

**The Environmental and Social Assessment (ESIA) and Environmental and Social Management Plan (ESMP)
for the Workers' Camp of China Railway Shanghai
Engineering Group**



Project: Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities

Project Number: BA-L-1063

Prepared by

SAEDI Consulting (Barbados) Inc.

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Provenance and basis of preparation

The environmental and social baseline in this document, and the field evidence on which it rests, were generated by BrinsJen Systems Development Specialists in preparing Versions 1 and 2. That work comprised the site visit and sampling exercise of 14 to 18 April 2026, the Rapid Biodiversity Assessment, the air quality, noise, soil and water quality monitoring, the stakeholder engagement exercise of 15 to 18 April 2026, and the associated laboratory analysis. SAEDI Consulting did not conduct or supervise that work.

SAEDI Consulting has reviewed the inherited material, revised and extended it, and is responsible for the content of Version 2C as issued. Where the inherited evidence has limitations of coverage, currency, sampling density or documentation, those limitations are declared at the point of use and are consolidated in the Baseline Data Coverage, Quality Assurance and Limitations section of the Description of the Environment chapter. Data carried forward from Versions 1 and 2 should be read subject to those declarations.

The Contractor remains China Railway Shanghai Engineering Group Co., Ltd. This document is prepared for submission by the Contractor to the Barbados Water Authority, the relevant agencies of the Government of Barbados and the Inter-American Development Bank. Obligations expressed in this ESIA/ESMP as resting on CRSEG, its subcontractors or its named personnel are unaffected by the change of preparing consultant.

List of Acronyms and Abbreviations

Acronym	Meaning
ADWF	Average dry weather flow
AoI	Area of Influence
BLPC	Barbados Light and Power Company Limited, now the National Petroleum Corporation (NPC); also written BL&P
BMS	Barbados Meteorological Services
BOD	Biochemical oxygen demand
BPW	Barbados Professional Women's Club
BrinsJen SDS	BrinsJen Systems Development Specialists
BWA	Barbados Water Authority
CARICOM	Caribbean Community
CARICOMP	Caribbean Coastal Marine Productivity programme
CCCCC	Caribbean Community Climate Change Centre
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CERMES	Centre for Resource Management and Environmental Studies, University of the West Indies
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLO	Community Liaison Officer
CoC	Code of Conduct
COD	Chemical oxygen demand
CRSEG	China Railway Shanghai Engineering Group Co., Ltd.
DAF	Dissolved air flotation
EAAA	Ecologically appropriate area of analysis
EEC	Environmental Engineering Consultants, Inc.
EHS	Environment, health and safety
EPA	United States Environmental Protection Agency
EPD	Environmental Protection Department (Barbados)
ERP	Emergency Response Plan
ESIA	Environmental and Social Impact Assessment
ESL	Environmental Solutions Limited
ESMP	Environmental and Social Management Plan
ESPF	IDB Environmental and Social Policy Framework
ESPS	IDB Environmental and Social Performance Standard
FAO	Food and Agriculture Organization of the United Nations

Acronym	Meaning
FTC	Fair Trading Commission
GBV	Gender-based violence
GCF	Green Climate Fund
GDP	Gross domestic product
GHNS	Graeme Hall Nature Sanctuary
GHS	Graeme Hall Swamp
GoB	Government of Barbados
GPS	Global positioning system
GRM	Grievance Redress Mechanism
HIRA	Hazard identification and risk assessment
HIV	Human immunodeficiency virus
HR	Human resources
HSE	Health, safety and environment
ICP-OES	Inductively coupled plasma optical emission spectrometry
IDB	Inter-American Development Bank
IFC	International Finance Corporation
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
LED	Light-emitting diode
LMIS	Labour Market Information System
MAFNS	Ministry of Agriculture, Food and Nutritional Security
MF/UF	Microfiltration / ultrafiltration
MLST	Ministry of Labour, Social Security and Third Sector
MSL	Mean sea level
NDC	Nationally Determined Contribution
NEET	Not in education, employment or training
NIOSH	United States National Institute for Occupational Safety and Health
NPC	National Petroleum Corporation
NPK	Nitrogen, phosphorus and potassium
NSFE	Non-standard forms of employment
NTU	Nephelometric turbidity unit
OSHA	United States Occupational Safety and Health Administration

Acronym	Meaning
PAHO	Pan American Health Organization
PAOs	Phosphorus-accumulating organisms
PEU	Project Execution Unit
PM2.5 / PM10	Particulate matter below 2.5 and 10 micrometers in diameter
PPE	Personal protective equipment
PV	Photovoltaic
PVC	Polyvinyl chloride
PWD	People with disabilities
R2RP	Roofs to Reefs Programme
RBA	Rapid Biodiversity Assessment
RO	Reverse osmosis
SAEDI	SAEDI Consulting (Barbados) Inc.
SCSTP	South Coast Sewage Treatment Plant
SCWRRF	South Coast Water Reclamation and Reuse Facility
SEA	Sexual exploitation and abuse
SEAH	Sexual exploitation, abuse and harassment
SEP	Stakeholder Engagement Plan
SGBV	Sexual and gender-based violence
SH	Sexual harassment
SIA	Social Impact Assessment
SME	Small and medium-sized enterprise
SMP	Social Management Plan
SOM	Soil organic matter
STI	Sexually transmitted infection
TDS	Total dissolved solids
TMP	Traffic Management Plan
TSS	Total suspended solids
UN	United Nations
UNEP	United Nations Environment Programme
USD	United States dollar
USDA	United States Department of Agriculture
UTM	Universal Transverse Mercator

Acronym	Meaning
WHO	World Health Organization
WMO	World Meteorological Organization
WWTP	Wastewater treatment plant

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KEY TERMS

The terms below have the meanings given wherever they appear in this assessment.

Term	Definition
Area of Influence	The geographic area within which environmental or social impacts from the Workers' Camp may reasonably occur through direct or indirect pathways.
Baseline	The pre-project environmental and social conditions against which project-related change is assessed.
Biodiversity	The variety of living organisms, habitats and ecological processes within and around the project area, including flora, fauna and wetland ecosystems.
Community Health and Safety	The protection of nearby residents, visitors, businesses and public users from project-related risks such as traffic, dust, noise, disease vectors, security issues and emergency incidents.
Cumulative Impact	An impact that results from the Workers' Camp in combination with other existing, planned or reasonably foreseeable activities in the same area.
Determinant of health	An environmental, social, economic or institutional condition through which Project activities may change health outcomes. Determinants are the pathways assessed in this document.
Direct Area of Influence	The area in which physical exposure pathways such as dust, noise, odor, emissions, drainage or immediate community interaction may occur.
Ecosystem Services	The benefits people obtain from ecosystems, including water regulation, habitat support, flood attenuation, recreation, cultural value and supporting ecological functions.
Emergency Preparedness and Response	The arrangements for preventing, preparing for and responding to incidents such as fire, spills, severe weather, injury, security events or other emergencies affecting the camp or nearby receptors.
Gender-Based Violence	Harmful conduct directed at a person because of gender or unequal gender relations, addressed in this ESIA/ESMP through prevention, response, reporting and survivor-centered controls.
Grievance Mechanism Redress	A process through which workers, community members and other stakeholders can safely raise concerns or complaints and receive responses, including confidential channels for sensitive matters.

Term	Definition
Indirect Area of Influence	The area beyond the direct Area of Influence where impacts may occur through identifiable transmission pathways such as haulage, drainage, labor influx or ecosystem connectivity.
Labour Influx	The arrival or concentration of workers associated with the project and the resulting interaction with local communities, services, housing, infrastructure and social dynamics.
Larvivorous Fish	Fish species that consume mosquito larvae and function as a biological vector control measure.
Mitigation	Measures designed to avoid, reduce, manage or compensate for adverse environmental or social impacts.
Monitoring	The regular collection, review and reporting of data to confirm whether impacts are occurring as predicted and whether management measures are effective.
Occupational Health and Safety	Measures and systems used to protect workers from injury, illness and unsafe working or living conditions associated with the camp and project activities.
Residual Impact	The level of impact that remains after mitigation measures have been applied.
Sensitive Receptor	A person, community, habitat, species, facility or resource that may be more vulnerable to project-related effects because of its location, use, condition or sensitivity.
Stakeholder	An individual, group, institution or organization that may affect, be affected by, or have an interest in the Workers' Camp or its environmental and social performance.
Stakeholder Engagement	A process of identifying, informing and consulting stakeholders and incorporating relevant feedback into project planning, implementation and monitoring.
Vector	An organism that transmits a pathogen between hosts. In this Assessment the term principally refers to mosquitoes and rodents.
Worker Influx	The temporary arrival or concentration of workers associated with the project and the related effects on nearby communities, services, infrastructure, safety and social dynamics.

EXECUTIVE SUMMARY

This document is the Environmental and Social Impact Assessment and Environmental and Social Management Plan for the Workers' Camp serving the Barbados Climate Resilient South Coast Water Reclamation Project, financed by the Inter-American Development Bank and the Green Climate Fund and executed by the Barbados Water Authority. The camp will be built and operated by China Railway Shanghai Engineering Group within the boundary of the existing South Coast Sewage Treatment Plant at Graeme Hall, Christ Church, and will be removed at the end of construction. This assessment covers the camp only. The works it serves are assessed separately in the Environmental and Social Impact Assessment for the parent project.

The camp and the workforce

The camp accommodates ninety-eight resident workers, of whom eighty are non-local skilled workers on fixed-term assignment. The total planned workforce for the project is two hundred and fifty-two, and up to two hundred and three people may be present on the site during a working day. That distinction runs through the assessment: the sanitary and welfare systems are sized on the resident population, while the peak daytime population is more than twice that figure. Confirmation of the design basis for the sanitary systems is one of the open items carried at the end of this document.

Twenty-two of the two hundred and fifty-two posts are held by women, a share of 8.7 per cent, and one hundred and fifty-four posts, 61.1 per cent of the workforce, sit in roles that employ no women at all. The assessment treats job creation as a beneficial impact but records that the benefit is not distributed evenly by sex, and the commitments in the Social Management Plan respond to that finding rather than to an assumption of equal access.

The receiving environment

The camp sits immediately adjacent to Graeme Hall Swamp, the last coastal mangrove wetland in Barbados, designated under the Ramsar Convention. The wetland is not in good condition. The last complete water quality dataset, from October 2018, records total phosphorus at 1.15 mg/l, chlorophyll-a at 84 µg/l, fecal coliforms at 9,500 per 100 ml and enterococci at 1,187 per 100 ml, all of which indicate eutrophic conditions and continuing fecal contamination. Legacy organochlorine pesticides persist in sediment, and zinc is elevated in water and in fish tissue. The swamp has been substantially isolated from the sea for several years and is passing from a brackish system to a freshwater one. No dataset published since 2018 supersedes those figures.

The significance of that condition for this assessment is that the receiving environment has little capacity to absorb additional load. A discharge that would be minor into a well-flushed system is not minor here, and the assessment therefore relies on the camp's controls holding rather than on dilution.

Air quality at the site is generally good, with the exception of carbon monoxide, which exceeded the World Health Organization fifteen-minute indoor air quality guideline of 100 mg/m³ at two of the three monitoring locations during the April 2026 survey. There is no national ambient noise standard in Barbados, so the assessment applies the IFC Environmental, Health and Safety Guidelines of 55 dBA by day and 45 dBA at night for residential receptors.

Significant findings

The impacts of greatest significance are the sanitary loading on a treatment works undergoing reconstruction; noise, dust and traffic experienced cumulatively with the construction of the water reclamation works next

door; the risk of accidental discharge or drainage to the wetland; pressure on community health services and utilities; and the labor influx risk associated with a workforce that is 91.7 per cent male and housed adjacent to a residential and tourism area.

On that last point the assessment is explicit. The Labour Influx Risk Screening places sexual harassment, exploitation and gender-based violence at likelihood 3 and consequence 5 before mitigation, and the national context makes the controls necessary rather than precautionary: the National Intimate Partner Violence survey found that 62 per cent of Barbadian women have experienced at least one form of intimate partner violence. Twelve minimum controls follow from the screening and are implemented through the Environmental and Social Management Plan, the Workers' Code of Conduct and the Grievance Redress Mechanism, which carries a separate confidential pathway for these cases.

No impact is assessed as critical after mitigation. Several remain medium, and those are the ones that depend on the controls being implemented and monitored rather than merely committed to.

Management and monitoring

The Environmental and Social Management Plan sets out the noise, emergency response, traffic, incident, solid waste, workers' health and safety and community health and safety arrangements, each with responsibilities, indicators and monitoring frequency. Water quality monitoring for the camp is to be reported against the same stations and laboratory methods used for Graeme Hall in 2010 and 2018, being the three lake stations and the bisecting canal source point, so that the camp's contribution can be distinguished from the pre-existing condition. Community-facing commitments run through the Stakeholder Engagement Plan and the Grievance Redress Mechanism.

Matters left open

This version does not close every question, and the outstanding items are recorded rather than glossed. The principal ones are the design basis for the camp's sanitary systems against the peak daytime population; the absence of any Graeme Hall water quality measurement after October 2018 and whether the monitoring programme designed for the parent project has yet been carried out; written confirmation of the Contractor's recruitment intentions with respect to women; and the source document for the intimate partner violence prevalence figure. These are listed in full in the outstanding items register issued with this assessment, and the substantive ones are also flagged as comments at the point in the text where they arise.

1 INTRODUCTION

1.1 Project overview and background

Barbados is among the most water-scarce countries in the world. Renewable freshwater resources are estimated at 305 to 310 m³ per capita per year, well below the 500 m³ threshold for absolute water scarcity. More than 80 per cent of potable water is abstracted from the island's freshwater limestone aquifers, with the balance produced principally by seawater desalination (Barbados Water Authority, BA-L1069 Strategic Environmental and Social Assessment, 2025).

Abstraction is already close to the sustainable limit of the aquifer system. Between 2019 and 2020, annual groundwater abstraction ranged from 57.6 to 74.9 million m³ against an estimated sustainable yield of 65.7 to 89.8 million m³ per year, placing abstraction at roughly 75 to 100 per cent of renewable capacity. Approximately 98 per cent of the island's groundwater resources have already been developed, so there is little scope to expand conventional supply without risking depletion and saline intrusion (Barbados Water Authority, 2025).

Demand is projected to rise by approximately 30 per cent by 2050, while climate change is expected to reduce recharge through declining rainfall and higher evapotranspiration. Absent improvements in efficiency and demand management, per capita availability could fall to 98 m³ per year by 2050. Distribution losses compound the position: the Barbados Water Authority estimates that approximately 50 per cent of water produced is non-revenue water, lost to leakage, ageing infrastructure and metering inaccuracy (World Bank, 2026).

Reducing distribution losses, improving groundwater management and developing alternative sources are therefore the three pillars of national water security policy, and it is within that policy context that this project sits.

The Barbados Water Authority (BWA) manages, protects, produces, distributes and regulates potable water and oversees wastewater and sewage treatment infrastructure. It also acts as the regulator for water resource management, no separate institution holding that legal function. The BWA operates two plants: the Bridgetown Sewage Treatment Plant, providing secondary treatment, and the South Coast Sewage Treatment Plant (SCSTP), providing primary treatment. The SCSTP is the subject of this project.

The Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities is intended to convert wastewater from a disposal problem into a national water resource, strengthening long-term water security and climate resilience. Its objectives are to diversify supply and reduce water insecurity through reuse of reclaimed wastewater, and to strengthen sector institutions in water resource management, operational efficiency, monitoring and gender mainstreaming (IDB, 2024).



Map 1: Location of the South Coast Sewage Treatment Plant

The project comprises four components, summarized in Table 1.

Table 1: Project components

Component	Scope	Key parameters
Component 1: Water reclamation infrastructure	Upgrade of the existing SCSTP headworks and construction of the new South Coast Water Reclamation and Reuse Facility (SCWRRF).	Average dry weather flow 9,000 m ³ /day
Component 2: Reclaimed water reuse	Pipeline along the former trainline (the Trailway) to convey reclaimed water for irrigation at River Plantation, together with aquifer recharge infrastructure and monitoring boreholes.	25 km reuse pipeline; approx. 160 ha irrigated; 4 km recharge pipeline; up to five injection wells
Component 3: Climate change and biodiversity opportunities	Conservation monitoring of the Graeme Hall Swamp and a solar photovoltaic plant with battery storage to offset the carbon footprint of the upgraded facilities.	7 MW solar PV with battery storage
Component 4: Institutional strengthening	Support to water resource governance through the Fair Trading Commission, the Environmental Protection Department and the Ministry of Agriculture, Food and Nutritional Security.	—

Under the selected design framework, Scenario A1, the SCSTP moves from advanced preliminary treatment to a reclamation system. The principal technical elements are set out in Table 2.

Table 2: Principal technical elements (Scenario A1)

Element	Description	Design parameter
Biological treatment	Five-Stage Bardenpho activated sludge process for total nitrogen removal.	

Element	Description	Design parameter
Filtration and disinfection	Disk filtration followed by ultraviolet disinfection, inactivating pathogens without forming disinfection by-products.	
Salinity reduction	A side stream treated by microfiltration or ultrafiltration and reverse osmosis; permeate blended with UV-treated water.	Final TDS below 450 mg/L, suitable for agricultural use
Aquifer recharge	Treated water not used for irrigation pumped at low pressure into the karst limestone aquifer of Christ Church through deep wells penetrating the saturated zone.	Up to five recharge wells
Sludge management	Solar drying system.	

The project is expected to deliver a drought-resistant irrigation supply supporting local food production; a locally controlled aquifer reserve buffering against drought and coastal saline intrusion; improved effluent quality, reducing pollutant discharge to the marine environment and to adjacent ecosystems including the Graeme Hall Swamp; and short-term construction employment alongside longer-term gains in public health, sanitation and agricultural livelihoods.

Delivery is supported by the Government of Barbados, the BWA, the Caribbean Community Climate Change Centre, the Green Climate Fund and the Inter-American Development Bank (IDB). The Contractor is China Railway Shanghai Engineering Group Co., Ltd. (CRSEG), working with Central & Southern China Municipal Engineering Design and Research Institute Co., Ltd. and GreenTech Environmental Co., Ltd.

CRSEG is required to prepare an ESIA and ESMP for each project component/phase. These satisfy a dual compliance framework: the statutory requirements of Barbados, enforced by the Environmental Protection Department and the Planning and Development Department, and the IDB Environmental and Social Policy Framework applying to a Category B operation.

This document is the ESIA and ESMP for the Workers' Camp. The camp serves as both the accommodation for the workforce and the project management headquarters for the duration of construction, and its footprint therefore requires standalone assessment and mitigation.

1.2 Project area of influence

The Area of Influence is defined in three parts, because physical and socio-economic effects do not travel the same distance. The direct Area of Influence is a 500 m radius from the boundary of the project site. It is the area within which physical exposure pathways operate, such as dust and particulates, noise and vibration, odor, hydrogen sulfide and bioaerosols, vectors, and surface water and drainage. All environmental and social effects arising from project activities and from facilities owned, operated or managed for the project are assessed within it, covering the natural and built environment, nearby communities and surrounding operations.

The socio-economic catchment extends to 1 km from the site boundary. It is the area within which interactions between project personnel and residents, businesses, informal vendors and service providers are most likely to occur, and within which labor influx, community interaction, pressure on local services, local commerce and price effects are assessed. It is identified separately because these effects travel further than physical ones, and it lies within the Indirect Area of Influence rather than forming a second direct area.

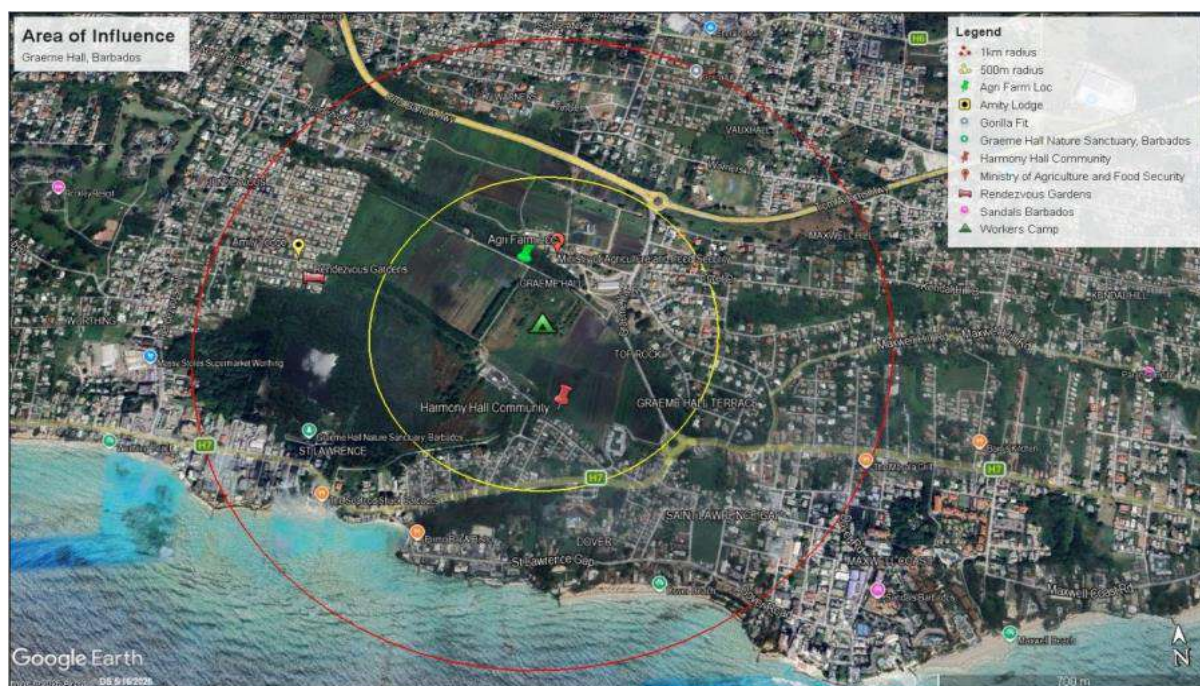
The Indirect Area of Influence is the area beyond the direct Area of Influence within which effects attributable to the Workers' Campsite may still be experienced through an identifiable transmission pathway, although no project activity, facility or land take occurs there. It has been determined by pathway rather than by nominal distance: for each pathway, the furthest receptor capable of experiencing the effect was identified and the Indirect Area of Influence taken as the envelope of those distances. Table 3 sets out the pathways and the receptors that define them.

Table 3: Transmission pathways defining the Indirect Area of Influence

Pathway	Receptor defining the extent	Basis
Acoustic propagation	Harmony Hall Community, approximately 280 m south-east	Measured levels of 56.3 to 60.5 dB(A) at monitoring Location 3, downwind of the campsite, before construction commenced
Traffic, access and pedestrian safety	Community roads serving Harmony Hall	Access by earthen dam of approximately 730 m from a primary access point approximately 193 m south of the campsite
Air quality and odor	Harmony Hall Community to the south-east; Ministry of Agriculture office approximately 254 m north	Fugitive dust from clearance, earthworks and vehicle movement, and odor from the adjacent SCSTP, dispersing downwind
Surface water and drainage	Graeme Hall Swamp	Site drains to the Swamp, the receiving environment for upland runoff; transmission is by drainage network, not straight-line distance
Biodiversity and habitat connectivity	Graeme Hall Swamp and the wider wetland system	Mobile fauna, including migratory avifauna on the Eastern Caribbean Flyway, range across the campsite and the wetland
Labour influx and community interaction	Harmony Hall Community and settlements served by the same road network and social infrastructure	Interaction through local commerce, services and social contact
Haulage and material delivery	Communities fronting the routes between the site and the ports, quarries and disposal facilities serving it	Vehicle movement, dust, noise and road safety effects are transmitted along the delivery routes, beyond the community road

Taking the envelope of these pathways, the Indirect Area of Influence comprises the area within 1 km of the campsite boundary, which contains the socio-economic catchment; the site access route and the community roads serving Harmony Hall; the full extent of the Graeme Hall Swamp, by virtue of hydrological and ecological connectivity; and the haulage and delivery routes between the site and the ports, quarries and disposal facilities serving it, together with the communities fronting those routes. Receptors within the Indirect Area of Influence are carried into the Impact Assessment chapter.

The direct and Indirect AOI as delineated above are shown on Map 2.



Map 2: *Area of Influence*

1.3 Objectives and scope

This ESIA and ESMP establishes that the construction and operation of the Workers' Camp meet regulatory requirements, that environmental and social impacts are mitigated, and that the camp is operated sustainably. It is prepared under the applicable environmental and social law of Barbados and the IDB Environmental and Social Policy Framework. Its scope is set out in Table 4.

Table 4: *Scope of this ESIA/ESMP*

Element	Coverage
ESIA/ESIA methodology	Approach to data collection, in-field assessment, desk review and analysis, and the basis on which impacts and management measures are determined.
Site description and land use	Current land use, geographic location and site characteristics, including climate, soil, topography and vegetation, and identification of sensitive ecological or protected areas within or near the site.
Baseline assessment	Pre-project conditions for air quality, water quality, noise, soil, biodiversity and ecosystem services, together with prevailing climatic and community conditions.
Legal and legislative framework	Applicable Barbadian legislation and IDB requirements governing the project, and how each applies.
Social and community assessment	Community demographics and socio-economic profile within the Area of Influence, and assessment of effects on communities and livelihoods.
Management plans	Measures to avoid impacts and, where avoidance is not practicable, to mitigate them, with allocated responsibility and monitoring.

Because construction has not yet commenced, the baseline assessments record genuine pre-project conditions against which future change can be measured. Where the assessment addresses the operational phase, the expectations for that phase and the arrangements for managing it are stated.

1.4 ESMP methodology

The assessment followed the phased approach set out in Table 5, designed so that the environmental and social assessments were carried out on a common basis and aligned with national requirements and international practice.

Table 5: Assessment methodology

Step	Description
1. Technical methodologies issued to the BWA	Testing and sampling methodologies, equipment lists, calibration certificates and proposed field activities were shared with the Barbados Water Authority in advance of the field exercise.
2. Site visit	Week-long site visit from 14 to 18 April 2026 to establish the environmental and socio-economic conditions of the site and to conduct social engagement.
3. Literature review	Review of project documentation, environmental and social data, and comparable international projects. Operational information was provided by the CRSEG project management team.
4. Environmental baseline collection	Collection of baseline data to establish pre-existing conditions at the site and its surroundings, covering the components in Table 6.
5. Social and community assessment	Land use, community profile, gender profile, livelihoods, economic activity, awareness of the project, and identification of cultural and heritage sites within the Area of Influence.
6. Impact assessment and analysis	Identification, quantification where possible, and rating of potential environmental and social impacts against defined criteria, before and after mitigation.
7. Mitigation and management	Determination of practical mitigation for each identified impact, and preparation of management plans consistent with Barbadian regulation and IDB requirements.

Table 6: Environmental baseline components

Component	Scope
Air quality	Ambient air quality including particulate matter, measured at three locations.
Water resources	Surface water sampling within and around the SCSTP facility to characterize hydrological conditions.
Noise	Ambient noise at four monitoring locations representing the nearest sensitive receptors.
Soil	Soil characteristics of the project zone by sampling and desk research.
Biodiversity	Rapid Biodiversity Assessment of flora and fauna and identification of sensitive or protected species. This is not a Critical Habitat Assessment; the limitations are stated in the Description of the Environment chapter.

Component	Scope
Ecosystem services	Identification and prioritization of ecosystem services in the direct and Indirect Areas of Influence, with indicative valuation where the evidence supports one.

1.5 ESMP preparation team

This Version 2C update was prepared by the environmental and social consulting team of SAEDI Consulting (Barbados) Inc., acting as subcontracted environmental and social specialist to China Railway Shanghai Engineering Group Co., Ltd. Versions 1 and 2 of this document, and the field evidence on which the baseline rests, were prepared by the environmental and social consulting team of BrinsJen Systems Development Specialists, whose contribution is acknowledged. That team comprised Jenell Williams-Pinder (project lead, soil assessment, project and environmental description, document compilation), Latoya Farinha (air quality assessment and management, project health and safety management), Melinda Franklin-Lynch (noise assessment and mitigation, legal and regulatory framework), Geeta Singh (water quality assessment and management, biodiversity assessment and conservation), Vanessa Williams (socio-cultural engagement, assessment and management) and Darshini Seeram (geographic information system lead, preparation of project maps). The SAEDI Consulting team responsible for the Version 2C update is:

- Leisa Perch: Managing Director; technical direction, quality assurance and final review
- Sara Lavell: Lead author of the Version 2C update; ESIA/ESMP consolidation and response to reviewer comments
- Kwasi Pierre: Labour Management Plan and Workers' Code of Conduct; client and Project Execution Unit liaison
- Roshanna Ramdass: Grievance Redress Mechanism; SH/SEA/GBV Prevention and Response Plan
- Shakirah Ali: Stakeholder Engagement Plan and social engagement inputs
- Marisa Hutchinson: Gender analysis and inputs to the social assessment
- Yemi Knight: Community Health Assessment and Community Health Programme
- Tracy Phillips: Critical Habitat Assessment methodology and field work
- Sai Sonali Anmolsingh: Graphics, visualization and progress reporting

2 WORKERS' CAMP DESCRIPTION

2.1 Purpose of the workers' camp

The primary purpose of the Workers' Camp is to provide a centralized, safe, and efficient living and working environment for personnel assigned to the *Barbados Climate Resilient South Coast Water Reclamation and Reuse Facilities Project*. Housing staff and having offices near the project site will allow management to optimize project logistics, ensure worker welfare, maintain strict health and safety standards, and designate facilities to engage with various project stakeholders. The camp will function to serve the following purposes: The camp will be designed, constructed and managed by the Contractor in accordance with applicable national law and with the Inter-American Development Bank's Environmental and Social Policy Framework, including its commitments to non-discrimination, equality, the prevention of sexual harassment, sexual exploitation and abuse and gender-based violence, and respect for the rights and dignity of all workers and of the surrounding communities.

The layout of the camp, drawn to scale from the facility schedules in this chapter, is shown in Figure 1. Typical unit plans and the foundation build-up are in Figure 2. The schedules fix the number, size and occupancy of each unit; the arrangement of the units on the plot is indicative and is to be confirmed against the Contractor's construction drawings.

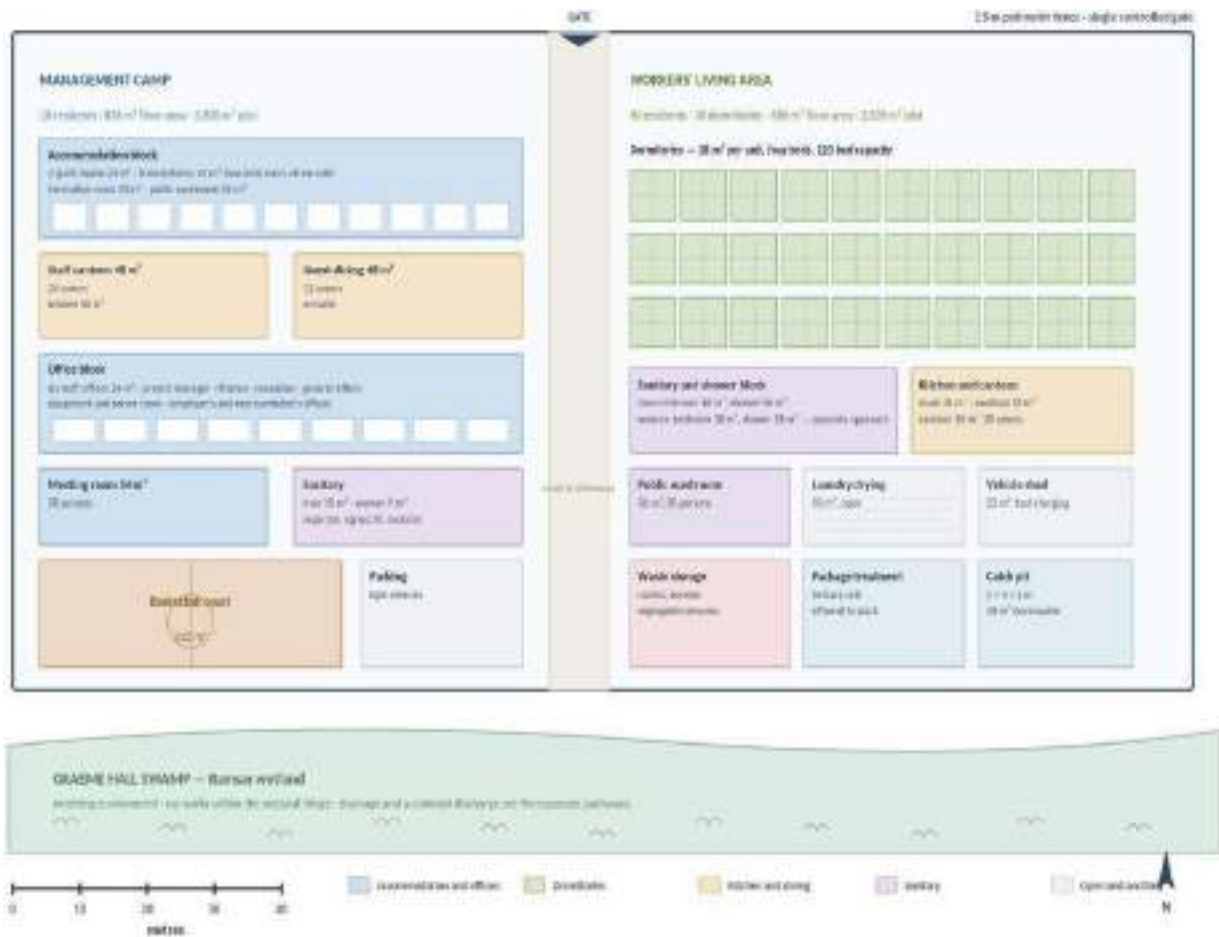


Figure 1: Indicative site layout. The management camp and the workers' living area sit either side of a single central driveway with one controlled gate, and the wetland lies immediately to the south.

Typical units — plan and section

Probationed modular construction on a 150 mm compacted crushed stone base with a 100 mm C15 blinding and 150 mm C30 slab, as specified in the EBA.

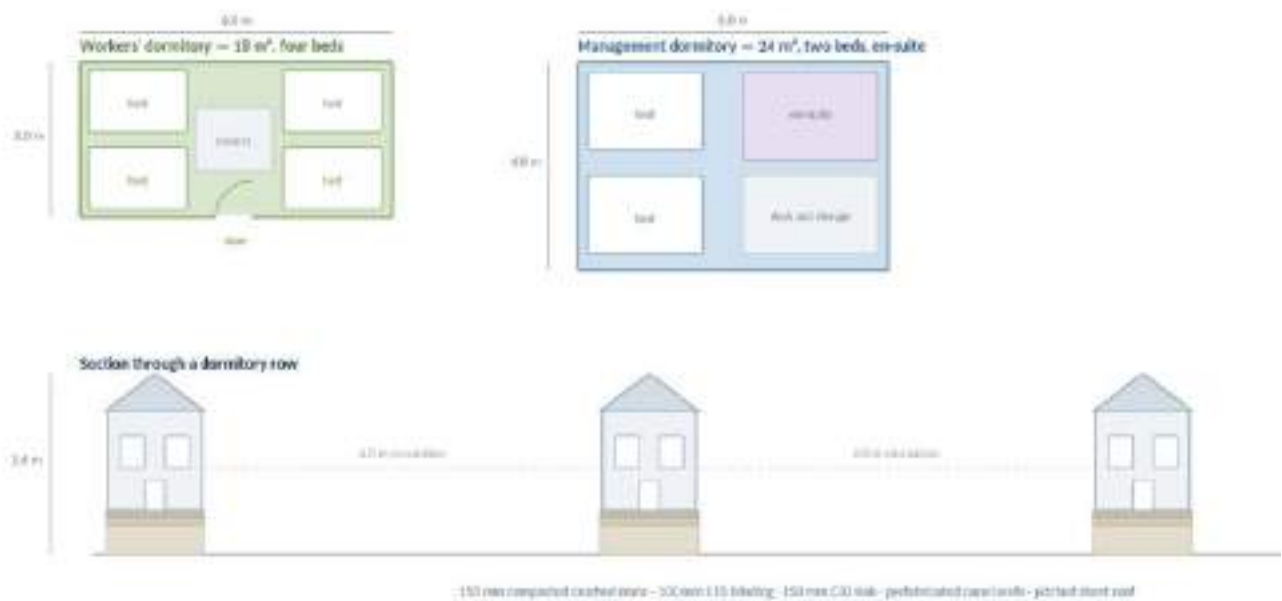


Figure 2: Typical dormitory unit plans and a section through a dormitory row, showing the 150 mm crushed stone, 100 mm C15 blinding and 150 mm C30 slab specified for the foundations.

- **Provision of Safe and Adequate Accommodation for Management and Staff of CRSEG:** The camp will offer secure living quarters and essential amenities for workers, including sleeping areas, sanitation facilities, potable water, dining areas, laundry services, electricity, internet connection, emergency response services and recreational spaces. This supports worker welfare, health, and morale throughout the project lifecycle.

Additionally, the accommodation and shared facilities will be designed and managed in a gender-responsive and inclusive manner, including separate, secure, and adequate sleeping and sanitation facilities for women and men, provision for proper hygiene management, and reasonable accessibility for workers with disabilities.

- **Facilitating Workforce Management and Logistics:** The camp will function as a centralized location for worker mobilization, shift coordination, transportation scheduling, training, toolbox meetings, emergency response, and supervision.

Further, the Contractor will manage and comply with national labor laws and standards, including fair contracts, wages, working hours, and rest periods for all workers. Also, a Code of Conduct, to be signed by all workers, subcontractors, and applicable stakeholders, will clearly prohibit discrimination, Sexual Harassment (SH), Sexual Exploitation and Abuse (SEA), and Gender-Based Violence (GBV) and will define expected behaviour within the camp and in interactions with the surrounding communities. A Grievance Redress Mechanism operates alongside the Code of Conduct and provides safe, accessible and confidential channels through which any person, including women, men, persons with disabilities and members of other potentially vulnerable groups, may raise a concern or complaint, including concerns relating to sexual harassment, sexual exploitation and abuse or gender-based violence. Its purpose, access channels and handling procedure are set out in the Grievance section of this document and in the companion Grievance Redress Mechanism recorded in Table 107.

- **Reducing Pressure on the Local Communities and Infrastructure:** The Workers' Camp is essential to the Contractor's operations and to ensure that its staff do not overburden nearby communities with sudden increases in demand for housing, water, sanitation, healthcare, and other services. The intention is to create a camp that is as self-sufficient as possible. Additionally, having the workforce in a centralized location will facilitate better management of interactions between the foreign workers and the local population.

These interactions will be managed through applicable stakeholder engagement measures to help support the objectives of this project. Such engagement mechanisms will particularly assist where concerns may arise from nearby residents, institutions, and other stakeholders. More details on the Stakeholder Engagement activities and plans are outlined in *Section 7: Social Impact Assessment* of this document.

Additionally, a Grievance Redress Mechanism (GRM) will also be active throughout all phases of this project. It will function to ensure that stakeholders (such as women, men, PWD, and other potentially vulnerable groups) have a safe, accessible, and confidential channel to raise concerns related to the Worker's presence and behaviour in the area. More information on the GRM is outlined in *Section 7: Social Impact Assessment* of this document.

- **Provision of Temporary Facilities for Project Operations:** In addition to accommodation, the camp will also include offices, materials, and storage areas necessary to support project activities.

2.2 Location of the workers' camp

The Camp will be located at the northeastern corner of the new SCWRRF, approximately 30m from the nearest proposed structure. To the northeast, it is about 160m from the Ministry of Agriculture. To the southeast, it is roughly 250m from the nearest residential area. The distance to the existing SCSTP is approximately 220m. The coordinates of the four corners of the camp are as follows:

- Point 1: N=63382.227, E=28547.975 (13o04'27.25" N 59o34'17.29" W)
- Point 2: N=63295.356, E=28634.901 (13o04'24.57" N 59o34' 14.26"W)
- Point 3: N=63246.807, E=28612.199 (13o04'23.03" N 59o34' 15.03"W)
- Point 4: N=63345.655, E=28512.291 (13o04'26.01" N 59o34'18.42" W)

The area surrounding the workers' camp consists mainly of wasteland and farmland, with no sensitive receptors. All domestic sewage from the camp is conveyed to SCSTP for treatment and there is no on-site discharge. Construction-related impacts are limited to the immediate vicinity of the camp; no identifiable indirect environmental impacts extend beyond the camp site.

The site and its setting are shown in Figures 3 to 7: the camp boundary and its four corners, aerial views of the location and its immediate surroundings, the position of the site relative to nearby landmarks, and a ground-level view of the land as found.



Figure 3: Schematic of the Workers' Camp Location, highlighting the four corners



Figure 4: Proposed location of the Workers' Camp from an aerial vantage point



Figure 5: Schematic of the Workers' Camp in proximity to key nearby landmarks



Figure 6: Aerial view of the proposed location for the Workers' Camp, adjacent to the SCSTP



Figure 7: Ground-level view of the identified site for the Workers' Camp (and other project activities)

2.3 Camp structure and functional areas

The camp will be divided into two key accommodation zones or blocks, specifically:

2.3.1 Management staff camp

The management staff office and living camp will contain buildings constructed of prefabricated materials. These structures will be located on the northeastern side of the new plant. It will include the living quarters

and office area for CRSEG's management staff, as well as office areas for the Employer and the Employer's Representative.

