Coliform: 200 mpn/100 ml; or (a) <i>E. coli</i>: 126 organisms/100ml; (b) <i>enterococci</i>: 35 organisms/100ml - Floatables: Not visible. <u>Specific sampling locations and frequencies will be defined in conjunction with the DOE. The following monitoring protocol is provided as a reference baseline, which must be formally approved by the regulatory entity prior to project commissioning:</u> -Conditional Sampling Locations: Establish three geo-		Recordkeeping of: - Certified laboratory test results for routine monthly effluent quality (Station 1). - Quarterly receiving water quality monitoring reports (Stations 2 & 3). - Calibration and maintenance logs for on-site monitoring equipment (e.g., flowmeters, pH meters). - Corrective action reports and process adjustment logs deployed during non-conformities. - Copies of compliance reports submitted to the environmental authority.	

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			referenced monitoring stations: - Station 1 (WWTP final effluent outfall): Mandatory monthly monitoring prior to environmental release. - Station 2 (Receiving Environment): Located within the mixing zone (50m from outfall coordinates in either the Placencia Lagoon or Caribbean Sea, depending on final design). - Station 3 (Receiving Environment): Located at a strategic up-current ambient control point. -Sampling Frequencies: - Station 1 (Effluent): Monitored monthly - Stations 2 and 3 (Receiving Waters): Monitored quarterly to track nutrient fate and ecological health. - Ensure strict compliance with project-specific nutrient removal standards to protect			

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			the lagoon's assimilative capacity. - Maintain an active contract with a certified environmental laboratory to ensure timely and accurate testing of all required parameters.			
Flora and Fauna Management Program	Placencia Peninsula WWTP and Sewerage System	Disruption of local wildlife populations, degradation of mangrove/coastal vegetation within the Key Biodiversity Area (KBA), and failure of compensatory habitats during routine operations.	- Continuity of the Biodiversity Action Plan (BAP). Implementation of an operational-phase wildlife and vegetation management program incorporating long-term measures identified by the Forest Department, Fisheries Department, and CZMAI for ecosystem protection. - Long-term periodic monitoring and maintenance of the replanted native coastal and mangrove species. - Implement a strict protocol for safely managing hazardous wildlife encounters at the WWTP and pumping stations without harming the animals.	Belize Water Services Limited (BWS)	Recordkeeping of: - Written Operational Flora and Fauna Management Program (or updated BAP) detailing measures approved by environmental authorities. - Training and induction records of BWS personnel regarding biodiversity conservation, the BAP, and the Wildlife Encounters Protocol. - Inspection logs of the revegetated/restored mangrove cover, indicating growth status, survival rates, and any required seedling replacements. - A formal log of Wildlife Encounters at the facilities and the exact measures applied to safely manage them.	DOE / Forest Department / Fisheries Department / CZMAI

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			- Strict execution of operational maintenance protocols at the WWTP to ensure continuous nutrient removal efficiency, directly fostering the recovery of seagrass meadows and protecting the marine habitats. - Enforce strict prohibition of hunting, poaching, fishing, or unauthorized vegetation collection by BWS operational staff. Maintain low vehicle speeds (20-30 km/h) and minimize high-noise activities at dawn/dusk to prevent disturbing trigger bird species (like the <i>Reddish Egret</i>).			
Occupational Health and Safety Program	Placencia Peninsula WWTP and Sewerage System	Occupational accidents, physical injuries, and severe health hazards during routine operation and maintenance tasks, including	- Develop and implement an Operational Occupational Health and Safety Program aligned with current national regulations and incorporating principles from globally recognized systems like ISO 45001:2018. - Implement strict, mandatory Confined Space Entry	Belize Water Services Limited (BWS)	Indicators: - Frequency Index (Total number of accidents x 200,000 / Total man-hours worked in the period). - Severity Index (Total number of days lost due to serious accidents x 200,000 / Total man-hours worked in the period).	Competent authority (Labor Department / Ministry of Health / DOE)

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
		exposure to toxic/asphyxiating gases in confined spaces, biological pathogens in raw wastewater, and chemical hazards	Procedures for all work involving manholes and wet wells. This must require atmospheric gas testing, mechanical ventilation, the use of safety harnesses, and standby personnel. - Reinforce clear occupational health and safety signage and protocols at all operational facilities. - Provide continuous worker immunization, adequate Personal Protective Equipment (PPE), and safety training. - Establish an Operational Contingency and Emergency Response Plan to ensure timely responses to medical emergencies.		- Fatal Accident Incidence Rate (Total number of fatal accidents x 200,000 / Total number of exposed workers). Records: - Confined Space Entry Permits and atmospheric testing logs. - Workplace accident and incident formal investigation reports. - PPE distribution logs and OHS training records.	
Emergency Preparedness and Response	Placencia Peninsula WWTP and Sewerage System	Environmental contamination, risks to public health and safety, occupational accidents (e.g., confined space	Development and implementation of a site-specific Operational Emergency Preparedness and Response Plan (EPRP) prior to operation. This plan must establish active coordination with the National Emergency	Belize Water Services Limited (BWS)	Recordkeeping of: - Approved Operational Emergency Preparedness and Response Plan (EPRP). - Training records, attendance sheets, and formal emergency drill simulation reports.	NEMO / Department of the Environment (DOE) / Ministry of Health

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
		incidents), fires, raw sewage spills, force main ruptures, hazardous material/fuel releases, flooding/storm surge impacts, and inadequate response to natural hazards (hurricanes).	Management Organization (NEMO), Fire Department, Police, Coast Guard, DOE, and local health clinics. The plan must include at a minimum: - Identification of potential emergency scenarios: Power grid failures, raw sewage overflows, force main ruptures, fires, fuel/chemical spills, extreme weather (floods, hurricanes, storm surges, extreme heat), and occupational emergencies. - Hurricane and Severe Storm Protocol: Pre-storm lockdown, securing and verifying the structural anchorage of MABR modules, sealing above-ground blower vents, locking down chemical and fuel storage areas against flotation, pre-testing backup generators(ensuring 48 to 72 hours of fuel autonomy), and pre-positioning 24/7 standby repair crews.		- Maintenance and inspection logs of emergency equipment (fire extinguishers, spill kits, SCBA gear, backup generator load tests). - Incident and accident formal investigation reports, including Environmental Spill Incident Reports submitted to DOE. - Post-event DANA reports and post-incident water quality test certificates for receiving waters.	

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			- Raw Sewage Overflow and Force Main Rupture Response: Immediate pumping isolation, deployment of emergency crews with vacuum trucks to contain and recover spilled effluent, disinfection of affected areas, and immediate water quality testing in the Placencia Lagoon and coastal waters. - Confined Space Rescue Protocol: For emergencies in lift station wet wells, mandatory use of external rescue tripods, mechanical winches, continuous air monitoring, and Self-Contained Breathing Apparatus (SCBA). Direct unequipped entry by rescuers is strictly prohibited. - Fire Prevention and Response: Regular clearing of dry brush and dead vegetation to maintain perimeter firebreaks around the WWTP and pump stations, along with			

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			the provision of Type A:B:C fire extinguishers. - Spill Containment Procedures: Immediate source isolation, deployment of spill kits (absorbent booms and pads), and protection of drainage inlets and lagoon shorelines to prevent groundwater or surface water infiltration. - Post-Event Protocols: Execution of Damage Assessment and Needs Analysis (DANA) following tropical storms or hurricanes to verify structural stability of force mains, lift stations, and WWTP concrete reactor tanks/perimeter platform slopes. - Training and Drills: Annual training for staff and periodic execution of emergency simulation drills (e.g., hurricane, spill containment, confined space rescue).			

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
Grievance Redress Mechanism	Placencia Peninsula WWTP and Sewerage System	Unresolved community complaints, prolonged public exposure to operational nuisances (e.g., foul odors, noise, sewage leaks), unaddressed workplace concerns, and public misinformation regarding system operations.	- Maintain an active Grievance Mechanism allowing residents and businesses to rapidly report the occurrence of odors from pump stations, or sewage leaks, triggering immediate corrective maintenance procedures by Belize Water Services (BWS). - Establish and maintain accessible communication channels throughout the operational phase, including a dedicated contact telephone number, a dedicated email address, a web-based interface, and physical suggestion/complaint boxes located in accessible areas. - Maintain a publicly accessible complaints register. This register must record the date of submission, the nature of the complaint, the corrective actions taken, the date of response, and the final resolution status. All grievances must be reviewed	Belize Water Services Limited (BWS)	Indicators: - Percentage of community complaints properly managed and resolved within the defined timeframe relative to the total number of complaints received. - Percentage of worker grievances addressed and closed through established channels. Records: - Updated Community Complaints Log detailing the nature of the issue and corrective actions applied. - Confidential Worker Grievance Logs. - Maintenance work orders triggered by community reports.	DOE/ BWS

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			promptly and responded to in a timely manner. - Maintain an effective WGM providing operational and maintenance workers a formal channel to raise workplace concerns. This mechanism must feature confidential, anonymous intake channels capable of handling complaints related to sexual and gender-based violence (GBV) or sexual harassment.			
Disaster Risk and Climate Change Management Plan	Placencia Peninsula WWTP and Sewerage System.	Human, economic, and environmental losses associated with natural hazards (e.g., hurricanes, floods, sea level rise, extreme heat), which may result in severe service disruptions, structural damage, or	Flooding, Storms, and Hurricanes: - Ensure that all sewage pumping stations and the WWTP are equipped with automatic backup power generators (with at least 48 to 72 hours of fuel autonomy) and emergency retention capacity to maintain continuous pumping during storm-induced power grid outages. - Implement an Operational Hurricane Preparedness and Lockdown Protocol, detailing pre-storm actions such as,	Belize Water Services Limited (BWS) (in coordination with NEMO Operational Committees during extreme events)	Recordkeeping of: - Maintenance and load-testing logs for all backup generators. - Formal DANA reports executed post-hurricane/storm. - Salinity and groundwater monitoring data logs. - Physical inspection logs of WWTP perimeter platform, shoreline stability along the Placencia Lagoon interface, and critical assets, and critical assets. - Records of process adjustments made to MABR	NEMO / Department of the Environment (DOE)

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
		emergency raw sewage overflows.	securing loose materials, and pre-positioning emergency repair crews prior to storm landfall. - Execute post-event structural, operational, and environmental inspections (Damage Assessment and Needs Analysis - DANA) immediately after tropical storms or hurricanes to evaluate physical damage to force mains and lift stations, followed by rapid repairs and water quality testing. Sea Level Rise and Coastal Erosion: - Establish an operational groundwater and salinity monitoring network (piezometers/salinity sensors) to track sea level rise-induced saltwater intrusion dynamics and potential impacts on the biological wastewater treatment processes. Extreme Heat and Drought: - Apply specific operational protocols (such as adjusting		operational parameters (such as blower aeration intensity, dissolved oxygen levels, and sludge age) during extreme heat, droughts, or pre-storm lockdowns.	

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			blower aeration intensity, dynamically monitoring dissolved oxygen levels, and managing sludge retention time and recirculation rates) to maintain biological process stability within the MABR units during prolonged drought periods and elevated liquid temperatures, thereby protecting biofilm viability and ensuring consistent nutrient removal efficiency. - Enforce regular clearing of dry brush and dead vegetation around the WWTP site perimeter and pumping stations to create firebreaks and mitigate bushfire risks. - Implement heat-stress OHS protocols for operational personnel, including mandatory hydration stations, shaded rest areas, and work rotation during peak solar hours. Early Warning and Maintenance: - Implement monitoring systems based on			

Plan / Program	Project	Impact to avoid	Minimum Mitigation Measures	Responsible Party	Indicators and Compliance, Records	Supervision
			hydrometeorological variables and maintain a direct communication channel with the National Emergency Management Organization (NEMO) to monitor official alerts and activate coordinated response protocols. - Conduct regular maintenance and structural inspections of critical assets, pipelines, and wet wells, focusing on structural anchors, seals, and safety devices to ensure long-term resilience.			

6.3. Budget for Implementation of the ESMP

The **Table 37** includes the estimated costs, schedules, and responsible entities for the implementation of the ESMPs.

Table 37 - Costs, Schedules, and Responsible Entities for the implementation of the ESMPs.

Measure	Description	Estimated cost	Schedule	Responsible
Implementation of Mitigation Measures and Programs of Construction ESMP	Preparation of the ESMP at the construction level and implementation during the construction of the project; socio-environmental monitoring of the works.	2.0% of the total cost of the Project (1.5% ESMP and 0.5% in case required BAP)	From the beginning of the work, until their finalization	Contractor
Implementation of Mitigation Measures of Operational ESMP	Incorporation of mitigation measures for the operational stage within the project activities	[incorporated in BWS operational budget]	Throughout the lifecycle of the infrastructure	BWS

The cost for the implementation of the ESMP mitigation measures and programs is indicative and does not constitute a prescriptive element of contractual obligation. The implementation of the ESMP is monitored exclusively in terms of its performance (results) and not based on the input used (resources spent by the contractor).

7. Conclusions

7.1. Conclusions and Feasibility

This Environmental and Social Assessment evaluated the environmental and social impacts and risks associated with the Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)

The analysis of impacts and risks focused on the interactions between project activities and the components of the physical, biological, and socioeconomic environment likely to be affected.

As is typical for infrastructure projects of this nature, the main potential adverse impacts and risks are associated with the construction phase and include occupational and community health and safety risks, temporary increases in noise, dust and traffic, soil disturbance and erosion, accidental spills of fuels or chemicals, and the generation of construction and hazardous waste. These impacts are expected to be temporary, localized, and limited to the Project's direct area of influence.

Although no national protected areas are located within the potential Project area, the proposed development is located within the Belize Coastal and Near Shore Islands Key Biodiversity Area (KBA), which is considered Critical Habitat. Accordingly, the ESA incorporates specific measures to avoid, minimize and mitigate potential impacts on flora, fauna, and ecosystem services through the Flora and Fauna Management Program, including pre-clearance surveys, minimization of vegetation clearing, and the preparation of a Biodiversity Action Plan (BAP).

During operation, the Project will substantially improve wastewater collection and treatment services, reducing the discharge of untreated wastewater and the associated risks to public health and coastal ecosystems. Potential operational impacts related to wastewater treatment processes, sludge management, effluent quality, odor generation, and the handling of treatment chemicals will be managed through the operational measures and management programs included in the ESMP.

The table below presents a summary of the most significant impacts and risks identified for the project, and the corresponding mitigation measures proposed to address them.

Table 38 - Summary of Impacts, Risks and Mitigation Measures for Projects. Source: PlanEHS, 2026.