Notably, to ensure safe and comfortable living for all individuals who will occupy these living quarters, the CoC has been created to prohibit discrimination, bullying, and any form of SH/SEA/GBV at this facility. The CoC will be communicated and distributed to all workers, subcontractors, and relevant stakeholders in their language to ensure that all rules and expectations are clearly communicated. The CoC will also be strategically placed at visible locations throughout the Camp. The Grievance Redress Mechanism operates alongside the Code of Conduct for this purpose. It may be accessed by workers and by community members through the channels set out in the Grievance section, including a confidential channel, and complaints concerning sexual harassment, sexual exploitation and abuse or gender-based violence are handled under a survivor-centered procedure rather than the general process.

The management camp will occupy a total site area of 3,830 m², with a total building floor area of 876 m². The female staff dormitory will also be located in this block. The female dormitory will be physically separated from the male dormitories, with controlled access, adequate external and internal lighting, and lockable doors for rooms and sanitary facilities to enhance privacy and safety. Further, the layout and circulation within this block will be designed to minimize isolated areas and reduce the risks of harassment or assault. A photograph or dimensioned illustration of the Management Staff Camp and of the workers' accommodation blocks, showing the prefabricated units proposed for this project rather than an example drawn from another project, is to be provided by the Contractor and inserted in this section before the next revision.

The accommodation area per person in the Management Staff Camp is 9 m². The Management Staff Camp is designed to accommodate 25 people, including members of the AECOM team. The management staff dormitories will be structured to accommodate two people per room. Each room will be equipped with beds, closet space, and natural ventilation windows. An adequate number of washroom facilities will be available, inclusive of exhaust fans for air circulation. Separate washroom, shower and changing facilities are provided for women and for men in both the Management Staff Camp and the Workers' Camp. The women's facilities are located within the female dormitory block, are lockable from the inside, and are reached by lit internal routes that do not pass through male accommodation areas. The number, location and ratio of facilities to users in each camp are given in the accommodation schedule.

LED lighting will be installed in all areas, such as various indoor spaces, common areas, pathways to bedrooms, restrooms, dining rooms, and night lighting will be provided in public areas. Additionally, night-time lighting will be provided in all covered walkway areas beneath the canopies. Also, night-time lighting will remain on around the bedrooms of the female dorm, all female living and recreational facilities and women's restrooms.

The detailed arrangements for the Management Staff Camp are outlined in Table 7 below, along with other supporting figures.

Please note, however, that the architectural images shared herein are originally highly detailed AUTOCAD images that have been considerably compressed to their present form. Therefore, some distortion will be visible. However, the original image below (and all others in the document) are available upon request. This will enable the reviewer to have clearer images for reference wherever necessary.

Table 7: Management Staff Camp Facilities

Management Staff Camp Facilities							
No.	Item	Building Area (m ² /unit)	Unit	Qty	Per Room: Beds/Occupant/Max Occupancy	Max Occupancy	Remarks
1	Guest Accommodation Room	24	Unit	3	1/1/1		with an en-suite bathroom
2	Dormitory Rooms	24	Unit	8	2/2/2		with an en-suite bathroom
3	Recreation Room	24	Unit	1		4	
4	Public Washroom	24	Unit	1		6	
5	Employer's Representative Kitchen and Dining Room	24	Unit	1		8	
6	Staff Canteen	48	Unit	1		24	
7	Kitchen	48	Unit	1			
8	Guest Dining Room	48	Unit	1		12	with an en-suite bathroom
9	Employer's Representative Office	18	Unit	1			
10	Employer's Office	18	Unit	1			
11	General Affairs Office	18	Unit	1			
12	Equipment Storage and Server Room	18	Unit	1			
13	Employer's Representative Bathroom	18	Unit	1			
14	Employer's Representative Lounge	18	Unit	1	2/2/2		
15	Meeting Room	54	Unit	1		30	
16	Men's Restroom	18	Unit	1		5	
17	Women's Restroom	9	Unit	1		3	
18	Storage Room	9	Unit	1			
19	Staff Offices	24	Unit	6			Three of the rooms will have washroom facilities
20	Finance Office	18	Unit	1			

Management Staff Camp Facilities							
21	Project Manager's Office	18	Unit	1			
22	Reception Room	18	Unit	1		8	
23	Basketball Court	422	Unit	1			
24	Crushed Stone Leveling	/	Unit	305			
25	Site Leveling	/	Unit	3830			

The architectural drawings for the Management Staff Camp are reproduced at Figures 8 and 9.

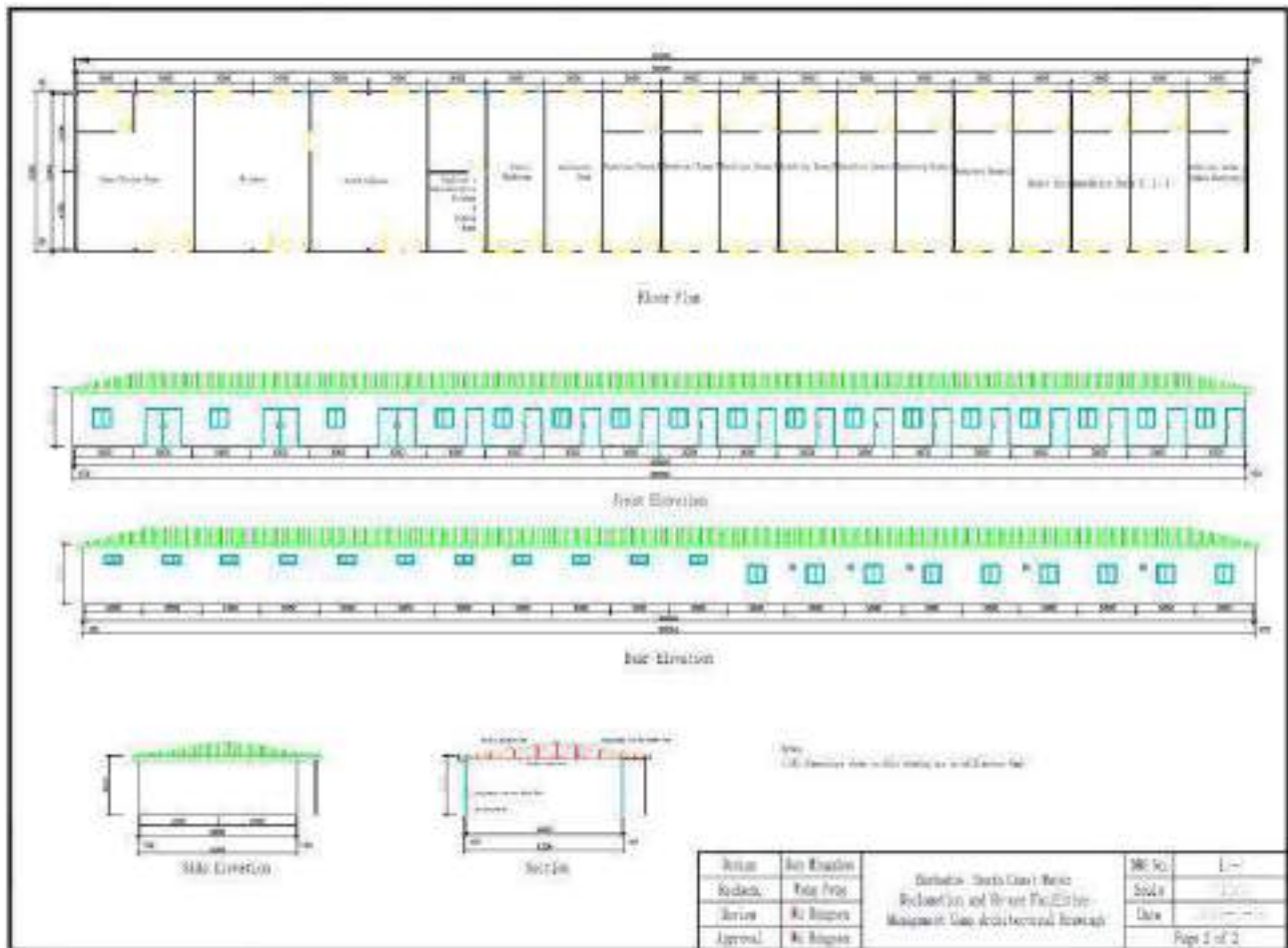


Figure 9: Management Camp Architectural Drawings (Part 2 of 2)

2.3.2 Workers' living area

These structures will be constructed to house the labor team. Similar to the Management Staff Camp, the structures will be prefabricated and consist of dormitories, washing areas, and a canteen, among other functional areas. The Workers' Camp living area will occupy a total site area of 2,835 m², with a building area of 788 m².

The figure of 120 is the design capacity of the workers' living area, providing headroom above the anticipated peak construction workforce of approximately 80. These figures reconcile with the Project Workforce Deployment Plan at Table E.1 in Annex E, which shows a peak of 98 personnel sustained from the third quarter of 2027 to the third quarter of 2028, comprising 18 management personnel and 80 site workers. The 18 management personnel are accommodated in the Management Staff Camp, which provides 25 places, the balance being available to the Employer's Representative and the AECOM team. Peak population across both camps is therefore 98, against a combined design capacity of 120.

The allocation of the dormitories will ensure that women and men are accommodated in separate areas with controlled and monitored access. The women's dormitories, restrooms, and shower rooms will be located separately to allow safe, well-lit access routes at all times, and all shared sanitary facilities will have functional locks and adequate privacy measures (e.g., doors, partitions, curtains). The women's restrooms and shower rooms will be equipped with facilities for menstrual hygiene management, including covered disposal bins,

regular waste collection, access to water, and privacy for washing and changing. The accommodation schedule identifies the rooms designated as women's dormitories as a separate line item. The number of rooms so designated will be confirmed once the Contractor provides the workforce breakdown by sex, and the allocation will be reviewed at each change in workforce composition so that designated capacity remains ahead of actual need. Compliance is verified at the pre-occupancy inspection and thereafter through the monthly camp inspection, which records the availability and condition of separate accommodation and sanitary facilities against the agreed minimum standards and reports to the Project Execution Unit.

Additionally, the available laundry spaces will be organized to ensure that women and men can use them safely and with adequate privacy, including appropriate lighting. Where feasible, designated times will be outlined for laundry activities to reduce overcrowding and potential for harassment. Overall, various rooms will have maximum occupancy provisions, and those numbers will not be exceeded. Also, the sanitary facilities in the camp will be designed to be accessible to workers and visitors with reduced mobility, including ramps, grab bars, and adequate circulation space in line with universal access principles.

The detailed arrangements for the workers' living area are outlined in Table 8 below:

Table 8: Workers' Living Area Facilities

Workers' Living Area Facilities					
No.	Item	Building Area (m2/unit)	Qty	Max Occupancy	Additional Notes
1	Dormitories	18	30	4 per room	120 max capacity
2	Main Kitchen	36	1	2 cooks	
3	Auxiliary Kitchen	18	1		
4	Workers' Canteen	36	1	30	
5	Women's Restroom	18	1	5	
6	Women's Shower Room	18	1	5	
7	Men's Restroom	36	1	10	
8	Men's Shower Room	36	1	13	
9	Public Washroom	36	1	30	
10	Non-motor Vehicle Shed and Construction Tools Charging Area	22	1		
11	Laundry Drying Area	90	1		
12	Site Leveling	Square meters	2835		

Notably, the majority of the project workforce will be Chinese workers, whose daily dining habits typically involve returning to their dormitories for simple meals. Consequently, the frequency of centralized dining is relatively low. The current dining hall seating arrangement and kitchen area have been reasonably designed based on the expected dining patterns and workforce habits. During future peak workforce periods, the camp facilities will be dynamically adjusted and optimized in accordance with actual demand to ensure that dining facilities remain sufficient and fit for purpose. Occupancy is managed so that overcrowding does not arise at

peak workforce. The workers' living area provides 30 rooms for four persons per room, giving a design capacity of 120 against an anticipated peak of approximately 98, so that no room is occupied beyond its design occupancy and spare capacity is retained. Room allocation avoids mixing shift patterns within a room where practicable, personal storage is lockable, and the camp rules restrict access to sleeping areas to their occupants. These measures are applied specifically to reduce the risk of harassment associated with crowded shared accommodation, and adherence is checked at the monthly camp inspection.

Rainwater from the workers' and management camp will be collected, converged, and stored in catchment wells to be used by the occupants of the camp. Additionally, three-stage sedimentation tanks shall be installed separately in the camp to process the generated domestic sewage. This sewage will be discharged to the nearest sewage manhole, adjacent to the SCSTP. The finished ground elevation of the outdoor areas for both camps is provisionally set at 7.3m (msl), while the indoor floor elevation will be provisionally 7.5m (msl), 20cm higher than the outdoor ground level. The workers' living area is expected to accommodate up to 98 workers at peak construction; with the 18 management personnel housed in the Management Staff Camp, the camp's resident population at peak is 98. The workers' and management staff camp will be surfaced with gravel. The architectural drawings for the Workers' Living Area are reproduced at Figures 10 to 13.

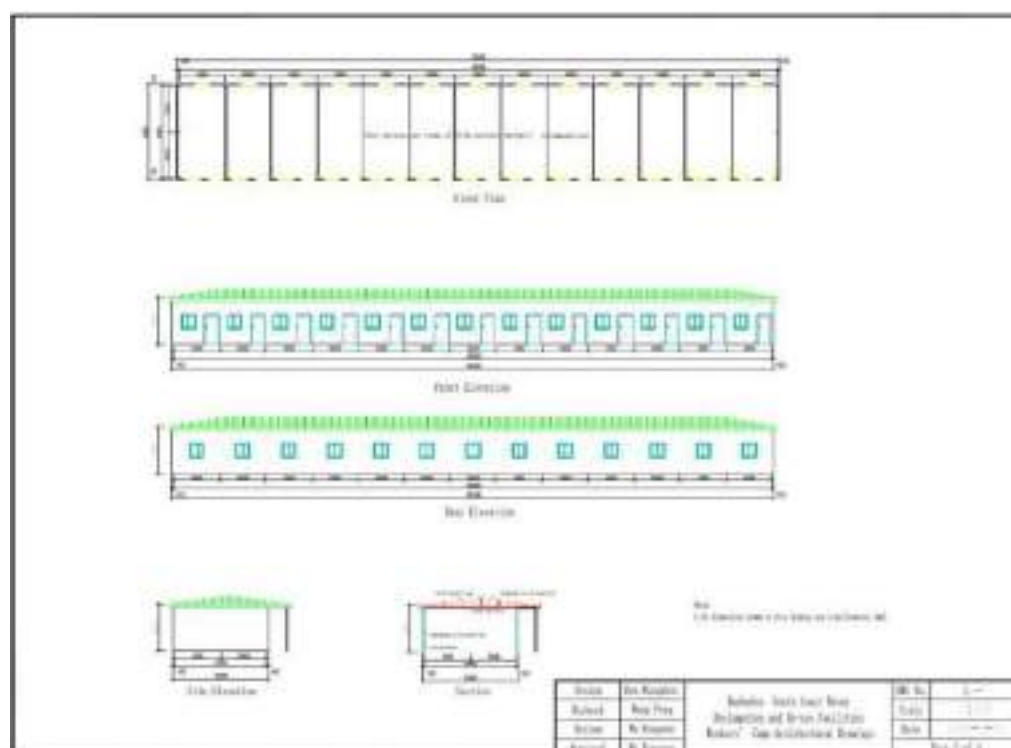


Figure 10: Architectural Drawings of the Workers' Living Area (Part 1 of 4)

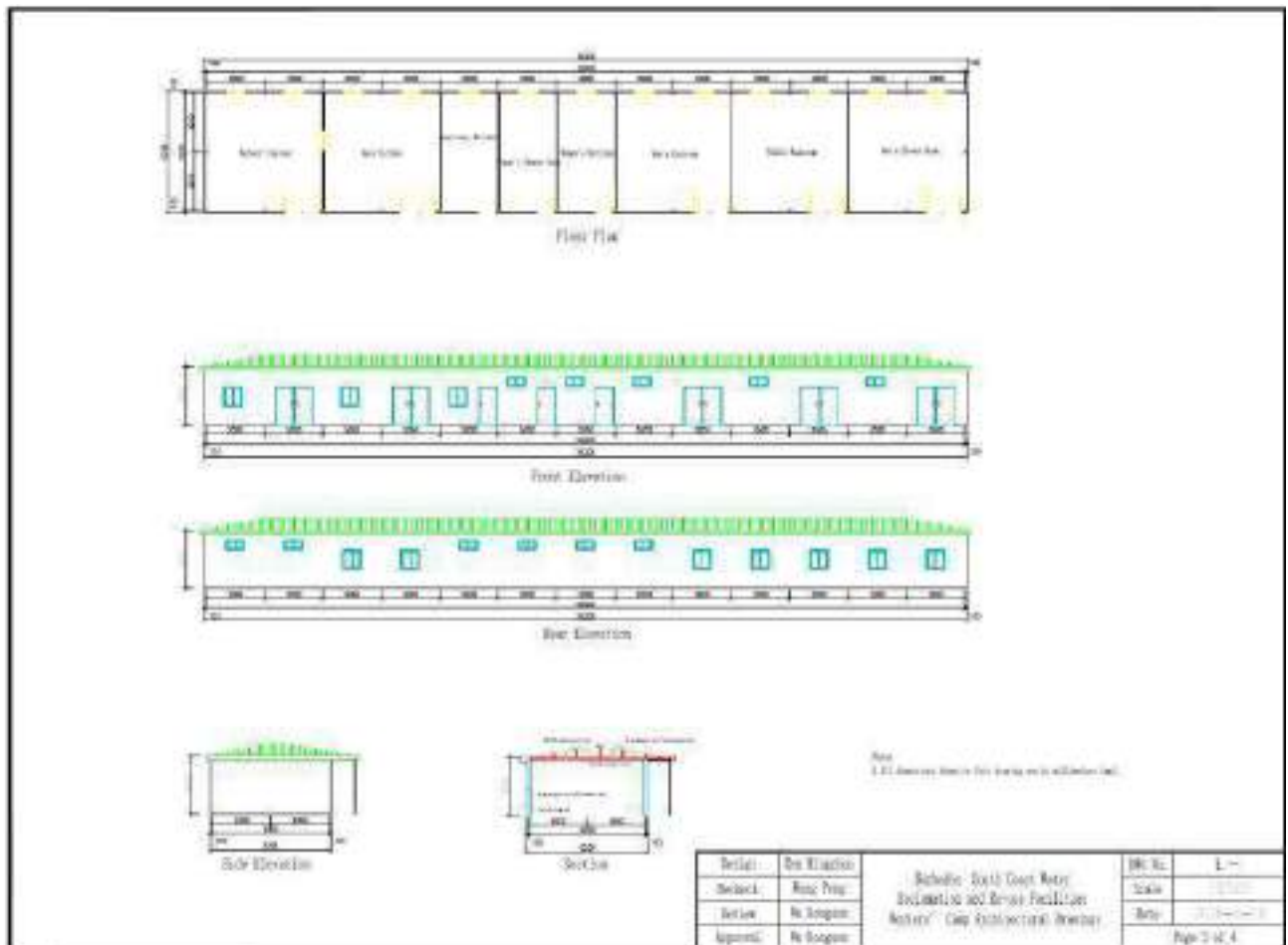


Figure 12: Architectural Drawings of the Workers' Living Area (Part 3 of 4)

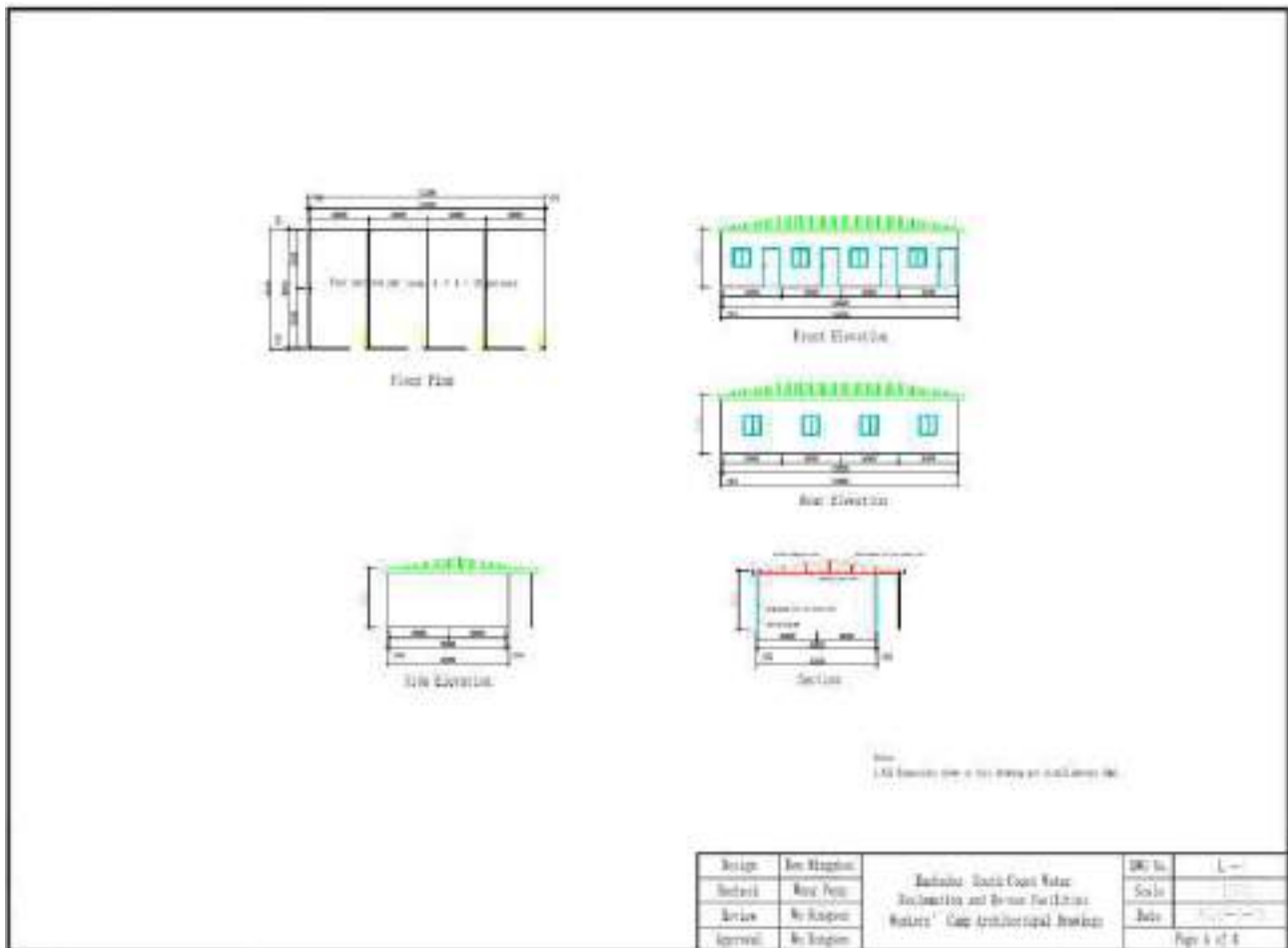


Figure 13: Architectural Drawings of the Workers' Living Area (Part 4 of 4)

2.3.3 Gates and Fencing

The facility will be secured and bordered by steel fencing, 2.5 to 3 meters high. Only authorized personnel will be allowed to access the grounds of these facilities. Local security will be arranged as necessary, in addition to developing a relationship with law enforcement within the community.

All project personnel activities will be strictly confined within the camp and/or the project construction area. This is to ensure there will be no social disturbance or negative impact on the surrounding communities. Further, the fencing will not obstruct the movement of local wildlife, nor will it affect residents' access to and from their homes and property.

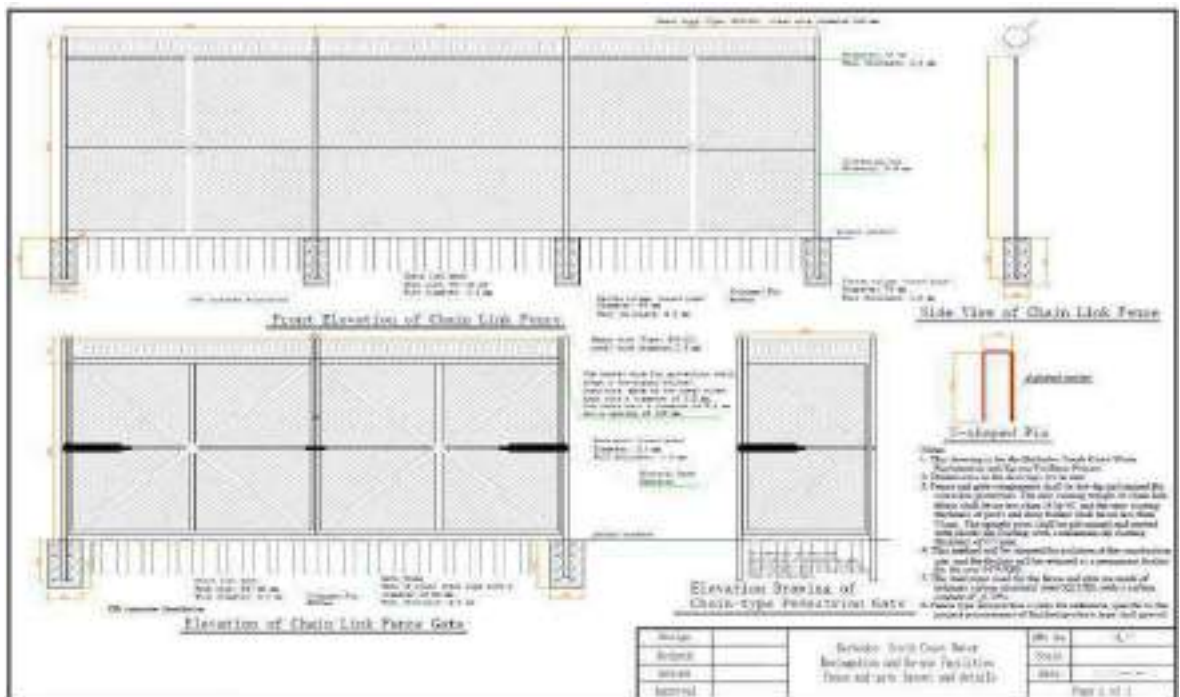


Figure 14: Fencing Arrangements for the Workers' Camp

2.3.4 Water supply, storage, and drainage

The Barbados Water Authority (BWA) will provide designated water supply points for the project's domestic and construction water use. Potable water for the compound shall be supplied through the existing municipal water supply network operated by the BWA or by an alternative potable water provider approved by the BWA, if required.

All potable water shall meet national drinking water standards and the World Health Organization (WHO) guidelines for potable water quality. Adequate storage tanks will be procured and installed to ensure a continuous supply. For added context, the camp's Water Supply Plan is outlined in Figure 15 on the following page.

The tanks will be covered, secured, and cleaned quarterly following commissioning, and in any event at least every six months, to ensure the cleanliness of the water they contain. A total of five (5) water storage tanks will be installed at the workers' camp and four (4) at the management camp. The water storage tanks will be cylindrical polyethylene (PE) tanks with a diameter of 1.83 m, a height of 2.65 m, and a storage capacity of 6 m³ per tank. Following commissioning, the water storage tanks will be cleaned once every three months. Cleaning activities will be scheduled during the low-water-demand period between 09:00 and 11:00 to minimize disruption to camp operations. Responsibility for tank maintenance and cleaning rests with the Camp Logistics Administrator.

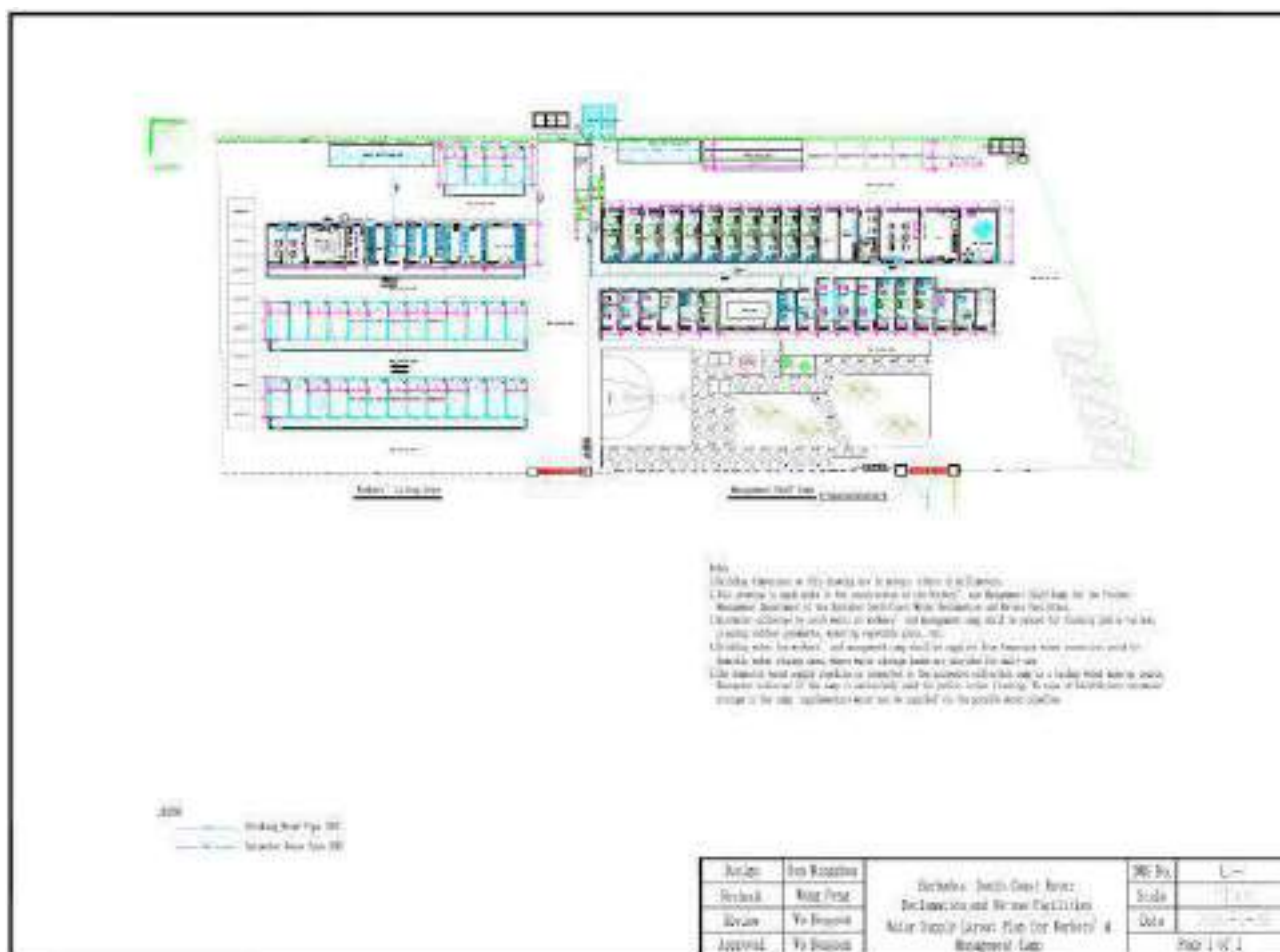


Figure 15: Water Supply Layout Plan

Potable water storage tanks shall be cleaned quarterly (every three months), including immediately following commissioning (see Table 9).

Table 9: Water storage tank cleaning procedure

Stage	Actions
Preparation	Tanks cleaned one at a time to maintain supply. Inlet valve closed and warning signage posted. Water drained and sediment removed. Cover opened and forced ventilation for at least 30 minutes to prevent oxygen deficiency. PPE worn: rubber gloves and boots, face mask, explosion-proof torch.
Physical cleaning and scale removal	Cleaning proceeds cover, inner walls, then base. Heavy scale treated with 5 per cent food-grade citric acid, soaked approximately 10 minutes and rinsed. Interior rinsed by water jet and wastewater discharged through the drain valve.
Disinfection	Sodium hypochlorite solution at 200–300 mg/L available chlorine sprayed over all internal surfaces and pipe connections. Tank sealed with a minimum 30-minute contact time.
Final rinsing and return to service	Tank partially refilled, allowed to stand approximately 5 minutes, drained, then flushed two to three times. Returned to service only when no disinfectant odor is detectable and water quality is satisfactory.

Additionally, the camp plans to install catch pits for rainwater harvesting. The collected rainwater can be used for watering the vegetable plot, cleaning site roads, and various domestic washing activities. In the event of insufficient rainwater supply, the system will be switched to the connected domestic water supply as a backup source to ensure a continuous and stable water supply for these activities.

A catch pit collects rainwater for irrigation of the vegetable plot and for cleaning and dust suppression. Its specification and maintenance regime are given in Table 10.

Table 10: Rainwater catch pit specification and maintenance

Item	Specification
Dimensions and capacity	5 m × 5 m × 2 m internal, giving a maximum storage capacity of 50 m ³ ; brick masonry construction collecting rainwater runoff within the camp.
Foundation and base	Excavation compacted in layers; 100 mm C15 plain concrete blinding; 150 mm cast-in-place C30 base slab laid to a 0.5 per cent fall towards an internal sediment sump.
Walls	200 mm brick masonry, internally finished with 20 mm waterproof cement mortar.
Cover	Top extends approximately 1 m above ground level, covered with 20 mm timber formwork panels or equivalent to exclude leaves and debris.
Cleaning frequency	Every three months, increased to every two months during periods of heavy rainfall.
Cleaning method	Inflow stopped and standing water pumped out; cover removed and pit ventilated for at least 30 minutes before entry, triggering the confined space procedure. Sediment and debris removed, walls cleaned by soft brush and water jet, inlets and outlets cleared, and the pit flushed. Sludge is bagged and taken to an approved disposal facility and is not stockpiled on site.
Safety	PPE comprising helmet, rubber boots and gloves and high-intensity lighting; a standby attendant remains outside the pit throughout; warning signs and barriers installed around the work area.

Notably, the public sanitary facilities will not utilize a dual water supply system. Instead, a domestic water supply pipeline will be connected to the rainwater catch pit to serve as a supplementary water source. Rainwater collected and stored in the catch pit will be used exclusively to operate the public sanitary facilities. In the event that the stored rainwater is insufficient to meet demand, additional water will be supplied through the potable water distribution system to ensure uninterrupted service. Further details of the water supply network to be put in place are outlined in the image below.

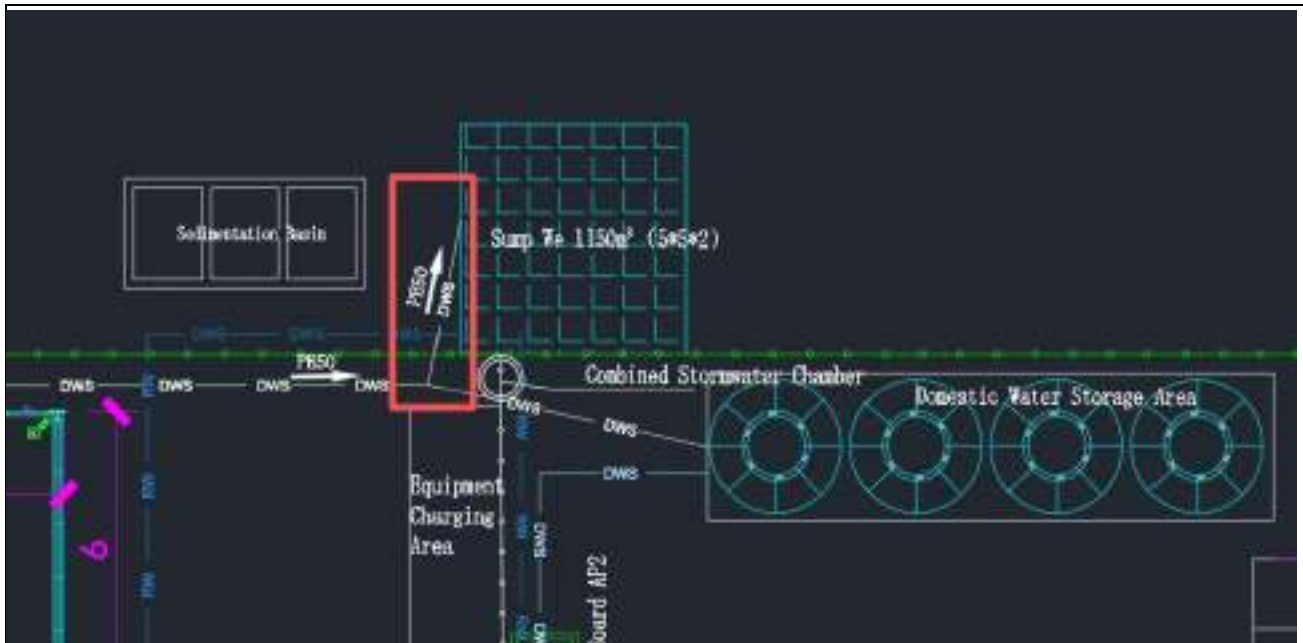


Figure 16: Water Supply Network

The water supply network is shown at Figure 16, and the location of the vegetable plot at Figures 17 and 18.

As noted above, a vegetable plot is proposed at the camp to provide a constant supply of fresh vegetables for meals, supplied from the camp water supply network. The vegetable garden within the workers' camp will measure 4 m × 32 m, with a total area of 128 m². The vegetable garden within the management camp measures 4 m × 24 m, with a total area of 96 m².

The types of vegetables to be cultivated will depend on the availability of seedlings from local suppliers. Proposed crops include pak choi, water spinach (kangkong), cucumber, tomato, eggplant, and chili pepper. Vegetables will be grown using natural cultivation methods. No chemical fertilizers, hydroponic nutrient solutions, or other synthetic growth enhancers will be applied during cultivation. The garden will be established in imported topsoil or a proprietary growing medium obtained from a commercial supplier, not in soil excavated from the campsite, so that produce is not grown in material of unverified quality. The use of night soil is prohibited absolutely, as is the use of any human excreta, sludge or effluent from the camp sanitation system or from the adjacent treatment plant as fertilizer or irrigation water. Irrigation will use the potable supply or harvested rainwater. This prohibition is included in the camp rules and verified at inspection.



Figure 17: Vegetable Plot (enlarged) Location at the Workers' Campsite

2.3.5 Power supply and energy management

Electricity for the camp will be supplied through the national electricity grid via the Barbados Light and Power Company (BLPC). However, for construction activities, power will be provided by a 5.5 kW generator.

Striving for sustainable energy use at the camp, where feasible, solar photovoltaic (PV) systems will be installed to supplement the grid electricity and reduce reliance on fossil fuels. The Project will seek to maximize the use of solar energy systems for general lighting in the courtyard, administrative buildings, and common areas, and for water heating with solar water heaters where feasible. Further, energy-efficient lighting (e.g., LED) and appliances will be installed throughout the compound. The power supply layout is shown at Figure 18. The proposed system capacity, panel and inverter specification, mounting arrangement, expected generation and the point of connection to the camp distribution board are to be provided by the Contractor, together with confirmation of whether any permission or approval is required for installation and, if so, its status.

Manufacturer datasheets for the solar spotlight and LED luminaires previously reproduced here have been removed. They are product specifications rather than assessment material; the relevant commitment is that LED lighting is installed throughout and that external lighting is positioned and directed to minimize glare and nuisance to nearby residents. Datasheets remain available from the Contractor on request.

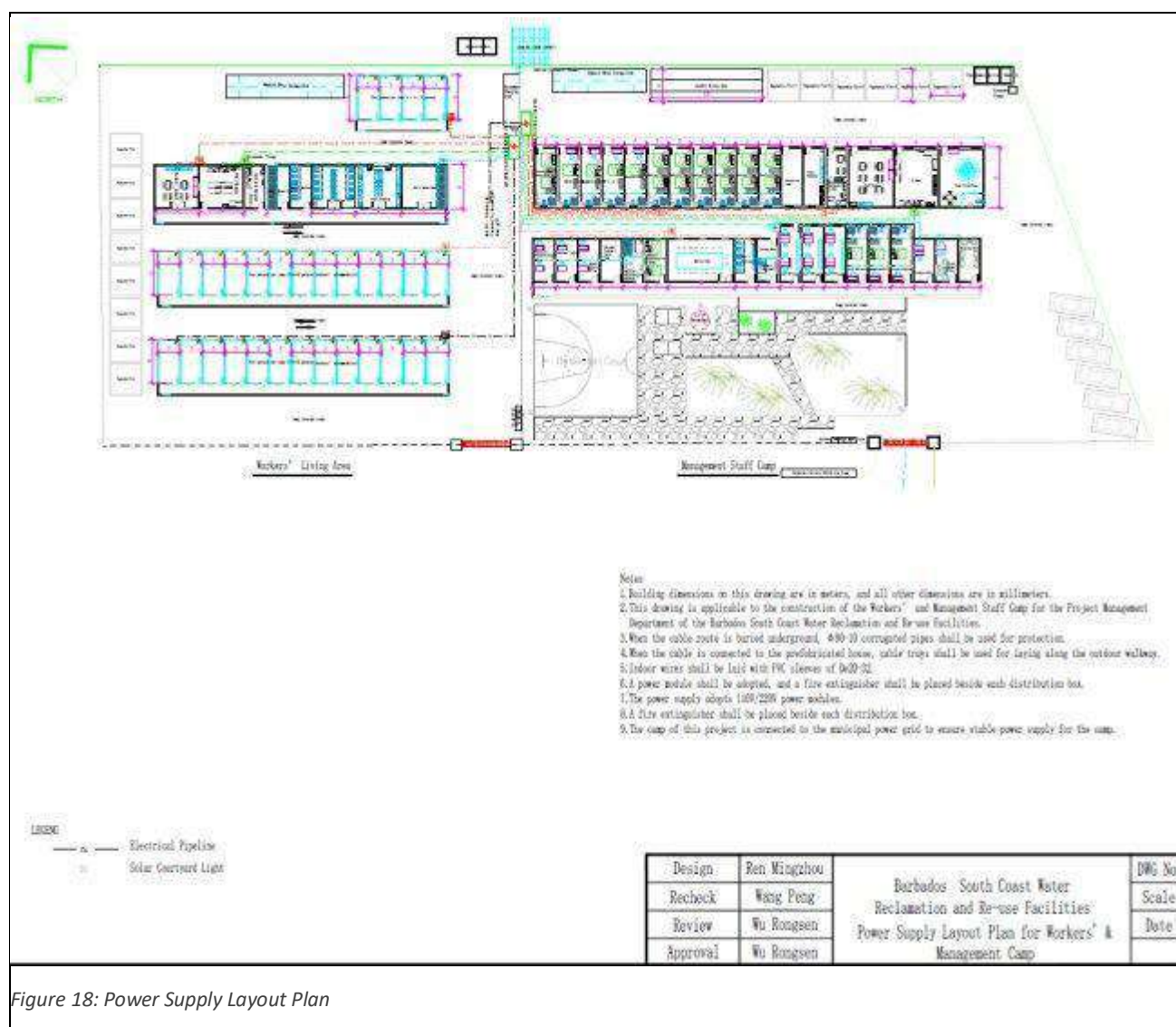


Figure 18: Power Supply Layout Plan

2.3.6 Drainage and stormwater management

No drainage or stormwater from the Camp shall enter any area of the Graeme Hall Swamp (GHS), since it will be treated at the existing wastewater treatment plant before discharge. Proper site grading shall ensure adequate drainage. All discharge and/or stormwater shall be directed to approved drainage systems. Additionally, regular drain cleaning will be conducted to prevent blockages. Erosion control measures shall be implemented where required.

Separate three-stage sedimentation tanks will be provided at both the Workers' Camp and the Management Camp for the treatment of domestic wastewater. Treated effluent will be discharged into the nearest SCSTP sewer manhole. The wastewater collection system will utilize 200mm diameter PVC pipes, which will be installed underground. The stormwater drainage system will also utilize 200mm diameter PVC pipes, installed underground. To ensure this system functions at optimum efficiency, a cleaning and maintenance plan has been developed. It is outlined as follows:

The receiving network is the collection system of the existing South Coast Sewage Treatment Plant, and the camp's treated domestic effluent therefore forms part of the influent to that plant. Confirmation of the available capacity and structural condition of the receiving sewer at the point of connection is required from the Barbados Water Authority as network owner and is being sought through the Project Execution Unit.

Pending that confirmation, the camp system is designed on the basis that discharge is limited to treated domestic wastewater from a peak resident population of 98 persons, with no industrial or construction process water entering the foul system.

The following controls apply to the prevention of overflow, backflow, leakage and odor, and are carried into the Environmental and Social Management Plan as monitored commitments: sedimentation tanks sized for peak occupancy with freeboard and desludging on a defined interval; a non-return valve on the connection to the SCSTP manhole to prevent backflow from the receiving network; sealed covers and vented tanks to control odor, with the tanks sited away from dormitories and the canteen; weekly visual inspection of manholes, tank levels and pipe runs, and immediate reporting of any surcharge or seepage; and a prohibition on the discharge of fats, oils, grease and solid waste to the foul system, reinforced through camp induction. Responsibility for inspection and maintenance rests with the Camp Logistics Administrator, with oversight by the HSE Officer.

Drainage channels are cleaned and inspected to the regime in Table 11, with routine cleaning monthly and emergency desilting immediately after heavy rainfall or storm events.

Table 11: Camp drainage channel cleaning and maintenance

Activity	Requirement
Routine cleaning	Floating debris and waste removed on sight. Full manual clean monthly to remove silt and sediment from the channel bed, with particular attention to bends, low-lying sections and dead zones. System flushed with clean water on completion.
Post-rainfall cleaning	Channels inspected after heavy rainfall and any blockage cleared immediately. Deposited sand, silt and leaves removed. Structures, outlets and connecting pipelines checked for obstruction and corrective action taken to prevent ponding, backflow or overflow.
Inspection	Condition inspected weekly. Damage, cracking, leakage or deterioration reported and repaired promptly.
Responsibility	Camp Logistics Administrator supervises, coordinates and accepts the work; additional site workers assigned where sediment accumulation is significant.

2.3.7 Storage of construction and operational materials

Construction materials to be used for the camp will include prefabricated material house components, floor tiles, sand and gravel, cement, water supply and drainage pipes, etc. These materials will be stored within the camp area and used progressively during the camp's construction.

All items to be stored onsite for construction and operational purposes are outlined in Table 12 below. The material storage facility is shown in Figure 19.



Figure 19: Material Storage Facility

Table 12: Construction and Operations Material List

No.	Description	Model and Specification	Unit	Qty	Storage Location
1	Sewage Pump	1.5kW, 220v	Set	2	Warehouse No. 1
2	Raincoat	Orange, Split Type w/ Reflective Strips	Set	20	Warehouse No. 1
3	Raincoat	Orange, Split Type w/ Reflective Strips	Set	40	Warehouse No. 1
4	Raincoat	Orange, Split Type w/ Reflective Strips	Set	40	Warehouse No. 1
5	Raincoat	Orange, Split Type w/ Reflective Strips	Set	20	Warehouse No. 1
6	Rubber Rain Boot	Size 40-44	Pair	60	Warehouse No. 1
7	Safety Harness	5-point, shock-absorbing, large hook	Set	40	Warehouse No. 1
8	Safety Helmet	Yellow, National Standard V-Type	Piece	120	Warehouse No. 1
9	Safety Helmet	Red, National Standard V-Type	Piece	30	Warehouse No. 1
10	Safety Helmet	White, National Standard V-Type	Piece	50	Warehouse No. 1

No.	Description	Model and Specification	Unit	Qty	Storage Location
11	Safety Helmet	Blue, National Standard V-Type	Piece	10	Warehouse No. 1
12	Solar LED Light	150W	Piece	6	Warehouse No. 2
13	High-Pressure Washing Machine	220V	Set	2	Warehouse No. 2
14	Summer Workwear for Workers	Long Sleeve Suit	Set	20	Warehouse No. 2
15	Summer Workwear for Workers	Long Sleeve Suit	Set	40	Warehouse No. 2
16	Summer Workwear for Workers	Long Sleeve Suit	Set	40	Warehouse No. 2
17	Summer Workwear for Workers	Long Sleeve Suit	Set	20	Warehouse No. 2
18	Management Uniform	Short Sleeve Shirt	Piece	20	Warehouse No. 2
19	Management Uniform	Short Sleeve Shirt	Piece	20	Warehouse No. 2
20	Distribution Box/Cabinet	Model AL2-6	Set	1	Warehouse No. 2
21	Distribution Box/Cabinet	Model AP3	Set	1	Warehouse No. 2
22	Distribution Box/Cabinet	Model AL3-1	Set	1	Warehouse No. 2
23	Distribution Box/Cabinet	Model AL3-2	Set	1	Warehouse No. 2
24	Distribution Box/Cabinet	Model AL3-3	Set	1	Warehouse No. 2
25	Distribution Box/Cabinet	Model AL3-4	Set	1	Warehouse No. 2
26	Distribution Box/Cabinet	Model AL3-5	Set	1	Warehouse No. 2
27	Distribution Box/Cabinet	Model AL3-6	Set	1	Warehouse No. 2
28	Distribution Box/Cabinet	Model AL3-7	Set	1	Warehouse No. 2
29	Distribution Box/Cabinet	Model AP1	Set	1	Warehouse No. 2
30	Distribution Box/Cabinet	Model AL1-1	Set	1	Warehouse No. 2
31	Floor Tile	800x800mm	m ²	203	Warehouse No. 3
32	Floor Tile	300x300mm	m ²	114	Warehouse No. 3
33	Cable (Residential Area)	YJV 4x70+1x35	m	65	Warehouse No. 3
34	Cable (Residential Area)	YJV 4x50+1x35	m	231	Warehouse No. 3
35	Cable (External Feed to Residential Area)	YJV 4x185+1x120	m	644	Warehouse No. 3
36	Rainwater Pipe (YS)	DN200 Corrugated Pipe	m	172	Warehouse No. 3
37	Sewage Pipe (WS)	DN300 Corrugated Pipe	m	53	Warehouse No. 3
38	Domestic Sewage Inlet Pipe	PVC Pipe, DN50	m	86	Warehouse No. 3
39	PVC Pipe	DN75	m	62	Warehouse No. 3
40	PVC Pipe	DN110	m	62	Warehouse No. 3
41	PVC Pipe	DN160	m	62	Warehouse No. 3
42	Water Supply Pipe	PPR 32	m	35	Warehouse No. 4

No.	Description	Model and Specification	Unit	Qty	Storage Location
43	Water Supply Pipe	PE50	m	15	Warehouse No. 4
44	Adaptor Connector	PE50 to PR 32	Piece	10	Warehouse No. 4
45	Angle Valve for Water Tank	-	Piece	20	Warehouse No. 4
46	Angle Valve for Sink	-	Piece	30	Warehouse No. 4
47	Angle Valve for Shower Room	-	Piece	30	Warehouse No. 4
48	Mixing Tap	-	Piece	30	Warehouse No. 4
49	Washing Machine Tap	-	Piece	5	Warehouse No. 4
50	High Pressure Hose	L=80cm	Piece	65	Warehouse No. 4
51	Cable (Construction Site)	YJV 4x70+1x35	m	507	Warehouse No. 5
52	Cable (Construction Site)	YJV 4x50+1x25	m	305	Warehouse No. 5
53	BVR Copper Core Cable	6mm ²	m	800	Warehouse No. 5
54	Electric Hammer	Corded Type	Set	2	Warehouse No. 5
55	Electric Breaker Hammer	Corded Type	Set	1	Warehouse No. 5
56	Cable Stripping Knife	-	Piece	10	Warehouse No. 5
57	Mist Cannon Sprayer	380v, Fully Automatic, 30m Range	Set	2	Warehouse No. 5
58	Water Boiler	40L	Set	1	Warehouse No. 5
59	Steel Plate	2m x 4m, Thickness 10mm	Piece	4	Warehouse No. 5
60	Steel Plate	2m x 4m, Thickness 16mm	Piece	4	Warehouse No. 5
61	Color Steel Tile	0.96m x 2.5m	m ²	350	Warehouse No. 5

2.3.8 Waste management

Waste management will be handled in accordance with the *CRSEG Integrated Solid Waste Management Plan*, which is integrated into the Environmental Management Plan. Consideration will be given to the expected waste streams, segregation methods, storage arrangements, and collection frequencies, among other focus areas.

At present, there are no plans to implement waste-to-energy recovery or energy utilization of waste generated from the project camps.

Construction waste and domestic waste generated by the project will be collected, transported, and disposed of by a licensed and qualified waste management contractor. Waste collection and disposal will be carried out on a weekly basis. Outdoor waste bins will be provided near the entrances of both the Workers' Camp and the Management Camp.

Waste generated on-site will be classified into two primary categories only: construction waste and domestic waste. No further segregation of these waste streams will be undertaken on-site. The two categories of waste will be stored separately and collected, transported, and disposed of by local licensed and qualified waste management contractors in accordance with applicable regulatory requirements. The waste management

contractor has not yet been identified. When that process is conducted, discussions on the best available and suitable operators will be held¹.

At this stage, the final disposal location(s) has not yet been confirmed. Therefore, it is currently not possible to determine whether the waste will be transported to a single disposal facility or to multiple approved disposal sites. Details of the disposal facilities will be confirmed by the appointed contractor in accordance with applicable regulatory requirements.

2.4 Camp construction activities

Given the project's scope, the execution of these steps will merge international standards (such as the IDB/GCF Environmental and Social Policy Frameworks for Category B projects) with local statutory mandates from the Barbados Environmental Protection Department (EPD), the Planning and Development Department, and the Barbados Water Authority (BWA). The primary camp construction activities are outlined below, in the intended execution sequence.

The construction sequence is as follows.

1. Vegetation clearing
2. Site levelling and compaction
3. Installation of underground water supply and drainage pipelines, and construction of building foundations
4. Installation of prefabricated buildings, together with construction of supporting facilities
5. Installation of water and electrical systems
6. Construction of ancillary facilities
7. Final finishing works, including the installation of camp fencing

The machinery parking location is shown at Figure 22.

1. Vegetation Clearing: The first activity entails the removal of weeds, trees, and other vegetation within the camp area. Clearing will be done within the boundaries of the identified project area, as guided by visible boundary irons/sticks around the perimeter. Prior to site clearing, the clearing boundaries will be demarcated throughout the site. An excavator will then be used to remove the existing surface vegetation. This is to prevent unnecessary environmental degradation and/or soil exposure beyond our working boundaries. Site clearing activities will be suspended during rainy weather.

If mature or protected tree species are on-site, formal permission will be sought from the *Natural Heritage Department within the Ministry of Environment, Water Resources and Drainage* (and/or any other relevant authorities) before this activity can commence. Clearing activities will include the controlled removal of weeds, shrubs, trees, organic debris, and any unsuitable materials within the designated camp area.

Any topsoil stripped during this phase will not be discarded. If possible, it will be stockpiled separately and covered with tarpaulins to prevent dust or rainwater erosion. The intention is to preserve the topsoil for future landscaping and the designated vegetable garden plot. No night soil will be used for landscaping or the vegetable garden plot. The cleared vegetation will be temporarily stored in the open area on the

¹ Recycle treatment should

northern side of the plant site and subsequently collected, transported, and disposed of by a licensed waste management company. On-site burial or open burning of vegetation is strictly prohibited. The locations of the temporary vegetation storage area and topsoil stockpile area are shown in Figure 20 below.

The Contractor will also implement applicable erosion and sediment control measures, such as silt fences, berms, drainage channels, and sediment traps. Our soil erosion and sediment control measures will include:

- Exposed soil stockpiles will be fully covered with green geotextile mesh (soil cover netting). Standard flood-control sandbags (25 cm × 50 cm) will be stacked around the perimeter of the soil stockpile areas to form a continuous protective barrier. This barrier will intercept surface runoff and prevent rainfall-induced erosion and sediment discharge from the stockpiled soil.
- Following rainfall events, any sediment accumulated on the inner side of the sandbag barriers will be promptly removed. Damaged or displaced sandbags will be replaced immediately to maintain the effectiveness of the control measures.
- The construction of the new water treatment plant will incorporate the installation of drainage ditches and sedimentation ponds as part of the overall site drainage and erosion control system.

Additionally, we will restrict clearing works to daylight hours to minimize any disturbance to nearby communities. Notably, where feasible, any existing mature vegetation outside the immediate work area can be preserved to provide natural windbreaks, dust reduction, and visual buffering for the campsite.



Figure 20: Cleared Vegetation and Topsoil Storage Location

2. Site leveling and Compaction: Following clearing, the site shall be graded and levelled to achieve adequate drainage, structural stability, and safe access throughout the camp. Compaction activities shall be performed using approved compaction equipment tested to achieve a suitable bearing capacity for prefabricated structures, utilities, and traffic loads. As such, we will conduct appropriate compaction testing to verify engineering requirements. In areas with weak or saturated soils, geotextiles or additional stabilization methods may be required.

This type of activity may require continuous dust mitigation by our team, such as regular watering down of exposed earth to prevent airborne particulates from migrating beyond the project site. This will be discussed further in the mitigation measures section of this document.

Special consideration will also be given to Barbados' heavy rainfall periods and hurricane vulnerability by ensuring the camp platform is elevated where necessary and resilient against flooding and stormwater accumulation. The crushed stone and coral layer will be used to provide a stable, mud-free platform for heavy equipment, which will reduce tire-tracking of mud onto the nearby public road while acting as a permeable base that manages localized stormwater infiltration.

Specific steps to facilitate applicable site leveling and compaction for the site will include the following:

- The site will be improved through ground replacement and filling using 0–160 mm marl aggregate, which will provide adequate durability, drainage performance, and bearing capacity for the intended use. Upon completion of the filling works, the material will be compacted in layers using a roller to achieve the required density. The finished floor level of the camp buildings will be maintained 200 mm above the surrounding ground level.
- A minimum site drainage gradient of 2% will be provided throughout the camp area to direct stormwater towards the drainage channels. Roof gutters will also be installed along the building eaves, with rainwater conveyed through downpipes into the underground stormwater drainage system.

- Flood-control sandbags will be maintained on site. During periods of heavy rainfall or flooding, sandbags can be rapidly deployed to form temporary flood barriers to prevent external floodwater from entering the camp area. Any damaged or displaced sandbags will be promptly replaced to ensure continued effectiveness.

3. Installation of underground water supply and drainage pipelines, and construction of building foundations: We will install water supply and drainage pipelines, and pour the building foundations, which shall be monolithically cast with concrete. The underground utility installation shall include potable water pipelines, wastewater drainage systems, stormwater conveyance systems, electrical conduits, and communication lines. Utility corridors will be clearly identified and protected during subsequent construction phases.

The building foundations will adopt a concrete structure. Concrete work will include proper curing, quality control testing, and safe handling of cement materials to reduce dust exposure and runoff contamination. Stormwater management during this phase will also include runoff diversion and sediment control to protect adjacent environments and coastal waters.

The camp utility systems are arranged as set out in Table 13.

Table 13: Camp utility infrastructure

System		Arrangement
Potable supply	water	Polyethylene (PE) pipe throughout. Main 50 mm diameter, branches 32 mm, distributing to all water-use facilities and rooms.
Wastewater collection		PVC pipe throughout. Main sewer 200 mm diameter, branches 160 mm, collecting from toilets, kitchens, shower rooms and washrooms. Treated through a three-stage sedimentation tank before discharge to the nearest SCSTP sewer manhole.
Stormwater drainage		200 mm diameter PVC collecting roof and ground runoff, conveyed to the rainwater catch pit.
Electrical and communications conduit	and	Cables installed in PVC conduit sized by circuit: De20 for general outlets, lighting and communications; De25 for air-conditioning and canteen equipment; De32 for main feeders from distribution boards. Communications cables run in dedicated conduit separate from power.

4. Installation of prefabricated buildings, together with construction of supporting facilities: At this stage, we will commence the erection of prefabricated houses, proceeding sequentially from north to south. Meanwhile, construction will also commence on ancillary facilities such as sedimentation tanks and catch pits.

The north-to-south construction sequence optimizes on-site crane and machinery positioning, preventing unnecessary back-and-forth transit over unpaved ground, which drastically reduces secondary dust generation. The erection of prefabricated camp structures will be conducted sequentially and in accordance with manufacturer specifications, structural engineering requirements, and local building regulations. Additionally, our team will ensure that all prefabricated units are securely anchored to withstand high winds and severe weather conditions.

Supporting facilities such as sedimentation tanks, septic systems, sump wells, and drainage infrastructure shall be installed concurrently to ensure environmentally sound wastewater and stormwater management.

The construction details of the proposed prefabricated structures are outlined below:

The prefabricated structures and their supporting works are built to the specification in Table 14.

Table 14: Prefabricated building and supporting works specification

Element	Specification
Main structure	150 mm compacted crushed stone sub-base; 50 mm C15 concrete foundation; prefabricated panel structure erected over it.
Water supply	Vertical pipes fixed to walls, horizontal branches along ring beams and wall bases.
Electrical	Flame-retardant PVC cable trunking, surface mounted and kept clear of wet areas. Distribution boards earthed with a main residual current device and branch breakers. Power and communications cables routed separately. Steel components and metal enclosures bonded to earth, grounding resistance not exceeding 4 Ω.
Lighting	Fittings arranged uniformly with moisture-resistant sealing; circuit-by-circuit commissioning.
Air conditioning	Indoor units set to a minimum 1 per cent drainage fall; outdoor units positioned for adequate ventilation.
Sanitary fixtures	Showers, toilets and wash basins installed and connected to water supply and drainage.
Ceilings and floors	Light-gauge steel ceiling framing fixed to roof purlins at hanger spacing not exceeding 1.2 m; floor tiling on a 30–50 mm dry mortar bed.
Buried pipework	Trenches machine-excavated leaving approximately 100 mm for hand trimming. PPR and HDPE water pipe heat-fusion welded, mains before branches. PVC drainage solvent-welded; corrugated pipe on rubber-ring socket joints.
Sump pit	Brick-built, 5 m × 5 m × 2 m, approximately 50 m ³ , for stormwater collection. 100 mm C15 blinding and 150 mm C30 base slab over compacted formation.
Sedimentation (septic) tank	Brick-built, 4.9 m × 2.0 m × 1.8 m, approximately 15 m ³ . Compacted base with blinding and 150 mm sloped floor slab; walls and internal partitions in brick masonry.

5. Installation of water and electrical systems: At this stage, water and electrical installation works shall be conducted. Please see the previous section (Section 4: Installation of prefabricated building) - *II. Water Supply and Drainage Pipe Installation and III. Electrical Cable Conduit Installation* for additional details. Simultaneously, interior floor tiling and ceiling construction will also be undertaken. This phase includes installation of water distribution systems, electrical wiring, lighting, air conditioning systems, drainage fixtures, sanitary facilities, and interior finishing works such as floor tiling and ceiling installation.

All electrical work will comply with recognized electrical safety standards and be performed by qualified personnel. Water conservation and energy efficiency measures will be integrated wherever practical. Such activities are discussed further in the mitigation section of this document.

6. Construction of ancillary facilities: For the additional comfort of our staff and people utilizing the camp, ancillary facilities will also be included. Such facilities will include clothes drying sheds, vegetable garden areas, walkways, shaded rest areas, and a basketball court. The details of these areas can be seen on the previous site layout diagrams shared in the earlier sections.

7. **Final finishing works, including installation of camp fencing:** Final works shall include installation of perimeter fencing, entrance gates, signage, landscaping, drainage improvements, road surfacing, and final cleaning activities. Security systems, emergency response equipment, and safety infrastructure should also be fully operational before occupancy.

The perimeter fence of the project site is proposed to be a permanent fence, which will also serve as the external security fence for the camp area. The final design and specifications of the permanent fence are subject to approval through the project review process. Detailed information is provided in the drawing previously outlined in Figure 14: Fencing Arrangements for the Workers' Camp.

8. **Commissioning:** Before commissioning, the camp will undergo a final comprehensive inspection and verification processes to ensure compliance with health, safety, environmental, and operational requirements. Final inspections will include items such as electrical, plumbing, and wastewater systems; verification of fire protection systems and emergency preparedness measures; testing of potable water quality; inspection of drainage systems for proper flow and erosion control; and waste management arrangements. The details of these activities are listed below.

Camp Inspection Verification

- *Inspection Schedule:* The final comprehensive camp inspection shall be conducted at the following stages:

- Upon completion of camp construction and installation of all supporting facilities;
- After all corrective actions have been closed and internal pre-acceptance inspections have been completed;
- At least seven (7) working days prior to the occupancy of the first personnel or the official commissioning of the camp.

- *Responsible Personnel:*

(1) *Organizing Party:* The Contractor's Project Management Team shall be responsible for organizing and implementing the final comprehensive inspection.

(2) *Inspection Team Members:* The inspection team shall comprise the following personnel: - *The named individuals above are the personnel proposed for these functions in the Contractor's technical proposal. Where a post-holder changes, the Contractor will notify the Project Execution Unit before the inspection is undertaken.*

- *Project Manager (Wu Rongsen):* Approval of the inspection plan and acceptance results;
- *Quality Manager (Wang Peng):* Responsible for inspection records and verification of compliance;
- *HSE Officer (Wu Dequan):* Responsible for health, safety, social and environmental compliance inspections²;
- *Mechanical Engineer (Ren Mingzhou):* Verification of power supply, water supply, fire protection, and electromechanical facilities;
- *Administration Officer (Wu Pengbo):* Verification of camp operational readiness and accommodation conditions;

² A local officer will be hired to complement Mr. Dequan in ensuring social compliance.

- **Environmental and Social Manager (to be appointed by the Contractor):** Responsible for social and gender compliance at the camp, including living conditions, the application of camp rules and welfare standards against the contractual and national legal requirements, the operation of the Code of Conduct and the grievance mechanism within the camp, and verification of these matters at inspection. This post has not yet been filled and must be named by CRSEG before the camp is commissioned.
- **Employer's Representative:** Participation in joint inspections and witnessing of acceptance activities;
- **Local Regulatory Authority Representatives (where required by regulations):** Conduct statutory inspections and confirm permitting requirements.

Pre-occupancy commissioning covers each functional area of the camp against a defined scope of inspection, set out in Table 15.

Table 15: Commissioning inspection agenda

Area	Scope of inspection
Health management	Potable water supply system, kitchen hygiene, food storage, sanitary facilities and waste handling.
Safety management	Fire extinguisher provision and placement, evacuation routes and assembly points, emergency lighting and electrical safety.
Environmental management	Wastewater collection and treatment, stormwater drainage, waste segregation and storage, and control of spillage.
Social and gender management	Availability and condition of separate accommodation and sanitary facilities for women and men, operation of the Code of Conduct and grievance mechanism within the camp, display of worker-facing information in the languages spoken on site, and welfare standards against contractual and legal requirements. Conducted by the Environmental and Social Manager.
Operational management	Dormitory facilities and occupancy readiness, dining and communal areas, offices and camp services.

Evaluation of Inspection Results:

Upon completion of the inspection, the camp shall be evaluated in accordance with the following criteria (see Table 16):

Table 16: Site Inspection Evaluation Rating

Rating	Description
Compliant	All requirements are satisfied, and the camp is approved for operation.
Conditionally Compliant	Minor deficiencies exist; the camp may be approved for operation subject to completion of corrective actions.
Non-Compliant	Major deficiencies exist; the camp shall not be approved for operation. All corrective actions are urgent.

All inspection findings shall be documented in the final *Camp Inspection Checklist*.

- Corrective Actions and Close-Out Requirements:

- All findings identified during the inspection shall be entered into the *Action Tracking Register* for monitoring and close-out.
- The camp shall not be approved for occupancy or operation until all major non-conformities have been satisfactorily closed.
- Completion of corrective actions shall be jointly verified and signed off by the HSE Officer, Quality Manager, and Project Manager.
- Formal operation of the camp may commence only after approval has been granted by the Client/Client Representative.

9. List of Equipment/Machinery to be used at the Workers' Camp

Table 17: List of Equipment/Machinery to be used at the Workers' Camp

Equipment Name	Specification and Model	Quantity	Manufacturer	Year of Manufacturer	Equipment Status	Country of Production	Place of Origin
Excavator	SY365	1	Sany Heavy Industry Co., Ltd	2022	GOOD	CHINA	CHINA
Forklift	CPCD35-Q25K2	1	Shanghai Heli Forklift Truck Co., Ltd	2026	GOOD	CHINA	CHINA
Road Roller	SSR180C-10	1	Sany Heavy Industry Co., Ltd	2023	GOOD	CHINA	CHINA
Concrete Mixer	JH600	1	LONTA MACHINERY Co. Ltd	2024	GOOD	CHINA	CHINA
Generator	5.5Kw	1	LONTA MACHINERY Co. Ltd	2024	GOOD	CHINA	CHINA



Figure 21: Machinery Parking Location (highlighted in yellow)

3 LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

3.1 Applicable legislation

Barbados maintains a broad framework of environmental, public health, labor and planning legislation. The instruments bearing directly on the construction and operation of the Workers' Camp are summarized in Table 18, which states what each requires of the camp, whether it addresses gender or vulnerable groups, and where the requirement is addressed in this ESIA/ESMP. The full objectives and provisions of each instrument are reproduced in Annex A. Gender classifications follow the standard scale, from gender neutral, making no reference to gender, through gender aware, gender sensitive and gender responsive, to gender transformative, which addresses structural inequality.

Table 18: National legislation applicable to the Workers' Camp

Instrument	Requirement bearing on the camp	Gender and vulnerable groups
Planning and Development Act, 2019	Planning permission required for camp construction; development must accord with the Act and its regulations.	Gender neutral
Planning and Development (EIA) Regulations, 2021	Screening, scoping and approval procedure determining whether an Initial Environmental Evaluation or full EIA is required for wastewater disposal, waste, traffic, noise and community interaction.	Gender neutral; public participation under s.11
Health Services Act, 1969 (CAP 44) and Amendment Act, 2025	Primary public health legislation applying to the camp as a temporary residential and occupational facility.	Gender neutral
Health Services (Building) Regulations, 1969	Approval of building construction required from the Minister of Health.	Gender aware
Health Services (Food Hygiene) Regulations, 1969	Standards for food storage, preparation and service in the canteen and kitchens.	Elderly and PWDs referenced in an exemption
Health Services (Rodent Control) Regulations, 1969	Rodent control across buildings, kitchens, dormitories and storage areas.	Gender neutral
Health Services (Nuisance) Regulations, 1969	Prohibits statutory nuisances; knowingly permitting a nuisance is an offence.	Gender neutral
Health Services (Lodging Houses and Barracks) Regulations, 1970	Directly governs premises housing groups of workers: separate sleeping accommodation by sex above age 7 and separate sanitary facilities.	Gender sensitive; separate accommodation and sanitation
Health Services (Collection and Disposal of Refuse) Regulations, 1975	Collection and disposal of construction and domestic waste.	Gender neutral
Marine Pollution Control Act, 2000 (CAP 392A)	Prevention and reduction of pollutant release to the marine environment.	Gender neutral
Storm Water Management Act, 2025	Duty to provide adequate stormwater drainage.	Gender neutral

Instrument	Requirement bearing on the camp	Gender and vulnerable groups
Barbados Water Authority Act, 1980 (CAP 274A) and Amendment Act, 2023	Establishes the BWA and its functions; the Authority executes the wider project.	Gender neutral
Barbados Water Authority (Sewage) Regulations, 1982	Governs discharge of domestic wastewater to the public sewer.	Gender neutral
Safety and Health at Work Act, 2005 (CAP 356) and Amendment Act, 2022	General duty to secure the health and safety of persons at work.	Gender sensitive; restrictions on women and young persons in certain work
Safety and Health at Work (Drinking Water) Regulations, 2022	Provision of potable drinking water at the workplace.	Gender neutral
Safety and Health at Work (Noise) Regulations, 2022	Exposure limits and control of occupational noise.	Gender neutral
Safety and Health at Work (Personal Protective Equipment) Regulations, 2022	Provision and use of PPE.	Gender neutral
Safety and Health at Work (Sanitary Conveniences) Regulations, 2022	Sufficient sanitary conveniences, separate for women and men.	Gender sensitive; separate facilities
Safety and Health at Work (Washing Facilities) Regulations, 2022	Sufficient washing facilities, with separate showers for women.	Gender sensitive; separate showers for women
Safety and Health at Work (Workstation) Regulations, 2022	Minimum workstation standards for supervisory and office staff.	Gender neutral
Safety and Health at Work (General Duties) Regulations, 2022	Duties of employers, occupiers and employees for a safe workplace.	Gender neutral
Accidents and Occupational Diseases (Notification) Act, 1952 (CAP 338)	Notification of accidents and occupational disease to the Chief Labour Officer.	Gender neutral
Sexual Offences Act (CAP 154) and Amendment Act, 2024	Criminal framework for sexual offences; obligations to report and cooperate with authorities.	Gender responsive; children and vulnerable persons
Employment Sexual Harassment (Prevention) Act, 2017 and Amendment	Requires a written policy, complaint handling and preventive measures against sexual harassment.	Gender aware
Employment (Prevention of Discrimination) Act, 2020	Prohibits discrimination in recruitment, duties, accommodation and treatment.	Gender responsive; women and PWDs
Employment Rights Act, 2012 (Act 2012-9)	Fundamental rights of employees, including written particulars of employment.	Gender sensitive; women and PWDs
Protection of Wages Act, 1951 (CAP 351)	Governs payment and protection of wages.	Gender neutral
Recruiting of Workers Act, 1938 (CAP 354)	Regulates recruitment, including prohibition on recruiting young persons.	Youth; minimum age

Instrument	Requirement bearing on the camp	Gender and vulnerable groups
Road Traffic Act, 1981 (CAP 295) and Amendment	Registration, licensing and safe operation of vehicles.	PWDs referenced

The treaties and conventions ratified by Barbados that bear on the camp are summarized in Table 19. Full objectives are reproduced in Annex A.

Table 19: Treaties and conventions applicable to the Workers' Camp

Instrument	Relevance to the camp	Addressed in
UN Framework Convention on Climate Change and the Paris Agreement	Framework for mitigation and adaptation; informs the project's climate resilience objective and energy choices at the camp.	Project Overview; power supply
Convention on Biological Diversity	Shapes national environmental policy and requirements for biodiversity.	EIA Description of the Environment; biodiversity
Ramsar Convention on Wetlands	Protects wetlands of international importance; governs erosion, sedimentation and runoff control near the Graeme Hall Swamp.	Drainage; ecosystem services; biodiversity
Montreal Protocol, 1987 (ratified 1992)	Phase-out of ozone-depleting substances; applies to refrigeration and air-conditioning procurement.	Camp Description; procurement
Cartagena Convention for the Marine Environment of the Wider Caribbean	Legal framework for protection of the marine environment from land-based activity.	Marine pollution controls
Basel Convention on Hazardous Wastes	Regulates transboundary movement of hazardous waste.	Integrated Solid Waste Management Plan
ILO Conventions (member since 1967)	Safe working conditions, fair employment, freedom of association, equal pay and prohibition of discrimination, violence and harassment at work.	Labour Management Plan; Code of Conduct
CEDAW, 1979	Requires gender-sensitive measures: equal access to employment, training and consultation, and protection from disproportionate impacts.	Social Assessment; Labour Management Plan
Inter-American Convention (Belém do Pará)	Right to live free from violence; supports codes of conduct, awareness training and safe grievance channels.	SH/SEA/GBV Plan; Code of Conduct; GRM
International Convention on the Elimination of All Forms of Racial Discrimination (CERD)	Prohibits racial discrimination in employment and access to services; bears on the treatment of a multinational workforce.	Ratified November 1972. Labour Management Plan; Code of Conduct
International Covenant on Civil and Political Rights (CCPR)	Civil and political rights including freedom of association and freedom from forced labor.	Ratified January 1973. Labour Management Plan
International Covenant on Economic, Social and Cultural Rights (CESCR)	Rights to just and favorable conditions of work, to health and to an adequate standard of living.	Ratified January 1973. Labour Management Plan; Workers' Health and Safety Plan

Instrument	Relevance to the camp	Addressed in
Convention on the Rights of the Child (CRC)	Protection of children from exploitation and harm; underpins the prohibition on child labor and on any sexual activity with a person under 18.	Ratified October 1990. Code of Conduct; SH/SEA/GBV Plan
Convention on the Rights of Persons with Disabilities (CRPD)	Accessibility, non-discrimination and reasonable accommodation in employment and in facilities.	Ratified February 2013. Workers' Health and Safety Plan; camp accessibility provisions
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment (CAT)	Not signed or ratified by Barbados. Recorded for completeness of the human rights framework.	Not applicable
International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (CMW)	Not signed or ratified by Barbados. Its subject matter is nonetheless directly relevant given the non-local workforce, and the protections are given effect through national labor law and the Labour Management Plan.	Not ratified. Labour Management Plan
Convention for the Protection of All Persons from Enforced Disappearance (CED)	Not signed or ratified by Barbados. Recorded for completeness of the human rights framework.	Not applicable

The institutions with a regulatory or approval role for the camp are set out in Table 20. Full descriptions of their functions are reproduced in Annex A.

Table 20: Institutions with a role in the Workers' Camp

Institution	Function	Role in relation to the camp
Barbados Water Authority	National water and wastewater authority; also regulator for water resource management.	Approves potable water supply and wastewater disposal arrangements for the camp.
Environmental Protection Department	National environmental authority.	Sets and enforces environmental requirements during camp construction and operation.
Ministry of Health and Wellness	Public health authority.	Standards for toilets, washrooms, food hygiene and general camp sanitation.
Ministry of Labour	Regulates employment and occupational safety.	Employment practices, PPE, sanitation, noise and drinking water compliance.
Ministry of Transport, Works and Water Resources	Roads, transport and water resources.	Road access, temporary works and traffic arrangements.
Barbados Fire Service	Fire safety authority.	Camp layout, access for appliances and fire precautions.
Planning and Development Department	Development control.	Primary regulator for planning permission for the camp.
Project Execution Unit (BWA)	Executes the project on behalf of the Authority.	Route for approvals, comment resolution and grievance escalation.

The IDB Environmental and Social Performance Standards activated for this project, and how each is implemented for the camp, are summarized in Table 21. Full objectives are reproduced in Annex A.

Table 21: IDB Performance Standards and their implementation for the camp

Performance Standard	Core requirement	Implementation for the camp
ESPS 1 — Assessment and Management	Identify and evaluate risks and impacts, apply the mitigation hierarchy, and provide grievance channels.	This ESIA/ESMP and its monitoring programme.
ESPS 2 — Labour and Working Conditions	Fair treatment, non-discrimination and equal opportunity; protection of workers in vulnerable situations, including migrant workers.	Labour Management Plan; Code of Conduct; GRM; Occupational health and safety Manual and Plan
ESPS 3 — Resource Efficiency and Pollution Prevention	Avoid or minimize pollution and greenhouse gas emissions and use resources efficiently.	Resource efficiency provisions; GHG baseline gap declared.
ESPS 4 — Community Health, Safety and Security	Avoid adverse effects on community health and safety, including from natural hazards.	Community Health and Safety Assessment and Plan; Traffic Management Plan; ERP.
ESPS 5 — Land Acquisition and Involuntary Resettlement	Avoid displacement; compensate where unavoidable.	Not triggered for the camp; no land acquisition or displacement arises.
ESPS 6 — Biodiversity Conservation	Protect biodiversity and maintain ecosystem services.	Description of the Environment; ecosystem services; Critical Habitat Assessment.
ESPS 7 — Indigenous Peoples	Respect the rights and culture of Indigenous Peoples.	Screened and not triggered; no Indigenous Peoples in the area of influence.
ESPS 8 — Cultural Heritage	Protect cultural heritage from adverse impacts.	Triggered by excavation; Chance Find Procedure in the Social Management Plan.
ESPS 9 — Gender Equality	Prevent gender-based risks, prevent SGBV and ensure inclusion in project benefits.	Social Assessment; SH/SEA/GBV Plan; Code of Conduct.
ESPS 10 — Stakeholder Engagement	Systematic, inclusive engagement and accessible grievance redress.	Stakeholder Engagement Plan; GRM.

3.2 Employment and labor instruments bearing on the Social Assessment

The instruments below are those bearing specifically on employment and labor, which are the matters this Social Assessment addresses. They complement rather than repeat the Legislative and Institutional Framework chapter: the environmental, public health, planning and marine legislation applying to the camp is set out at Table 18, the treaties and conventions at Table 19, and the IDB Performance Standards at Table 21, with the full provisions of each at Annex A. Instruments appearing in both places, being the Safety and Health at Work Act, the Sexual Offences Act, the Employment Sexual Harassment (Prevention) Act, the Employment Rights Act, the Employment (Prevention of Discrimination) Act and the Planning and Development (Environmental Impact Assessment) Regulations, are stated once at Table 18 and are not repeated here.

The employment and labor instruments bearing on the Social Management Plan, and the relevance of each to the project, are set out in Table 22.

Table 22: Employment and labor legislation bearing on the Social Assessment

Instrument	Principal provisions	Relevance to the project
Constitution of Barbados, Chapter III	Fundamental rights and freedoms, including equality and dignity before the law, protection from discrimination and freedom of association.	Underpins non-discrimination and freedom of association commitments in the Labour Management Plan and Code of Conduct.
Labour Laws, Chapter 346 (L.R.O. 1979)	Regulates employment generally, including young persons. Part III s.9 requires a register of young persons employed with names, addresses and dates of birth. Part IV s.11 prohibits employment of a child in any industrial undertaking.	The statutory basis for the child labor controls assessed in the Social Impact Assessment Matrix: age verification, the Register of Young Persons and audit by the PEU.
Chapter 345A, Employment of Women (Maternity Leave)	Entitlement to and duration of maternity leave (ss.3–4) and protection of employment during leave (s.6).	Applies to any woman engaged on the project; relevant to non-discrimination in recruitment and to workforce planning.
Chapter 348, Holidays with Pay	Holiday entitlement for employees.	Terms of employment under the Labour Management Plan.
Chapter 349, Labour Clauses (Public Contracts)	Gives effect to the ILO convention on labor clauses in public contracts; the Schedule sets the conditions under which a contractor must operate in respect of workers employed under a public contract.	Directly applicable: this is a publicly funded contract, so the Schedule conditions bind CRSEG and its subcontractors.
Chapter 351, Protection of Wages	Wages payable in legal tender; restrictions on deductions.	Payment arrangements and the pay-related grievance route in the Labour Management Plan.
Chapter 352, Public Holidays	Consolidates public and bank holidays and the power to appoint or vary them.	Working time, rest days and scheduling of construction activity.
Chapter 361, Trade Unions	Rights of workers to associate and assemble, and offences against those exercising them.	Freedom of association, assessed under Workers' Rights in the Social Impact Assessment Matrix.