Impact/Risk (ESA Chapter 5)	Project Phase	Sign and Magnitude	Affected Component	Mitigation Measures
Surface Water and Groundwater Resources	Construction	High (-) WWTP Medium (-) Sewerage	Physical Media (risk of contamination from spills, suspended sediment loads, groundwater interception during trenching in highly permeable sandy soils with shallow freshwater lens)	• Environmental and Social Liabilities Program • Chemical Substances Management Program • Waste Management Program • Socio-Environmental Training for Construction Personnel • Emergency Preparedness and Response Program
Soil Resources	Construction	High (-) WWTP Medium (-) Sewerage	Physical Media (permanent land reclamation and soil conversion for WWTP; temporary soil disturbance from trenching; loss of natural soil profile)	• Environmental and Social Liabilities Program • Chemical Substances Management Program • Management of Construction Sites • Waste Management Program
Flora	Construction	High (-) WWTP Low (-) Sewerage	Biological Media (removal of mangroves; vegetation disturbance along pipeline corridors in critical habitat), leading to the direct loss of essential ecosystem services such as shoreline stabilization, erosion control, sediment retention, water-quality regulation, blue carbon sequestration, and natural buffering against storm surges and coastal flooding.	• Flora and Fauna Management Program • Socio-Environmental Training for Construction Personnel • Community Information and Participation Program • Biodiversity Action Plan (BAP) to ensure Net Gain in accordance with IDB ESPS 6.
Wildlife	Construction	High (-) WWTP Low (-) Sewerage	Biological Media (displacement of fauna, particularly endangered bird species; disruption of critical habitat in KBA and IBA; noise disturbance to migratory species)	• Flora and Fauna Management Program • Air Quality, Noise and Vibrations Management Program • Socio-Environmental Training for Construction Personnel • Emergency Preparedness and Response Program
Road and Traffic Impacts	Construction	Medium (-) Sewerage Low (-) WWTP	Socioeconomic Media (temporary road blockages, increased traffic volume on single peninsula corridor, access restrictions, traffic congestion)	• Traffic and Pedestrian Management Program • Community Information and Participation Program • Management of Construction Sites • Socio-Environmental Training for Construction Personnel

Impact/Risk (ESA Chapter 5)	Project Phase	Sign and Magnitude	Affected Component	Mitigation Measures
Main Utilities (Water and Energy Services)	Construction	Medium (-)	Socioeconomic Media (risk of accidental rupture of existing utility lines; interference with BWS water distribution facility operations)	• Coordination with Service Providers Program • Management of Construction Sites • Traffic and Pedestrian Management Program • Community Information and Participation Program
Occupational Health and Safety	Construction	High (-)	Socioeconomic Media (occupational accidents, injuries, and health hazards from heavy machinery operation, trenching hazards, confined space risks, equipment-related injuries)	• Occupational and Community Health and Safety Program • Management of Construction Sites • Traffic and Pedestrian Management Program • Socio-Environmental Training for Construction Personnel • Emergency Preparedness and Response Program • Disaster Risk and Climate Change Management Plan
Economic Development: Commercial and Service Activities	Construction	Medium (-)	Socioeconomic Media (disruption to commercial establishments, hotels, and restaurants due to traffic blockages, reduced access, dust, noise; negative impact on tourism revenue during construction)	• Traffic and Pedestrian Management Program • Community Information and Participation Program • Management of Construction Sites • Air Quality, Noise and Vibrations Management Program
Landscape and Public Space	Construction	Medium (-)	Socioeconomic Media (visual degradation from construction activities, open trenches, stockpiles; aesthetic impact on public spaces and tourist areas; disruption of recreational quality)	• Community Information and Participation Program • Management of Construction Sites • Air Quality, Noise and Vibrations Management Program • Flora and Fauna Management Program
Surface Water and Groundwater Resources	Operation	Medium (-) Risk Medium (+) Benefit	Physical Media (positive: interception and treatment of raw sewage, reduction of bacterial and nutrient loads to lagoon and coastal waters; negative: risk of accidental leaks, overflows during power outages, sludge disposal impacts)	• Effluent Management Program • Chemical Substances Management Program • Waste Management Program • Emergency Preparedness and Response Program • Occupational and Community Health and Safety Program • Disaster Risk and Climate Change Management Plan •

Impact/Risk (ESA Chapter 5)	Project Phase	Sign and Magnitude	Affected Component	Mitigation Measures
Main Utilities (Water and Energy Services)	Operation	High (+)	Socioeconomic Media (expansion and modernization of centralized wastewater utility service; closure of sanitation gap; benefits to 1,844 residential beneficiaries and 245 commercial establishments)	• Coordination with Service Providers Program • Community Information and Participation Program • Waste Management Program
Community Health and Safety	Operation	High (+)	Socioeconomic Media (reduction of waterborne diseases, elimination of fecal coliform exposure, improvement of public health outcomes; reduction in bacterial and nutrient loading)	• Occupational and Community Health and Safety Program • Pest and Vector Control Program • Emergency Preparedness and Response Program • Disaster Risk and Climate Change Management Plan • Community Information and Participation Program
Economic Development: Commercial and Service Activities	Operation	Medium (+)	Socioeconomic Media (protection and enhancement of tourism industry; improved commercial environment; increased property values due to improved environmental sanitation; cleaner coastal environment)	• Community Information and Participation Program • Waste Management Program • Emergency Preparedness and Response Program

The identified environmental and social impacts are considered manageable through the implementation of the mitigation measures and management programs described in Chapters 5 and 6 of this ESA, in accordance with applicable national legislation and the IDB Environmental and Social Performance Standards. The Project is expected to generate significant long-term environmental and social benefits by improving sanitation services, reducing pollution loads to receiving water bodies, protecting sensitive coastal ecosystems, and strengthening institutional capacity for sustainable wastewater management.

Therefore, the **Project is considered environmentally and socially feasible, with no significant adverse impacts that cannot be effectively avoided, minimized, mitigated, or managed through the proposed measures.**

7.2. Limitations and Recommendations

The preparation of this Environmental and Social Assessment was based on the definition of the components and interventions as of February 2026.

Given this, the following items are recommended to be resolved during the design and construction phase, to ensure the proper level of due diligence of the Project.

Project Gaps versus IDB's ESPF	Recommended Actions
Update of ESA / ESMP	Update the ESA and ESMP once the final engineering design and the exact locations of all Project interventions are confirmed. The update should reflect the final infrastructure siting, design criteria, and any supporting technical studies prepared during detailed design, assess the environmental and social impacts associated with the final design, update mitigation and monitoring measures as needed, document stakeholder engagement undertaken during the detailed design stage, and confirm whether physical or economic displacement will occur.
Analysis of Alternatives	Include an analysis of alternatives for the proposed infrastructure works, considering the potential area of the WWTP in Seine Bight and documenting the rationale for site selection, including environmental, social, technical, and economic considerations.
Land Ownership	Provide documentation confirming Government ownership of all land required for Project activities, together with confirmation from the Lands and Surveys Department that the proposed land use is compatible with the intended Project interventions.
Soil, Water and Odor Baseline & Environmental Liabilities Assessment	Conduct a site-specific soil, water and odor quality baseline sampling assessment at the WWTP site in Seine Bight and pumping station locations, prior to site mobilization. This baseline study will identify and characterize pre-existing environmental liabilities (e.g., micro-dumps, unauthorized solid waste accumulations, or legacy chemical/hydrocarbon contamination), establish pre-construction reference parameters against international guidelines, document existing odor conditions in the vicinity of the proposed facilities and inform necessary cleanup or remediation actions under Program 4 (Environmental and Social Liabilities Management Plan) of the ESMP.