Instrument	Principal provisions	Relevance to the project
Minimum Wage Act, 2017 and Minimum Wage (National and Sectoral Minimum Wage) Order, 2021	Establishes the national and sectoral minimum wage and the Minister's power to prescribe and vary it.	Sets the wage floor for all workers engaged on the project, including through subcontractors.

The IDB Environmental and Social Performance Standards activated for this project, and how each is implemented for the camp, are set out at Table 21 of the Legislative and Institutional Framework chapter and are not repeated here.

4 ENVIRONMENTAL BASELINE

4.1 Baseline data coverage, quality assurance and limitations

The baseline presented in this chapter draws on field sampling undertaken between 14 and 18 April 2026, on laboratory analysis of the samples then collected, and on published literature. The coverage and quality of that evidence is set out below so that the weight properly attaching to each element is clear, and so that the gaps requiring closure before the October submission are visible rather than implicit.

Sampling density and season. Water quality was characterized from five locations with a single grab sample at each. Air quality and noise were monitored at three and four locations respectively over a period of three days. All field data therefore represent a single season, falling within the dry season, and no wet-season data exist. Single grab samples establish order of magnitude and identify gross exceedances, but they do not support statistical treatment, and averages derived from them should not be read as representative of long-term conditions. Additional sampling rounds covering the wet season, and repeat sampling at each water quality location, are required and are programmed under the Studies Report for the South Coast Sewage Treatment Plant and the South Coast Water Reclamation and Reuse Facility.

Sample handling, preservation and chain of custody. Samples were collected by BrinsJen Systems Development Specialists technicians together with CRSEG personnel and delivered to the analyzing laboratory. The preservation method, holding times, container types and chain-of-custody records for each sample are held by the laboratory and are annexed to this ESIA/ESMP in the laboratory certificates of analysis. Where the field record does not state the container type or the temperature maintained in transit, including for the biochemical oxygen demand determinations, that omission is acknowledged and the parameter should be treated as indicative pending a repeat round collected under a documented sampling and preservation protocol; this is to be considered for future ESIAs/ESMPs for the new and updated sewage plant, however, new data should be taken. The sampling and preservation protocol will be prepared before the next sampling exercise and will specify container type, preservative, chilling, holding time and custody documentation for every parameter which is mandatory for the next phase.

Currency of secondary data. Several elements of the baseline rely on published data from 2019 and earlier, including the water quality review of the Graeme Hall Swamp and parts of the hydrology, limnology and fish records. These are retained because they remain the most complete published record for the receiving environment, but they are not a current description of it. Where a value is more than five years old it is identified as such at the point of use. Updated data for the Graeme Hall Swamp is required and is programmed under the Studies Report referred to above.

Greenhouse gases. No assessment was undertaken of carbon dioxide, methane or other greenhouse gases at or around the campsite. This is a material gap for two reasons: IDB Environmental and Social Performance Standard 3 requires project-related greenhouse gas emissions to be avoided or minimized, which presupposes a baseline; and CRSEG carries a non-carbon emissions commitment under its contract with the South Coast Water Reclamation Project, against which performance cannot be demonstrated without a pre-construction reference point. No project activity had commenced at the site at the date of sampling, so the opportunity to establish a true pre-project baseline remains open but is closing. Monitoring of carbon dioxide and methane is to be included in the next environmental testing exercise, and the Project Execution Unit is to be notified of the date once the mission is scheduled.

Biological environment. The habitats and ecosystems, marine environment, terrestrial ecosystems, critical natural habitat, protected area and species listing sections of this chapter are derived from literature review rather than from field survey and are presented as regional context. The primary field evidence for the campsite itself is the Rapid Biodiversity Assessment of 14 to 17 April 2026, which is a single-season, non-exhaustive survey. The Critical Habitat Assessment required by the environmental and social safeguards teams of the Project Execution Unit and the Inter-American Development Bank will supersede the literature-derived material for the purposes of critical habitat determination.

4.2 Topography

-General Topography of Christ Church Parish

The project site is located in the coastal parish of Christ Church at the southern end of Barbados. It has a land area of 57 km² (22 sq mi) (*Mindat.org*, 2026). The average elevation is 46m, with a maximum of 212m. The top is characterized by relatively low-lying, flat topography, particularly in its coastal regions, in contrast to the more rugged, elevated terrain found in other parts of the island. This geographic configuration makes the parish highly sensitive to coastal processes, including erosion and sea-level variability. The landscape includes essential ecological zones such as the Graeme Hall Nature Sanctuary, which serves as the site of the last significant remaining mangrove swamp in Barbados. These mangroves are vital for coastal stabilization, sediment filtration, and providing critical habitats for local biodiversity (EEC, 2010; Mahon et al., 2025).

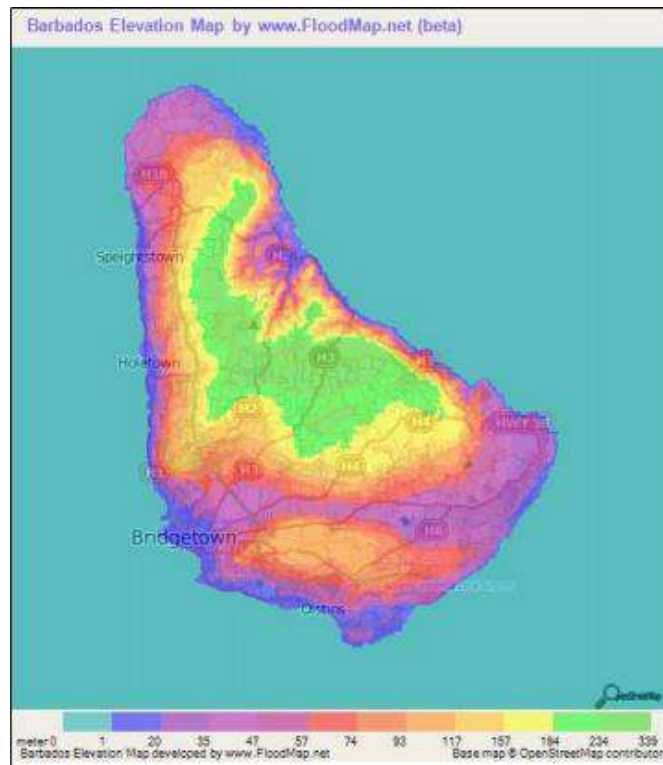


Figure 22: Elevation Map of Barbados³

Elevation across Barbados is shown at Figure 22.

³ Flood map. (n.d.). Country Elevation Map – Barbados. Accessed at https://www.floodmap.net/elevation/CountryElevationMap/?ct=BB#google_vignette

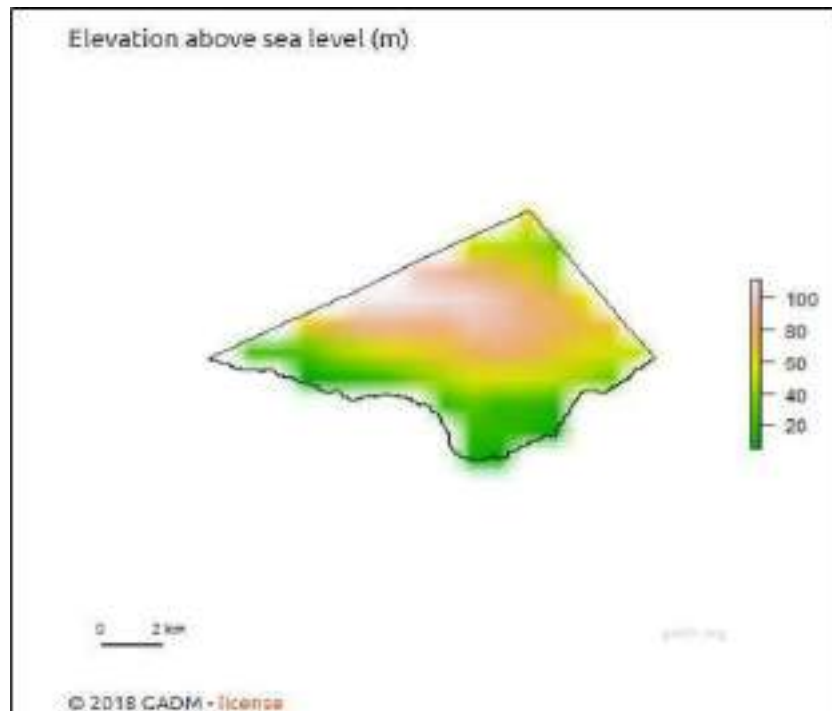


Figure 23: Topographical Elevation levels of the Christ Church Parish⁴

This low-lying southern coastal corridor is generally characterized by relatively flat to gently undulating terrain, coastal limestone geology, extensive urban and tourism development, and sensitive marine and wetland ecosystems (see Figure 23). The district is environmentally significant because of its proximity to coral reef systems, coastal wetlands, groundwater recharge zones, and erosion- sensitive shorelines.

-Topography of the Workers' Camp Location

Precisely where the SCSTP is located can be categorized as a low-lying coastal plain zone. The Workers' Camp will be situated adjacent to this operation and is therefore located in the same topographical area.

As such, the topographical description for the proposed Workers' Camp location is flat to gently sloping. The location sits just a few meters above mean sea level, with the further reaches of the area dropping to sea level as it gets closer to the coastline.

Similar to the wider geological characteristics of the Christ Church Parish, the Workers' Camp location sits on a coral limestone cap. This implies that surface runoff is likely to transition rapidly into any groundwater aquifers within the vicinity.

However, moving north of the proposed Workers' Camp location is the Ministry of Agriculture, where the land noticeably begins a gentle, stepped ascent. This moderate change in topography is said to represent the transition from the coastal plain to the lower marine terraces. The topography here is relatively open and flat, allowing several observed agricultural activities to be facilitated. Notably, with this slight inland elevation between the Ministry of Agriculture and the project area, it means that there will be a natural surface water flow from the higher elevation in the north towards the lower elevation at the camp's expected location.

Apart from these natural topographical characteristics of the proposed Workers' Camp location, the area is flanked by heavily modified human development landscapes to the east by Harmony Hall (directly within the 500 m radius direct Area of Influence) and to the west by a flat agricultural plot. The nearby South Coast

⁴ GADM. (n.d.). Christ Church. Accessed at <https://gadm.org/maps/BRB/christchurch.html>

Corridor is an active highway. There are minimal natural elevation changes and transitions from the Workers' Camp location to any of the neighboring locations described, making the topographical layout of the area largely uniform.

4.3 Climate

Christ Church experiences a tropical maritime climate influenced by the northeast trade winds and the surrounding Atlantic Ocean and Caribbean Sea. Temperatures remain relatively stable throughout the year, generally ranging between 22°C and 31°C, with average daytime temperatures commonly around 28–30°C.

The climate of this area can be characterized by the following:

- **Seasonality:** A distinct dry season from February to May, during which rainfall is minimal, and wind speeds are often higher (*CARIBSAVE Climate Change Risk Profile / Risk Atlas, 2012*). However, due to likely influences from climate change, such seasonal periods have become less distinct, starting earlier or lasting longer than expected. Further, there's also a high risk of wildfires during the dry season, with such occurrences usually commencing in January, with occasional triggers until May. Low rainfall, combined with the accumulation of dried biomass and periods of high wind, creates conditions conducive to grass and rubbish fires (*Douglas, 2023*). A single seasonality is adopted throughout this assessment: a dry season from December to May and a wetter season from June to November, with the driest months falling between February and May. Where a cited source uses different months, the source's own definition is retained in the citation and the difference is noted rather than silently harmonized. The wildfire risk discussion should be read against the December to May dry season.
- **Humidity:** Humidity levels remain generally high throughout the year, with peaks between June and August.
- **Variability:** While year-round temperatures are stable, the area is subject to tropical weather patterns, including brief but intense afternoon rain showers and potential influence from large-scale climate oscillations (e.g., ENSO) that can alter precipitation cycles (*Douglas, 2023; Barbados Meteorological Services, 2026*).
- **Water Resource Management:** The combination of high seasonal demand (partly driven by the tourism industry) and low rainfall during the dry season can deplete local aquifers and reservoirs. Additionally, drying soil conditions in the dry season can cause soil shrinkage and shifting, which exert pressure on underground water and sanitation infrastructure, increasing the frequency of pipe leaks and bursts (*Douglas, 2023*).

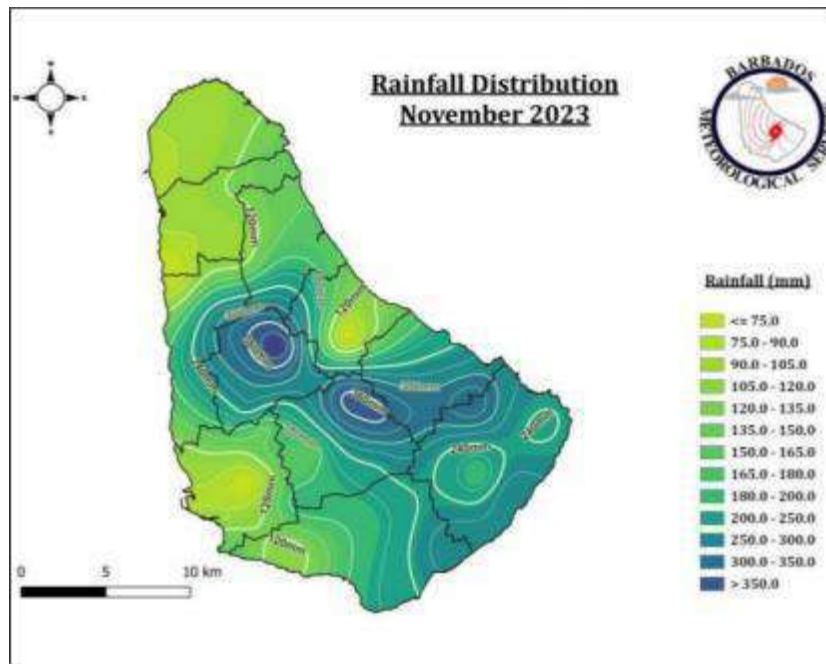


Figure 24: Rainfall Distribution Map – November 2023⁵

The climate baseline is illustrated at Figures 24 to 31: rainfall distribution for November 2023 and May 2026, mean rainfall and climatic characteristics for the 1991 to 2020 period, mean sunshine hours and recorded extreme events, maximum and minimum temperature distribution for May 2026, and the Barbados Meteorological Services peak temperature forecast for June to October 2026.

Christ Church and other west and south coast leeward areas are sheltered from the prevailing trade winds by the island's interior; these Caribbean-facing regions tend to be warmer, drier, and calmer. They receive the most sunshine and the least rainfall. Nevertheless, despite any specific localized differences, the island as a whole shares a tropical maritime climate defined by year-round warmth (temperatures typically between 24 °C and 29 °C) and two distinct seasons: a dry season and a wet season.

⁵ Barbados Meteorological Services. (n.d.). Barbados weather. Accessed at <https://www.barbadosweather.org/>

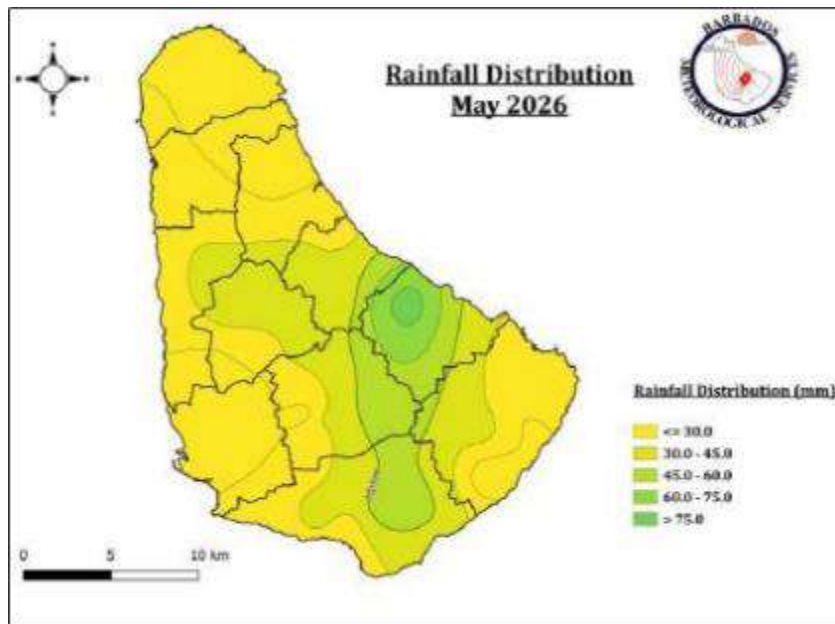


Figure 25: Rainfall Distribution Map – May 2026⁶

According to the May 2026 (Issue No. 76) - BMS Monthly Climate Outlook Newsletter, prepared by the Barbados Meteorological Services (BMS), May was dry, sunny and hazy this year, with minimal rainfall accumulations recorded during most of the month. Accumulatively, the agency reported that the total rainfall across the island for the May 2026 period was between 12.0mm and 79.8mm. While the month began relatively dry, a mid-month upper-level instability and a low-level trough brought in high levels of rainfall over several days. Notably, the highest recorded amount of rainfall, 40.5mm, occurred at Charnocks. This was noted by the BMS as being below the climatological average of the island of 74.1mm. This perspective is important to consider since, as referenced in Figure 25: Rainfall Distribution Map – November 2023, rainfall levels ranged well above 300mm. This implies that the project team must prepare itself, activities, and the supporting physical structures for varying precipitation patterns that are likely to occur due to historical data for the season.

Additionally, it should be noted that a drier-than-normal wet season is expected in the coming months due to the emergence of El Niño in the hemisphere. The BMS also expects periodic intrusions of Saharan dust during this period.

⁶ Ibid

MONTH	MEAN RAINFALL 1991-2020	MAXIMUM RAINFALL 1991-2020	MEAN RAIN DAYS 1991- 2020	AVERAGE MAX. WIND SPEED 1991-2020	MEAN WIND DIRECTION 1991-2020
JANUARY	68.1MM	200.4MM	11	23KT	79(E)
FEBURARY	41.7M	95.3MM	9	23KT	82(E)
MARCH	38.9MM	87.2MM	8	22KT	89(E)
APRIL	58.1MM	153.4MM	8	22KT	91(E)
MAY	74.1MM	249.1MM	8	22KT	93(E)
JUNE	101.2MM	240.3MM	11	25KT	92(E)
JULY	121.5MM	303.5MM	15	24KT	94(E)
AUGUST	150.6MM	314.5MM	16	24KT	92(E)
SEPTEMBER	162.6MM	350.0MM	13	26KT	99(E)
OCTOBER	179.6MM	457.3MM	15	25KT	101(E)
NOVEMBER	172.6MM	513.9MM	14	22KT	110(E)
DECEMBER	91.0MM	327.9MM	11	23KT	81(E)

Figure 26: Several Mean Values of Rainfall Patterns of Barbados – 1991-2020⁷

MONTH	MEAN WIND SPEED 1991-2020	MEAN RH 1991- 2020	MEAN TEMPERATURE 1991-2020	MEAN MAX. TEMPERATURE 1991-2020	MEAN MIN. TEMPERATURE 1991-2020
JANUARY	13KT	77%	26.9 °C	29.3 °C	23.3 °C
FEBURARY	13KT	76%	25.8 °C	29.2 °C	23.0 °C
MARCH	12KT	75%	26.3 °C	29.7 °C	23.4 °C
APRIL	13KT	76%	27.0 °C	30.2 °C	24.2 °C
MAY	13KT	77%	27.7 °C	30.6 °C	25.0 °C
JUNE	14KT	79%	27.8 °C	30.7 °C	25.2 °C
JULY	13KT	80%	27.8 °C	30.7 °C	25.1 °C
AUGUST	11KT	81%	27.8 °C	30.9 °C	24.8 °C
SEPTEMBER	9KT	80%	27.8 °C	31.0 °C	24.8 °C
OCTOBER	10KT	82%	27.7 °C	30.8 °C	24.7 °C
NOVEMBER	11KT	82%	27.2 °C	30.3 °C	24.3 °C
DECEMBER	12KT	78%	26.6 °C	29.6 °C	23.9 °C

Figure 27: Several Mean Values of Climatic Characterizations of Barbados – 1991-2020⁸

MONTH	MEAN SUNSHINE HOURS 1991-2020
JANUARY	8.5
FEBURARY	8.8
MARCH	8.8
APRIL	8.7
MAY	8.5
JUNE	7.5
JULY	8.1
AUGUST	8.4
SEPTEMBER	7.8
OCTOBER	7.7
NOVEMBER	7.6
DECEMBER	8.2

EXTREME EVENTS	
Maximum Temperature	34.2 °C (30 September 2023)
Minimum Temperature	16.5 °C (January 2 nd 1984)
Highest Monthly Rainfall	513.9mm (November 1991)
Lowest Monthly Rainfall	3.6mm (February 2010)
Highest Daily Rainfall	255.0mm (September 28th, 2018)
Lowest Relative Humidity	39% (February 17th, 2008)

Figure 28: Mean Sunshine Hours – 1991-2020 and Extreme Events of Barbados⁹

⁷ Ibid

⁸ Ibid

⁹ Ibid

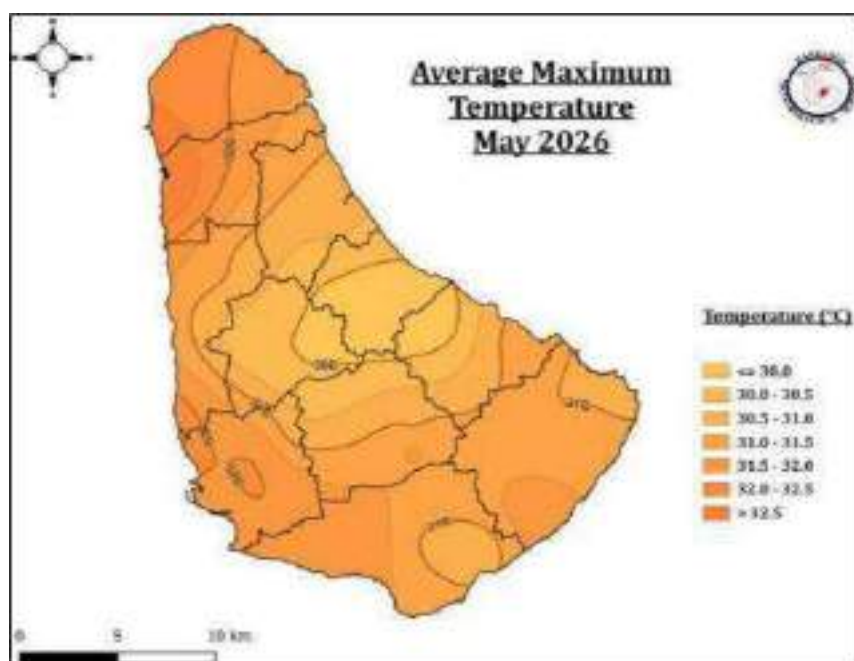


Figure 29: Average Maximum Temperature Distribution across Barbados – May 2026¹⁰

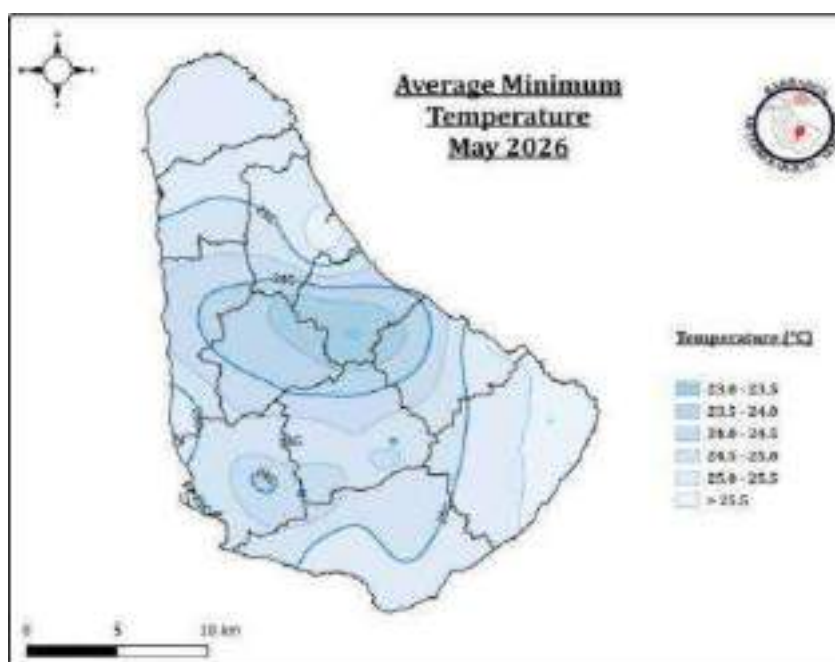


Figure 30: Average Minimum Temperature Distribution across Barbados – May 2026¹¹

As previously mentioned, El Niño is expected to heavily influence weather patterns in the western hemisphere for the latter part of 2026. The latest seasonal forecasts indicate a pronounced shift toward El Niño conditions, with probabilities reaching 80% for June–August 2026 (*World Meteorological Organization (WMO), May 2026*). Likewise, the BMS estimates hotter-than-normal temperatures from June 2026 to October 2026, with daytime temperatures expected to peak between 32 °C and 34 °C in the more populated and south-western districts. Therefore, the project team will consider these projections when preparing for construction and other outdoor

¹⁰ Ibid

¹¹ Ibid

operations for the Workers' Camp. As such, regular reviews of the BMS website shall be integrated into overall project planning and execution.

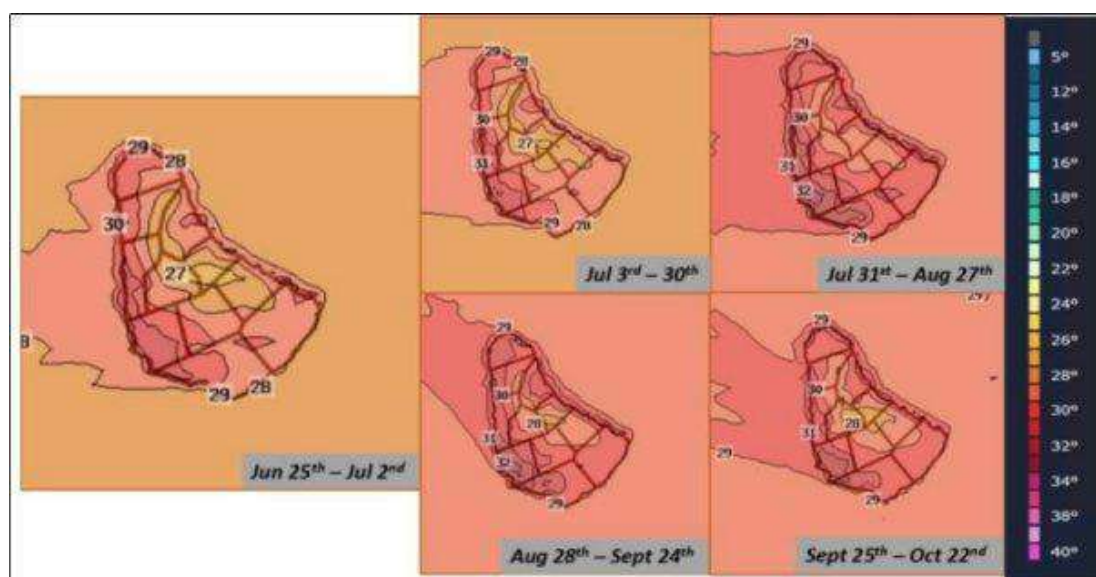


Figure 31: BMS Climate peak temperature forecast from June to October 2026¹²

4.3.1 Climate and disaster risk context

The climate and disaster risk context for the campsite is drawn from the Climate Change and Disaster Risk Reduction Assessment and the Disaster and Climate Change Risk Management Plan prepared by SAEDI Consulting for the Health Services Resilience Programme (BA-U0003, August 2026). Those documents assess Barbados-wide hazard exposure on a consistent basis, and the hazard set applies to this site. Table 23 records each hazard and its bearing on the Workers' Camp.

Table 23: Climate and disaster hazard context for the Workers' Camp

Hazard	National context	Bearing on the Workers' Camp
Tropical cyclone and hurricane wind	Dominant systemic hazard nationally. Expected annual damage of 0.9 to 13 per cent of exposure value, against 0.016 to 0.023 per cent for fluvial flooding and 0.002 to 0.006 per cent for earthquake.	Prefabricated accommodation is vulnerable to wind loading. Secure or demobilize external equipment and stockpiles on warning; camp Emergency Response Plan applies.
Extreme heat	Heat-wave frequency rising sharply; 2023 and 2024 the highest in the 35-year instrumented record, and the most significant climate signal for design.	Directly supports the heat stress assessment required by IDB Annex 1. Bears on dormitory ventilation and cooling, work scheduling, hydration and rest breaks.
Rainfall flooding and access severance	Mapped flood extents commonly stop short of buildings but cross the roads serving them, making access rather than inundation the operative risk.	The camp has a single access route: an earthen dam of approximately 730 m. Loss of that route isolates the camp with the buildings intact. Alternative access and pre-positioning of supplies must be addressed in the Emergency Response Plan.

¹² Ibid

Hazard	National context	Bearing on the Workers' Camp
Drought and water stress	Island-wide operational exposure; the most severe SPI-12 signal in the recent record occurred in April 2016. Barbados is among the twenty most water-scarce countries on renewable freshwater per capita.	Camp storage capacity, conservation measures and tanker arrangements required during BWA supply restriction.
Wildfire and grassfire	Rated Moderate against a Very low national fire-weather classification, on the 2026 Barbados Fire Service record and documented grassfire damage to the overhead distribution network.	The campsite is vegetated with grasses and shrubs. Vegetation management, a cleared perimeter and fire precautions are required, and grassfire may remove power by damaging overhead lines rather than by reaching the site.
Saharan Air Layer dust	Recurrent particulate spikes exceeding the WHO PM10 guideline of 50 µg/m ³ , operational rather than structural.	Compounds with construction dust during works. Relevant to the interpretation of the particulate baseline in Table 45 and to dust suppression scheduling and respiratory protection.
Earthquake	Low-frequency, high-consequence latent hazard at Medium national level.	Camp structures and foundations to be designed to CUBiC with a seismic zonal factor of Z = 0.375.

Two points warrant emphasis. First, the failure of pathways that matter here do not begin with damage to the camp; they begin with the loss of a service the camp depends on but does not control. A grassfire that damages overhead distribution poles, or a cyclone that takes down the grid, removes power to pumping and sanitation without touching the buildings. The camp's generator provision and water storage should be sized and tested against that scenario rather than against direct structural damage.

Second, the camp is served by a single access route. The evidence across comparable Barbadian sites is that flooding severs approach roads while leaving buildings intact, and the campsite's access is an earthen dam of approximately 730 m crossing low-lying ground. Loss of that route would isolate the camp and interrupt worker rotation, supply delivery and emergency access. This is assessed in the Impact Assessment chapter and is carried into the Emergency Response Plan, which is to identify an alternative route or a defined shelter-in-place provision with supplies held on site.

4.4 Hydrology and limnology

According to the Geology Map of Barbados, the surface of the Oceanics layer beneath GHS lies about 55 m below Mean Sea Level (MSL). Consequently, the limestone cap beneath the wetland area would be about 56 to 57 m thick. On the Geological map, the surficial geology is described as Marine Beach and Modern Dune Deposits (*Baird 2019*).

The contours on the Geology Map of Barbados indicate that groundwater beneath the Graeme Hall site exists as sheet water and that groundwater flows in a west-southwesterly direction towards the sea (*Baird 2019*). *Wallace & Pryor (2010)* reported that the Graeme Hall groundwater zone consists of 15 m thick freshwater overlying saline water and that the water extends approximately 6 km inland. *Senn (1946)* says that the groundwater sheet is continuously on lower levels.

The swamp and its lake are fed by springs in the Amity Lodge area (*Brewster 1986,ARA 1998*). *EEC (2010)* noted that there are two freshwater springs in the northwest corner of the Sanctuary, and that at least one spring has been reported in the marsh east of the Bisecting Canal (*University of the West Indies, 2004*). Freshwater

irrigation wells are reported to exist on Ministry of Agriculture lands immediately northeast of the Sanctuary. Upland recharges and groundwater flowing through the coral cap supply freshwater to these wells and springs.

Cattaneo et al. (1987) discussed the water budget based on rainfall and evapotranspiration. They did not estimate flushing but thought that the entire volume might flush in a year. They also noted the likelihood of seawater intrusion through the sand bar. The Barbados Stormwater Drainage Study (*Cumming Cockburn et al. 1996*) provides considerable detail on the water balance in GHS. They note that to preserve the ecosystem, water levels should be maintained constantly. They propose two options: the improved operation of the sluice gate and the installation of a discharge pipe with its outfall offshore.

ARA (1997) noted that there were numerous instances of drainage canals from surrounding residential and commercial areas into the GHS, presenting the opportunity for significant pollution from contaminated surface water to enter the Swamp. The drainage of GHS is important for several reasons: prevention of flooding in adjacent areas, maintenance of adequate water levels in GHS, and the connectivity among water bodies to allow access by fish that control mosquito larvae. The plan for GHNS, prepared by *GHBS (2000)*, noted that the bisecting canal had been recently cleared and that the canal across the CLICO lands to the west of GHNS had also been cleared, and connections to the bisecting canal had been improved. *ARA (1997)* noted that the majority of water exchange with the sea comes via groundwater intrusion of saline water from the sea.

EEC (2010) observed that in February 2010, the stain line on the red mangrove roots indicated that the water level was about 0.6 m below normal. At the same time the two trays were dry. Water is pumped from the springs to the trays. *Baird (2019)* refers to GHS as being at the mouth of the watershed and the recipient of runoff moving towards the sea. The swamp is effectively the last stop of runoff before entering the sea. The swamp attenuates floodwater, provides a resident time for incident runoff, allowing the uptake of nutrients by its natural vegetation, and effectively serves as a filter or clean-up for runoff before discharge to the sea. As previously mentioned, discharge of water from the swamp to the sea passes through the southern canal controlled by the operation of the sluice gate at the beach.

4.4.1 Limnology of the Project Environs

Available studies indicate that the limnological conditions within the Graeme Hall Swamp (GHS) are influenced by periodic marine intrusion, nutrient enrichment, and spatial variations in salinity and water quality.

Water quality conditions in the channel connecting the lake to the sluice gate have historically been affected by exchanges with the marine environment. *Parker (1986)* documented the accumulation and decomposition of marine biological debris, primarily marine algae, within the canal during a prolonged dry period when water levels in the swamp were low. These conditions were associated with low oxygen and saturation with hydrogen sulphide as outlined in Table 25, and high salinities near to the level of full seawater. The study noted that the sluice gate should not be opened during such periods.

Investigations of water samples over three weeks, undertaken by *Gittens and O'Reilly (1986)*, found that coliform concentrations within the lake were low enough to permit swimming based on the United States Environmental Protection Agency's standards at the time. Water quality sampling conducted in the lake, smaller water bodies, and the canal connecting the swamp to the sea measured temperature, pH, water clarity, turbidity, conductivity, dissolved oxygen, salinity, percentage suspended matter, phosphate, and nitrate. Results indicated evidence of nutrient enrichment within the system; however, coliform levels were not significantly elevated in areas adjacent to the egret colony, suggesting that the bird population was not a major contributor to nutrient contamination.

Furthermore, *Cattaneo et al. (1987)* reported elevated chlorophyll concentrations and nutrient levels consistent with hypertrophic conditions. The study also noted that lake waters were hard and naturally discoloured. Significant oxygen consumption was observed, with approximately 60% of the dissolved oxygen in the water being depleted at night. Within the eastern marsh, salinity varied spatially, increasing from nearly freshwater conditions in the north and east to approximately 20 ppt in the south and west. Nutrient gradients were also identified across the marsh.

Measurements collected by *King (1987)* further analyzed water quality and sediment conditions using water samples from six sites in the lake at depths of 0.36 to 2.26 m. Water clarity, assessed using a Secchi disk, ranged from 0.24 m to 0.42 m, indicating relatively low transparency. Dissolved oxygen concentrations were reported to be near saturation at the time of sampling. Nutrient analyses identified phosphate concentrations ranging from 0.043 to 0.598 mg/L, about 1/10 of those found by *Gittens and O'Reilly (1986)*. Measurements also included biological oxygen demand (BOD), nitrate, and total nitrogen, with sediment sampling undertaken at 13 locations throughout the lake.

Subsequent investigations by *ARA (1997)* expanded water quality testing in the dug channels east of the central causeway; along the Central Causeway; along the discharge canal; within the lake; the drainage channel entering the west side of the lake, and at groundwater stations within uplands along the southern, western, and northern side of the swamp. Sampling conducted during both wet and dry seasons included analyses of temperature, conductivity, dissolved oxygen, pH, BOD, Total Phosphorous, Ortho Phosphorous, nitrite/nitrate, total coliform, Fecal Streptococci, and Total Suspended Solids. Results indicated that fecal coliform concentrations exceeded applicable standards at several locations. These elevated counts were attributed to groundwater used in sewage plant dewatering that may have been contaminated from suck wells. In contrast, coliform concentrations within the lake itself were not elevated, providing further evidence that the cattle egret roosting area at the northeastern end of the lake was unlikely to be the source of contamination. Nutrient concentrations, particularly total phosphorus and total nitrogen, were substantially greater than levels typically expected in a natural mangrove swamp (*ARA, 1997*).

More recent monitoring undertaken by EEC (2010) included analysis of a broader range of water quality parameters. The findings are summarized in Tables 26 and 27.

4.4.2 Marine water quality

A water quality study near Worthing beach in 1983-1984 indicated that coliform bacteria counts were very high (*GoB 1994*). This was assumed to be due to effluents from GHS.

Baird (2019) reviewed marine water quality for the period 1993 - 2018. This data was obtained from the GoB's Environmental Protection Department (EPD) and was generated as part of the EPD's routine marine water quality monitoring programme. These data generally showed higher levels of enterococci in the early 2000s, with a gradual decreasing trend through to 2014, with the exception of a few high samples in 2011 and 2014. The values increased significantly after 2014, presumably as a result of the issues that started to develop with the South Coast Sewerage System. The lagoon suffered acute eutrophication in late 2016 when problems at the sewerage treatment plant required an emergency overflow into the canal that connects the swamp and the lagoon. In 2018, Baird conducted additional water sampling studies at four sites, including Worthing Beach, along the south coast from the Casuarina Hotel (now Sandals Resort) to Needham's Point.

4.4.3 Water quality review of the Graeme Hall Swamp (GHS)

The quality of water is generally used as an indication of the health of the ecosystem it supports. This is determined by measuring important chemical, physical, and biological parameters of the water, such as total

coliforms, pH, turbidity, dissolved oxygen, total dissolved solids (TDS), total suspended solids (TSS), biological oxygen demand (BOD), chemical oxygen demand (COD), and the concentration of various ions. These parameters can also indicate whether the water is safe for irrigation use and how effluent in industries or other environmental factors may be affecting the environment itself.

GHBS (2000) outlined a plan for monitoring water quality in GHBS and provided results for testing for pesticides in GHBS in 1997. However, the results of the pesticide testing are not compared to any standards.

In 2001, GHNS established a water quality monitoring programme as part of a broader environmental monitoring initiative carried out by UWI (*Smith Warner International, 2003*). The parameters studied were temperature, salinity, dissolved oxygen, biological oxygen demand, pH, turbidity, nitrates, phosphates, ammonia, total suspended solids, fecal coliforms, and fecal streptococci.

Graeme Hall water quality in 2010 and 2018 (EEC 2010, 2019) presents results of water quality analysis carried out in February 2010 (EEC 2010) and October 2018 (EEC 2019). The 2010 data are based on sampling at 20 points in the Swamp over three consecutive days. The 2018 data are based on samples taken at four points in the Graeme Hall Nature Sanctuary over two consecutive days. The figures in the following table (Table 24) represent the average of the results obtained for each parameter over the respective sampling periods.

Table 24: Graeme Hall water quality in 2010 and 2018 (EEC 2010, 2019)

Parameter	February 2010	October 2018
pH	8.23	8.3
Nitrates (mg/l)	0.15	<0.2
Total phosphorus (mg/l)	0.4	1.15
Salinity (ppt)	1.4	1.0
TSS (mg/l)	39	39
Dissolved oxygen (mg/l)	4.6	8.0
BOD (mg/l)		10
Enterococci (cols/100ml)	842	1,187
Fecal coliform (cols/100ml)		9,500
Chlorophyll-A (mcg/l)	33	84
Turbidity (NTU)	12.3	30.7

The 2010 EEC survey included an analysis for a broader range of parameters, with findings summarized in Table 25 below.