Project Gaps versus IDB's ESPF	Recommended Actions
Water Quality & Aquatic Fauna Baseline	Prior to any site mobilization, construction, or discharge activities, establish a comprehensive water quality and aquatic fauna baseline. A baseline study of the Placencia Lagoon is mandatory because of its physical proximity to the potential WWTP site (to monitor potential construction-phase runoff) and its status as a potential receiving environment for the treated effluent. Additionally, if the Detailed Engineering Design selects a marine outfall (Caribbean Sea) as the final effluent disposal method, a targeted marine water quality and aquatic fauna baseline study must also be executed.
Biodiversity Action Plan (BAP) & Critical Habitat Net Gain	Develop and implement a site-specific Biodiversity Action Plan (BAP) once the final engineering designs and exact project footprint are confirmed, following the guidelines of Annex 2 of this ESA. The BAP must quantify the precise acreage of Critical Habitat to be affected. In strict compliance with IDB ESPS 6 for operations within Critical Habitats, the BAP must design and execute targeted <i>in situ</i> (on-site) habitat enhancement and threat-reduction measures within the project's area of influence to ensure No Net Loss of natural habitats and achieve a measurable Net Gain in Critical Habitat values. Offsets outside the Critical Habitat are not acceptable mitigation mechanisms under ESPS 6; hence, the BAP must be developed with qualified external experts following the technical framework and guidelines established in Annex 2 (Biodiversity Action Plan Guidelines) of this ESA. The preliminary Critical Habitat analysis will be incorporated into the next version of this document.

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Annex 1. Labor Management Procedure (LMP)

Introduction

The purpose of this Labor Management Procedure (LMP) is to establish the scope and application of ESPS 2 "Labor and Working Conditions" for the Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)

The Labor Management Procedure will be managed as part of the Environmental and Social Management Plan (ESMP). The requirements included in the LMP will be systematically **integrated into the legal requirements of the Project, the tender documents and the contracts of the contracting companies and suppliers.**

The LMP is a dynamic document and should therefore be revised and updated as necessary during the life cycle of the Project.

The LMP presents the guidelines and minimum contents for the labor management and working conditions of the works of the Project to be fulfilled by the main contractor, the companies involved and the executing agency. The responsibility for ensuring compliance with this procedure shall be the responsibility of EA.

The LMP is governed by the principles of equality, opportunity and fair treatment ensuring that no employment decisions will be made based on personal characteristics outside the requirements inherent to the job, refraining from discrimination in any aspect of the employment relationship, such as recruitment and hiring, remuneration (wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, dismissal or retirement and disciplinary practices. Measures shall be taken to prevent and address violence, harassment, intimidation, or exploitation, especially regarding women, persons of diverse sexual orientations and gender identities, persons with disabilities, and migrant workers. Under no conditions shall child or forced labor be permitted.

A safe and healthy work environment shall be ensured, considering the risks inherent in the Project and specific hazards for women, persons of diverse sexual orientations and gender identities, persons with disabilities, children (of working age, in accordance with this Performance Standard), and migrant workers. Measures shall also be taken to prevent accidents, injuries and illnesses that may arise from, be associated with, or occur during work, minimizing, to a reasonable extent practicable, the causes of hazard factors.

Scope of the Labor Management Procedure (LMP)

Environmental and Social Performance Standard 2 "Labor and Working Conditions" of IDB's Environmental and Social Policy Framework pursues the following objectives:

- Respect and protect the fundamental principles and rights of workers.
- Promote fair treatment, non-discrimination, and equal opportunities for workers.
- Establish, maintain, and improve relations between workers and the employer.
- Ensure compliance with national legislation on employment and labor.

- Protect workers, including those in vulnerable situations, such as women, persons of diverse sexual orientations and gender identities, persons with disabilities, children (of working age, in accordance with this Performance Standard) and migrant workers, workers hired by third parties and workers in the main supply chain.
- Promote safe and healthy working conditions and promote workers' health and prevent the use of child labor and forced labor (as defined by the ILO).¹³⁰

This standard applies to:

- **Direct workers:** are persons employed or hired directly by the borrower to work specifically in relation to the Project. The direct worker is employed or hired by the borrower, is paid directly by the borrower, and is subject to the borrower's instructions and day-to-day control.
- **Contract workers:** Persons engaged through third parties to perform work related to core functions of the Project for a considerable period of time where that third party exercises continuous control over the work, working conditions and treatment of the worker in relation to the project¹³¹
- **Main supply chain workers:** Workers in the main supply chain provides goods and materials to the project, where the supplier exercises control over this worker for the work, working conditions and treatment of the worker¹³²

Where public employees are working in connection with the Project on either full-time or part-time basis, they will be subject to the terms and conditions of their existing public sector employment agreement or arrangement, unless their employment or hiring has been effectively legally transferred to the Project.¹³³

Requirements relating to gender equality and stakeholder participation (including a grievance mechanism) should also be considered in the implementation of this Performance Standard in accordance with ESPS 9 and 10. In no case and under no circumstances shall child and forced labor be permitted.

¹³⁰Child Labor refers to work that deprives children (**any person under 18**) of their childhood, their potential and their dignity and that is harmful to their physical and/or mental development. It refers to work that is mentally or morally dangerous and harmful to children or interferes with their schooling by depriving them of the opportunity to attend school, obliging them to leave school prematurely or requiring them to attempt to combine school attendance with excessively long and heavy work.

International Labor Organization: <https://www.ilo.org/media/430541/download>

¹³¹ The core functions of the project are those corresponding to the construction, production and service processes that are essential for a specific activity, without which it could not continue.

¹³²Primary or primary suppliers are those that continuously supply goods or materials essential to the core functions of the project.

¹³³ ESPS 2 is not intended to interfere with the relationship between the borrower when it comes to a government agency and its public administration officials, who are typically employed under specific terms and conditions that may reflect mandatory legal requirements.

Description of the Project's Workforce.

Identification and characterization of workers involved in the project:

Depending on the activities foreseen in the project, it is estimated that the organization of the workforce involved will be as follows:

1. **Direct workers:** In accordance with the organizational structure foreseen for this Program, it is considered that the direct hiring of personnel under the modality of contracting services will be coordinated by the EA and are mostly linked to the hiring of personnel to carry out supervision and technical inspections (environmental and social) of works.
2. **Project workers:** It is expected that the largest number of staff will be employed under this category. The contracting companies will conduct the construction work foreseen for each project.
3. **Workers in the main supply chain:** Personnel employed by the companies supplying inputs and infrastructure linked to the works foreseen by the Project. The Project must conduct due diligence to ensure that inputs produced under conditions of forced labor are not procured and that the working conditions of suppliers comply with current regulations with their personnel.

Table 39 - Summary Table of Type of Workers Linked to the Project

Type of Worker	Characteristics
Direct Workers	Individual Consultants directly hired by the Project
Contract workers	Workers hired by the contracting firms hired by the Project. It is expected by the type of works that the largest number of people involved in the Project be incorporated under this modality of contracting.
Primary Supplier Workers	The number of workers to be hired under this modality and the specific characteristics will be information provided by the contractor who has been awarded the work.

Assessment of possible occupational hazards

Depending on the activities to be conducted by the staff in the project, the main risks for each of the most relevant jobs must be identified.

The existing risks involve adopting measures for the prevention of accidents and incidents with the development of safe working methods, with a correct choice and training of personnel to perform such work, in addition to using the appropriate tools and personal protection elements (PPE).

The following table provides a summary of the main activities, with the possible risks identified and those responsible.

Table 40 - Example of activities and risks identified in the project.