Table 25: Nutrients and other Water Quality Parameters EEC (2010)

Parameter	Findings
Alkalinity	The average alkalinity, 275 mg/l, twice the alkalinity of seawater near Barbados,
Ammonia	The average ammonia level from the two ponds increased from 0.021 mg/l in 2002-2003 to 0.141 mg/l in 2010

Parameter	Findings
Chlorophyll A	Chlorophyll-a results ranged from 25.3 ug/l in the east pond to 137 ug/l in the west pond. The high reading reflected the most algae of all onsite and offsite sample locations, indicating potentially high nutrient load and eutrophic conditions.
Tannin Chloride	Tannins and lignins averaged a relatively low 0.8 mg/l, reflecting the groundwater source for the ponds.
Fecal coliform	Fecal coliform averaged 460 colonies/100 ml, down approximately 50% from 2002.
Fecal streptococci	Fecal streptococcus averaged 565 colonies/100ml, approximately 325% higher than the results from April 2002

The metals determined in the 2010 EEC survey, and the findings for each, are given in Table 26.

Table 26: Metals analyzed by EEC (2010)

Metal	Findings
Copper	Relatively high, averaging 0.004 mg/l for the two ponds
Iron	Higher from the two ponds than from other sampled areas.
Lead	Less than laboratory detection limits.
Magnesium	Relatively low, reflecting the freshwater condition of the ponds
Mercury	Less than laboratory detection limits.
Phosphorus	Phosphorus levels averaged 0.16 mg/l, compared with phosphate levels in 2002 of less than 0.005 mg/l.
Potassium	Relatively low, reflecting the freshwater condition of the ponds
Zinc	The average zinc concentration of 0.029 mg/l was similar to the average observed from all onsite and offsite sample locations with the exception of the lake, which averaged 0.01 mg/l,

The copper and zinc averages exceeded the Barbadian government's proposed marine ambient standards of 0.0013 mg/l and 0.015, respectively. For iron, the result of 1.35 mg/l, taken together with dissolved oxygen averaging a relatively low 1.79 mg/l, suggests that groundwater from the springs was oxygen-poor.

Parker (1986) found water salinity in the Bisecting Canal to be in the range of 29-34 ppt, which indicated a seawater connection. *ARA (1997)* salinity results differed considerably from those in *Parker's 1986* sampling; this was attributed to the practice of dewatering from the sewage plant, which pumped several million gallons of freshwater into the swamp. *ARA* did find higher salinity in the lake in the dry season.

It is also suggested that saline water enters GHS through the porous geological formations separating the swamp from the sea, as proposed by *Senn (1966)*. By February 2010, water salinity in the canal was 1.3 ppt (*EEC, 2010*), indicating that the GHS had been transformed from a brackish to a freshwater environment. Salinity measurements taken annually at the CARICOMP plots confirmed the continuation of a gradual change to a freshwater system with average values in the canal of 3.98 ppt in 1993-1994, dropping to 2.00 ppt by 2017-2019, and average interstitial salinities of 13.75 ppt in 2000-2001, dropping to 5.80 ppt by 2017-2019.

4.4.4 Currency of the Graeme Hall water quality baseline

The EEC surveys of February 2010 and October 2018 remain the last confirmed measurements for Graeme Hall covering the full parameter suite. A search of published sources in August 2026 found no governmental or academic dataset for the period 2019 to 2026 repeating those parameters at those sites. The values in Tables 25 to 27 are therefore carried forward as the baseline of record, on the understanding that they are between eight and sixteen years old, and that the intervening period contains both the sewage system failures of 2017 to 2020 and the subsequent cessation of effluent discharge to the swamp.

A step towards closing the ecological side of these gaps has been completed. A three-day ecological verification visit to Graeme Hall Swamp and the ecologically connected areas was undertaken on 21, 24 and 28 August 2026, in support of the Critical Habitat Assessment prepared for the project. The visit verified wetland and habitat condition, drainage and hydrological connections, the project-to-habitat interfaces, visible pressures and signs of degradation, with opportunistic recording of flora and fauna and photographic and GPS documentation. Consistent with its intended scope, it was not a comprehensive ecological survey and no destructive or intrusive sampling was undertaken; it confirmed the condition described in this baseline but did not replace the missing quantitative dataset. Access to the Graeme Hall Nature Sanctuary itself was not granted in time for the exercise – those observations rely on the Field Officer's prior visit of 10 April 2026, retained for contextual purposes only.

What has been published since is qualitative or partial. CERMES Technical Report No. 110 (Mahon et al., 2025), an eighty-eight-page consolidation of the written record on the swamp to 2025, confirms that legacy organochlorine pesticides, among them dieldrin, chlordane, DDE and heptachlor, persist in the marsh and spring pond sediments, and that zinc is elevated in water and in tilapia tissue above the proposed standards. It also records the trend that matters most for the ecology of the wetland: the swamp has been isolated from the sea for several years and is passing from a brackish system to a freshwater one. Salinity in the main lake fell from 1.4 ppt in 2010 to 1.0 ppt in 2018, and the direction has not reversed.

Professor Robin Mahon, lead author of that report, has described the remedy as a modest engineering intervention: rehabilitating the sluice gate and reopening the channel so that seawater can enter and swamp water discharge, work he characterizes as within the reach of a backhoe now that the beach has eroded back. That work lies outside the scope of the Workers' Camp, but it bears directly on this assessment, because the receiving environment for any accidental discharge from the camp is a wetland that has already lost much of the tidal flushing which would otherwise disperse it.

The Graeme Hall Nature Sanctuary reopened in May 2025 after sixteen years of closure, restored by the Barbados Wetland Trust and opened to the public on 31 May 2025. The sanctuary accounts for approximately thirty-eight per cent of the wetland designated under the Ramsar Convention. The remainder is in government ownership and has no active management regime. The Graeme Hall Swamp Committee exists but does not meet regularly, and a baseline study is planned without a confirmed date. For this assessment that means there is no standing body to receive monitoring results for the wider swamp, which is why the camp's monitoring obligations are directed to the Barbados Water Authority and the Environmental Protection Department rather than to a wetland authority.

The wider project provides the route by which this baseline will be refreshed. The Barbados Climate Resilient South Coast Water Reclamation Project, with a construction contract valued at US\$66 million executed by China Railway Shanghai Engineering Group over three years, converts the existing advanced preliminary treatment at the South Coast plant to tertiary treatment, with the reclaimed water intended for the irrigation of edible crops and for recharge of the Christ Church non-potable aquifer. Effluent discharge to the swamp

has ceased. The monitoring programme designed for that project, set out at Table 27, is the suite against which any future Graeme Hall sampling should be reported, and the monitoring carried out for the camp should use the same parameters and laboratory methods so that the two sets of results are comparable.

Table 27: Water quality parameters in the monitoring programme designed for the South Coast Water Reclamation Project

Category	Parameters
Physicochemical	Temperature, pH, salinity, conductivity, turbidity
Solids	Total suspended solids, total dissolved solids
Oxygen and organics	Dissolved oxygen, biochemical oxygen demand, chemical oxygen demand
Nutrients	Ammonia, nitrate, nitrite, total nitrogen, total phosphorus
Biological	Chlorophyll-a
Microbiological	Fecal coliforms, fecal enterococci
Organic contaminants	Volatile organic compounds, semi-volatile organic compounds, oil and grease
Metals	Cadmium, copper, iron, lead, zinc, nickel, with priority on zinc
Pesticides	Organochlorines including dieldrin and the DDT family, and organophosphates

Sampling is to be carried out in both the dry and the wet season and at the sites used by EEC, being the three lake stations and the bisecting canal, so that results remain comparable with 2010 and 2018.

Three gaps remain and are recorded rather than filled. There is no post-2018 dataset for the swamp. There is no published record of whether the sampling designed for the project has yet been carried out. And the pesticide results obtained by the Graeme Hall Bird Sanctuary in 1997 were never released, so the pre-2010 trend for organochlorines cannot be established. These are carried in the outstanding items register.

Two further pieces of the picture come from work published in 2025 and 2026. The project results framework carries a dedicated conservation component for the swamp, with approximately US\$2 million allocated to Graeme Hall Swamp natural heritage conservation, which is the funding route by which the hydrological and habitat work identified by CERMES could be delivered. And in January 2026 the Barbados Wetland Trust, on taking over the sanctuary, stated that it would carry out its own water quality assessments. Neither of those has yet produced a published dataset, but both change who is likely to hold the next set of numbers.

Where future sampling should take place is already settled by the earlier work. The stations used in 2018 were the three lake stations S3B, S7A and S15, together with the source point on the bisecting canal. Sampling at those four points, quarterly as a minimum and monthly through the wet season, with biennial surveys of fish, benthos and vegetation alongside, is what would make the next dataset comparable with 2010 and 2018 rather than a fresh and unanchored snapshot. The camp's own monitoring should be reported against the same stations and the same laboratory methods.

Methodology Used for Assessing Water Quality in the Project Area *Historical Water Sampling conducted by CRSEG Representatives*

No existing water bodies/sources lie within the actual area of the proposed location for the Workers' Camp. Nevertheless, sewage from the Workers' Camp area is intended to be fed to the existing treatment plant; water quality data at the influent could serve as baseline data for the Workers' Camp before its construction and operations. Separately, the quality of the water to be used within the camp itself is to be evidenced. Potable water for both camps will be supplied through the Barbados Water Authority mains and stored in the polyethylene tanks described in the camp description. Certificates of analysis for the supplied water,

covering the parameters relevant to potable use, will be obtained from the Authority or by direct sampling before occupation and annexed to this ESIA/ESMP. Where water is instead purchased from a third-party supplier, the supplier's quality data will be obtained and annexed on the same basis.

While historical water quality data for the project have already been provided by the BWA, to gain a more comprehensive understanding of the on-site water quality conditions, Representatives of the CRSEG team have been conducting additional influent water quality sampling and testing since January 2026 (see sample dates and times in Table 28). The primary purpose of this exercise is to provide more sufficient and reliable data to support the design, verification, and optimization of the wastewater treatment process.

The geographic location of the water quality sampling point is at the influent screening chamber within the existing treatment plant. The location is illustrated in Figure 32 below. This location was selected since the Senior Engineer of the BWA confirmed that the SCSTP conducts routine water quality sampling on a weekly basis at the same influent point. All sampling activities were carried out by CRSEG's Engineer (see Figure 33).

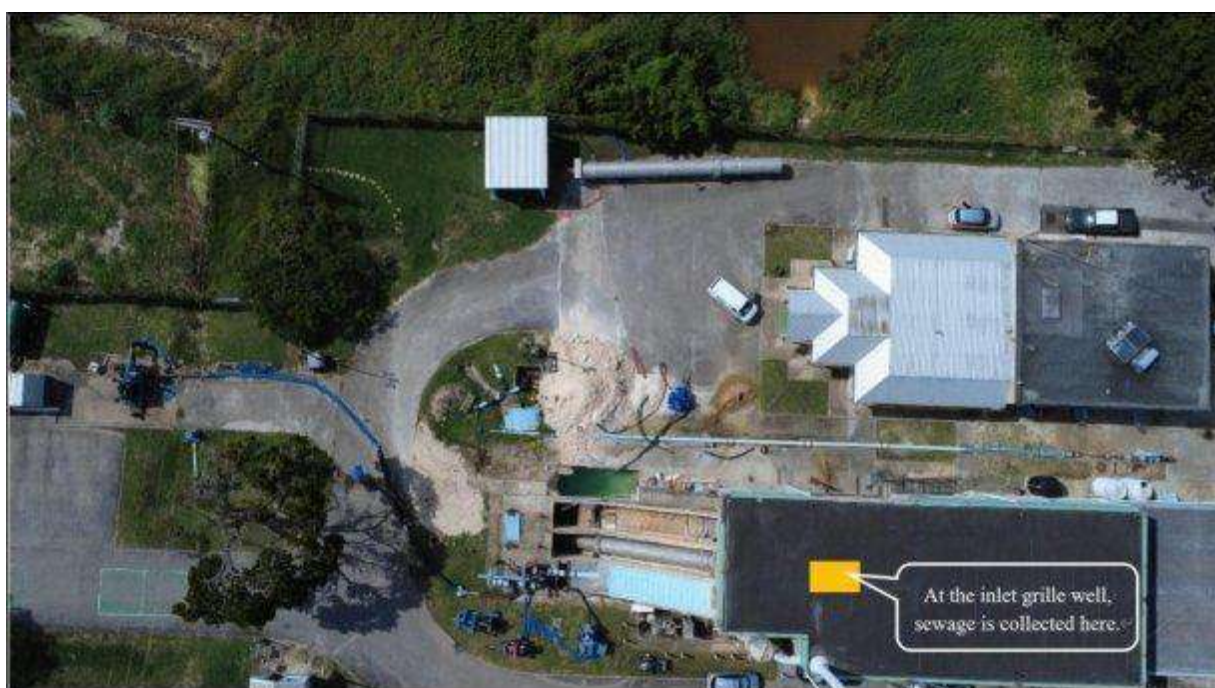


Figure 32: Water sample location of influent at the SCSTP (GPS location: 21P 0220979, UTM 1446566)



Figure 33: CRSEG's engineer collecting influent water sample at the SCSTP

Table 28: The Dates and Times of Water Sampling Conducted by CRSEG Representatives

Sample No.	Date received by Lab	Remarks	
SCSTP-CRSEG #1 Sample	11:30 AM, 1/20/2026	1/20/2026	
SCSTP-CRSEG #2 Sample	8:50 PM, 1/26/2026 11:50 AM, 1/27/2026	1/27/2026	Mixed sample
SCSTP-CRSEG #3 Sample	9:10 PM, 1/28/2026 12:20 AM, 1/29/2026	1/29/2026	Mixed sample
SCSTP-CRSEG #4 Sample	9:30 PM, 2/2/2026 11:40 AM, 2/3/2026	2/3/2026	Mixed sample
SCSTP-CRSEG #5 Sample	9:20 PM, 2/4/2026 12:50 AM, 2/5/2026	2/5/2026	Mixed sample

*All samples were taken at the SCSTP influent by the CRSEG Team (GPS location: 21P 0220979, UTM 1446566)

4.4.5 The Water Sampling Methodology utilized by CRSEG Representatives

The following activities and considerations were conducted to retrieve samples from January 2026 to February 2026:

- Based on communication with the Government Analytical Services Laboratory, water quality assessment is conducted at their facility only twice per week, specifically every Tuesday and Thursday. As such, sample collection was coordinated to be conducted during this period to ensure samples were delivered to the lab at functional times.

- The influent wastewater at the SCSTP is pumped to the screw conveyor for treatment during peak periods each day. Typically, wastewater sampling conditions are only available when pumping is in operation. Based on this, samples were taken during the midday and evening peak periods. The collected samples were mixed in equal proportions to form a representative composite sample, which was then taken to the Government Analytical Services Laboratory for testing.
- The sampling point is located at the influent screening chamber of the existing wastewater treatment plant, which is the same location used by the plant for its routine influent sampling. Manual sampling methods were adopted to collect influent wastewater samples within the chamber, ensuring that the samples are representative of the actual influent characteristics of the SCSTP.
- Except for the first water quality sample, the subsequent five sampling events were conducted by collecting samples during two time periods: the evening of the previous day (between 8:30 PM and 9:30 PM) and midday of the following day (between 11:30 AM and 1:00 PM). The two samples were then mixed in equal proportions and submitted to the Government Analytical Services Laboratory for testing. A total of nine sample collections were carried out, yielding the five composite samples listed in Table 29.
- The Government Analytical Services Laboratory provided two containers for each sampling event, each with a capacity of 700 ml. One container is used for testing the Oil & Grease parameter, while the other is used for testing other parameters.
- Note, there are no existing water bodies/ sources within the actual area of the proposed Workers' Camp area; therefore, no samples were retrieved from that exact location. Ideally, and for ongoing reference for this document, if there were water bodies within that area, samples would have been retrieved and delivered to the laboratory for assessment. For direct context, the selected sample point for this exercise can be observed in Figure 33: Water sample location of influent at the SCSTP.
- The parameters tested are outlined below in Table 29. To reiterate, the water quality parameters tested are from water samples taken by CRSEG at the influent screening chamber within the existing treatment plant (GPS coordinates: 21P 0220979, UTM 1446566).

Table 29: Water Quality Parameters Tested from Samples retrieved by CRSEG

No.	Classification	Water Quality Parameters	Unit	Number of Tests	Purpose of Testing
1	Routine Parameters	pH		5	This may impact on the stability of the biological treatment system; therefore, it is necessary to assess whether any abnormal risks are present in the influent.
2		Dissolved Oxygen	mg/L	5	The influent dissolved oxygen (DO) is typically close to zero, having minimal impact on process design, and is primarily relevant during the operational phase.
3		Total Suspended Solids	mg/L	5	This parameter influences the design of the sedimentation tanks and sludge production and constitutes a key basis for process and structural design.

No.	Classification	Water Quality Parameters	Unit	Number of Tests	Purpose of Testing
4		Chemical Oxygen Demand	mg/L	5	This parameter represents the total organic load of the influent and serves as a critical basis for sizing the biological reactors and determining aeration demand.
5		Biochemical Oxygen Demand	mg/L	5	This parameter is used to evaluate the biodegradability of the wastewater (BOD/COD ratio) and has a direct impact on the selection of the treatment process configuration.
6		Total Nitrogen	mg/L	5	This parameter is used to assess the need for enhanced nitrogen removal and the provision of supplemental carbon for denitrification.
7		Ammonia-N	mg/L	5	This parameter governs the nitrification load and aeration system sizing and is a critical parameter for the design of nitrogen removal processes.
8		Total Phosphorus	mg/L	5	This parameter governs the need for chemical phosphorus removal, the required chemical dosing, and the stability of the effluent.
9		Total Dissolved Solids	mg/L	5	This parameter has limited relevance to conventional secondary and tertiary treatment processes but is of greater significance in reuse applications and membrane treatment systems.
10		Oils & Grease	mg/L	5	
11	Ionic Parameters	Electrical Conductivity	µs/cm	2	This parameter is used to assess the presence of seawater intrusion or elevated salinity and does not influence the selection of the biological treatment process.
12		Calcium	mg/L	2	Calcium and magnesium, in combination with alkalinity and sulphate, govern the potential for inorganic scaling. Iron, manganese, and aluminum may lead to membrane fouling or deposition, while sodium serves as an indicator for salinity and possible external water ingress.
13		Magnesium	mg/L		
14		Sodium	mg/L		
15		Iron	mg/L		
16		Manganese	mg/L		
17		Aluminum	mg/L		
18		Alkalinity	mg/L CaCO ₃	2	Assessment of Membrane Scaling Risk
19		Sulphate	mg/L	2	This parameter has limited influence on conventional secondary and tertiary treatment processes and is mainly relevant for specialized industrial applications and reuse assessments.

No.	Classification	Water Quality Parameters	Unit	Number of Tests	Purpose of Testing
20		Fluoride	mg/L	2	This parameter is used to evaluate salinity and the potential risk of seawater intrusion or infiltration. High salinity levels may significantly impact water reuse applications and the performance of reverse osmosis (RO) systems.
21		Chloride	mg/L	2	This mainly has an impact on reuse applications and membrane treatment systems.

4.4.6 Water quality baseline assessment of the workers' campsite

Baseline water sampling was conducted within the project area in April 2026 by *BrinJen SDS Technicians*. This activity was done in accordance with international standards as outlined in the *BrinsJen SDS Water Sampling Methodology*. A site reconnaissance of the area was first conducted to identify appropriate sample points to capture critical water baseline information from the project area. Simultaneously, conversations were had with the Government Analytical Services Laboratory to determine their water testing capacity, days and time of operation, along with specific sampling and transport instructions for water samples.

On April 16, 2026, CRSEG's team, along with the BrinsJen SDS Technicians, collected water samples at various locations within and outside the SCSTP. Sites were selected based on proximity to the Workers' Camp area. Further, sewage from the Workers' Camp area is also intended to be fed to SCSTP (domestic sewage generated from the workers' camp shall be discharged to SCSTP for treatment as no other discharge outlet is available); therefore, samples were retrieved from there as well. Note, there are no existing water bodies/ sources within the actual area of the Workers' Camp, and therefore, no sampling or testing could be done within that actual location. Ideally, and for ongoing reference for this document, if there were water bodies within that area, samples would have been retrieved and delivered to the laboratory for assessment.

Samples were collected from five locations: two within and three outside of the SCSTP, as described below. The analyses of these samples were done by *BrinsJen SDS (in-situ)*, as well as laboratory assessment of samples conducted by the Government Analytical Services. Additional samples were taken by CRSEG's team on April 22, 2026, for further testing at the laboratory.

Individual sampling was conducted in alignment with prior discussions done with the lab. Triplicate sampling was not conducted because it is not necessary for the in-field sampling. Triplicate assessment of the sample is then facilitated by standard laboratory testing procedures. ISO standards clearly indicate that the number of samples should be based on purpose, variability, and risk. Duplicate or replicate samples are used for quality control and are not mandated universally. Further, the WHO water quality monitoring guidance outlines that the sampling design should prioritize determining ideal sampling locations and timing. Replication is case-dependent, mainly used for validation and not routine duplication. These factors were considered in sample collection. Ambient water quality samples were taken consistently within 30cm of the surface of the standing water body (samples 3, 4, and 5 described below). A 1-liter bottle was filled and well mixed before in-situ testing was carried out on the homogenous sample. A similar mixture of a 1-liter sample was done for the influent and effluent samples taken from the SCSTP. Because variability is often lower within a defined sampling point, a single well- collected representative sample can adequately characterize the conditions. Triplicates add little value in such cases. Triplicate samples primarily assess analytical precision for lab

repeatability as per their procedure. All sampling was done to meet the lab's requirement to produce statistically viable results.

4.4.6.1. Water samples points and in-situ assessment locations

- **Sample 1:** SCSTP inlet (influent) - [GPS location: 21P 0220979, UTM 1446566]
- **Sample 2:** SCSTP outlet (effluent) - [GPS location: 21P 0220957, UTM 1446577]
- **Sample 3:** Swamp area to the side of SCSTP - [GPS location: 21P 0220965, UTM 1446544]
- **Sample 4:** Drainage canal at the back of SCSTP - [GPS location: P21P 0220928, UTM 1446597]
- **Sample 5:** stream at the front-side of SCSTP, which is also connected to the swamp - [GPS location: 21P 0221011, UTM 1446463]



Figure 34: In-situ water quality testing (April 16, 2026)

In-situ testing and the sampling locations are shown at Figures 34 and 35.



Map 3: Water Quality Samples and Assessment Locations



Figure 35: Water Samples Collection and Assessment Locations (April 16, 2026)

4.4.6.2. Analytical method

The methods used to analyze the various water quality parameters for the baseline assessment are stated in Table 30 below:

Table 30: Methods used to Analyze the various Water Quality Parameters

	Parameter	Method/ Reference
In-situ	Total Dissolved Solids Temperature Electrical Conductivity	HoneForest TDS, EC. Temp Meter 3in1 - an advanced digital PPM meter pen with

	Parameter	Method/ Reference
		microprocessor technology combining TDS, EC, and temperature measurement.
	pH	ExStik Waterproof pH Meter, which uses a flat surface electrode to measure pH in liquids, semi-solids, and solids.
	pH	pH meter
	Electrical Conductivity	Conductivity Meter
	Total Dissolved Solids	Gravimetric
	Total Suspended Solids	Gravimetric
	Dissolved Oxygen	D.O meter
	Turbidity	Turbidimetric/ Turbidity meter
	Biochemical Oxygen Demand	D.O.meter
	Salinity	Titrimetric
	Alkalinity	Titrimetric
	Bicarbonate	Titrimetric
	Chloride	Titrimetric
	Total Phosphorus	Colorimetric
	Ortho Phosphorus	Colorimetric
	Ammonia-N	Autoanalyzer/ Colorimetric
	Sulphate	Ion Chromatography
	Nitrate-N	Ion Chromatography
	Total Hardness	Calculated
	Calcium	ICP/OES
	Manganese	ICP/OES
	Copper	ICP/OES
	Magnesium	ICP/OES
	Sodium	ICP/OES
	Potassium	ICP/OES
	Iron (Total)	ICP/OES
	Copper	ICP/OES
	Zinc	ICP/OES
	Lead	ICP/OES

4.4.6.3. Water quality results from CRSEG sampling activities

Five influent samples were taken by the CRSEG team at the screening chamber of the existing South Coast Sewage Treatment Plant, at 21P 0220979, UTM 1446566. The results are presented in three parts: the sample identification at Table 31, the measured results at Table 32, and the date of analysis for each determinant at Table 33. Matters arising from the data are set out after the tables.

4.4.6.4. Sample identification

Samples 2 to 5 are composites of an evening grab and a grab the following morning. Sample 1 is a single grab. This should be stated wherever these results are used, because a composite and a single grab are not directly comparable.

Table 31: Sample identification

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Laboratory ID	202600155	202600180	202600219	202600293	202600306
Grab times	11:30, 20 Jan	20:50, 26 Jan 11:50, 27 Jan	21:10, 28 Jan 00:20, 29 Jan	21:30, 2 Feb 11:40, 3 Feb	21:20, 4 Feb 00:50, 5 Feb
Date received	20 Jan 2026	27 Jan 2026	29 Jan 2026	3 Feb 2026	5 Feb 2026

4.4.6.5. Measured results

All five samples were analyzed for the core wastewater parameters. Metals, major ions and the remaining physical parameters were analyzed on samples 1 and 5 only. Shaded rows carry a discrepancy, explained in section D.

Table 32: Results, all values in mg/L unless stated

Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
pH (pH units)	7.10	7.13	6.84	7.13	6.80
Total suspended solids	244	144	206	141	not reported
Dissolved oxygen	<1	<1	<1	<1	1.8
Total phosphorus	6.3	5.4	6.0	6.6	5.6
Ammonia-N	50	37	7	53	6
Total nitrogen	73	41	46	55	38
Total dissolved solids	734	642	610	809	671
Biochemical oxygen demand	270	245	260	330	330
Chemical oxygen demand	743	436	826	888	854

Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Oil and grease	79	36	26	43	not reported
Chloride	196	—	—	—	132
Alkalinity	394	—	—	—	352
Electrical conductivity ($\mu\text{S}/\text{cm}$ at 25 °C)	1,500	—	—	—	1,312
Calcium (as CaCO_3)	153	—	—	—	79
Magnesium (as CaCO_3)	2.0	—	—	—	<0.005
Manganese	<0.005	—	—	—	<0.005
Sodium	121	—	—	—	72
Iron	1.3	—	—	—	1.2
Aluminum	0.04	—	—	—	<0.005
Fluoride	3.49	—	—	—	2.88
Sulphate	35	—	—	—	32
Total suspended solids, second analysis	244	—	—	—	378

A dash means the parameter was not analyzed for that sample. Values preceded by < are below the laboratory limit of detection.

4.4.6.6. Date of analysis

Table 33: Date of analysis by parameter and sample

Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
pH	20 Jan	27 Jan	29 Jan	3 Feb	5 Feb
Total suspended solids	28 Jan	28 Jan	4 Feb	4 Feb	—
Dissolved oxygen	20 Jan	27 Jan	29 Jan	3 Feb	5 Feb
Total phosphorus	30 Jan	30 Jan	30 Jan	20 Feb	20 Mar
Ammonia-N	4 Mar	4 Mar	5 Mar	4 Mar	4 Mar
Total nitrogen	19 Feb	19 Feb	19 Feb	19 Feb	19 Feb
Total dissolved solids	29 Jan	29 Jan	16 Feb	16 Feb	16 Feb
Biochemical oxygen demand	22 Jan	29 Jan	29 Jan	5 Feb	5 Feb

Parameter	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Chemical oxygen demand	25 Jan	25 Feb	25 Feb	25 Feb	25 Feb
Oil and grease	2 Feb	2 Feb	2 Feb	11 Feb	—
Chloride and alkalinity	28 Jan	—	—	—	10–11 Feb
Electrical conductivity	20 Jan	—	—	—	5 Feb
Metals and major ions	19 Feb	—	—	—	19 Feb
Fluoride and sulphate	2 Mar	—	—	—	2 Mar
Total suspended solids, second analysis	28 Jan	—	—	—	12 Feb

4.4.6.7. Matters arising from the data

Four points need resolving with the laboratory before these results are relied upon, and they are the reason the rows above are shaded.

Holding times. Ammonia-N was analyzed on 4 and 5 March for samples received between 20 January and 5 February, a delay of between 27 and 43 days. Total phosphorus for sample 5 was analyzed on 20 March, 43 days after receipt. The standard holding time for both determinants is 28 days, and for ammonia 28 days only when the sample is preserved and refrigerated. Several of these analyses fall outside it, which means the nitrogen and phosphorus figures may understate the true concentrations. Chemical oxygen demand was analyzed on 25 January for sample 1 but on 25 February for samples 2 to 5, a month after receipt, against a holding time of 28 days.

Total suspended solids is reported twice. The first analysis gives 244 mg/L for sample 1 and no result for sample 5. The second gives 244 mg/L for sample 1 and 378 mg/L for sample 5, analyzed on 12 February. The two are consistent for sample 1 and the second appears to be a later batch, but the table should carry one result per sample with the analysis date, not two rows that a reader must reconcile.

Ammonia-N swings from 50 and 53 mg/L in samples 1 and 4 to 7 and 6 mg/L in samples 3 and 5, an eightfold difference in an influent stream that is otherwise stable across the same samples on total nitrogen, which ranges only from 38 to 73 mg/L. Either the low results are analytical failures or the influent is genuinely variable, and the two possibilities carry different consequences for the plant's design basis.

Magnesium is reported as 2.0 mg/L in sample 1 and below 0.005 mg/L in sample 5. A four-hundredfold difference in a conservative major ion, in the same influent two weeks apart, is not plausible and one of the two figures is likely to be wrong.

The laboratory identifier for sample 4 is given in the source as 02600293. On the pattern of the other four it should read 202600293, and it is corrected here.

Notably, as previously stated and explained via shared sampling methodologies and several discussions, the use of a single sample grab per sample point is statistically significant and a standard technique for water sampling. Triplicate testing is carried out by the lab, meeting their internal criteria to produce statistically significant results. A one (1) liter sample submitted to the lab is sufficient to conduct testing by the lab's criteria. For repeated reference, triplicate testing is conducted at the laboratory stage due to the usual margin of error that exists in testing equipment. The result issued is often the average of a single sample tested 3 times in the lab.

As sewage from the Workers' Camp would be fed to the existing treatment plant, water quality data at the influent serves as baseline data for the Workers' Camp before its construction and operations.

Table 34: Baseline Water Quality Results of Sampling conducted in April 2026

	Sample ID	Inlet Sample #1	Outlet Sample #2	Swamp Sample #3	Back of Plant Sample #4	Front Stream Sample #5	Date Analyzed
	Sample Location	21P 0220979 UTM 1446566	21P 0220957 UTM 1446577	21P 0220965 UTM 1446544	21P 0220928 UTM 1446597	21P 0221011 UTM 1446463	
	Sampling Time (h)	9.07	9.15	9.33	9.37	9.57	
	Weather Conditions	Sunny					
In-situ	Temperature °C	30	30.3	30.8	29.8	29.4	4/16/2026
	pH	7.23	7.32	7.48	7.53	7.67	4/16/2026
	Total Dissolved Solids ppm (mg/L)	758	790	529	509	587	4/16/2026
	Electrical Conductivity (µS/cm)	1619	1672	1125	1053	1272	4/16/2026
	Laboratory ID	202601157	202601158	202601159	202601160	202601161	
	Date received	4/16/2026	4/16/2026	4/16/2026	4/16/2026	4/16/2026	
	Turbidity (NTU)	157	234	18	30	11	4/9/2026
	Total Suspended Solids (mg/L)	89	142	7.0	23	9.4	5/7/2026
	Biochemical Oxygen Demand (mg/L)	215	205	13	3.9	10	4/16/2026
	Salinity (ppt)	0.47	0.50	0.22	0.22	0.31	4/22/2026
	Dissolved Oxygen (mg/L)	<1.0	<1.0	5.7	7.2	6.3	4/16/2026
	Total Phosphorus (mg/L)	4.4	4.7	0.37	0.28	0.33	5/8/2026
	Manganese (mg/L)	0.035	0.050	0.045	0.067	0.022	5/15/2026
	Copper (mg/L)	0.128	1.72	0.058	0.143	0.069	5/15/2026
	Ammonia-N (mg/L)	29	33	0.42	<0.05	0.19	4/21/2026

	Sample ID	Inlet Sample #1	Outlet Sample #2	Swamp Sample #3	Back of Plant Sample #4	Front Stream Sample #5	Date Analyzed
	Sample Location	21P 0220979 UTM 1446566	21P 0220957 UTM 1446577	21P 0220965 UTM 1446544	21P 0220928 UTM 1446597	21P 0221011 UTM 1446463	
	Sampling Time (h)	9.07	9.15	9.33	9.37	9.57	
	Weather Conditions	Sunny					
	Time Sample taken (h)	9:19	9:22	9:05	9:09	9:13	-
	Sample ID	202601217	202601218	202601219	202601220	202601221	-
	Date Received	4/22/2026	4/22/2026	4/22/2026	4/22/2026	4/22/2026	-
	Fecal Coliform (CFU/ 100m)	6.0 X 10 ⁶	1.0 X 10 ⁷	E 60	E 60	1.30 X 10 ²	4/22/2026
	Enterococcus spp. (CFU/ 100m)	1.0 X 10 ⁶	1.2 X 10 ⁶	E 40	E 1.8 X 10 ²	E 1.7 X 10 ³	4/22/2026

The standards against which these results were assessed are listed in Table 35, comprising the Barbados marine water quality criteria, the wastewater criteria for discharge and for irrigation, and the US EPA values.

Table 35: Water Quality Standards Referenced

	1 Barbados Marine Water Quality Monitoring Standards	*Wastewater criteria for direct discharge to wells	*Wastewater criteria for irrigation reuse	US EPA
<i>Parameter/ unit</i>		<i>Marine Pollution Control Discharge Standards</i>	<i>Recommended Discharge Standards from Treatment Plan</i>	
Temperature °C	15 - 35			
pH	6.5 - 8.5	6 – 9	6 – 8	
Electrical Conductivity	800 - 2,500 µS/cm			800 - 2,500 µS/cm
Total Dissolved Solids (TDS)	1,000,000 µm/L			1,000 mg/L
Total Suspended Solids (mg/L)	-	30	< 10	158 mg/L

	1 Barbados Marine Water Quality Monitoring Standards	*Wastewater criteria for direct discharge to wells	*Wastewater criteria for irrigation reuse	US EPA
Turbidity (NTU)	Clarity should not be reduced by 20%			Clarity should not be reduced by 20%
Dissolved Oxygen (mg/L)	> 6.5 (> 80% saturation)			
Biochemical Oxygen Demand (mg/L)		30	< 10	
Total Phosphorus	25 µg/L or 0.025 mg/L	1		25 µg/L or 0.025 mg/L
Ammonia-N (mg/L)		< 1		17 mg/L
Salinity (ppt)	-			
Magnesium (mg/L CaCO₃)				35 mg/L
Manganese	100 µg/L			100 µg/L
Copper	1000 µg/L			1000 µg/L
Chloride				250 mg/L
Fecal Coliform (CFU/ 100ml)	< 150	< 200 CFU/ 100ml geometric mean	nil	
Enterococcus spp. (CFU/ 100m)	< 35			
Calcium (mg/L CaCO₃)				
Manganese (mg/L)				
Sodium (mg/L)				20 mg/L
Iron (mg/L)				0.3 mg/L
Aluminum (mg/L)				
Fluoride (mg/l)				
Sulphate (mg/L)				250 mg/L
Total Nitrogen				10 to 15 mg/L.

12024, Environmental Solutions Ltd, Barbados Climate Resilient South Coast Water Reclamation Plant D2 - ESIA, ESMP and ESMS.

**(2015, Oct), Environmental Protection Department (EPD), Guidelines for the Submission of Building Development Applications to the Environmental Protection Department*

4.4.6.8. Discussion of the water quality results

The water quality results are set out in Table 36, which gives the measured values for the surrounding environs, the SCSTP influent and the SCSTP effluent, the applicable standard, and the interpretation. Values for the influent are drawn from the January to February 2026 sampling round and those for the surrounding environs, influent and effluent from the round of 16 April 2026.

The effluent column is the material one. Suspended solids leave the plant at 142 mg/L against 89 mg/L entering it, and against an Environmental Protection Department marine limit of 30 mg/L. Biochemical oxygen demand falls only from 215 to 205 mg/L, which is no meaningful removal of organic load. Ammonia removal is approximately twenty-six per cent, indicating that nitrification is not occurring. Total phosphorus leaves at 4.7 mg/L against an environmental limit of 0.025 mg/L, and copper at 1.72 mg/L against a regulatory limit of 1.0 mg/L. Fecal coliforms and enterococci in the effluent exceed safe limits by orders of magnitude, which is disinfection failure. On these results the plant is not treating: for several parameters the effluent is worse than the influent.

This is a pre-project baseline condition and is not attributable to the Workers' Camp. It is recorded here because it governs two conclusions in this assessment. The first is that the camp's foul discharge enters a works that is not currently achieving its consented performance, so the incremental load must be assessed against a system already failing rather than against design capacity. The second is that the condition of Graeme Hall Swamp described in the environmental baseline has a continuing source, and the improvement expected from the tertiary upgrade is the mechanism by which that source is removed. Confirmation of the receiving sewer's available capacity remains outstanding and is carried in the information request register.

Table 36: Water quality results and interpretation

Parameter	Surrounding environs	SCSTP influent	SCSTP effluent	Standard and interpretation
Temperature	29.4–30.8 °C	—	not reported	
pH	7.23–7.67	—	not reported	
Total Suspended Solids	7–23 mg/L	89 mg/L	142 mg/L	EPD marine limit 30 mg/L. Effluent exceeds influent: no solids removal
Turbidity	11–30 NTU	157 NTU	not reported	
Dissolved oxygen	5.7–7.2 mg/L	<1.0 mg/L	not reported	
Biochemical Oxygen Demand	—	215 mg/L	205 mg/L	Virtually no organic load removal between influent and effluent
Chemical Oxygen Demand	—	436–888 mg/L	not reported	

Parameter	Surrounding environs	SCSTP influent	SCSTP effluent	Standard and interpretation
Salinity	0.22–0.31 ppt	0.47 ppt	not reported	
Ammonia-N	<0.05–0.42 mg/L	50 mg/L	approx. 26% removal	Nitrification failure
Total Phosphorus	0.28–0.37 mg/L	4.4 mg/L	4.7 mg/L	Environmental limit 0.025 mg/L. Effluent exceeds influent
Manganese	0.022–0.067 mg/L	0.035 mg/L	not reported	
Copper	0.058–0.143 mg/L	0.128 mg/L	1.72 mg/L	Barbados regulatory limit 1.0 mg/L. Exceeded
Fecal coliform	—	6.0×10^6 CFU/100 mL	exceeds safe limits by orders of magnitude	Disinfection failure
Enterococcus spp.	1.8×10^2 CFU/100 mL (back of plant)	1.0×10^6 CFU/100 mL	exceeds safe limits by orders of magnitude	Disinfection failure
Alkalinity	—	352–394 mg/L	not reported	
Calcium	—	79–153 mg/L	not reported	
Magnesium, Sodium, Iron, Aluminum	—	Mg and Na within normal municipal range; Fe 1.2–1.3 mg/L; Al <0.005–0.04 mg/L	not reported	
Fluoride	—	2.88–3.49 mg/L	not reported	
Sulphate	—	32–35 mg/L	not reported	
Chloride	—	132–196 mg/L	not reported	
Oil and grease	—	26–79 mg/L	not reported	

Two conclusions follow. First, the receiving environment around the plant is in reasonable condition on the physical and chemical parameters measured, with dissolved oxygen between 5.7 and 7.2 mg/L and neutral pH, although total phosphorus at 0.28 to 0.37 mg/L is above the threshold at which eutrophication is accelerated and enterococci at the back of the plant indicate elevated risk.

Second, and more significantly for this assessment, the existing South Coast Sewage Treatment Plant is not achieving treatment. On seven parameters the effluent is worse than the influent: total suspended solids, turbidity, total phosphorus, manganese, copper, fecal coliform and enterococci. Biochemical oxygen demand falls by approximately five per cent against an expected eighty-five to ninety-five per cent, ammonia removal is approximately twenty-six per cent, dissolved oxygen is below 1.0 mg/L throughout, and effluent copper at 1.72 mg/L exceeds the national limit of 1.0 mg/L. Fecal coliform and enterococcus counts leaving the plant exceed those entering it, which indicates that disinfection has failed rather than underperformed.

This is a pre-project baseline condition. It arises from the operation of the existing plant and is not attributable to the Workers' Camp or to the works assessed in this document. It is recorded here so that the condition of the receiving environment at the point of project commencement is established, and so that subsequent monitoring can distinguish existing plant performance from any effect of the project. The condition is also material to the assessment of wastewater exposure risk for camp occupants, which is addressed in the Workers' Health and Safety Plan, and it should be formally notified to the Barbados Water Authority and the Environmental Protection Department.

4.5. Biological environment

4.5.1. Marine habitats and ecosystems

The project area lies adjacent to an area characterized by extensive fringing coral reefs, seagrass meadows, sandy lagoons, reef flats, patch reefs, and nearshore hard-bottom communities. These ecosystems collectively support one of the most productive marine environments on the island and provide critical ecological, economic, and social services. The benthic habitat survey prepared by BRI in 1984 provided some information about the marine habitat and biodiversity in the St Lawrence Lagoon, describing dense seagrass beds, high macroalgae diversity, and a high density of juvenile reef fishes using the coral rubble bank protecting the lagoon.

Recognizing the importance of the greater GHS marine ecosystem, UWI-CERMES undertook annual monitoring of the mangroves in GHS and the seagrass community in the adjacent St Lawrence lagoon from 1993 to 2020. This monitoring was guided by a protocol developed as part of the Caribbean Coastal Marine Productivity (CARICOMP) program, which ran from 1985 to 2007. As part of the monitoring program, the first detailed habitat description and map of the lagoon was produced by *Parker and Oxenford in 1998*. This region is characterized by a narrow limestone shelf extending 2 to 3 km offshore, which supports a highly dynamic but ecologically stressed marine community (*Hanoman-Van-Sluytman, 2014*).

A detailed marine habitat map was then produced for the entire island in 2015 under the GoB CRMP study (*Baldwin et al. 2019*), and a satellite image was subsequently generated that highlighted the marine habitats of the St Lawrence Lagoon area, together with the locations of four permanent coral reef monitoring sites that have been monitored by the GoB since 1997. However, historically dominated by critical structural framework builders such as Elkhorn coral (*Acpora palmata*) and Staghorn coral (*Acropora cervicornis*), these reefs have experienced profound phase-shifts over the last several decades due to regional bleaching anomalies, overfishing, and localized land-based sources of pollution (*Lirman & Schopmeyer, 2016*). Live coral cover has dropped significantly, sitting at approximately 12%. Concurrently, opportunistic species have claimed the

substrate, with sponges accounting for roughly 28% and macroalgae covering 18% of the remaining hard bottom (*Hanoman-Van-Sluytman, 2014*).

The region contains several important marine habitats that are interdependent. Therefore, it will always be important to consider what ongoing development in this location means for the health of these ecosystems. Several of these habits are discussed below.

4.5.2. Seagrasses

Extensive seagrass meadows occur within the sheltered coastal waters throughout the Christ Church Parish, particularly in the St Lawrence area. Some seagrasses that dominate the area include Turtle Grass (*Thalassia testudinum*), Manatee Grass (*Syringodium filiforme*), Shoal Grass *Halodule wrightii*. For the first nine years of the UWI-CERMES monitoring programme (1993-2001), two permanent CARICOMP monitoring plots within the seagrass beds were assessed once or twice a year to record their health status and productivity. Between March 2001 and March 2002, the limited but dense Turtle Grass (*Thalassia testudinum*) and Manatee Grass (*Syringodium filiforme*) seagrass beds in the lagoon virtually disappeared.

Several factors are thought to have contributed to the seagrass decline, including eutrophic outflows from the GHS, rapid rates of beach sand accretion and depletion, increased terrestrial runoff of storm drain water, flushing of newly constructed sewerage pipes in 2001 and 2002, and extremely heavy grazing by an unusually high recruitment of the white sea urchin (locally called sea egg) (*Tripneustes ventricosus*) in 2001. These impacts were likely exacerbated by sand movements associated with tropical storms and other extreme weather events (*Mahon et al., 2025*).

Because seagrass meadows occur immediately adjacent to coral reefs, they reduce suspended sediments reaching reef communities while simultaneously providing nursery habitat that supports reef fish populations. This ecological connectivity is widely recognized as essential for maintaining reef resilience throughout the Caribbean (UNEP, 2020).

Seagrass ecosystems provide several essential ecological functions, such as a nursery habitat for juvenile reef fishes, habitat for queen conch and lobsters, feeding grounds for sea turtles, sediment stabilization, nutrient cycling, blue carbon storage, and improvement of water clarity.

4.5.3. Ichthyofauna and mobile Macro-Invertebrates

The composition of the local fish community is directly tied to this structural complexity. Fish population densities and sizes exhibit strong gradients across the southern shelf, heavily influenced by localised artisanal fishing pressures and habitat quality (*Chapman & Kramer, 1999*).

- Resident Reef Fish: Dominant families observed within the Christ Church nearshore zone include parrotfish (*Scaridae*), damselfish (*Pomacentridae*), surgeonfish (*Acanthuridae*), and grunts (*Haemulidae*).
- Macro-invertebrates: Herbivorous Sea urchins, particularly *Diadema antillarum*, are present in low numbers. Their grazing activity is crucial for keeping macroalgal overgrowth in check and exposing bare substrate for potential coral larval settlement (*Lirman & Schopmeyer, 2016*).

4.5.4. Intertidal zones and sandy shorelines

The sandy beaches extending across Christ Church represent critical high-energy intertidal interfaces. Between reef patches occur extensive carbonate sand flats and limestone pavement communities. Although often perceived as low-diversity habitats, these environments support creatures such as sea cucumbers, sea stars,

echinoderm, mollusks, burrowing crustaceans, benthic algae, and juvenile fishes. Additionally, hard-bottom substrates provide colonization surfaces for macroalgae, sponges, octocorals, juvenile hard corals and encrusting organisms. These habitats function as transitional zones linking reef and seagrass ecosystems while providing important feeding grounds for numerous fish species. These dynamic shorelines are highly susceptible to severe coastal erosion driven by wave action and rising sea levels. This vulnerability has required extensive public and private shoreline stabilization programs, including the construction of breakwaters, groins, and continuous boardwalks to protect fragile coastal fringes (Cumberbatch et al., 2016).

4.5.5. Terrestrial ecosystems and biodiversity

Terrestrial ecosystem context. The terrestrial environment of the south coast of Christ Church Parish is a highly modified landscape, dominated by urban and peri-urban development, tourism infrastructure and agricultural land (Inniss, 2020). Natural vegetation is severely fragmented and shows a high degree of anthropogenic disturbance; remnant natural ecosystems are largely confined to secondary coastal scrub, pioneer salt-tolerant plant communities on exposed limestone pavement, and the specialized fringing vegetation of the parish's few remaining coastal wetlands (Carrington, 2007). These fragments continue to perform an ecological function disproportionate to their size, buffering land-based pollution and surface runoff while remaining under continuous pressure from the expansion of residential and commercial development (Government of Barbados, 2023).

Recognized conservation areas. Beyond the Graeme Hall Swamp, the principal site of recognized ecological value in the vicinity is the Chancery Lane Swamp, an eight-acre seasonal wetland of shallow open water, mudflats and grassy meadow bounded by a vegetated seaward berm, some distance further east along the south coast (Key Biodiversity Areas Partnership, 2009). It is designated a Key Biodiversity Area and serves as an important stopover for migratory shorebirds on the Atlantic Flyway, though it remains privately owned and exposed to encroachment from adjacent residential development and illegal dumping (Key Biodiversity Areas Partnership, 2009). The Woodbourne Shorebird Reserve, a former hunting swamp converted to a managed freshwater refuge in 2008 and opened to its first migrant shorebirds the following year, is a second notable site: one of the few actively managed habitat-restoration areas in the parish, it continues to operate as a sanctuary for migratory waterfowl (BirdsCaribbean, 2024).

Terrestrial fauna and species of conservation concern. Regional terrestrial fauna spans a small number of highly adaptable, urban-tolerant residents alongside a much larger number of vulnerable, range-restricted endemics. Avifaunal diversity is comparatively robust, sustained by migratory waders and by resident endemics such as the Barbados bullfinch (*Loxigilla barbadensis*), whose populations in built-up areas show markedly better problem-solving performance and immune function than their rural counterparts, an adaptation associated with living alongside people (Audet et al., 2016). Mammalian diversity is limited to bats roosting in nearby coastal caves, introduced green monkeys, and populations of black rats and the small Indian mongoose; the mongoose in particular is now recognized in Barbados as a significant predator of native reptiles, ground-nesting birds and sea turtle nests (Biodiversity Barbados, 2025). Invertebrate diversity includes the endemic Barbados velvet worm alongside a number of introduced agricultural pests (Inniss, 2020).

Terrestrial reptile diversity carries the most acute conservation concern of any regional taxon, driven chiefly by historic and ongoing habitat loss. Table 37 summarizes the four species of principal concern identified in the literature.

Table 37: Terrestrial reptile and endemic bird species of conservation concern, Christ Church Parish

Common name	Scientific name	Taxonomic group	IUCN Red List status	Regional distribution and ecology
Barbados leaf-toed gecko	<i>Phyllodactylus pulcher</i>	Reptile	Critically Endangered	Highly fragmented; confined to roughly 18 hectares of remnant coastal limestone cliff on the south/south-east coast. Population estimated at 6,000 individuals.
Barbados skink	<i>Alinea lanceolata</i>	Reptile	Critically Endangered (Possibly Extinct)	Historically known only from the Graeme Hall Swamp and Chancery Lane; last recorded in 1889. Highly vulnerable to introduced mammalian predators.
Barbados threadsnake	<i>Tetracheilostoma carlae</i>	Reptile	Critically Endangered	Endemic micro-snake reaching about 10 cm; exceedingly rare, restricted by loss of secondary forest and ground-layer habitat.
Barbados bullfinch	<i>Loxigilla barbadensis</i>	Bird	Least Concern (Endemic)	Highly adaptive to human-modified landscapes; widespread across the parish's urban and scrub environments.

Source: IUCN Red List status per Daltry (2016) for *Phyllodactylus pulcher* and Horrocks and Daltry (2017) for *Alinea lanceolata*; other entries per Inniss (2020).

The Barbados leaf-toed gecko is confined to narrow, unprotected strips of coastal limestone cliff, a refuge of roughly 18 hectares supporting an estimated population of 6,000 individuals, which leaves it highly exposed to stochastic events such as volcanic ashfall and to the continuing expansion of coastal housing (Blades & Vique Bosquet, 2025).

Anthropogenic pressures. Terrestrial biodiversity in the parish sits under sustained development pressure: decades of land-use planning favoring coastal tourism and residential growth over habitat retention have driven the fragmentation described above (Government of Barbados, 2023). Invasive species add a second, compounding pressure. Beyond the mongoose's impact on native herpetofauna and birds, the spread of the non-native house gecko (*Hemidactylus mabouia*) is displacing native reptiles from suitable microhabitat through competition, while the giant African snail and the pink hibiscus mealybug degrade vegetation condition more broadly (Williams et al., 2020).

Ecological context of the project site. Set within this heavily modified regional matrix, the Graeme Hall Swamp and the adjoining project footprint function as a critical, largely isolated ecological refuge. As the island's last major intact coastal wetland, the site anchors what is otherwise a much-diminished network of south-coast green space (CERMES, 2007), and it supplies provisioning and regulating ecosystem services, together with

habitat for both endemic terrestrial species and long-distance migratory flyways, that the surrounding urbanized parish can no longer provide on its own (Inniss, 2020).

Data limitations. This regional baseline is constrained by the absence of a recent, comprehensive multi-taxa field survey of terrestrial fauna across Christ Church Parish. The published literature available is concentrated on targeted single-species assessments, principally of *Phyllodactylus pulcher*, rather than on holistic ecosystem-level survey; regional population densities for most taxa are therefore extrapolations rather than direct counts, and the continued existence of the Barbados skink (*Alinea lanceolata*) remains scientifically unresolved, with no confirmed sighting since 1889. This subsection is accordingly provisional and is expected to be superseded by the findings of the site-specific Critical Habitat Assessment referenced in the Baseline Data Coverage, Quality Assurance and Limitations discussion above.

4.5.6. The Graeme Hall Swamp

Graeme Hall, officially designated as Graeme Hall Swamp (GHS), is a wetland located downstream from the South Coast Sewage Treatment Plant (SCSTP) and adjacent to the shore. It is surrounded by agricultural land and urban areas, making it a vital natural area in Barbados. GHS is particularly significant as it houses the last significant mangrove forest ecosystem in the country, spanning approximately 33 hectares. The wetland comprises two distinct areas: the western portion, covering 13.68 hectares, is privately owned and designated as the Graeme Hall Nature Sanctuary (GHNS), while the eastern portion, covering 19.37 hectares, is owned by the Barbados Agricultural Development and Marketing Corporation. It is the single most critical terrestrial and brackish-water ecological feature within the Christ Church Parish.

GHS is perhaps the most extensively researched ecosystem in Barbados, having been the subject of numerous studies aimed at documenting, *inter alia*, the state of and changes in its hydrology, ecosystems and habitats, and plant and animal biodiversity. Covering approximately 240 acres, it represents the last remaining mangrove forest of its kind on the island and was officially designated as a Ramsar Site of International Importance in 2006 (Williams, 2008).

The wetland is heavily dominated by Red Mangroves (*Rhizophora mangle*) along the interior water channels and White Mangroves (*Laguncularia racemosa*) in the surrounding upper brackish mudflats. This root architecture provides a unique brackish-water nursery environment while serving as a massive biological filter that traps inland sediment and mitigates nutrient loads before they can discharge onto the south coast coral reefs. Additionally, Graeme Hall functions as an essential regional sanctuary and stopover point for both resident and migratory waterbirds. It serves as a vital nesting and roosting site for species such as the Little Egret (*Egretta garzetta*), the Cattle Egret (*Bubulcus ibis*), and various migratory shorebirds and teals travelling along the Atlantic flyway (Hutt, 1975). Historically, the GHS still represents one of the island's most significant biodiversity hotspots and remains an important ecological receptor despite surrounding urban development.

4.5.6.1. The critical importance of the Graeme Hall Swamp

According to the IDB (2015), in identifying a critical natural habitat, it is required to evaluate the presence of critical natural habitats in the area of influence of the project against the criteria for such habitat described in the environment and safeguards compliance policy. Critical natural habitats are distinguished by the following:

- It may be an existing protected area, an area officially proposed by a government for protection, and/or a site that maintains conditions that are vital for the viability of the environment.
- An unprotected area of known high conservation value.

- An existing protected area that may include reserves that meet the criteria of the IUCN Protected Area Management Categories I through VI; World Heritage Sites, areas protected under the RAMSAR Convention on Wetlands; core areas of World Biosphere Reserves; areas in the UN List of National Parks and Protected Areas.
- An area of known high conservation value are sites that may be: (i) highly suitable for biodiversity conservation; (ii) crucial for critically endangered, endangered, vulnerable or near threatened species listed as such in the IUCN Red List of Endangered Species; and (iii) critical for the viability of migratory routes of migratory species.

Due to the features of the GHS, the wetland was therefore designated as a *Ramsar Site* on April 12, 2006. The GHS was designated as a Wetland of International Importance under the Ramsar Convention on Wetlands (*Ramsar 2006*). The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention promotes the conservation of wetlands and their resources through the concept of “wise use”. Wise use basically means making use of a wetland in a sustainable way so that it may yield the greatest continuous benefit to present and future generations (*Williams, 2008*). The Ramsar designation was awarded, based on three of the eight Ramsar criteria as follows (*Ramsar 2006*):

- **Criterion 1:** A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region: *“Graeme Hall Swamp ... is the last remaining complete ecosystem of its type left in Barbados and has the largest body of inland water on the island (4.86 ha lake in addition to wetland area). It also contains the largest remaining area of red mangrove (Rhizophora mangle) and white mangrove (Laguncularia racemosa) forest. It is the only location on the island where a mangrove forest, a seagrass bed, and a shallow nearshore hard coral reef can be found in close proximity to each other (Ramsar 2006).*
- **Criterion 2:** A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities: *“The presence of the peregrine falcon (Falco peregrinus), listed in CITES Appendix I, has been recorded in the Swamp.” (Ramsar 2006)*
- **Criterion 4:** A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles or provides refuge during adverse conditions: *“At least eighty-four (84) bird species have been recorded at the Sanctuary, which is home to the widest diversity of resident and migratory birds on the island, including locally (Setophaga petechia, formerly Dendroica petechia). The oldest nesting colony for the snowy egret (Egretta thula) is at the swamp, as is the first known breeding colony of Little Egret (Egretta garzetta) to become established in the Americas.” (Ramsar 2006)*

In total, the GHS incorporates six different Ramsar wetland types:

- Coastal brackish/saline lagoons (Marine/coastal wetlands Ramsar type J)
- Intertidal forested wetlands (Marine/coastal Ramsar type I)
- Freshwater, tree-dominated wetlands (Inland wetlands Ramsar type Xf)
- Shrub-dominated wetlands (Inland wetlands Ramsar type W)

- Water storage area (Human-made wetlands Ramsar type 6)
- Canals and drainage channels, ditches (Human-made wetlands Ramsar type 9)

The site is officially located in Christ Church at coordinates: 13°04'N 59°34'59" W with an area of 33 ha. At least 84 bird species have been recorded, including Caribbean coot (*Fulica caribaea*) and yellow warbler (*Setophaga petechia*, formerly *Dendroica petechia*), and the site's red mangrove (*Rhizophora mangle*) and white mangrove (*Laguncularia racemosa*) stands are the largest healthy mangrove areas left on the island. There are more than 20 fresh and brackish water fish species, among the most interesting of which are those marine species that have become isolated from the sea and become breeding residents of the lake. Fishing has been suspended pending study of the effect of the water quality on human consumption of fish and the effects on fish populations of the introduction of aggressive tilapia species. Ecotourism and environmental educational and research activities are the chief human uses of the site, which has been proposed as a National Heritage Site (Ramsar, 2005).

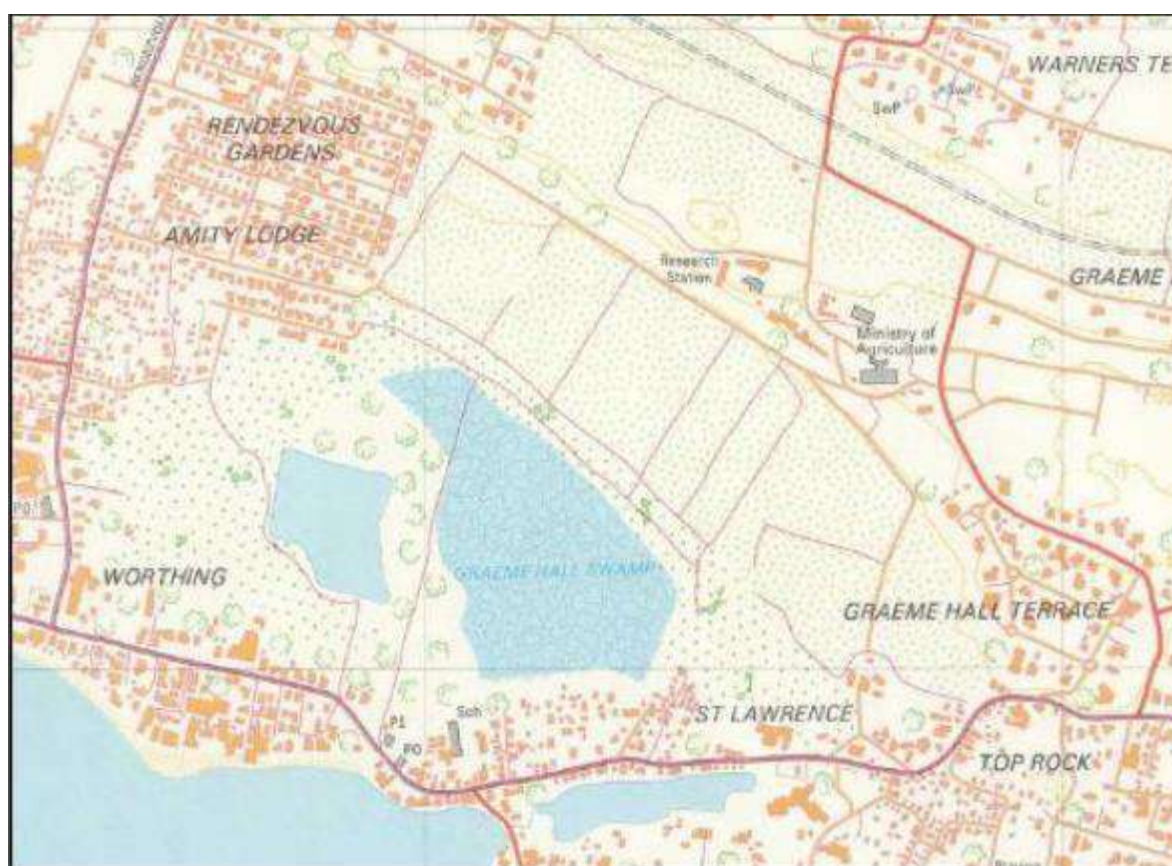


Figure 36: Topographic Map highlighting the location of the Graeme Hall Swamp¹³

The location of Graeme Hall Swamp relative to the site is shown at Figure 36.

(Williams, 2008) outlines the legal obligations to conserve the GHS, which, when followed, will ensure that all safeguards are in place during this project's execution. They are listed as follows:

- **Ramsar Convention:** A designation that makes Barbados eligible to access and receive some of the financial and non-financial benefits from accession to the Convention¹⁹;

¹³ UWI. 2025. Graeme Hall Swamp Review. Accessed at https://www.cavehill.uwi.edu/cermes/wp-content/uploads/sites/38/Docs/Technical_Reports/Mahon_et_al_2025_Graeme_Hall_Swamp_Review_CTR_110.pdf

- **Convention on Biological Diversity (CBD):** emphasizing conservation and sustainable use;
- **Convention on International Trade in Endangered Species (CITES):** which ensures that such trade does not threaten the survival of the species;
- **Protocol on Specially Protected Areas and Wildlife (SPA):** assists Caribbean Governments in protecting rare and fragile ecosystems within the implementation of the CBD
- **Protocol on Land-based Sources of Marine Pollution (LBS):** directed at (among other) domestic wastewater sources of marine pollution and its impact on fisheries and tourism;
- **Barbados National Physical Development Plan:** which designated Graeme Hall as a *Natural Heritage Conservation Area*;
- **National Biodiversity Strategy and Action Plan (NBSAP):** which specifically mentions the Graeme Hall Swamp and its environs;
- **Coastal Zone Management Act and Plan (CZMA & CZMP):** which seeks to establish the Graeme Hall Swamp as a Biodiversity Reference Area;
- **Marine Pollution Control Act (MPCA):** enacted to prevent, reduce, and control pollution of the marine environment from whatever source.

The protection of habitat, monitoring of changes in the coastal zone, and the preservation of wetlands are all activities undertaken by the Graeme Hall Nature Sanctuary, which can be used by the Government as evidence of its intention to honor its international obligations (*Williams, 2008*). The landscape features of this site include the following (*Williams, 2008*):

- The largest remaining areas of red (*Rhizophora mangle*) and white (*Avicennia racemosa*) mangroves;
- Red mangroves dominate much of the lake shoreline, although white mangroves dominate the northeastern shore.
- The largest body of inland water in Barbados;
- The swamp serves as a central drainage point of a 1,158-acre watershed area.
- In previous times, the mangrove wetland, seagrass bed, and shallow nearshore hard coral reef ecosystems interacted with each other as one large ecosystem;
- Currently, a narrow sluice gate connects the Swamp to the marine area
- A network of man-made drainage canals has been constructed, where the banks of these canals support a dense growth of sedges and strips of grasslands

The Biotic and non-Biotic features include the following (*Williams, 2008*):

- At least 44 bird species, including locally threatened species such as Caribbean coot (*Fulica caribaea*) and yellow warbler (*Setophaga petechia*, formerly *Dendroica petechia*)
- Roost area for migratory and native water birds, one of only three primary roost areas in Barbados within the Eastern Caribbean Flyway
- The oldest nesting colony for the snowy egret (*Egretta thula*) is at the swamp, as is the first known breeding colony of Little Egret (*Egretta garzetta*) to become established in the Americas.
- A wide variety of fish, crustacean, bird and mammalian species inhabit the swamp.

- More than 20 fresh and brackish water fish species, among the most interesting of which are those marine species that have become isolated from the sea and become breeding residents of the lake.
- Other species include the green monkey (*Chlorocebus aethiops*), mongoose (*Herpestes javanicus*), fisherman bat (*Noctilio leporinus*), several herptile species, a wide diversity of invertebrate life and aquatic life

Further, the Graeme Hall Swamp is identified as a Natural Heritage Conservation Area. (Wolf, 2004) outlines the purpose of this designation is to:

- conserve and enhance the environmental quality and visual integrity of sites of ecological and geological importance;
- ensure that new development is compatible with the natural heritage and landscape qualities of these areas;
- define and protect a functionally connected natural heritage system based on an ecosystem approach.
- The designation established the importance of the Graeme Hall Ecosystem in the social and economic life of Barbados. The Physical Development Plan (Amended 2003) recognizes that *“Barbados near-shore marine ecosystem is one of its most important natural resources and provides the major tourism and recreational attraction for the island.”* (Potter and Phillips, 2004).

Additionally, the GHS also has the designation of being a “Nature Sanctuary”. The “Nature Sanctuary” is an owner-applied designation that signals the purpose of the acquisitions and infrastructure work conducted by the Graeme Hall Nature Sanctuary Inc., namely, the conservation of the Wetlands of Graeme Hall. “As part of its mission in the Caribbean, GHNS is facilitating the preservation of 34.25 acres of Graeme Hall Swamp in one of the most densely populated areas of the island. Residential and commercial tourism development surrounds the swamp along the southern, eastern, western, and northwestern boundaries, a main coastal road (Hwy 7) runs between the swamp and the sea on the south side, and agricultural lands border the swamp along the northeastern side” (Brown et al., 2008). This designation broadens the “conservation commitment” of GHNS to the wider ecosystem. GHNS is a private investment that is creating public value.

4.5.6.2. Value of Graeme Hall wetlands

An initial assessment of the total value of the Graeme Hall Nature Sanctuary was conducted by Williams in a 2008 study titled, *“The Wetlands of Graeme Hall: An Initial Assessment of Value”*. The goal was to assess the value of GHNS in terms of its infrastructure, its services, its contribution to the conservation of the Wetlands and buffer zone, and by extension, the Southwest Coast community and the national economy. The study objectives included: a value assessment of the physical assets of the Graeme Hall Nature Sanctuary; a socio-economic assessment of the functions and uses of the wetlands landscape at Graeme Hall; and a perspective on maintaining this natural asset as a legacy to future generations of Barbadians.

The value assessment was designed as a non-intrusive inquiry into the characteristics and functions of the Graeme Hall Nature Sanctuary. It comprised predominantly of desk research and relied exclusively on data and information that already exists in the public domain. The activities included (Williams, 2008): Document Review, Scoping Visit to GHNS, Value Assessment of GHNS Infrastructure, Assessment of Social and Economic Value of the Wetlands Landscape, and Projections of the potential Legacy Welfare benefits

The study identified 12 valuable functions of the wetlands at Graeme Hall. These include (Williams, 2008): Habitat; Refuge; Regulating Hydrological Flows; Storage and retention of water; Hosting unique biological material; Capacitance and absorption of pollutants; Removal or breakdown of excess compounds; Maintaining

ecological characteristics of the landscape; Monitoring coastal zone changes; Impacting local community quality of life; Providing cultural attraction and being a repository of scientific information.

Using various valuation methods, the study made an initial value of the Graeme Hall Wetlands at US\$551,288,300 (Williams, 2008). Those details are outlined in Table 38 below.

Table 38: Total Value of Graeme Hall Wetlands

WETLAND SERVICES		WETLAND VALUE	VALUE METHOD	ESTIMATE
Wetland Values	Conservation	GHNS Replacement Value	Replacement Cost	\$ 23,635,520
		Buffer Zone Value	Real Estate Market Prices	\$ 6,048,000
Heritage Landscape Values	Cultural	Tourism Sector Support	Proportionate Tourist Expenditure Estimates	\$105,736,000
Wetland Avoidance	Emergency	Risk Aversion	Avoidance Cost - Market Price	\$173,000,000
CARICOMP Monitoring		Disaster Preparedness	-	-
Biodiversity		Quality of Life Support – South coast community	Shadow-value: Net Factor Income	\$242,868,780
Total Value Estimate				\$551,288,300

The true meaning of the magnitude of these valuations is not simply that natural resources like the Graeme Hall Wetlands are being undervalued; rather, it is an identification of the weight in the decision-making process that must be given to the Graeme Hall Wetlands that produce these services, otherwise current and continued future human welfare may drastically suffer (Williams, 2008).

4.5.7. Ecosystem services of the workers' campsite area

Ecosystem services are the benefits that people obtain from ecosystems. In accordance with IDB Environmental and Social Performance Standard (ESPS) 6, this section identifies ecosystem services associated with the area in which the Workers' Campsite will be installed and operated, distinguishing those arising within the direct Area of Influence from those arising within the Indirect Area of Influence (AOI), prioritizes them, and provides an indicative economic valuation where the available evidence supports one.

The assessment is a non-intrusive desk-based inquiry relying on publicly available information and is consistent with the method used by Williams (2008). It is supplemented by field observations recorded during the Rapid Biodiversity Assessment conducted between 14 and 17 April 2026. No primary ecosystem service valuation study was undertaken. Services are considered within the provisioning, regulating, cultural and supporting categories of the Millennium Ecosystem Assessment. Table 39: List of ecosystem services categorized according to Millenium Ecosystem Assessment categories, AOI and descriptions. Table 39 shows a summary of ecosystem services corresponding to the direct AOI and indirect AOI. These services are further explored in this sub-section.

Table 39: List of ecosystem services categorized according to Millenium Ecosystem Assessment categories, AOI and descriptions

Ecosystem Service	MEA Category	AOI (Direct or Indirect)	Description
Soil retention and erosion control	Regulating	Direct AOI	Grassland and shrub vegetation help stabilize soils and reduce erosion within the campsite footprint.
Rainfall infiltration and groundwater recharge	Regulating	Direct AOI	Vegetated surfaces facilitate localized infiltration of rainfall and contribute to groundwater recharge.
Dust and noise attenuation	Regulating	Direct AOI	Existing vegetation provides limited attenuation of dust and noise generated by surrounding activities.
Microclimate regulation	Regulating	Direct AOI	Vegetation contributes to localized shading and minor temperature moderation.
Habitat, forage and cover for terrestrial fauna	Supporting	Direct AOI	The site provides habitat and foraging opportunities for fauna recorded during the Rapid Biodiversity Assessment.
Vegetated buffer function	Supporting	Direct AOI	Vegetation provides a buffer between the South Coast Sewage Treatment Plant and surrounding agricultural lands.
Provisioning services	Provisioning	Direct AOI	No significant provisioning services were identified. The site is not cultivated and is not used for grazing, harvesting or water abstraction.
Cultural, recreational, heritage or spiritual values	Cultural	Direct AOI	No recorded amenity, recreational, heritage or spiritual use; public access is absent.
Habitat for resident and migratory birds	Supporting	Indirect AOI	Supports roosting and breeding of red seal coots, sandpipers, egrets and other avifauna.
Refuge function for migratory species	Supporting	Indirect AOI	Provides refuge and stopover habitat for resident and transient bird populations on the Eastern Caribbean Flyway.
Hydrological regulation	Regulating	Indirect AOI	Regulates watershed drainage and moderates hydrological flows within the catchment.
Water storage and retention	Regulating	Indirect AOI	Stores and retains water within the wetland and associated aquifer system.

Ecosystem Service	MEA Category	AOI (Direct or Indirect)	Description
Mangrove genetic resources	Provisioning/Supporting	Indirect AOI	Supports unique biological and genetic resources associated with white and red mangrove communities.
Pollutant absorption and runoff regulation	Regulating	Indirect AOI	Absorbs pollutants and regulates sediment- and contaminant-laden runoff entering the wetland.
Waste treatment and nutrient processing	Regulating	Indirect AOI	Provides emergency wastewater treatment capacity through the removal and breakdown of excess compounds.
Wetland maintenance and conservation support	Supporting	Indirect AOI	Supports conservation management through national and international wetland protection obligations.
Climate and coastal change monitoring	Cultural/Supporting	Indirect AOI	Functions as a monitoring site for coastal environmental change under the CARICOMP programme.
Landscape and heritage value	Cultural	Indirect AOI	Contributes to landscape character, quality of life, and the environmental setting of the area.
Recreation and tourism	Cultural	Indirect AOI	Provides recreational, tourism and visitor opportunities associated with the wetland environment.
Education and scientific research	Cultural/Supporting	Indirect AOI	Supports environmental education, scientific research and ecological monitoring.

Ecosystem Services within the Area of Influence (AOI)

The proposed Workers' Campsite footprint in the direct AOI (500 m physical pathway area) occupies approximately 6,592 m² of grassland and shrub vegetation accessed via an earthen dam. The land is not cultivated and does not contain surface water features.

Regulating services provided by the area include soil retention and erosion control through vegetative cover, localized rainfall infiltration and groundwater recharge, attenuation of dust and noise, and minor microclimatic regulation. Supporting services include the provision of habitat, forage, and cover for terrestrial fauna as recorded during the Rapid Biodiversity Assessment, as well as the maintenance of a vegetated buffer between the South Coast Sewage Treatment Plant and surrounding agricultural lands. No significant provisioning services were identified in the area nor does the site possess any recorded amenity, recreational, heritage or spiritual use. There is also no public access.

At the broader landscape scale, the dominant provider of ecosystem services within the indirect AOI is the Graeme Hall Swamp, the largest remaining inland mangrove wetland in Barbados. Williams (2008) identified

a diverse range of ecosystem functions and services associated with the wetland, including habitats supporting the roosting and breeding of red seal coots, sandpipers and egrets, refuge for resident and transient bird populations on the Eastern Caribbean Flyaway for birds, regulation of hydrological flows, water storage and retention, hosting of white and red mangrove genetic resources, absorption of pollutants and regulation of upland runoff, emergency wastewater treatment functions through removal or breakdown of excess compounds, support for wetland conservation and maintenance, function as a monitoring site for adjustment in the coastal zone to global change under the CARICOMP project, landscape and cultural heritage values, recreation and tourism, and educational and scientific research opportunities.

These services contribute significantly to the ecological functioning of the area and underpin the environmental importance of the Graeme Hall Swamp.

Priority Ecosystem Services

Applying the ESPS 6 test, the following ecosystem services are considered priority ecosystem services for the Workers' Campsite because the project either influences their condition or depends on them:

Pollutant absorption and waste treatment functions of the Graeme Hall Swamp. The wetland provides capacity for the attenuation and processing of pollutants entering the catchment and serves as an emergency buffer within the South Coast wastewater management system. Any failure in camp sanitation, or any overloading of the plant during the construction period, is transmitted directly to this service. As campsite wastewater will enter the same treatment network, the Project both depends upon and may influence this service.

Water quality regulation and pollutant retention. Surface runoff from the campsite has the potential to enter drainage pathways connected to the wetland. Consequently, the Swamp's capacity to retain sediments, nutrients, hydrocarbons, and other contaminants represents a key ecosystem service receptor.

Hydrological regulation. Hard standing, compaction and drainage works at the campsite alter the rate and timing of runoff reaching the watershed drainage network.

Habitat and refuge functions. Vegetation clearance at the footprint removes habitat and forage for the fauna recorded during the Rapid Biodiversity Assessment, and camp lighting, noise and human presence may affect roosting and transiting avifauna using the Swamp. The significance of this effect cannot be fully determined until the Critical Habitat Assessment required by the Project Execution Unit and the IDB safeguards team has been completed.

Soil retention and infiltration services within the campsite footprint. These services are under direct Project control and are lost on clearance, to be reinstated through the Habitat Restoration Plan at decommissioning.

Other ecosystem services identified by *Williams (2008)* associated with the Graeme Hall Swamp, including landscape heritage, cultural attraction, the CARICOMP monitoring function and the information repository function, are not assessed as priority services for this project as the campsite neither controls them nor materially affects their condition, and no project activity is dependent upon them. However, they are still recorded here given their contribution to the significance of the Swamp as a receptor in the Impact Assessment chapter.

Economic Value

Williams (2008) estimated the total economic value of the Graeme Hall Wetlands at approximately US\$551.3 million, using a combination of replacement cost, avoidance cost, proportionate tourist expenditure, real estate market prices, and shadow-value approaches, shown in Table 36. This estimate relates to the wetland system as a whole and is presented here as context for the scale of the receptor within the Indirect AOI, and

it is not apportioned to the Workers' Campsite; the campsite occupies no part of the wetland, and attributing any share of that figure to a 6,592 m² footprint of dry scrub grassland would not be defensible.

For the direct AOI, no published unit values exist for Barbadian dry scrub grassland of this extent and condition. Where the Critical Habitat Assessment is subsequently commissioned, the ecosystem services identified in this section should be revisited against the primary data it generates, and valued at that point if the data support it. The prioritization above should be treated as provisional until that assessment is complete.

The priority ecosystem services identified in this section are carried forward as receptors in the Impact Assessment chapter, and the measures addressing them are set out in the Management Plan.

4.5.8. Biodiversity assessment of the workers' campsite project area

A Rapid Biodiversity Assessment (RBA) was conducted during the period April 14 to 17, 2026, in and around the area of the proposed campsite. This was done to record biodiversity species observed within the Workers' Campsite and the surrounding environs. The study area encompasses the Workers' Campsite area, as well as the entire existing treatment plant area and the new proposed project site, which falls within the direct 500km radius of the Area of Influence (AOI). To accurately capture the baseline biophysical conditions of the project area, the spatial boundary for the biodiversity inventory cannot be restricted to the immediate physical footprint of the project site. Ecosystems do not operate as closed, static enclaves; rather, they are governed by dynamic processes of ecological connectivity and metapopulation dynamics that function across macro-regional scales, hence the identified area of influence. Confining the assessment to a narrow radius introduces a significant risk of underrepresenting ecological dependencies due to two primary biological mechanisms:

- **Faunal Mobility and Trophic Ranges:** Highly mobile terrestrial and marine fauna— including migratory avifauna utilizing regional flyways, marine reptiles (such as nesting sea turtles), cetaceans, and pelagic ichthyofauna—possess extensive home ranges and seasonal migratory pathways. Meaning, various fauna populations may reside directly in the project area, as well as the environs of the AOI.
- **Floral Dispersal and Colonization Dynamics:** Plant communities expand, propagate, and colonies open niches via macro-scale dispersal mechanisms such as wind (anemochory), water currents (hydrochory), and animal vectors (zoochory). In tropical coastal and marine environments where favorable climatic factors allow for rapid growth and opportunistic establishment, plant propagules routinely bridge substantial geographic distances, maintaining vital genetic flow between seemingly isolated habitats.

Because localized impacts cannot be decoupled from wider regional environmental dynamics, this RBA will include species observed and/or researched to be present in the stated direct AOI, spanning the 500 m direct Area of Influence. It should also be reiterated that this study is not a Critical Habitat Assessment, and the techniques used for that type of assessment will not be applied to this RBA. The techniques referenced here are strictly for a RBA exercise, and the results herein reflect the scope of the RBA activity. Therefore, any noted lacking nuance may apply to a Critical Habitat Assessment or another such exercise, which is beyond the scope of this RBA. To focus on the immediate project zone, the following sub-transects were assessed (also see Map 4):

- 1) In front of the existing Treatment Plant and primary entrance to the Workers' Campsite (*GPS: 21P 0221145, UTM 1446448*)
- 2) At the back of the existing SCSTP (*GPS: 21P 0220928, UTM 1446597*)
- 3) GHS swamp at the side of (adjacent to) the existing SCSTP (*GPS: 21P 0220965, UTM 1446544*)

- 4) Northern side of workers campsite and proposed site for new treatment plant (GPS: 21P 0221316, UTM 1446738)
- 5) Northwestern side (back) of workers campsite and proposed site for the new treatment plant (GPS: 21P 0221063, UTM 1446909)
- 6) Southwestern side (back) of workers campsite and proposed site for the new treatment plant (GPS: 21P 0220936, UTM 1446672)



Map 4: Biodiversity Collection Area for the Workers' Campsite

The objective of this RBA is to establish a primary baseline dataset for terrestrial flora and fauna to satisfy the requirements of IDB ESPS 6. A mix of random and targeted sampling was used to capture overall diversity and detect rare species. This baseline acts as a foundational component of the project's ESIA. It provides the necessary data to apply the Mitigation Hierarchy (avoid, minimize, restore, and offset) and to determine whether the affected ecosystems constitute Modified, Natural, or Critical Habitats as defined by the IDB.

In alignment with the IDB Guidance for Assessing and Managing Biodiversity Impacts, the rapid assessment approach was deployed to optimize field efficiency and identify time-sensitive conservation priorities. Rather than executing an exhaustive multi-year inventory, field operations focused on documenting key indicator species, assessing structural habitat characteristics, and evaluating priority Ecosystem Services to identify biological hotspots and sensitive natural resources.

Scoping and determining the Ecologically Appropriate Area of Analysis (EAAA) for the RBA was also carried out. Field investigations utilized a combination of random and targeted sampling to capture representative biodiversity and maximize the detection probability of rare, threatened, endemic, or legally protected species. Data collection was executed through two primary field mechanisms: transect sampling done by walking designated lines primarily along the defined boundaries of the project site and different habitat types, recording observations (e.g., visual sightings), and using non-destructive methods such as photography; and to safeguard against sampling bias, random sampling was done by extending inward from the boundaries into

the core project interior. The precise configuration of this random sampling was adapted based on real- time field variations in vegetation communities and shifting flora assemblages. Species locations identified were done in proximity to the identified GPS location points detailed in the previous section.

The vulnerability of these species was compared against the International Union for the Conservation of Nature (IUCN) Red List conservation status (<https://www.iucnredlist.org/>). The IUCN Red List Categories and Criteria are intended to be an easily and widely understood system for classifying species at high risk of global extinction.