Activity Group	Activity	Location	Risks identified	Responsible
Management and Administration	Planning, design, execution and implementation, evaluation, and monitoring of Projects	Construction Offices	No specific and significant risks are identified. Risks related to occupational health and safety in internal environments (ergonomic risks, accidents, stress, mental load, psychophysical factors)	EA
Training and Awareness for people hired by the contractor	- Train, inform and raise awareness especially among construction personnel both orally and in writing about the expected environmental and social problems, the implementation and control of environmental and social protection measures and the specific and relevant aspects applicable to the execution of projects in accordance with current environmental and social regulations and regulations. - Conduct gender-sensitive training and code of conduct for all contracted personnel, including the management staff of the contractor company. - Have updated the technical file of the personnel with the training conducted and the elements of security and personal protection delivered	Workshops / offices	No specific and considerable risks are identified if the facilities of the workshops comply with current regulations. Possible risks linked to occupational health and safety in internal environments (accidents, stress, mental load, psychophysical factors).	Contractor (Environmental and Social Manager)

Civil works of infrastructure and equipment	Implementation of sanitation infrastructure works, including the construction, rehabilitation and upgrading of wastewater collection, treatment and related sanitation facilities in Placencia.	Sanitation infrastructure and related facilities in Placencia, Stann Creek District, Belize	Specific risks are identified that can be avoided with the corresponding security measures and protocols. In workshops and place of work: • Risks of gender-based violence • Occupational and community accident risks In the recruitment processes: • Risk of exclusion of vulnerable groups • Exclusion of local labor and discrimination • Influx of labor from outside the place. • Risk of child labor. In the execution of the planned works: Occupational hazards: • Accidents and falls of different levels • Falling objects • Road accidents (circulation of trucks and machinery) • Marine Accidents (circulation of vessels for transportation of material, equipment and waste to and from mainland) • Temporary hearing loss due to operation of equipment and machinery. • Infectious diseases due to water accumulation and vector proliferation, especially regarding marine and mangrove ecosystems Ergonomic risks: • Forced posture; Repetitive motion; Cargo handling; Application of forces: Overexertion	Contractor Company
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Activity Group	Activity	Location	Risks identified	Responsible
Construction supervision	Supervise the environmental and social management plan, occupational safety and health; monitor environmental, social, health and safety risks, their impacts and actions taken (including in the field, if necessary).	Office / Field activities at the site of implementation of the works	In Office: No specific and considerable risks are identified. Possible risks linked to occupational health and safety in internal environments (accidents, stress, mental load, psychophysical factors). In the field: Risks linked to accidents in the work area. They can be minimized if PPE is properly used.	EA / Construction Inspection

Description of prevention and mitigation measures to address possible risks in the workplace

Based on the identification of the main risks by activity group, the priority measures to prevent and minimize the risks identified are detailed below, by way of example:

Prevention and mitigation measures in the workshops:

- Implement hygiene, safety and health standards and conditions.
- Install workshops of size according to the number of people employed and as required by Laws and Decrees.
- Training and awareness on health and safety, non-discrimination, and prevention of gender-based violence, prevention of child exploitation, forced labor, prevention of discrimination and / or violence against people from indigenous communities or vulnerable groups in compliance with the code of conduct.

Prevention and mitigation measures in staff recruitment processes:

- The contractor will seek to approach its recruitment process with a gender perspective, seeking to make equal opportunities for men and women effective.
- Personnel with criminal records related to sexual crimes, sexual harassment, prostitution, and trafficking in persons will not be hired in order to protect the integrity of the population linked to the work.
- The contractor will try to prioritize the local skilled and unskilled local labor, especially the beneficiary parties of the works and surrounding localities.
- The contractor will attain ILO regulations and prohibit hiring of **child labor**¹³⁴.
- Nondiscrimination requires that the contractor/ EU not make employment-related decisions based on personal characteristics, such as gender, race, ethnic, social and indigenous origin, religion, political opinion, nationality, disability and sexual orientation that are not related to job requirements. They cannot affect equality of opportunity or treatment in employment.
- The contractor shall develop and implement the **code of conduct** and provide training for its knowledge and understanding. See Appendix A for the proposed content of the code of conduct. This Code is aimed at ensuring respectful and harmonious ties in the workplace in which the Project and its projects are developed in such a way as to ensure a work environment free of discrimination and/or violence based on gender, gender identity, sexual orientation, cultural identity, religion, ethnic or national origin, trade union membership, disability or any other discrimination typified in current legislation.

¹³⁴ Child Labor refers to work that deprives children (**any person under 18**) of their childhood, their potential and their dignity and that is harmful to their physical and/or mental development. It refers to work that is mentally or morally dangerous and harmful to children or interferes with their schooling by depriving them of the opportunity to attend school, obliging them to leave school prematurely or requiring them to attempt to combine school attendance with excessively long and heavy work.

Prevention and mitigation measures in the execution of civil works of infrastructure and equipment of the project:

- Review the environment in which the tasks will be developed. If power poles, hazardous materials tanks or other items are present in adjacent areas, they could catch fire or fall on workers in the event of evacuation.
- Provision of personal protection elements (PPE) and tools and machinery in perfect working order.
- Training and advisory programs for the people employed by the contractor on the inherent risks of their tasks and the mitigation measures, actions and good practices to be implemented to ensure the health, safety and hygiene of the employees, the population, and the protection of the environment.
- Code of conduct.
- Evaluate the state of gas, electricity, and water facilities near the intervention area.
- Examine the distribution of workspaces verifying that there are no elements that could interfere with a rapid evacuation.
- Identify safe areas.
- Determine accessibility to fire protection equipment, emergency lights, first aid equipment, etc. (they should always be in place of easy access).
- Define the resources available to avoid and respond to an emergency.
- Make an inventory of those security elements that the organization has (fire extinguishers, first aid kit, etc.).
- In the case of works conducted in the vicinity of routes, traffic management measures, signaling and communication program to the community must be extreme.

Protocols and procedures to address cases of gender-based violence during the life cycle of the project.

The Contractor will establish reporting procedures, protocol for responses to unacceptable conduct and internal accountability measures in situations of gender-based violence within the framework of the operation.

In terms of prevention, in addition to urging the development of actions aimed at dismantling all types of situations of inequality, discrimination and exclusion in the workplace, actions can be implemented to raise awareness and train on gender issues. The training program will be defined according to the demands of the different work teams.

To address cases of gender violence, immediate and confidential contact should be made with local authorities who are experts in the field if the victim gives clear and enthusiastic consent to do so, to ensure adequate treatment of the victim of violence, providing specific advice and accompaniment. The identity of the complainant should be kept confidential to protect against retaliation, stigmatization, revictimization or other consequences that frequently can happen.

As a preliminary step in the Identification of Specialized Victim Support Services, the specialized institutions that provide support and guidance to victims of gender-based violence are listed below, along with their corresponding offices.

Table 41 – Gender Violence Referral Institutions. Source:
https://www.paho.org/sites/default/files/gbv_referral_pathway_final_update_0.pdf

Institution	Description	Contact Information
911 // 0-800-A-WAY-OUT	24/7 National GBV Hotline operated by the Family Violence Unit — for victims/survivors to report gender-based violence (police response & referral). Victims can also send SMS/WhatsApp for assistance.	911 // 0-800-A-WAY-OUT ((0-800-292-9688) // WhatsApp: 672-9628
Women and Family Support Services Department (24hs)	Provide counselling, psychosocial support, case management services, food assistance and shelter/safe houses when needed.	24hs Case Management and Shelter/Safehouse services: 227-3888 / 227-1764 // (501) 227-7397 / 227- 3888 8-5pm Counselling, Psychosocial support and Food Assistance: (501) 227-3888 / 227-1764
BFLA Headquarters	Provide counselling services	(9:00 am - 5:00 pm) 203-1018 / 613-5018
Belize Community Counselling Center (Community Rehabilitation Department)	Provide counselling services	(10:00 am - 5:00 pm) 227-2716 / 227-1406
Our Circle Resource Center	Provide counselling services	(10:00-16:00) 623-6062
Family Violence Unit	Police unit dedicated to gender based violence cases	911 // 0-800-A-WAY-OUT ((0-800-292-9688) // WhatsApp: 672-9628 Queen Street Police Station (24h) 227-2222 Raccoon Street Police Station (24h) 227-2222 Placencia Police Station 503-3142

Grievance Redress Mechanism (GRM) for Project Labor Management

The Project has a Grievance Redress Mechanism (GRM), and at the same time the LMP has a simultaneous mechanism that aims to arbitrate the means and mechanisms to facilitate the reception

of concerns exclusively (queries, claims, complaints, suggestions) of workers linked to the Project, and respond to them to solve them, and to anticipate potential conflicts.