It divides species into nine categories: **Not Evaluated**, **Data Deficient**, **Least Concern**, **Near Threatened**, **Vulnerable**, **Endangered**, **Critically Endangered**, **Extinct in the Wild** and **Extinct**. See Figures 38 and 39 for more details. For reference, when ‘Not Evaluated’ is mentioned in the upcoming discussions and tables, it will refer to flora or fauna not formally assessed per IUCN criteria.

“Not Evaluated is used for taxa that have not been formally assessed under the IUCN Red List Categories and Criteria. This can occur because the species is newly described, data have not yet been compiled for an assessment, priorities have focused on other groups or regions, or an assessment is planned but not completed. NE is therefore a status about the assessment process, not a statement about population size, trend, threats, or extinction risk” (IUCN, 2024).

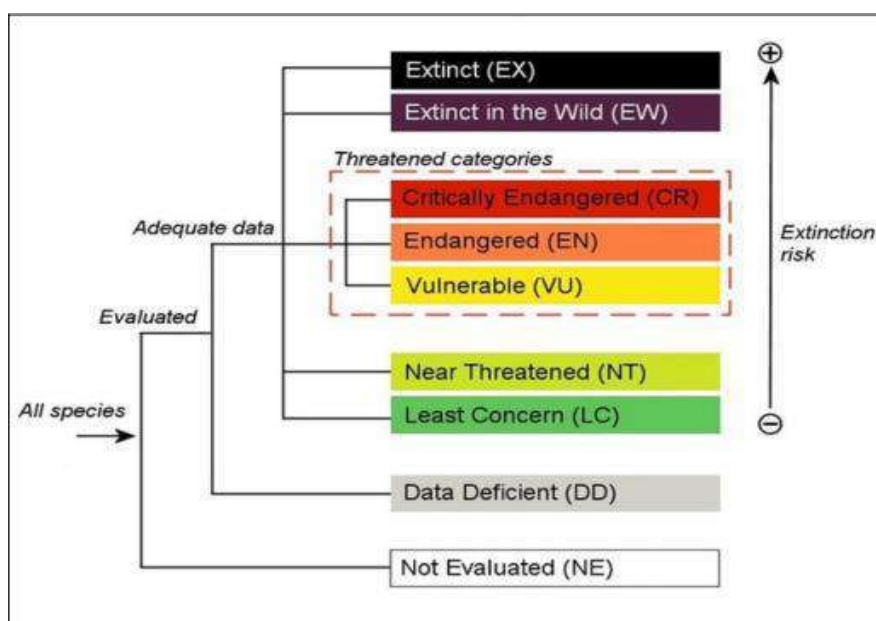


Figure 37: The IUCN Red List Categories © International Union for Conservation of Nature¹⁴

The IUCN Red List categories used throughout this section, and their definitions, are reproduced at Figures 37 and 38.

¹⁴ IUCN. Red list Accessed at <https://www.iucnredlist.org/>



Figure 38: The IUCN Red List Categories Explained © International Union for Conservation of Nature¹⁵

4.5.9. Critical Habitat and Field Verification

The Project is located within a highly modified but environmentally sensitive landscape. Of particular importance is the proximity of the existing treatment plant and proposed Project activities to the **Graeme Hall Swamp**, which forms part of the Graeme Hall Swamp Ramsar Site and represents one of the most significant remaining wetland systems in Barbados (Ramsar Sites Information Service, 2005). The wetland provides habitat for resident and migratory species and is influenced by hydrological connections between the surrounding catchment, groundwater, wetland system and adjacent coastal environment. The ecological sensitivity of the area, together with the nature and scale of the proposed infrastructure, requires careful consideration of potential risks and impacts to biodiversity and ecosystem functions.

Field verification was undertaken on 21, 24 and 28 August 2026 as part of the Critical Habitat Assessment to confirm the ecological condition and hydrological connectivity of the Graeme Hall wetland system in relation to the Barbados Climate Resilient South Coast Water Reclamation Project. The verification exercise was conducted at seven stations and provided current evidence of habitat status, drainage pathways and existing pressures. Accessible portions of the wetland were assessed as Moderate to Good, with an established mosaic of marsh, mangrove and open-water/canal habitats, mature red and white mangroves, and marsh vegetation and standing water remaining present. Localized degradation was also recorded, including hurricane-related mangrove damage, illegal dumping and existing infrastructure/urban influence. The Nature Sanctuary (station FV-05) could not be accessed in time for the August exercise due to landowner access permissions.

4.5.9.1. Project Location and Components Relevant to the CHA

The SCSTP is located at Graeme Hall, Christ Church, within a substantially developed landscape containing residential, commercial, agricultural and transport infrastructure. Historical assessments similarly describe the wetland as embedded within a mixed land-use setting comprising residential development, tourism-related

¹⁵ IUCN. (n.d.) Red list. Accessed at <https://www.iucnredlist.org>

commercial uses, agricultural lands and major transport infrastructure, with surrounding land uses influencing drainage and other inputs to the wetland system (Williams, 2008). Graeme Hall Swamp lies immediately south of the treatment plant, while the wider Project footprint includes proposed reclaimed-water pipelines, storage locations, aquifer recharge points and agricultural reuse infrastructure (ESL, 2024).

Not all Project components are equally relevant to Critical Habitat. The CHA therefore focuses on activities for which a plausible pathway exists to a Key Biodiversity Feature (KBF), including potential changes in water quantity or quality, groundwater interactions, drainage, accidental releases, habitat disturbance, noise or other construction-related disturbance. Infrastructure outside the immediate Graeme Hall area is considered where such an ecological connection can reasonably occur. Specific Project–KBF interaction pathways are assessed in Section 7.

4.5.9.2. Graeme Hall Swamp and its Conservation Context

Graeme Hall Swamp is a coastal wetland in Christ Church and Barbados' only Wetland of International Importance under the Ramsar Convention. The Ramsar site, designated in December 2005, encompasses approximately 33 ha and forms part of a wider ecological landscape that includes wetland habitats and adjacent coastal and marine systems.

A more recent national assessment confirms the particular conservation importance of Graeme Hall. The 2023 *Barbados National Wetland Inventory* identifies it among Barbados' nationally important wetlands and documents its ecological character, water regime, habitats and biota, changes in ecological character, ecosystem services, pressures and management context. This recognition has a longer planning history. Williams (2008) documents the Ramsar designation, identification of Graeme Hall as a Natural Heritage Conservation Area under the then Physical Development Plan, and earlier proposals for a wider national park and watershed-management approach. The National Wetland Inventory similarly notes that the wider Graeme Hall Swamp, beach, seagrass bed and reef ecosystem has previously been recognized through national land-use planning as an environmentally sensitive terrestrial and marine system.

Graeme Hall comprises lands under both private and public ownership and contains a mosaic of mangrove, open-water and other wetland and terrestrial habitats supporting aquatic organisms and resident and migratory birds (Mahon et al., 2025; Mahon et al., 2023). More detailed consideration of these habitats and species is provided in Section 5.

The Ramsar designation and other conservation designations provide important evidence of recognized biodiversity significance.

4.5.9.3. Hydrological and Coastal/Marine Setting

Graeme Hall is not an isolated wetland. Available studies describe a wider watershed and groundwater-influenced system with historical hydrological connections between the swamp and the adjacent marine environment. Mahon et al. (2025), drawing together several decades of investigations, specifically considers the Graeme Hall watershed, wetland hydrology and limnology, connection to the sea, and adjacent marine environment as interconnected elements of the system. Earlier assessments similarly place the wetland within the approximately 1,158-acre Graeme Hall watershed and recognize the importance of the surrounding floodplain and buffer areas to drainage and maintenance of wetland ecological character (Williams, 2008).

The wetland–marine connection has been substantially modified by development. Williams (2008) reports that construction of Highway 7 along the coastal sand bar effectively removed the former direct natural connection between the wetland and sea, leaving a sluice-controlled drainage connection. Subsequent studies document how the management and condition of this connection have influenced water levels, salinity,

flushing, and ecological conditions within the wetland (Mahon et al., 2025). Historically, the mangrove wetland, adjacent seagrass beds and shallow nearshore reef functioned as more closely connected components of the coastal ecosystem (Williams, 2008). The 2023 National Wetland Inventory similarly recognizes the swamp, beach, seagrass bed and reef as components of a wider environmentally sensitive system.

Exchange between the swamp and sea has historically occurred through a drainage channel and sluice arrangement, the management and condition of which have influenced water levels, salinity and ecological conditions within the wetland. Field investigations undertaken in 2010 documented a substantial decline in wetland salinity and associated changes in mangrove and aquatic community characteristics following reduced seawater exchange, providing direct evidence of the ecological importance of maintaining the wetland's hydrological and salinity regime (Environmental Engineering Consultants [EEC], 2010). The adjacent marine environment contains seagrass and coral reef habitat and provides habitat for marine fauna of conservation interest.

These relationships are important to the CHA because the ecological area potentially influenced by the Project cannot necessarily be defined by the physical footprint of the SCSTP or the administrative boundary of the Ramsar site. The assessment consequently considers plausible surface-water, groundwater and ecological connections between Project activities, Graeme Hall and downstream coastal and marine receptors. The CHA Assessment Area is defined in Section 4.2.

4.5.9.4. Existing Environmental Pressures and Ecological Change

Graeme Hall has undergone substantial historical modification and continues to experience multiple environmental pressures. The available evidence identifies altered drainage and hydrological connectivity, water-quality concerns, sewage inputs, changes in salinity and water exchange, invasive or introduced species, and pressures associated with surrounding urban, agricultural and infrastructure development (ESL, 2024; Mahon et al., 2025). These pressures have a long documented history. Williams (2008), drawing on the 2007 Graeme Hall Master Plan, records a 2005 incident in which raw sewage was redirected from the South Coast Sewage Treatment Plant into the wetland rather than through the designed emergency marine outfall. This provides historical evidence of a direct wastewater–wetland interaction pathway, although it should not be interpreted as evidence of current operating practice. The 2025 review similarly documents both the long history of physical modification of the swamp and the continuing interaction between the SCSTP and the Graeme Hall system.

The National Wetland Inventory also records changes in ecological character and identifies restoration of water quality, hydrological exchange and ecological condition as longstanding management priorities. Previous recommendations have included monitoring of water quality, fish communities (including Atlantic Tarpon, Common Snook, White Mullet and Mangrove Rivulus) and mangrove habitats (Red, White and Black Mangrove, and Buttonwood/Button).

These existing pressures are relevant to establishing present ecological condition and interpreting cumulative effects, but do not diminish the conservation significance of remaining biodiversity features. The CHA therefore distinguishes, to the extent supported by available evidence, existing or historical pressures from effects plausibly attributable to BA-L1063. Detailed evidence concerning habitats, species, ecological processes and current condition is presented in Section 5.15.

4.5.10. Plant diversity – flora

4.5.10.1. Vegetation within the workers' camp area

This section outlines a visual representation of the flora species observed within and at the boundaries of the Workers' Campsite area. The specific species observed are presented in the tables that follow.



Figure 39: Vegetation located on the northern side of the existing Treatment Plant and within the southern side of the new treatment plant project site (GPS Location: 21P 0221023, UTM 1446608)

Most of the proposed Workers' Campsite area is populated by black spear grass (*Heteropogon contortus* – *Poaceae*), recorded as the primary vegetation cover and flora species within the area, as is shown in Figure 39. According to the IUCN Red List, *Heteropogon contortus* is Not Evaluated (NE), which means that it has not yet been evaluated against the criteria. Not Evaluated (NE) species are not published on the IUCN Red List (<https://www.iucnredlist.org/>). Sparse clutters of Blackwell switchgrass (*Cenchrus stramineus* – *Poaceae*), classified as Least Concern (LC) were also observed within that area. Least Concern (LC) defines a tax on when it has been evaluated against the Red List Criteria and does not qualify for Critically Endangered, Endangered, Vulnerable, or Near Threatened. Notably, no critical habitat was observed within the Workers' Campsite area.



Figure 40: Vegetation along the primary access to the Workers Campsite (in front of the existing Treatment Plant)(GPS Location: 21P 0221145, UTM 1446448)

Vegetation across the site and its approaches is shown at Figures 40 to 43, covering the primary access, the northern side of the existing treatment plant, the western boundary and the land immediately outside the campsite.



Figure 41: Vegetation at the northern side of the existing Treatment Plant and at the southern side of the new proposed Treatment Plant (GPS Point: 21P 0221023, UTM 1446608)



Figure 42: Vegetation to the western side (back) of the project site for the Workers' Campsite and the new Treatment Plant (GPS Location: 21P 0221063, UTM 1446909)



Figure 43: Vegetation outside of the Workers Campsite to the northern side of the proposed site for the new treatment plant (GPS Location: 21P 0221316, UTM 1446738)

Since the Workers' Campsite area is very small (approximately 6,592 m², or 0.0066 km²), all flora species were recorded within the proposed area as well as along the primary access, main entrance area, and the immediate boundaries and environs. Species observed are presented in Figures 44 and 45 below. No critical habitat was observed within the Workers' Campsite area.



Figure 44: Flora photographed within the Workers' Camp site and its immediate environs during the field survey of 14 to 18 April 2026.

The Rough bark lignum-vitae, bottom right, is Endangered and stands on the site itself.

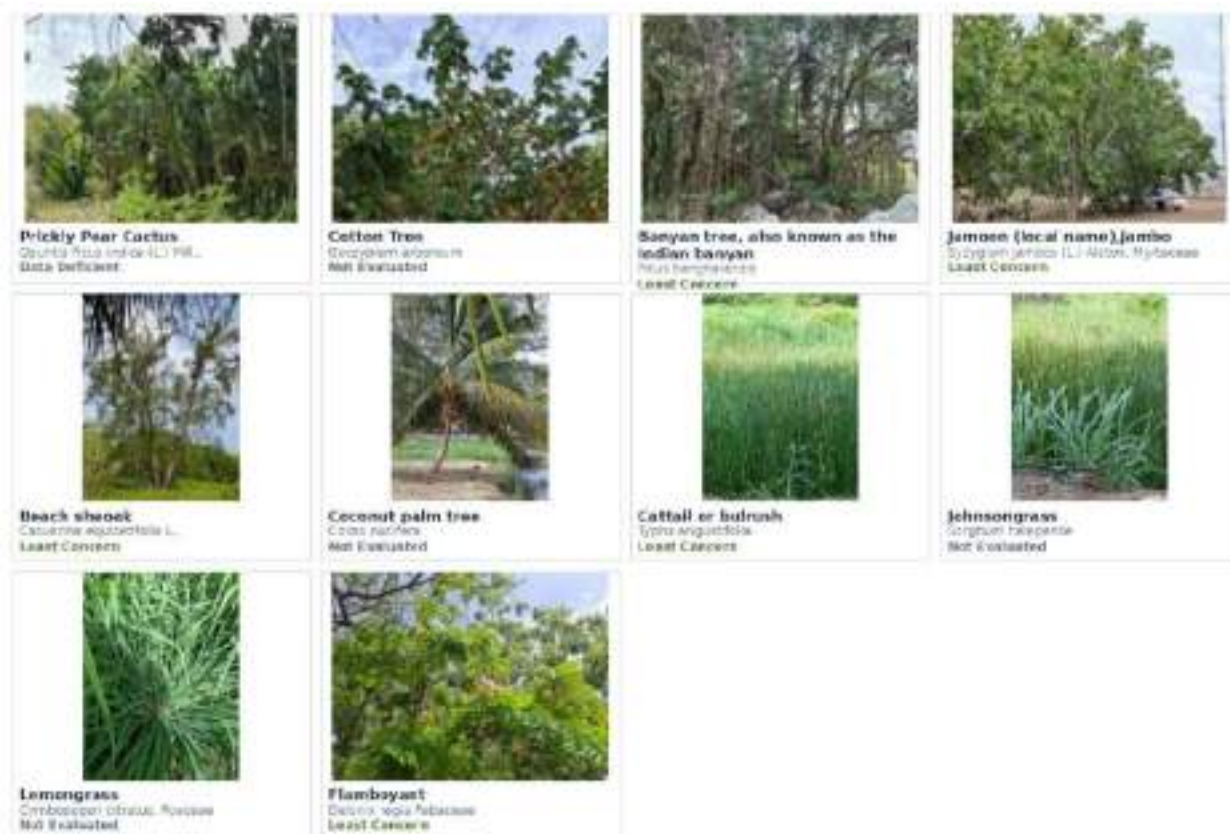


Figure 45: Vegetation photographed along the principal access route to the site, including cattail and Johnsongrass within the swamp area adjacent to the project.

Based on this assessment, most of the flora diversity was classified as "Least Concern (LC)", which refers to when taxon has been evaluated against the Red List Criteria but does not qualify as Critically Endangered, Endangered, Vulnerable or Near Threatened, and "Not Evaluated (NE)", One specie, the *Opuntia ficus* or Prickly Pear Cactus (in proximity to GPS location: 21P 0221145, UTM 1446448), was "Data Deficient (DD)", which indicates that there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking.

One tree, the Roughbark lignum-vitae or tree of life (*Lignum Vitae* - *Guaiacum officinale*), which was labelled and observed just outside of the project area, near the Ministry of Agriculture compound (in close proximity to GPS location: 21P 0221316, UTM 1446738), is noted to be Endangered (EN) according to the IUCN Red List. This is reportedly due to historical overexploitation for its wood and medicinal resin. The West Indian mahogany (*Swietenia mahagoni*), located at the entrance of the existing treatment plant (in close proximity to GPS location: 21P 0221021, UTM 1446544), is considered **Near Threatened** (IUCN 3.1) and is listed under Appendix II of CITES as a species that is considered threatened and may become endangered unless trade is strictly regulated.

The flora of the project area is characterized by a few trees, some shrubs, and mostly perennial grasses. Most of the project area is covered with black spear grass (*Heteropogon contortus*). Castor oil plant, the bellyache bush (*Jatropha gossypifolia*), these of which are abundantly found on the northern side of the site (in proximity to GPS location: 21P 0221316, UTM 1446738). The highest distribution of trees, the Ipil-ipil (*Leucaena leucocephala*) is also found mainly on the northern boundary of the site (in close proximity to GPS location: 21P 0221316, UTM 1446738). The adjacent swamp area (in proximity to GPS location: 21P 0221011,

UTM 1446463) is characterized mainly by the cattail or bulrush (*Typha angustifolia*) and the Johnsongrass (*Sorghum halepense*).

4.5.11. Animal Diversity (Fauna)

4.5.11.1. Birds

No birds or habitat for birds were observed within the Workers' Campsite area, as the area is covered primarily with grass. However, several species were observed within the vicinity of the proposed Workers Campsite, as is illustrated in Figure 46 below. Habitats of the *Quiscalus niger* or Greater Antillean Gracklewere observed in the large tree within the existing treatment plant compound (in proximity to GPS location: 21P 0220979, UTM 1446566). All the bird species observed were classified as "Least Concern (LC)", that is, they have been evaluated against the Red List criteria and do not qualify as Critically Endangered, Endangered, Vulnerable, or Near Threatened. The transect routes walked by the survey team, together with the geographical coordinates at which observations were recorded, are annexed to this ESIA/ESMP so that the survey effort and its spatial coverage can be verified.

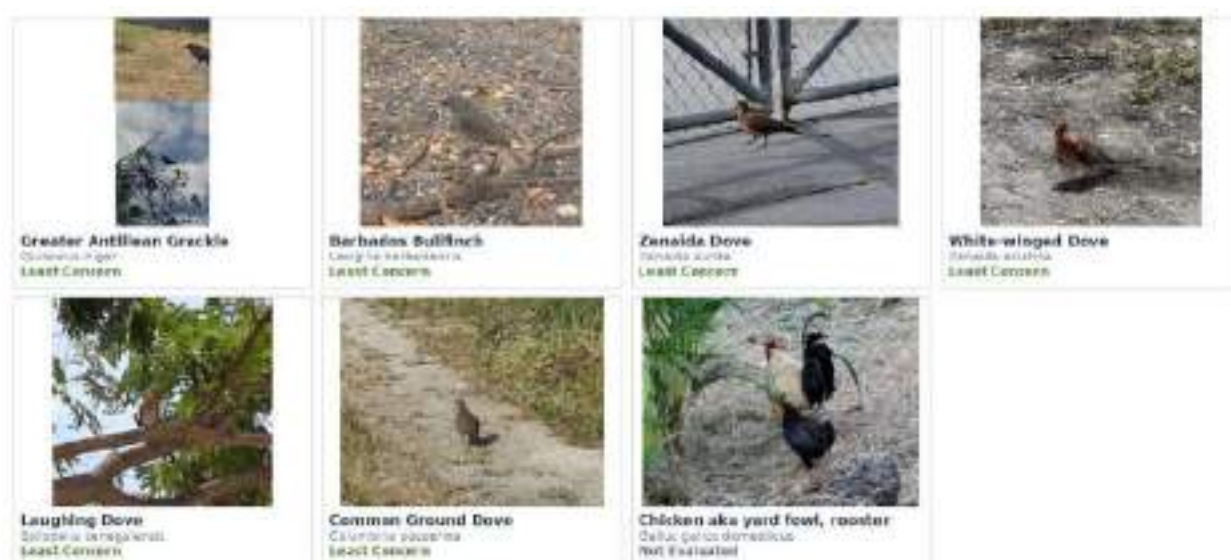


Figure 46: Birds photographed within the Workers' Camp site and its immediate environs. All are assessed as Least Concern; the domestic fowl is not evaluated.

Due to the migratory nature of birds and their colony patterns, the data generated highlights several species that frequent the area. This can be used as baseline data for the Workers' Camp project area and environs.

Importantly, Birdlife International has determined GHS to be an Important Bird Area (IBA) (Burke 2009b). This was partially based on GHS being home to significant populations of four range-restricted species: the green-throated Carib hummingbird (*Eulampis holosericeus*), the Antillean crested hummingbird (*Orthorhyncus cristatus*), the Caribbean elaenia (*Elaenia martinica*), and the endemic Barbados bullfinch (*Loxia barbadensis*). It is also known or thought to hold, on a regular basis, at least 1% of the biogeographic population of the little egret (*Egretta garzetta*) for which GHS is the only documented nesting location in the Western Hemisphere.

Due to the wetland's proximity to the project area and the nature bird movement, it is important to include a list of observed species within the GHS. Graeme Hall Swamp has been noted as an important nesting site for several species of wading birds (Kushlan 2007). Notables are the little and snowy egrets, which are European and western hemisphere ecological counterparts. Little egrets established a nesting site population at GHS in 1994 (Massiah 1996, Massiah and Frost 1998), leading to a subsequent comparative study of their feeding

ecology (Kushlan 2007). Kushlan warned of the tenuous nature of the existence of these egrets in GHS if the nesting area is not conserved. Of particular note was the roosting of cattle egrets in GHS in the white mangroves adjacent to the lake (Riven- Ramsey 1981, 1988, Krebs et al. 1994). Cattle egrets first appeared in Barbados in 1957 and were first seen in GHS in 1972. There were several other roosts in other parts of the island, but the one at GHS was the largest. Details of roosting, nesting, and foraging behaviors of these birds can be found in Riven-Ramsey (1988) and Krebs et al. (1994). Johnson (1986) spent considerable time observing the nesting colony of cattle egrets that was located there. A survey of the Barbados race of the yellow warbler was conducted in March 1997 (estimated to be at the beginning of the nesting season) to establish a population estimate for Graeme Hall Swamp. Based on visual observations and the location and abundance of territorial calls and courtship singing within each habitat type, a conservative estimate is that the swamp provides habitat for approximately 20-40 pairs of yellow warblers (ARA 1997).

Reed et al. (2018) conducted stable isotope studies on several species of migratory birds in Barbados to determine their area of origin. While they did not collect samples from Graeme Hall Swamp, the species studied have been recorded there. They found that natal origins of juvenile American golden-plover (*Pluvialis dominica*), stilt sandpiper (*Calidris himantopus*), short-billed dowitcher (*Limnodromus griseus*), and lesser yellowlegs (*Tringa flavipes*) were predicted to be mainly from the eastern parts of their breeding ranges in eastern Canada, with American golden- plover, stilt sandpiper, and short-billed dowitcher also having high potential areas of origin in parts of Alaska, USA. The importance of GHS as a habitat for resident and migratory birds was a key consideration in its 2006 designation as a Wetland of International Importance.

The consolidated list of bird species recorded at the Graeme Hall Swamp by earlier studies, principally Hutt (1981), Johnson (1986) and subsequent surveys. It is literature-derived regional context and is not a record of species observed at the campsite. The species observed during the Rapid Biodiversity Assessment of April 2026 are given in the tables above.

4.5.11.2. Fishes

There is no water body within/at the exact proposed location of the Workers' Campsite, and therefore, no fish biodiversity data was recorded from that area. Nevertheless, the nearest waterbody to the camp is the GHS, and historical data is presented as a baseline for the project's fish biodiversity. When a Critical Habitat Assessment is conducted by appropriate specialists, updated information from that exercise may be added to this document for modern reference. However, for this section, the writer will reference historical data collected in the area about the fish population.

The Critical Habitat Assessment required by the environmental and social safeguards teams of the Project Execution Unit and the Inter-American Development Bank has not been completed at the date of this submission. It is programmed under the Studies Report for the South Coast Sewage Treatment Plant and the South Coast Water Reclamation and Reuse Facility, with evidence collection and drafting due to complete on 27 September 2026 and finalization on 15 October 2026. This chapter is therefore submitted on the basis of the Rapid Biodiversity Assessment and the published literature and is to be read subject to that limitation. The fish, habitat and critical natural habitat sections will be revised against the primary data generated by that assessment when it is available.

There have been several surveys of fish in GHS, with a total of 26 species found. Johnson (1986) sampled fish from GHS with a baited trap in the lake and with hand nets in the main canal, the lateral canals, and the canal near its exit to the sea. Cattaneo et al. (1987) sampled the fish with a seine, dip net and a minnow trap in the lake and eastern marsh. Kramer et al. (2007) also surveyed the fish of GHS using the same gear, and reported

species by three sampling areas in the swamp. They found two species not previously recorded. In 2010, EEC noted that tilapia and tarpon were abundant in the main lake at GHNS.

In 2019, a severe decline in fish biodiversity in the mangrove lake was observed (EEC 2019b). This was attributed to poor water quality resulting from the high-volume discharge of untreated sewage into the wetland ecosystem (EEC 2019b). Thirteen locations were sampled in representative habitats (lake, south pond, brackish tray, lily ponds, stormwater ditch) with a variety of fishing gear. The greatest number of species was found in the lily ponds, which were above the impact of the sewage. The only fish species observed in the lake was the Atlantic tarpon. No sign of historically abundant tilapia was observed in the Sanctuary (EEC, 2019b). EEC (2019b) concluded that the present ichthyofauna represents a dramatic change from historical accounts for the Sanctuary.

4.5.11.3. Mammals

Based on this assessment, most of the mammals encountered in the Workers' Camp area are classified as "Least Concern (LC)", that is, they have been evaluated against the Red List criteria and do not qualify as Critically Endangered, Endangered, Vulnerable, or Near Threatened (see Figure 47). Nevertheless, the African green monkey (*Chlorocebus sabaeus*) is listed under Appendix II of CITES as a species that is considered threatened and may become endangered unless trade is strictly regulated. Outlined below are the mammals that were observed in the Workers' Camp project zone.



Figure 47: Mammals photographed within the vicinity of the Workers' Camp. The mongoose and the brown rat were observed but not photographed.

4.5.11.4. Invertebrates

Observed invertebrates in the area are listed as follows (Figure 48):



Figure 48: Invertebrates and habitats photographed within the project area.

4.5.12. Species of conservation concern

The species inventories above record everything observed. This sub-section isolates the species whose conservation status or ecological function means that an effect on them would be material, and states for each the habitat association through which the project could reach it (see Table 40). It draws on the Graeme Hall Swamp species screening and on CERMES Technical Report No 110.

Table 40: Species of conservation concern in the Graeme Hall system

Species	Common name	Status	Presence	Ecological association and relevance
Chelonia mydas	Green turtle	Endangered	Migratory	Uses the seagrass beds of the St Lawrence lagoon, which the swamp feeds. The pathway from the project is water quality in the discharge that reaches the lagoon, not direct disturbance at the camp
Megalops atlanticus	Tarpon	Vulnerable	Migratory	Top predator and keystone species in the Graeme Hall food web. Loss of the top predator restructures the community beneath it, so an effect here propagates rather than remaining local
Fulica caribaea	Caribbean Coot	Near Threatened	Resident; Caribbean regional endemic	Uses the wetland for roosting and breeding. Resident status means it has no seasonal escape from a sustained disturbance
Calidris pusilla	Semipalmated Sandpiper	Near Threatened	Migratory	Uses the wetland for roosting. Exposure is seasonal and concentrated in passage periods
Setophaga petechia	Yellow Warbler	See note	Migratory, with a resident Barbadian form	Uses the wetland for roosting and breeding

Two matters of nomenclature and status should be settled before submission. The Yellow Warbler is recorded in the screening as *Dendroica petechia* with Near Threatened status; the genus *Dendroica* was merged into *Setophaga* in 2011, and the species is assessed globally as Least Concern, although the Barbadian form is of local conservation interest. The Caribbean Coot is described as endemic, which is correct at the Caribbean regional scale but not at the national scale, and some authorities treat it as a form of *Fulica americana* rather than a separate species. Both entries should be verified against the current IUCN assessment and the nomenclature stated on that basis.

Four of the five species above are recorded in the literature compiled for the Graeme Hall system and appear in the species records at Annex B. The green turtle is the exception. It is not recorded in the field surveys undertaken for this assessment, nor in the literature-derived records for the swamp itself, because the species does not use the wetland: its association is with the seagrass beds of the St Lawrence lagoon, which the swamp discharges into and which lie outside the survey area. It is included here because the pathway from the project to that habitat is water quality in the discharge, and an assessment that surveyed only the wetland would miss it.

This distinction matters for how the species records should be read. The field surveys establish what is present within and immediately around the campsite. They are not a survey of the receiving system, and the absence of a species from Tables 20 to 26 is not evidence that the project cannot affect it. Where a species is reached through a water-quality or food-web pathway rather than through direct disturbance, the relevant evidence is the ecosystem condition recorded above, not the site inventory.

4.5.13. Condition of the receiving ecosystem

The condition of the wetland matters to this assessment because it determines how much additional pressure the system can absorb. CERMES Technical Report No 110 reports that the benthic community of the Sanctuary comprises seventeen taxa at densities between 304 and 10,609 individuals per square meter. For comparison, a healthy red mangrove community in Florida supported approximately three hundred taxa at densities between 22,591 and 52,914 per square meter. On that evidence the report characterizes the Graeme Hall mangrove system as a critically endangered mangrove ecosystem.

Three findings in the same report identify the mechanisms. Benthic biodiversity is lowest at the sites closest to stormwater runoff inputs and highest at those farthest from them. The lack of a drainage outlet and of tidal exchange favors freshwater competitors over the estuarine community the system should support, and biodiversity would be expected to recover if connectivity to the sea were re-established. And the existence of a high-volume emergency discharge of raw sewage into the Ramsar wetland presents a continuing threat to water quality, to the ecosystem and to human health. Water quality sampled in the Sanctuary and its surroundings has on numerous occasions violated proposed Barbadian standards for the protection of the environment and public health.

4.5.14. Relevance to the Workers' Camp

Two connections follow, and both are material to the assessment rather than contextual.

The first concerns the discharge route. Treated domestic effluent from the camp drains to the collection system of the existing South Coast Sewage Treatment Plant and forms part of the influent to that plant. That plant holds the emergency bypass that discharges raw sewage into the Ramsar wetland. The camp therefore adds load, however modest, to a system whose failure mode discharges into a critically endangered ecosystem. This is the reason the camp is designed for zero direct discharge to ground, why effluent quality is monitored before discharge, and why the sanitary loading question raised earlier in this document requires resolution: a system sized for 98 residents but serving up to 203 people by day has a materially higher probability of exceeding its design condition.

The second concerns the direction of the project's net effect. The evidence above supports the beneficial impact claimed for the project rather than undermining it. Reducing untreated effluent reaching the wetland and the nearshore addresses the mechanism the CERMES report identifies as the principal ongoing threat. The benefit is real and is evidenced. It is nonetheless contingent, in the same way as the reclaimed water benefits,

on the plant performing as designed, and the pre-project condition recorded here is the baseline against which that will be judged.

4.6. Air quality

Ambient air quality was assessed within the project area to establish baseline conditions before construction of the proposed workers' camp and associated facility development. The monitoring programme was designed to characterize existing air quality at selected GPS-referenced locations, identify any location-specific influences on measured pollutant concentrations, and provide a defensible benchmark against which future construction and operational monitoring can be compared.

Monitoring was undertaken between 15 and 17 April 2026 in accordance with the Air Quality Monitoring Plan. The assessment included particulate matter (dust) (PM_{2.5} and PM₁₀) and selected gaseous pollutants relevant to site activities and nearby receptors, namely sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and hydrogen sulphide (H₂S). These parameters were selected to support the evaluation of potential dust, traffic-related, combustion-related, and odor-related air quality conditions within and around the monitored area.

Particulate matter was monitored because construction preparation and vehicle movement can generate dust that may affect workers and nearby receptors. Sulphur dioxide, nitrogen dioxide, and carbon monoxide were monitored as indicators of combustion-related emissions from traffic, equipment, and other fuel-burning sources, while hydrogen sulphide was included because it is relevant to odor and occupational exposure considerations in wastewater-related environments. Together, these parameters provide an appropriate baseline dataset for assessing ambient air quality in the project area.

Notably, no assessment was conducted for Carbon Dioxide (CO₂), Methane (CH₄), or any other Greenhouse Gases (GHG) at or around the proposed campsite location. This has been noted as an activity to be conducted during the next environmental testing exercise on the island. All geographical points collected during the air quality sampling exercise have been logged and will be maintained throughout the construction and operational phases of the project. Monitoring of greenhouse gases will be carried out during the next mission to the island, at the previously sampled locations. The results will be noted and presented in an updated version of this document. The absence of this baseline is recorded as a limitation in the Baseline Data Coverage, Quality Assurance and Limitations section at the start of this chapter, together with the reasons why it is material to IDB Environmental and Social Performance Standard 3 and to the non-carbon emissions commitment in the CRSEG contract. The Project Execution Unit will be notified of the date of the next monitoring mission once scheduled.

Several monitoring locations were assessed during the survey; however, the locations relevant to the proposed workers' camp are presented below (see Table 41).

Table 41: Description of Sample locations used to assess Air Quality for Workers' Camp

Location Description	GPS
Location 4: This location is upwind of the Project site and closest to the area designated for the workers' camp. Upwind of the sampling location is the highway. A farm is located east of this point.	21 P 0221309 UTM 1446696
Location 5: This location is at the northern boundary of the project area. A farm is downwind of the sampling location.	21P 0221068 UTM 1446920

Location Description	GPS
Location 1: This location is within the boundary of the new facility and is upwind of the existing facility. It is also downwind of the area designated for the workers' campsite.	21P 0221023 UTM 1446608



Map 5: Map showing the three Air Sampling Locations monitored for the proposed Workers' Campsite

The data collected provides a baseline reference point for future monitoring, as no project activities had commenced at the site during the monitoring period.

Air quality was monitored at three locations. Location 4 lies upwind of the campsite and downwind of the highway and the Ministry of Agriculture; Location 5 lies upwind at the boundary between the campsite and farmland; and Location 1 lies downwind of the campsite. The results for all three locations are consolidated in Table 42, together with the applicable guideline and an assessment against it.

Table 42: Air quality baseline results against applicable guidelines

Parameter	Averaging period	Location (downwind)	1	Location 4 (upwind)	Location 5 (upwind boundary)
PM2.5	1 h (Loc 4, 5); 12 h (Loc 1)	24.64 µg/m ³		0.57 µg/m ³	0.33 µg/m ³
PM10	1 h (Loc 4, 5); 12 h (Loc 1)	59.61 µg/m ³		4.86 µg/m ³	1.83 µg/m ³
SO ₂	10 minutes	396.4 µg/m ³		212.2 µg/m ³	33.8 µg/m ³
NO ₂	1 hour	0.63 µg/m ³		11.03 µg/m ³	10.7 µg/m ³

Parameter	Averaging period	Location 1 (downwind)	Location 4 (upwind)	Location 5 (upwind boundary)
H ₂ S	10 minutes	0.018 ppm	0.03 ppm	0.04 ppm
CO	15 minutes	34.1 mg/m ³ (Day 1); 117.8 mg/m ³ (Day 2)	61.7 mg/m ³	141.9 mg/m ³

Two matters arise. Carbon monoxide exceeds the WHO fifteen-minute guideline of 100 mg/m³ at Location 5, at 141.9 mg/m³, and at Location 1 on the second day of measurement, at 117.8 mg/m³. No project activity had commenced at the time of monitoring, so these readings reflect existing conditions, most plausibly vehicle movement on the adjacent highway and farm traffic. The source should nonetheless be investigated and the measurement repeated, because carbon monoxide at these concentrations bears on worker exposure once the camp is occupied.

Particulate matter at Location 1 was measured over twelve hours while the WHO guideline is expressed as a twenty-four hour mean, so the comparison in Table 40 is indicative only. A full twenty-four hour measurement is required at Location 1 before the particulate baseline can be relied upon, and this is recorded in the Baseline Data Coverage, Quality Assurance and Limitations section at the start of this chapter.

Figures 49 to 51 record the three air quality monitoring locations at the time of sampling.



Figure 49: Location 4 showing the proposed workers' camp area, with the existing facility in the background



Figure 50: Sampling at Location 5, with the farm in the background



Figure 51: Location 1 with the proposed workers' camp area in the background

4.6.1. Interpretation of baseline air quality conditions

Ambient air quality monitoring conducted between 15 and 17 April 2026 indicates that the project area generally exhibited favorable baseline air quality before the commencement of project activities. Interpretation of the results using the GPS-referenced monitoring locations shows that pollutant concentrations were generally low across the study area, with the clearest evidence of good background conditions observed at Locations 4 and 5. The assessment, therefore, provides a useful baseline for evaluating any future changes associated with site preparation, construction activity and subsequent operation of the development.

Location 4 situated upwind of the proposed workers' camp area, and Location 5, located along the northern project boundary, both recorded very low particulate matter concentrations and generally low gaseous pollutant levels during the monitoring period. These two locations are therefore considered representative of relatively clean background conditions in the wider project area. Their results also suggest that, at the time of monitoring, nearby traffic and agricultural activity were not producing elevated ambient concentrations of the parameters assessed.

In contrast, Location 1, which lies within the new facility footprint and downwind of the proposed workers' camp area, recorded the highest particulate matter concentrations in the survey and one elevated short-term carbon monoxide result. Field observations indicate that these results were influenced by local site conditions, including dry weather, loose coral material, visible dust movement and vehicle activity within the active development area. Although the particulate matter data at this location were collected over 12 hours and should not be treated as a direct comparison with 24-hour health-based guideline values, the results indicate that dust generation and intermittent combustion-related emissions were already evident within the project footprint before full construction commenced.

Overall, the monitoring results support the conclusion that baseline ambient air quality in the project area was generally acceptable, with the principal area of concern being localized dust conditions at Location 1 and isolated short-term carbon monoxide elevations at Locations 1 and 5. The findings are consistent with the use of internationally recognized health-based comparison references, including the World Health Organization air quality guidelines and the NIOSH exposure limit for hydrogen sulphide. As the project advances, continued monitoring at the same GPS-referenced locations, together with dust suppression, vehicle management and good housekeeping practices, will be important for tracking trends and managing air quality risk.

4.7. Geology

The geology of Graeme Hall Swamp consists of marine beaches and modern dune deposits, with coastal montmorillonite clays (Ramsar Information Sheet). The lake bottom consists of a layer of silt varying from 0.3 to 1.7 m in thickness (ARA, 1997). Soils are dark grey, brown, about 1 m thick (*Oyalese 1964*).

From the Soil and Land-Use Surveys No. 18, according to *Vernon & Carroll (1966)*, the surficial (shallow) geology of the Graeme Hall Swamp area consists of a 'Black Association' soil cover layer in the region of 450 mm thick underlain by karstic limestone. This 'Black Association' soil layer, which has a uniformly dark colored profile, consists of approximately 60% clay, 14% sand, and 9% silt, the balance of the composition being calcium carbonate and moisture. The normal and shallow associates of this soil, deemed to be present on site, are slated to have slow to rapid drainage. Findings of site exploration works by *Baird (2019)* were consistent with the descriptions above.

Dunning et al. (2018) notes that below the first high cliff and the Christ Church Ridge, the area is mantled primarily in soils of the Black Association, which are relatively shallow Mollisols and deeper Vertisols (*Vernon and Carroll 1966, Muhs 2001, Ahmad 2011*). These form a catena sequence clearly visible in several construction-site exposures near GHS.

A landmark sedimentological study published by *Kearney (2023)* analyzed deep core samples (up to 2.25 meters) from the adjacent wetland, tracing a 1,400-year geological history of the region. Kearney made observations of the foundational layer consisting of basal carbonaceous sands derived from marine erosion of the nearby reefs. The research also notes that approximately 600– 700 years before present (B.P.), the sediment profile transitioned cleanly from purely biogenic (marine) sand to highly concentrated silicates and terrestrial mineral matter.