Likewise, workers may appeal directly to the courts, applying the general system in force in the country.

Principles of the GRM for the Labor Management Procedure

Each project will have a feedback/claims management system that includes input/reception, analysis, monitoring, resolution and return to the people who are working linked to the projects.

The principles that the system observe are the same as those that govern the general GRM of the Project:

- The interaction/claims management system will have mechanisms in accordance with the local context and the sociocultural characteristics of the people involved in each project, with special consideration and respect for the most vulnerable groups (young people, women, people with disabilities, migrants, among others).
- The complaint procedures, the process that will follow, the deadline and the resolution mechanisms will be widely disseminated for your knowledge by the interested parties, that is, by direct workers, contractors, and primary suppliers.
- In all cases, a record will be kept of the reception, analysis and resolution of claims and conflicts.

GRM Guidelines

In general, the mechanism will follow the following guidelines:

- **Proportional:** The Mechanism will proportionally consider the level of risk and possible negative impacts on the affected areas.
- **Culturally appropriate:** The Mechanism will be designed to consider the local customs of the area.
- **Accessible:** The Mechanism will be designed in a clear and simple way so that it is understandable to all people. There will be no cost related to it.
- **Anonymous:** The complainant may remain anonymous, as long as it does not interfere with the possible solution to the complaint or problem. Anonymity is distinguished from confidentiality in that it is an anonymous complaint, the personal data (name, address) of the complainant are not recorded.
- **Confidential:** The Project will respect the confidentiality of the complainant. Information and details about a confidential report will only be shared internally, and only when it is necessary to report or coordinate with the authorities.
- **Transparent:** The process and operation of the Mechanism will be transparent, predictable, and readily available for use by the population.

Management of the specific GRM for the Labor Management of the Project

The procedure begins with the presentation of the consultation, claim, complaint and / or suggestions (orally or written) by any worker linked to the works. The process ends with the closure and agreement in the resolution of both parties (the claimant and the contractor). The process will be documented by means of a record (in a physical and/or digitized file).

Complaints received by all means of receipt enabled during the implementation of the Project must be attended and classified.

The claims received via the contractors of each work, or agencies of the municipal authority (if applicable) must be redirected to EA for management.

Reception and registration of claims for the labor management of the Project

- Office of contractors (specific modality for operators and employees)
- Suggestion box / complaints book available in the workshops (Specific for operators and employees).
- EA (via telephone, mail, or other way enabled to make the claim) specifically for direct employees, contractors, and workers in the main supply chain).
- Offices of the municipalities involved.
- Others (to be defined during the life of the Project).

Claims Evaluation

All claims that enter through the various channels must be registered and managed considering the criterion of proportionality (level of risk and possible negative impacts).

In the case of a claim related to employees of the contractor, it will be considered and responded to by the Contractor company with supervision of EA.

EA must also resolve all complaints and queries related to the works of the Project that occur in the labor field of its offices and dependencies.

After receiving a claim, it must be evaluated by EA in terms of severity, safety implications, complexity, and impact, among others, to take immediate action as appropriate. Complaints must be answered in a timely manner according to the urgency of the order.

If the claim or complaint is rejected, the worker will be informed of the decision and the reasons for it. To this end, pertinent, relevant, and understandable information will be provided according to the sociocultural characteristics of the workers.

If possible, if additional information is required for the correct evaluation of the complaint, the EA team will contact the worker to obtain the necessary information.

The file must include, together with the complaint, a summary of the procedures and steps taken. Registration information will be updated periodically to reflect the status of the case until the complaint has been finalized.

Conflict resolution

In all cases EA must ensure that the attention of claims and the resolution of conflicts are conducted in an adequate and timely manner, and that all workers linked to the Project have satisfactory management of their claim.

Responding to Complaints

Low-importance claims will be dealt with within a maximum of 30 calendar days, medium-importance claims will be dealt with within 15 calendar days, and high-importance claims will be dealt with within a maximum of 7 calendar days. The established deadlines can be adjusted by EA.

Monitoring and documentation

EA will be responsible for maintaining an up-to-date database with all documentation and information related to complaints that are submitted as part of labor management. This team is also responsible for following up on the complaint processing process, in coordination with the areas involved, and for facilitating the participation of the worker in the process.

The complaint registry must demonstrate that all of these actions and processes were conducted in accordance with this document.

It will include:

- Date on which the complaint was registered.
- Person responsible for the complaint.
- Information on the corrective measures proposed/communicated by the complainant (if applicable).
- Date on which the complaint was closed; and
- The date of the reply was sent to the complainant.

Deadlines

All complaints must be registered, and the proposed solution must be communicated to the interested party within a stipulated period. The deadlines set can be adjusted.

Monitoring

Any complaint closed with compliance by the complainant must be monitored for a reasonable period in order to verify that the reasons for the complaint or claim were effectively resolved. The estimated period for this purpose is 6 (six) months from the response and / or solution to the claim.

As initially indicated, this document is dynamic in nature, therefore the specific procedures for the implementation of the Grievance Mechanism for Labor Management will be strengthened with the implementation of each project.

Appendix A - Code of Conduct - Model and Suggested Content

Model Standard Code of Conduct for Workers

Introduction

The company is committed to ensuring a work environment which minimizes any negative impacts on the local environment, communities, and its workers. The company also strongly commits to creating and maintaining an environment in which Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) have no place, and where they will not be tolerated by any employee, sub-contractor, supplier, associate, or representative of the company. The purpose of this *Code of Conduct* is to:

1. Create a common understanding of what constitutes Sexual exploitation and abuse, and sexual harassment.
2. Create a shared commitment to standard behaviors and guidelines for company employees to prevent, report, and respond to SEA and SH.
3. Create understanding that breach of this code of conduct will result in disciplinary action.

Definitions

Sexual Exploitation and Abuse (SEA)¹³⁵

Is defined as any actual or attempted abuse of a position of vulnerability, differential power, or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another¹³⁶.

- Sexual Abuse: "The actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions."

Sexual Harassment: ¹³⁷

Unwelcome sexual advances, request for sexual favors, and other verbal or physical conduct of sexual nature.

Sexual Harassment versus SEA¹³⁸

SEA occurs against a beneficiary or member of the community. Sexual harassment occurs between personnel/staff of an organization or company and involves any unwelcome sexual advance or unwanted verbal or physical conduct of a sexual nature. The distinction between the two is important so that agency policies and staff trainings can include specific instruction on the procedures to report each.

Consent is the choice behind a person's voluntary decision to do something. Consent for any sexual activity must be freely given, ok to withdraw, made with as much knowledge as possible, and specific to the situation. If agreement is obtained using threats, lies, coercion, or exploitation of power imbalance, it is not consent. **Under this Code of Conduct¹³⁹ consent cannot be given by anyone under the age of 18, regardless of the age of majority or age of consent locally. Mistaken belief regarding the age of the child is not a defense.**

¹³⁵ As defined in the UN Secretary's bulletin – Special Measures for protection from sexual exploitation and abuse October 9, 2003, ST/SGB/2003/13

¹³⁶ In the context of World Bank Financed operations exploitation occurs when access to, or benefit from a World Bank Financed good or service is used to extract sexual gain.

¹³⁷ Inter-Agency Standing Committee Protection against Sexual Exploitation and Abuse (PSEA): Inter-agency cooperation in community-based complaint mechanism. Global standard Operating Procedures. May 2016

¹³⁸ Ibid

¹³⁹ In accordance with the United Nations Convention on the Rights of the Child.

There is no consent when the agreement is obtained through:

- the use of threats, force or other forms of coercion, abduction, fraud, manipulation, deception, or misrepresentation
- the use of a threat to withhold a benefit to which the person is already entitled, or
- a promise is made to the person to provide a benefit.

While all forms of violence against a community resident or a co-worker are forbidden, this code of conduct is particularly concerned with the prevention and reporting of sexual exploitation and abuse (SEA) and sexual harassment which constitute gross misconduct, is grounds for termination or other consequences related to employment and employment status:

(1) **Examples of sexual exploitation and abuse** include, but are not limited to:

- A project worker tells women in the community that he can get them jobs related to the work site (cooking and cleaning) in exchange for sex.
- A worker that is connecting electricity input to households says that he can connect women headed households to the grid in exchange for sex.
- A project worker gets drunk after being paid and rapes a local woman.
- A project worker denies passage of a woman through the site that he is working on unless she performs a sexual favor.
- A manager tells a woman applying for a job that he will only hire her if she has sex with him.
- A worker begins a friendship with a 17-year-old girl who walks to and from school on the road where project related work is taking place. He gives her moto rides to school. He tells her that he loves her. They have sex.

(2) **Examples of sexual harassment in a work context** include, but are not limited to:

- Male staff comment on female staffs' appearances (both positive and negative) and sexual desirability.
- When a female staff member complains about comments male staff are making about her appearance, they say she is "asking for it" because of how she dresses.
- A male manager touches a female staff members' buttocks when he passes her at work.
- A male staff member tells a female staff member he will get her a raise if she sends him naked photographs of herself.

Individual signed commitment:

I, _____, acknowledge that sexual exploitation and abuse (SEA) and sexual harassment, are prohibited. As an (*employee/contractor*) of (*contracted agency / sub-contracted agency*) in (*country*), I acknowledge that SEA and SH activities on the work site, the work site surroundings, or the surrounding community constitute a violation of this *Code of Conduct*. I understand SEA and SH activities are grounds for sanctions, penalties or potential termination of employment. Prosecution of those who commit SEA and SH may be pursued if appropriate.

I agree that while working on the project I will:

- Treat all persons, including children (persons under the age of 18), with respect regardless of sex, race, color, language, religion, political or other opinion, national, ethnic or social origin, gender identity, sexual orientation, property, disability, birth or other status.
- Commit to creating an environment which prevents SEA and SH and promotes this code of conduct. In particular, I will seek to support the systems which maintain this environment.
- **Not** participating in SEA and SH as defined by this *Code of Conduct* and as defined under (country) law (and other local law, where applicable).
- **Not** use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
- **Not** participate in sexual contact or activity with anyone below the age of 18. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense. I will not participate in actions intended to build a relationship with a minor that will lead to sexual activity.
- **Not** solicit/engage in sexual favors in exchange for anything as described above.
- Unless there is full consent by all parties involved, recognizing that a child is unable to give consent and a child is anyone under the age of 18, I will not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered “non-consensual” under this Code.

I commit to:

- Adhere to the provisions of this code of conduct both on and off the project site.
- Attend and actively partake in training courses related to preventing SEA and SH as requested by my employer.

If I am aware of or suspect SEA and SH, at the project site or surrounding community, I understand that I am encouraged to report it to the Grievance Reporting Mechanism (GRM) or to my manager. The safety, consent, and consequences for the person who has suffered the abuse will be part of my consideration when reporting. I understand that I will be expected to maintain confidentiality on any matters related to the incident to protect the privacy and security of all those involved.

Sanctions: I understand that if I breach this Individual Code of Conduct, my employer will take disciplinary action which could include:

- Informal warning or formal warning
- Additional training.
- Loss of salary.
- Suspension of employment (with or without payment of salary)
- Termination of employment.
- Report to the police or other authorities as warranted.

I understand that it is my responsibility to adhere to this code of conduct. That I will avoid actions or behaviors that could be construed as SEA and SH. Any such actions will be a breach of this Individual Code of Conduct. I acknowledge that I have read the Individual Code of Conduct, do agree to comply with the standards contained in this document, and understand my roles and responsibilities to prevent and potentially report SEA and SH issues. I understand that any action inconsistent with this Individual Code of Conduct or failure to act mandated by this Individual Code of Conduct may result in disciplinary action and may affect my ongoing employment.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Annex 2. Biodiversity Action Plan (BAP) Guidelines

Introduction

The purpose of this document is exclusively to establish the technical guidelines for the future elaboration of the definitive Biodiversity Action Plan (BAP) for the **Placencia Resilient and Sustainable Sanitation Infrastructure Project (BL-L1056)**, executed by **Belize Water Services Limited (BWS)**. It does not constitute the execution plan itself but defines the normative and operational framework that the Executing Agency (BWS) or its Contractors must follow. The definitive BAP will be a dynamic, stakeholder-driven management instrument applying the Mitigation Hierarchy.

Objectives of the BAP Guidelines

The primary objective of these guidelines is to establish the framework for biodiversity management under Project BL-L1056 in full compliance with IDB ESPS 6. The goal is to guarantee that the construction, operation, and maintenance phases achieve **No Net Loss of natural habitats** and deliver a **Net Gain in conservation values** within designated Critical Habitats.

Serving as a **methodological baseline**, this document outlines the core requirements for the final BAP, which must integrate updated biotic field data, expert recommendations, and outcomes from stakeholder and public participation processes.

Legal and Institutional Framework

The legal and institutional framework governing biodiversity management for Project BL-L1056 integrates national legislation, international biodiversity treaties ratified by Belize, and Inter-American Development Bank (IDB) Environmental and Social Performance Standards, specifically ESPS 6. Designed to protect biological diversity, maintain ecosystem functions, and promote sustainable natural resource management, this framework mandates that the most stringent requirements between national laws and IDB guidelines shall take precedence, as detailed in **Chapter 3** of this ESA.

Environmental and Biological Context

The project's direct and indirect Area of Influence in the Placencia Peninsula is preliminarily classified as Critical Habitat because the proposed project footprint lies entirely within the **Belize Coastal and Near Shore Islands Key Biodiversity Area (KBA)**, triggering **ESPS 6 Criterion 6 (legally protected or internationally recognized areas of high biodiversity value)**. It is important to emphasize that while Critical Habitat status is currently triggered by this KBA designation, detailed baseline updates and biotic field surveys conducted during the formulation of the definitive BAP may conclusively establish that Critical Habitat status is also triggered under additional ESPS 6 criteria (such as those pertaining to threatened species, migratory species, or unique ecosystems).

Identification and Assessment Requirements for Biodiversity Risks and Impacts

The definitive BAP study team must conduct targeted field assessments and review existing environmental data to refine the identification of potential project risks across all construction and operational phases:

- **Baseline Refinement & Biotic Surveys:** Execute comprehensive pre-construction field surveys across the direct footprint (WWTP site, pipeline alignments, pump stations) and indirect area of influence (Placencia Lagoon interface).
- **Mangrove & Vegetation Assessment:** Quantify the exact footprint of broadleaf and mangrove vegetation clearing, mapping over wash mangrove zones, species composition, and carbon sequestration/coastal protection ecosystem services.
- **Fauna & Trigger Species Assessment:** Evaluate risks of direct habitat loss, fragmentation, acoustic disturbance, and breeding disruption for avifauna (specifically nesting/roosting sites of the *Reddish Egret* and migratory species) and local fauna.
- **Hydrological & Water Quality Risk Evaluation:** Assess potential soil erosion, trench dewatering impacts, sediment runoff into Placencia Lagoon, shallow aquifer vulnerability, and operational effluent/overflow risks affecting marine benthic habitats.

Framework for Developing Specific Mitigation Measures (No Net Loss)

The definitive BAP must structure operational mitigation programs following the sequential Mitigation Hierarchy (Avoidance, Minimization, Restoration) to ensure No Net Loss of natural habitats:

Avoidance Guidelines

- **Pre-Clearance Surveys:** Establish mandatory pre-clearance ecological inspections prior to any site clearing or earthworks.
- **Footprint Demarcation:** Require physical marking of non-intervention buffer boundaries around undisturbed mangroves, wetlands, and waterbodies.
- **Siting Optimization:** Mandate that temporary laydown yards, storage areas, and worker camps be restricted to pre-existing degraded footprints on BWS property.

Minimization Guidelines

- **Wildlife Handling Protocol:** Formulate a mandatory Wildlife Encounters and Relocation Protocol, including pre-clearing visual checks for active nests, eggs, and mobile fauna.
- **Disturbance Controls:** Enforce vehicle speed limits (20–30 km/h) and restrict high-noise construction operations during sensitive dawn/dusk periods to prevent disturbing KBA trigger birds.
- **Exploitation & Chemical Prohibitions:** Enforce strict contractual prohibitions against hunting, poaching, fishing, or plant collection by workers, and prohibit Annex III Rotterdam Convention pesticides.
- **Sediment & Pollution Control:** Require secondary containment for hazardous chemicals, turbidity curtains, and sediment retention traps during earthworks to prevent runoff into Placencia Lagoon.

Restoration Guidelines

- **Site Rehabilitation Plan:** Design a detailed revegetation plan for temporary work corridors using native broadleaf and coastal species.
- **Mangrove Compensation Ratios:** Define compensatory mangrove planting protocols in coordination with the Forest Department under the Forests Act, establishing required replanting ratios and target survival rates (e.g., ≥80% survival evaluated over multi-year monitoring).

Guidelines for Designing In-Situ Actions to Achieve Net Gain in Critical Habitat

Under IDB ESPS 6 (Criterion 6), operations situated within Critical Habitat must achieve a measurable **Net Gain** in the specific biodiversity values for which the area was designated. **Offsets outside Critical Habitat are not acceptable mitigation mechanisms under ESPS 6;** Net Gain must be delivered strictly through *in situ* (on-site) habitat enhancement and threat reduction programs within the project's area of influence.

Critical Habitat status for Project BL-L1056 is currently triggered by the project site's location within the **Belize Coastal and Near Shore Islands Key Biodiversity Area (KBA)** under Criterion 6 (legally protected or internationally recognized areas of high biodiversity value). Because detailed biotic baseline surveys for the definitive BAP will evaluate whether Critical Habitat is also triggered under additional ESPS 6 criteria (e.g., Criteria 1–3 for threatened, endemic, or migratory species), the following actions and indicators represent generic guidelines and illustrative examples to direct the formulation of the final BAP:

In-Situ Net Gain Action Guidelines (Indicative Scope)

- **Protective Buffer Belts:** Evaluate the design and integration of permanent native vegetation/mangrove shelterbelts along project perimeters (such as the WWTP site and Placencia Lagoon interface) to enhance coastal buffer capacity and provide natural shelter and foraging habitat for local fauna within the KBA.
- **Aquatic Ecosystem Quality Support:** Require engineering design standards and operational preventive maintenance protocols for the WWTP that strictly control nutrient (Nitrogen, Phosphorus) and organic loads.
- **Community Stewardship Initiatives:** Incorporate local community participation (such as Seine Bight and Placencia residents) in native coastal vegetation restoration and environmental awareness activities to foster long-term local conservation engagement.

Net Gain Indicators & Verification Framework (Indicative Criteria)

- **BAP Approval & Compliance:** Formal regulatory and IDB approval of the definitive BAP demonstrating verified Net Gain methodologies under ESPS 6.
- **Revegetation Thresholds:** Establishment and achievement of measurable seedling/plant survival targets (e.g., target ≥80% survival evaluated at 24 months post-planting) for restored or compensatory areas.
- **Net Area Gain:** Verification of a net increase in restored, reforested, or protected coastal buffer acreage relative to the directly cleared infrastructure footprint.
- **Water Quality Standards:** Sustained operational compliance with required effluent discharge standards to prevent degradation of receiving aquatic ecosystems in Placencia Lagoon.

Preliminary Framework for the Biodiversity Monitoring and Evaluation Program

The definitive BAP must incorporate a long-term Biodiversity Monitoring and Evaluation Program designed to track baseline indicators, verify mitigation effectiveness, and enable adaptive management based on empirical field data.

Because comprehensive biotic baseline assessments and full Critical Habitat evaluations remain pending, the receptors, scope, frequencies, and responsibilities outlined below constitute a preliminary, generic framework to guide the team elaborating the definitive document:

Vegetation & Habitat Cover Guidelines

- **Scope:** Establish quantitative pre-clearance footprints and permanent sampling plots to monitor replanted native coastal vegetation/mangroves and evaluate seedling survival rates against established targets (e.g., target $\geq 80\%$ survival threshold).
- **Indicative Frequency:** Semi-annually during construction and operation (minimum 24 months post-planting).
- **Responsible Parties:** BWS / Contractor Environmental Specialist / Forest Department / CZMAI.

Terrestrial & Avian Fauna Guidelines

- **Scope:** Conduct visual pre-clearing inspections for potential sensitive species (e.g., Reddish Egret) and active nesting/roosting sites; audit vehicle speed compliance (20–30 km/h); maintain a formal Wildlife Encounters Log.
- **Indicative Frequency:** Monthly during construction; quarterly during operation.
- **Responsible Parties:** BWS Project Implementation Unit / Works Inspector / Qualified Ecologist.

Water Quality & Aquatic Ecosystem Guidelines

- **Scope:** Perform routine sampling of WWTP effluent parameters (BOD5, TSS, nutrients, pathogens) and monitor receiving water quality in Placencia Lagoon to verify protection of aquatic ecosystems and benthic seagrass habitats.
- **Indicative Frequency:** Monthly / Routine effluent laboratory testing.
- **Responsible Parties:** BWS / Certified Environmental Laboratory / Department of the Environment (DOE).

Institutional Implementation, Capacity Building, and Stakeholder Engagement

- **Implementation Responsibilities & Budget:** BWS as Executing Agency is responsible for financing, elaborating, executing, and auditing the definitive BAP. Contractors must incorporate all BAP specifications into their Construction Environmental and Social Management Plan (ESMPc) and bidding budgets.
- **Workforce Capacity Building:** All site personnel must undergo mandatory socio-environmental inductions covering the ecological significance of the Belize Coastal KBA/IBA, trigger bird species protection, safe wildlife encounter protocols, speed limits, and hunting prohibitions.

- **Regulatory & Stakeholder Engagement:** BWS must document stakeholder consultations and coordinate directly with the Department of the Environment (DOE), Forest Department, Fisheries Department, CZMAI, and local Village Councils during BAP elaboration.
- **Public Transparency & Adaptive Management:** The BAP will be maintained as a publicly accessible living document. BWS will publish periodic environmental performance reports. If monitoring data reveals seedling mortality below target thresholds or unexpected ecological impacts, BWS will trigger adaptive management protocols to implement immediate corrective actions.