More recent studies were also conducted by the University of the West Indies' Centre for Resource Management and Environmental Studies, recorded in the CERMES Technical Report No 110 and led by *Mahon et al., 2025*. The study contextualized the geological materials against engineering risks for the South Coast infrastructure. The primary observations in this regard outlined the following results:

- *Pervasive Karstification:* The parent Pleistocene limestone around Christ Church is noted for being intensely pervasively karstified. It features a network of subterranean fractures, solution valleys, and micro-voids.
- *High Infiltration/Low Retention:* This structural honeycombing allows surface liquid and potential effluent to bypass topsoil almost instantly, facilitating rapid infiltration into the groundwater table rather than holding it on the surface.
- *Smectoid Vertisols:* The weathering of the limestone cap under the south coast's dry sub- humid maritime climate has produced smectoid soils. These are rich in montmorillonite clay, exhibiting stark

shrink-swell properties that create engineering variables for pipeline foundations and structural stress during seasonal transitions.

Therefore, the geological research conducted in the project location over several years emphasizes the site's complex position in a low-lying carbonate layer overlying highly dynamic Holocene swamp matrices. Such information will be integrated into engineering designs and decision-making for the Workers' Camp and beyond.

4.7.1. Soil

The soils of the Christ Church district in Barbados are strongly influenced by the island's coral limestone geology, marine depositional history, tropical climate, and long-term weathering processes. Soils within the Christ Church Parish are generally characterized as well-drained calcareous to clay-enriched residual soils developed over uplifted coral limestone terraces, with localized coastal sands and anthropogenically modified soils in developed areas (*John D. Humphrey, 2004*).

The southern portion of Barbados is situated largely within the island's "Coral Cap," a thick sequence of uplifted Pleistocene reef limestone that underlies much of the terrain. Soil development across the district reflects prolonged weathering of these carbonate materials combined with contributions from airborne mineral inputs deposited over geological time (*John D. Humphrey, 2004*).

4.7.1.1. Geological context and parent material

Unlike volcanic Caribbean islands, Barbados is composed predominantly of sedimentary carbonate rocks rather than igneous material. Approximately 85% of the island is underlain by reef-associated coralline limestone, commonly referred to as the Coral Rock Formation. These geological conditions exert strong control over the type, depth, chemistry, and hydraulic behaviour of soils in the area. Although limestone forms the dominant geological substrate, research indicates that the present-day soils of Barbados were not formed solely through dissolution of limestone. Soil development has been influenced by weathered coral-derived sediments, windblown mineral dust transported from North Africa (Saharan dust), volcanic ash contributions from the Lesser Antilles, and minor contributions from older sedimentary deposits within Barbados (*D.R. et al, U.S. Geological Survey, 1987*). The mineralogy of the sand, silt, and clay fractions of the soils, and trace element geochemistry, suggest that aeolian materials carried on the trade winds from Africa, volcanic ash from the island of St. Vincent, and quartz from Tertiary bedrock on the island itself are the parent materials for the soils (*D.R. et al, U.S. Geological Survey, 1987*). This unique combination results in well-developed, clay-rich soil profiles that are distinct from the underlying limestone substrate, which typically serves more as a hydrological base than a primary source of soil nutrients.

4.7.1.2. Soil classification and morphology

The soil taxonomy within the Christ Church area generally oscillates between two major groups, largely dependent on the geomorphological age of the terrace and local topography:

- **Vertisols (e.g., Typic Chromudert):** Frequently found in lower-lying areas or depressions, these are characterized by high clay content (often interstratified kaolinite-smectite). These soils exhibit significant shrink-swell potential due to the prevalence of smectite clays, leading to the formation of desiccation cracks during the dry season and "slickensides" (polished/grooved surfaces) within the soil profile.

- **Mollisols (e.g., Typic Hapludoll):** These are commonly observed on stable, older terrace surfaces. While still clay-rich, they often display more distinct horizonation compared to Vertisols and are generally more stable, though they remain subject to pedoturbation (natural soil mixing) processes.

4.7.1.3. Physical and hydrological properties

- **Texture and Structure:** The soils are typically heavy, clay-rich, and exhibit a strong angular blocky structure. It can be described as sandy loam to clay loam surface horizons, localized red to reddish-brown clay-rich subsoils, granular to blocky structure in weathered zones, and moderate aggregation due to carbonate content and weathering processes (*Cambridge University Press, 2017*).
- **Permeability:** Despite high clay content, infiltration is heavily influenced by the underlying karst topography. While the soil matrix itself may have low permeability when saturated, the overall landscape often features high secondary porosity due to sinkholes, fractures, and drainage wells within the limestone, which facilitate rapid, direct recharge to the aquifer.
- **Erosion Risk:** Soil stability is highly dependent on vegetative cover. Given the tropical climate, areas with exposed soil are susceptible to rapid erosion during high-intensity rainfall events, particularly on the terrace slopes.

As such, for construction and infrastructure planning, the following environmental constraints are noted:

- **Foundation Engineering:** The shrink-swell nature of the clay-rich soils (*Vertisols*) requires specific geotechnical consideration for foundation design to prevent structural movement.
- **Drainage and Runoff:** Due to the potential for low surface infiltration when these soils are saturated, project design must incorporate adequate stormwater management to prevent surface ponding and localized flooding.
- **Soil Management:** The thin nature of some top-soil layers over the coral bedrock necessitates careful excavation and stockpiling protocols to ensure the viability of post- construction landscaping and environmental rehabilitation.

4.7.1.4. Soil assessment

4.7.1.4.1. Methodology

As guided by the *BrinsJen SDS Soil Sampling Procedure*, the following steps were taken to facilitate soil sampling in the project area:

- A shovel was the primary tool for soil sampling retrieval, particularly since an auger was unavailable. A "V-shape" shovel was used to facilitate the sampling, as it provides a consistent volume of soil from the specific depth profile required for accurate chemical and physical analysis.
- The sample locations were identified, and the surface was cleared by removing surface litter such as living plants, rocks, or loose organic debris, without removing the actual topsoil.
- The shovel was then inserted into the ground to the desired sampling depth, typically 15 to 20 cm for most environmental or agricultural assessments.
- The shovel was then re-inserted into the hole, approximately 2 cm back from the original cut.
- A thin vertical slice of soil that is uniform in thickness from the top to the bottom was retrieved, scooping the sample onto a sample sheet.
- After the sample was placed on the sample sheet, additional observed litter from the soil was removed.

- When the litter was satisfactorily removed, the sample was then transferred to a storage bag. The bag was then properly labelled. Upon instructions from the Government Analytical Lab, the volume of the sample to be retrieved was determined, in addition to details about the storage bag and sample labelling.
- Repeat this process at multiple sample locations across the site.



Figure 52: Images from the Soil Sampling activity conducted around the project area

The soil sampling activity, the samples collected and the results obtained are shown at Figures 52 to 54.

4.7.1.4.2. Strategy

Due to the rectangular-shaped site layout, a **Four (4) Point Perimeter Sampling Strategy** was decided as the most effective way to capture data from all cardinal directions. To achieve representative coverage for a rectangular site, samples were placed at each of the four corners of each boundary line. The sample points must be at least 1–3 meters outside each of the four corners of the project site.



Map 6: Soil Sample Locations

4.7.1.4.3. Soil sample points

Four soil sampling points were established across the site. Their descriptions and coordinates are given in Table 43.

Table 43: Soil Sample Points

Sample #	Description	GPS Point
1	Agri Farm Location	21P 0221063 UTM 1446909
2	Behind the Min of Agriculture	21P 0221316 UTM 1446738
3	Back of SCSTP Site	21P 0220928 UTM 1446597
4	Harmony Hall Community	21P 0221145 UTM 1446448



Figure 53: Collected Soil Samples from four locations at the Project Site

4.7.1.4.4. Parameters tested

The parameters tested were based on the capacity of the local lab. The lab used to facilitate these tests was the Government Analytical Laboratory. Testing soils in the Christ Church district provides an important baseline for understanding soil health, environmental sensitivity, land capability, and potential project impacts. The soil tests focused on the following three parameters:

Soil pH (Acidity/Alkalinity): Measures the hydrogen ion concentration, indicating whether the soil is acidic, neutral, or alkaline. Soil pH determines the chemical availability of essential plant nutrients. In the coral-derived limestone soils common in Christ Church, pH is often neutral to alkaline. At high pH levels, certain micronutrients (like iron and manganese) may become chemically "locked" and unavailable to plants, potentially impacting the success of revegetation or landscaping (Horneck et al., n.d.). It serves as a master variable for biological and chemical activity. Extreme pH levels inhibit beneficial microbial populations that are essential for breaking down organic matter and cycling nutrients (Hussain, 2026). The summarized scale is as follows:

- pH < 7 → acidic soil
- pH = 7 → neutral
- pH > 7 → alkaline soi

Results were interpreted against the USDA pH classification reproduced at Table B.2 in Annex B. The soils of the Graeme Hall area are classified as Pellic Vertisol under the FAO system and Vertisol under the USDA system, with a clay content of approximately 60 per cent, following the primary survey of Vernon and Carroll in Soil and Land-Use Surveys No. 18: Barbados, Imperial College of Tropical Agriculture, 1965.

In Barbados, limestone-derived soils often tend toward neutral to moderately alkaline conditions due to calcium carbonate influence.

(Soil)Organic Matter: Soil organic matter represents decomposed plant residues, microbial biomass, humus, and other biological materials stored in the soil. Organic matter is often considered one of the strongest indicators of long-term soil quality because it supports both soil fertility and ecosystem functioning. It represents and identifies the fraction of the soil composed of decaying plant and animal residues. It is widely considered the single most important indicator of soil quality and agronomic sustainability (Reeves, 1997).

High SOM levels significantly improve the soil's water-holding capacity. In a parish like Christ Church, which may face periodic drought, soils with higher organic matter act as a buffer, reducing the need for irrigation and mitigating runoff during heavy rainfall events. SOM acts as a "glue" (via humic substances and fungal hyphae) that stabilizes soil aggregates. This is vital for erosion control on construction sites where topsoil has been disturbed. It reflects the soil's capacity to perform ecosystem functions, including carbon sequestration, nutrient cycling, and support for a diverse microbial community (Theresa, 2026). Organic matter acts as a reservoir that stores nutrients and gradually releases them into forms available for plant uptake. It also improves soil structure and increases resistance to degradation (FAO,2000).

Nitrogen, Phosphorus, Potassium (NPK): These are the primary macronutrients required for plant life: **Nitrogen (N)** drives vegetative growth and chlorophyll production, **Phosphorus (P)** is critical for energy transfer (ATP), root development, and seedling establishment and **Potassium (K)** regulates metabolic processes, water uptake, and overall plant stress tolerance (e.g., resistance to disease or drought). A balanced NPK profile suggests a fertile, biologically active soil. Conversely, significant deficiencies suggest the soil has been degraded, perhaps due to erosion or historical intensive land use, and will require amendment before it can support sustainable vegetation cover (Li, 2026). Site Restoration, post-construction, the success of site landscaping or ecological compensation (e.g., planting native coastal shrubs) depends on the soil's ability to support plant growth. NPK testing prevents the over-application of fertilizers, which is a major environmental risk in coastal areas where nutrient leaching can lead to groundwater contamination and algae blooms in nearshore marine environments (Horneck et al., n.d.).

Nitrogen values are interpreted against the ranges in Table 44.

Table 44: Interpretation of Nitrogen Values

Nitrogen (mg/kg)	Interpretation
<1000	Low
1000 - 2000	Moderate
>2000	High

4.7.1.5. Soil assessment results



Government Analytical Services

Culloden Road, St. Michael, Barbados, BB14018 | (246) 535-1740

www.agriculture.gov.bb

CERTIFICATE OF ANALYSIS

Report Number: 2026-0399

3. Results

Sample ID	Agri Farm Loc (Sample 1)	Min of Agri (Sample2)	Back of Plant (Sample 3)	Community (Sample 4)	
Time Sample taken	8:00	8:19	10:00	10:30	
Laboratory ID	202601162	202601163	202601164	202601165	
Date received	4/16/2026	4/16/2026	4/16/2026	4/16/2026	
Date analysed					Date analysed
Nitrogen (mg/kg N)	3230	3304	1795	3353	5/15/2026
Phosphorus (mg/kg)	1288	3805	1936	2780	5/18/2026
Potassium (mg/kg)	1529	1522	925	572	5/15/2026
pH	7.37	7.32	7.51	7.47	5/14/2026
Organic Matter (%)	3.51	3.15	2.81	4.45	5/12/2026

Figure 54: Soil Sample Results from the Project Area



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Sample ID	Agri Farm Loc (Sample 1)	Min of Agri (Sample2)	Back of Plant (Sample 3)	Community (Sample 4)	
Time Sample taken	8:00	8:19	10:00	10:30	
Laboratory ID	202601162	202601163	202601164	202601165	
Date received	4/16/2026	4/16/2026	4/16/2026	4/16/2026	
Date analysed					Date analysed
Nitrogen (mg/kg N)	3230	3304	1795	3353	5/15/2026
Phosphorus (mg/kg)	1288	3805	1936	2780	5/18/2026
Potassium (mg/kg)	1529	1522	925	572	5/15/2026
pH	7.37	7.32	7.51	7.47	5/14/2026
Organic Matter (%)	3.51	3.15	2.81	4.45	5/12/2026

Figure 55: Soil Sample Results from the Project Area

4.7.1.6. Analysis

4.7.1.6.1. Soil PH Baseline

The pH across all four samples is remarkably uniform, ranging from 7.32 to 7.51. According to standard international agronomic and environmental benchmarks (such as the USDA Soil Survey specifications), the results fall almost entirely within the neutral range to slightly alkaline, which is generally regarded as optimal for nutrient availability, microbial activity, vegetation establishment, and stable biological processes. Notably, these results fit the known regional geology of the Christ Church parish, which is dominated by Pleistocene coral limestone terraces. This aligns well with expectations for calcareous limestone-derived soils in Christ Church.

4.7.1.6.2. Organic matter baseline

The results Range: 2.81–4.45% with an average of approximately 3.48%. In tropical soils, an organic matter content above 3.0% is considered healthy and indicative of good structural integrity, water retention, and microbial activity. SOM ranges from a low of 2.81% (Sample 3: Back of Plant) to a high of 4.45% (Sample 4: Community). The site generally falls into the moderate-to- good organic matter category. Sample 3 (2.81%) shows signs of localized depletion or soil compaction—highly typical for areas where there is traffic or heavy machinery activity. Notably, this was retrieved along the temporary road access path between the SCSTP and the proposed project site. Nearby residents, as well as the Contractor, have been using this route to traverse the area. This low value indeed signifies localized disturbance and compaction in that zone.

Conversely, Sample 4 (4.45%) displays excellent topsoil health, likely due to established community vegetation or turf management.

4.7.1.6.3. Nitrogen, phosphorus, potassium (NPK) baseline

Nitrogen (range: 1,795 – 3,353 mg/kg N): These values represent total nitrogen. For baseline environmental profiles, these concentrations are moderate to high, indicating a strong reserve of organic nitrogen that will gradually mineralize. These concentrations are unusually high for undisturbed mineral soils. Three of four samples fall in the high category. Possible explanations include previous agricultural activity, fertilizer inputs, accumulation of organic residues, and nutrient concentration in productive topsoil. Sample 3 shows noticeably less nitrogen than the others.

Phosphorus (range: 1,288 – 3,805 mg/kg): These values are exceptionally elevated compared to standard global baselines. Typical unamended soils rarely exceed 500–1,000 mg/kg of total phosphorus. The concentration of 3,805 mg/kg in Sample 2 (Min of Agri) points heavily toward a history of intensive agricultural fertilizer applications or highly localized phosphate-rich mineral deposits.

Phosphorus values are interpreted against the ranges in Table 45.

Table 45: Interpretation of Phosphorus Values

Phosphorous (mg/kg)	Interpretation
<50	Low
50-150	Moderate
>150	High

Potential causes include historical fertilization, imported topsoil, organic accumulation, and site modification. Unlike nitrogen, phosphorus tends to bind to soils and accumulate. High phosphorus may increase the risk of nutrient runoff, eutrophication, and algal growth if transported to receiving waters. This is particularly important given Christ Church’s sensitivity to coastal water quality.

Potassium (572 – 1,529 mg/kg): These levels are robust and high, guaranteeing that the soil has strong structural resistance to plant drought stress, though the high calcium index typical of Christ Church might slightly compete with potassium uptake. Sample 4 shows lower potassium relative to the other locations. This suggests sufficient nutrient reserves, generally good plant resilience potential, and reasonable drought tolerance. Variation across samples suggests localized heterogeneity.

Because the Phosphorus and Nitrogen levels are extremely high across the site, any civil works that generate loose sediment present a severe environmental hazard. If storm runoff carries these soils into local drainage systems or nearby coastal zones, it can trigger severe eutrophication (harmful algae blooms), which violates coastal protection regulations in Barbados.

The overall assessment for each parameter is summarized in Table 46.

Table 46: Overall Soil Condition

Parameter	Assessment
pH	Excellent
Organic Matter	Good
Nitrogen	High
Phosphorous	Very High
Potassium	Moderate – High

4.8. Noise

The establishment of the Workers’ Campsite will introduce sound into the project environment during both the construction and operational phases. Noise may simply be defined as unwanted sound, and the classification of sound as noise is dependent on the sound level (measured in decibels), the receptor, and duration and frequency of exposure. The impacts associated with noise from the construction and operation of the Workers’ Campsite will be highly dependent on the extent of change in current baseline (ambient) noise conditions.

4.8.1. Description of the Existing Environment

The area earmarked for the establishment of the Workers’ Campsite is located approximately 218m west of the Highway and approximately 254m south of the Ministry of Agriculture’s Office. The Harmony Hall Community is situated roughly 280 m to the southeast of the proposed Workers’ Campsite. Access to the location is currently provided by an earthen dam, extending approximately 730 m from a primary access point positioned approximately 193 m south of the Workers’ Campsite (location # 3 on the noise assessment map). The site is vegetated, comprising predominantly of grasses and shrubs. From an acoustic standpoint, the existing environment is influenced by continuous vehicular traffic along the Highway, which constitutes the ambient noise source within the area. Additional intermittent noise emissions originate from vehicles and equipment (such as cars, pickup trucks, and tractors) traversing the earthen pathway adjacent to the site.

4.8.2. Baseline monitoring methodology

Four locations were identified to characterize and determine the pre-construction ambient noise levels at the Workers' Campsite and along the primary access route to the site. The locations described below also represented the closest positions to sensitive receptors:

- *Location 1 (Co-ordinates: 21P 0221023 UTM 1446608)*-Downwind of Workers' Campsite, representing the expected maximum exposure to site-related noise during construction and operation
- *Location 3 (Co-ordinates: 21P 0221078 UTM 1446493)* – Downwind of Workers' Campsite and West of Harmony Hall Community, capturing noise propagation toward the nearest residential cluster
- *Location 4 (Co-ordinates: 21P 0221309 UTM 1446696)* – Upwind of Workers' Campsite and downwind of Ministry of Agriculture and Highway, representing background noise influenced by continuous vehicular traffic
- *Location 5 (Co-ordinates: 21P 0221068 UTM 1446920)* – Upwind of Workers' Campsite & Boundary between Campsite and Farmlands, representing background noise influenced by vehicles entering the farming area



Figure 56: Images of Noise Monitoring Locations

In the interest of personnel safety, monitoring locations were positioned as close as practicable to the proposed campsite footprint (Figure 56). These locations also represented the safest monitoring positions in the vicinity of the proposed Workers' Campsite, since the areas closer to the central point of the Campsite were vegetated; no clear pathway was visible, and there were indications and verbal warnings about the likely presence of abandoned wells. The noise assessment Map is represented on the following page.



Map 7: Noise Monitoring Locations

Noise monitoring was conducted using two Class-2, calibrated REED- R8080 sound level meters bearing serial numbers 220106871 and 230604542. The meters were calibrated on September 02, 2025, and are due for recalibration on September 02, 2027. The meters were field calibrated on April 13, 2026, using a REED R8090 calibrator bearing serial number 230306350. The calibration certificates are included in the Appendix.

In keeping with recommended practices for noise monitoring, the meters were placed on tripods, elevated at approximately 1.5 m, and were also positioned away from reflecting surfaces and obstructions. The sound level meters were also equipped with a windshield ball, which proved necessary during several instances of heavy wind gusts during monitoring, as it prevented the distortion of measurements by wind-induced, low-frequency sound. The meter was set to record on an A-weighting with a “Fast” time-weighting, and to log sound levels every 5 seconds, thereby resulting in approximately 720 datapoints during each one-hour monitoring cycle.

Noise monitoring at the representative upwind locations of the proposed Workers’ Campsite (i.e., monitoring locations #4 and #5) was conducted continuously for one hour at each location. In contrast, however, several one-hour cycles were repeated throughout the day at locations #1 and #3. Monitoring was conducted during periods within the anticipated working hours for the construction and operation of the Workers’ Campsite, i.e., 08:00 h to 18:00 h, with consideration of a lunch period from 11:30h to 13:30 h. At each downwind location, an additional 2 hours of monitoring were conducted outside of the proposed working hours to determine baseline noise levels before the start of daily activities and after their conclusion. These downwind locations represent areas most likely to experience noise from the Workers’ Campsite and correspond to points along the existing access road where materials will be transported to the site. At the end of each monitoring cycle, the logged data was retrieved using the REED R8080 software. The noise monitoring results are presented in Table 47.

Table 47: Noise Monitoring Results

ORGANISATION CONDUCTING THE ASSESSMENT: BRINSJEN SYSTEM DEVELOPMENT SPECIALISTS AUTHORISED PERSONNEL: MELINDA FRANKLIN-LYNCH DATE OF NOISE ASSESSMENT: APRIL 15 &16, 2026 <u>INSTRUMENT DETAILS</u> NAME: SOUND LEVEL METER BRAND: REED MODEL: R8080 SERIAL NUMBERS: 220106871 and 230604542 FACTORY CALIBRATION DATE: SEPTEMBER 02, 2025 FACTORY CALIBRATION DUE DATE: SEPTEMBER 02, 2027 DATE OF LAST FIELD CALIBRATION: APRIL 13, 2026							
Date	Description	GPS	Start (hr)	End (hr)	Sound Level - dB (A)		
					Maximum	Minimum	Average
4/15/2026	Location#1-Downwind of Workers' Campsite	21 P 0221023 UTM 1446608	09:00	10:00	74.4	46.1	55.1
			12:00	13:00	81.8	46.8	58.6
			14:00	15:00	73.0	49.3	54.7
			17:00	18:00	82.1	44.0	52.5
			18:00	19:00	75.3	43.0	51.7
4/16/2026			06:50	07:50	77.1	49.3	55.8
4/15/2026	Location #3- Downwind of Workers' Campsite (Access to Site)	21P 0221078 UTM 1446493	09:00	10:00	71.9	57.2	59.4
			12:00	13:00	81.7	57.7	59.5
			14:00	15:00	68.8	59.1	60.5
			17:00	18:00	75.7	55.9	57.4

ORGANISATION CONDUCTING THE ASSESSMENT: BRINSJEN SYSTEM DEVELOPMENT SPECIALISTS

AUTHORISED PERSONNEL: MELINDA FRANKLIN-LYNCH

DATE OF NOISE ASSESSMENT: APRIL 15 &16, 2026

INSTRUMENT DETAILS

NAME: SOUND LEVEL METER

BRAND: REED

MODEL: R8080

SERIAL NUMBERS: 220106871 and 230604542

FACTORY CALIBRATION DATE: SEPTEMBER 02, 2025

FACTORY CALIBRATION DUE DATE: SEPTEMBER 02, 2027

DATE OF LAST FIELD CALIBRATION: APRIL 13, 2026

			18:00	19:00	67.6	55.7	56.3
4/16/2026			06:50	07:50	70.4	57.8	59.4
4/17/2026	Location# 4-Upwind of Workers' Campsite (downwind of highway and Ministry of Agriculture)	21 P 0221309 UTM 1446696	07:21	08:21	77.9	42.1	50.6
4/17/2026	Location #5-Upwind of Workers' Campsite (boundary between Campsite and Farmlands)	21 P 0221068 UTM 1446920	12:00	13:00	66.4	56.3	57.3

4.8.3. Summary of noise assessment results

Noise monitoring was conducted at both upwind and downwind locations of the proposed Workers' Campsite between April 15 and 17, 2026. The noise monitoring activity recorded maximum noise levels ranging from 66.4 to 82 dB (A), during the proposed hours of work, while minimum and average noise levels ranged from 42.1 to 59.1 dB (A) and 50.6-60.5 dB (A), respectively. During periods before and after the proposed working hours, maximum noise levels ranged from 67.6-77.1 dB (A); while minimum and average levels ranged from 43-57.8 dB (A) and 51.7-59.4 dB (A) respectively.

At the downwind sites (Locations #1 and #3), average sound levels ranged from approximately 51.7 dB(A) to 60.5 dB(A), with maximum readings reaching up to 82.1 dB(A) during active daytime hours. In contrast, the upwind sites (Locations #4 and #5) recorded lower average levels, around 50.6 dB(A) and 57.3 dB(A), respectively, with only 2 datapoints reaching and exceeding 70 dB(A). Overall, the data indicates that downwind areas experienced higher and more variable noise levels due to proximity to existing transport routes, while upwind areas remained relatively quieter, dominated by ambient environmental and traffic noise.

4.8.4. Overview of ambient noise conditions

The baseline acoustic environment in the vicinity of the Workers' Campsite is characterized by low to moderate ambient noise from natural soundscape, distant traffic from the Highway, and intermittent vehicle movements adjacent to the site and along the access road. These baseline values form the reference for assessing project-related noise impacts from future construction and operation activities. Noise monitoring captured measurements including minimum, maximum, and average noise levels during each monitoring cycle.

Baseline monitoring at upwind locations showed average sound levels generally in the low- to upper-50 dB(A) range, with occasional short-term peaks associated primarily with passing traffic. Downwind locations, representing receptors closer to the proposed campsite footprint and along the haul route, exhibited slightly higher and more variable noise levels, with typical daytime averages between approximately 52–61 dB(A) and maximum levels occasionally reaching the low-80 dB(A).

When assessed against international benchmarks, the measured ambient levels are broadly consistent with typical daytime environmental noise conditions for mixed rural–transport corridors. The World Health Organization's *Guidelines for Community Noise* indicates that to avoid significant annoyance in outdoor living areas, daytime equivalent sound levels should generally not exceed about 55 dB(A), and levels above 65 dB(A) are associated with increasing disturbance and reduced acoustic comfort. In the monitored area, average levels at several locations are close to or slightly above this 55 dB(A) reference during active periods, suggesting that sensitive receptors may experience some degree of annoyance during peak construction or traffic activity. From an occupational perspective, the measured levels are substantially below the OSHA permissible exposure limit of 90 dB(A) as an 8-hour time-weighted average for workers, indicating that, under ambient conditions, the risk of occupational hearing damage for campsite workers is low. However, with the introduction of additional noise sources, mitigation measures need to be implemented to keep noise exposure as close to ambient conditions as possible.

4.8.5. Construction phase noise conditions

During the construction phase, noise impacts are expected to be intermittent to continuous, driven primarily by heavy machinery use, vehicle movements, generators, and the use of hand tools. Baseline monitoring

shows that the project area already experiences low to moderate ambient noise, influenced by highway traffic and vehicle movements on the road adjacent to the site.

During construction of the Workers' Campsite, the principal noise impacts are expected to arise from site preparation, movement of construction machinery, and increased traffic along the access road. These activities will temporarily elevate noise levels at downwind receptors, particularly during peak work periods, and may intermittently exceed the WHO community noise guideline values for outdoor areas (55 dB(A) for daytime and 45 dB(A)) if unmitigated, leading to short-term annoyance for nearby residents and other land users. Several pieces of construction equipment which are planned for use during the construction of the Workers' Campsite, are known to release noise emissions at levels far exceeding the WHO's Community Noise Guideline Values, which Barbados has used as a basis for the development of the National Noise Policy (EPD, 2020).

The Occupational Safety and Health Administration (OSHA) defines the permissible noise limits that workers can be exposed to and their duration. It is noted that for activities with the potential for higher noise emissions, that exposure time needs to be decreased to prevent hearing impairment (OSHA, n.d.). Administrative and engineering controls are warranted when sound levels exceed the proposed exposure limit. The use of personal protective equipment is needed if administrative and engineering measures fail to reduce sound levels within permissible limits.

Since noise levels are measured on a logarithmic scale, noise emissions from the operation of multiple pieces of equipment simultaneously will also be calculated logarithmically rather than mathematically. Therefore, the operation of two noise-producing equipment with similar sound pressures will result in a 3 dB increase in sound pressure. Additionally, in contrast to noise from traffic, construction equipment acts as a point source and will typically decrease at a rate of 6dB per doubling of distance (Dooling and Popper, 2007). Although the construction phase of the project will generate continuous and intermittent noise, the already mixed ambient context and the relatively moderate baseline levels, noise impact from the Construction activities acts are likely to be localized and reversible, diminishing significantly outside of working hours and at increasing distances from the Workers' Campsite.

The implementation of standard good practice mitigation, such as scheduling the noisiest activities within daytime hours, maintaining equipment, enforcing speed limits on access roads, and avoiding unnecessary idling, will further reduce the magnitude and duration of construction- related noise impacts.

4.8.6. Operational phase noise conditions

During the operational phase, noise levels are anticipated to be lower and more stable, dominated by routine camp activities such as internal vehicle movement, staff congregation, kitchen operations, and the operation of a standby generator. The generator represents the most significant long-term noise source, with the potential to influence night-time conditions if operated during the night-time and if not properly attenuated.

With construction completed, the frequency and intensity of high noise events are expected to decline, and overall sound levels at downwind receptors should remain broadly comparable to, or slightly above, current baseline conditions. Without mitigation, operational noise could exceed the WHO guideline limits. However, the incorporation of sound attenuated generator housings, strategic placement of facilities, conduct of operational activities within established working hours, enforcement of quiet hours, and ongoing monitoring ensure that operational noise remains within acceptable limits and align with both community and occupational good practice.

When these controls are put in place, and consistently monitored, operational noise impacts are assessed as low to medium significance, with low residual impacts, and no long-term adverse effects anticipated for workers or surrounding communities.

4.9. Baseline parameters, sources and confidence

The parameters relied upon across the environmental and social baseline are consolidated below with the source of each, its reference year and an assessment of confidence (see Table 48). The purpose is that a reviewer can trace any figure used in the assessment to its origin and judge its currency without searching the text. Parameters recorded as not found are genuine gaps rather than omissions, and are carried in the open items register.

Table 48: Baseline parameters and their sources

Parameter	Value	Year	Source	Confidence	Note
Air quality, particulates	Exceedance of WHO 24-hour guidelines during dust events	2015	World Bank and CERMES Economic Resilience and Green Growth	Medium-high	Spikes driven by seasonal Saharan dust transport
Air quality, gases	Not found	—	Ministry of Environment; Barbados Meteorological Services	Low	No permanent continuous ambient monitoring network exists
Statutory noise limits	No national standard. IFC EHS Guidelines applied: 55 dBA day, 45 dBA night for residential receptors	2007	IFC General EHS Guidelines, Environmental Noise	High	Adopted as the applicable standard in the absence of a national one
Ambient noise, south coast	52.0 to 68.0 dBA	2024	BA-L1063 Updated ESIA/ESMP	High	Field baseline measured along Worthing
Coastal water quality	Historical breach of coliform criteria during the 2017–2020 outfall failures	2024	BWA and Coastal Zone Management Unit	High	Recorded as a pre-project condition
Groundwater protection zoning	Zones 2 and 3, adjacent to Zone 1	2024	BWA and Government of Barbados	High	1973 Groundwater Protection Zoning policy applies
Water scarcity	280 to 300 m ³ per capita per year	2021	FAO AQUASTAT; UN-OCHA; BWA	High	Among the ten most water-scarce countries
Sea level rise projection	0.4 to 1.0 m by 2100	2021	Government of Barbados 2021 NDC Update; IPCC	High	Aligned with the IPCC AR6 high-emissions scenario
National climate filings	NDC Update 2021; Second National Communication 2018	2021	Ministry of Environment; UNFCCC	High	Third National Communication in preparation with UNDP
Graeme Hall protected status	Ramsar Site No. 1591; protected area under the Physical Development Plan; 33 ha	2005	Ramsar Secretariat; Government of Barbados	High	The Ramsar designation attaches to the wetland complex, not to the Sanctuary facility

Parameter	Value	Year	Source	Confidence	Note
Graeme Hall Nature Sanctuary	Closed to the public since late 2008 or 2009	2011	UWI CERMES; Mahon and others	High	Privately owned; closed following environmental and regulatory disputes
Soil classification	Pellic Vertisol under the FAO system; Vertisol under the USDA system; approximately 60 per cent clay	1965	Vernon and Carroll, Soil and Land-Use Surveys No. 18: Barbados, Imperial College of Tropical Agriculture	High	The primary survey source, replacing the figure-sharing references previously cited
Population, Christ Church parish	54,300 residents	2021	Barbados Statistical Service, 2021/2022 Population and Housing Census	High	Parish-level aggregation only
Sub-parish demographics	Not found	—	Barbados Statistical Service	Low	Disaggregated data for St Lawrence, Worthing and Graeme Hall is not published
Unemployment, national	8.5 to 10.0 per cent	2022	Barbados Statistical Service, Labour Force Survey 2022	High	Youth unemployment exceeds 20 per cent
Statutory minimum wage	BBD 8.50 per hour	2021	Ministry of Labour, Minimum Wage Order 2021	High	National floor across all employment
Homicide rate, national	17.8 to 18.2 per 100,000	2024	Criminal Justice Research and Planning Unit; Barbados Crime Observatory	High	48 to 49 homicides recorded nationally
Crime share, Christ Church	21 per cent of national homicides, being 10 homicides	2025	Barbados Crime Observatory	High	St Michael accounted for 58 per cent
Intimate partner violence	30.0 per cent lifetime prevalence	2018	UN Women, IDB and PAHO, Women's Health Survey	High	Regional and national prevalence survey
Sewerage coverage, south coast	60 to 70 per cent of properties connected	2024	Barbados Water Authority	High	Unconnected properties rely on septic tanks and soakaways

Three points arise from this consolidation. There is no national ambient noise standard, so the IFC General EHS Guidelines values of 55 dBA by day and 45 dBA at night for residential receptors are adopted as applicable criteria, and the monitoring thresholds in the Environmental and Social Management Plan are set against them. There is no permanent continuous ambient air quality monitoring network in Barbados, so the air quality baseline rests on campaign monitoring and on regional studies rather than on a continuous record. And the Barbados Statistical Service does not publish demographic data below parish level, so no census figure exists

for St Lawrence, Worthing or Graeme Hall; the community-level profile described in the Social Assessment is the route by which that gap is closed.

5. ENVIRONMENTAL IMPACT ASSESSMENT

5.1. Critical Habitat Assessment (CHA)

5.1.1. Purpose and Objectives of the Rapid CHA

The purpose of the Rapid CHA is to determine whether biodiversity features within the area potentially influenced by the Project meet the applicable IDB criteria for Critical Habitat and, where relevant, to identify the implications for Project impact assessment, mitigation, management and monitoring.

The assessment has been designed as a focused, evidence-based exercise drawing primarily on existing environmental and biodiversity information, supplemented by available technical inputs and targeted verification where required. It is not intended to constitute a new comprehensive ecological baseline survey. Rather, it consolidates and evaluates the available evidence in a manner that supports a transparent and defensible determination of Critical Habitat in the context of the proposed Project.

The specific objectives of the Rapid CHA are to:

- define an ecologically appropriate assessment area within which potential Critical Habitat features and Project interactions can be considered;
- review and evaluate existing biodiversity information relevant to the Project and its wider area of ecological influence;
- identify biodiversity features, habitats, species and ecological processes that warrant consideration as Key Biodiversity Features (KBFs);
- screen the identified KBFs systematically against the applicable IDB Critical Habitat criteria;
- determine, on the basis of available evidence, whether and where Critical Habitat criteria are triggered;
- assess relevant pathways through which Project activities could affect identified KBFs and any Critical Habitat;
- identify appropriate application of the mitigation hierarchy and associated management and monitoring requirements; and
- identify material information gaps or targeted verification requirements where these could affect the Critical Habitat determination, assessment of impacts or selection of mitigation measures.

The assessment adopts a precautionary but evidence-based approach. Where available information is insufficient to support a definitive conclusion, uncertainty is explicitly identified rather than interpreted as evidence that a Critical Habitat criterion is not met.

5.1.2. Scope and Relationship to the ESIA/ESMP/ESMS

The Rapid CHA is a specialist biodiversity assessment that supports, but does not replace, the broader environmental and social assessment and management processes for BA-L1063. It should therefore be read in conjunction with the Project's Environmental and Social Impact Assessment (ESIA), Environmental and

Social Management Plan (ESMP), Environmental and Social Management System (ESMS), and associated technical studies and baseline information.

Existing Project documentation provides important information on the proposed infrastructure, environmental setting, potential impact pathways, mitigation measures and management arrangements. The CHA builds on this information by applying a specific biodiversity and Critical Habitat lens to determine whether biodiversity features potentially affected by the Project meet the applicable IDB requirements and whether additional biodiversity-specific measures may be necessary.

The assessment focuses on biodiversity features and ecological processes with a plausible relationship to the Project and its area of influence. This includes the Graeme Hall wetland system and associated terrestrial and aquatic biodiversity, hydrological and ecological processes supporting the wetland, species of conservation concern, and relevant coastal and marine habitats that may be connected to the Project through hydrological or other ecological pathways.

Consistent with the rapid nature of the assessment, existing information is used wherever it is considered sufficiently reliable and current for the decision being made. Additional investigation or field verification is identified only where an information gap could materially affect the Critical Habitat determination, the assessment of Project-related impacts, or the identification of appropriate mitigation, management or monitoring measures. Supporting evidence registers, detailed species screening, technical consultation and field verification records, photographs, and detailed assessment matrices are provided in the annexes, as appropriate.

5.1.3. Applicable IDB Critical Habitat Requirements

IDB Biodiversity Safeguard Framework

This CHA has been undertaken with reference to the Inter-American Development Bank's (IDB, 2015) *Guidance for Assessing and Managing Biodiversity Impacts and Risks in Inter-American Development Bank Supported Operations*, which operationalizes the biodiversity provisions of the Bank's Environment and Safeguards Compliance Policy (OP-703). The guidance addresses natural and critical natural habitats, biodiversity impact assessment, application of the mitigation hierarchy and management of residual impacts.

Under the IDB framework, identification of Critical Natural Habitat does not in itself preclude Bank financing. Rather, it establishes a higher level of scrutiny for assessing biodiversity impacts and determining whether a project could result in significant conversion or degradation of the habitat and the biodiversity values for which it qualifies.

For this assessment, **Critical Natural Habitat** and **Critical Habitat** are used interchangeably, with the former reflecting the terminology of the 2015 IDB guidance.

Critical Natural Habitat Criteria

The IDB identifies Critical Natural Habitats as: (i) existing protected areas, areas officially proposed for protection, and sites that maintain conditions vital to the viability of such areas; and (ii) unprotected areas of known high conservation value. Existing protected areas include **Wetlands of International Importance designated under the Ramsar Convention**.

For this CHA, these requirements are operationalized through the six screening criteria in Table 49. The criteria are not mutually exclusive, and an area or biodiversity feature may qualify under more than one criterion.

Table 49: Critical Habitat Screening Criteria Applied in this Assessment

CRITERION	APPLICATION IN THE CHA
A. EXISTING OR PROPOSED PROTECTED AREA / INTERNATIONALLY RECOGNIZED SITE	Determines whether an area is formally protected, proposed for protection, or recognized under an international conservation designation, including the Ramsar Convention.
B. AREA NECESSARY TO MAINTAIN A PROTECTED AREA	Considers adjoining areas, waterways, buffers, hydrological connections or ecological processes necessary to maintain the viability or ecological character of a protected area.
C. HABITAT CRUCIAL FOR CR/EN/VU/NT SPECIES	Determines whether habitat is crucial for the survival, feeding, breeding, refuge or movement of species classified as Critically Endangered, Endangered, Vulnerable or Near Threatened.
D. ENDEMIC OR RANGE-RESTRICTED SPECIES	Considers whether the area supports endemic or geographically restricted species for which the affected habitat is particularly important.
E. MIGRATORY SPECIES, ROUTES OR CONGREGATIONS	Determines whether the area provides important habitat for migratory routes, feeding, breeding, refuge or significant congregations of migratory species.
F. HABITAT HIGHLY SUITABLE FOR BIODIVERSITY CONSERVATION	Considers conservation importance arising from factors such as habitat vulnerability and irreplaceability, rare or threatened ecosystems, refugia, ecological processes, connectivity and important ecosystem functions or services.

Source: adapted from IDB (2015).

The detailed assessment of KBFs against these criteria is presented in **Section 5.1.6: Critical Habitat Screening and Determination**.

5.1.3.1. Application to Graeme Hall Swamp

Graeme Hall Swamp is designated as a **Wetland of International Importance under the Ramsar Convention**. As Ramsar sites are expressly included within the IDB definition of Critical Natural Habitat, the designation establishes a **confirmed Critical Habitat trigger under Criterion A**.

The CHA therefore does not need to establish *de novo* whether the formally designated Ramsar site constitutes Critical Natural Habitat. Instead, the assessment focuses on:

1. identifying the KBFs and ecological processes requiring protection;
2. determining whether functionally connected areas outside the Ramsar boundary are necessary to maintain those values; and
3. assessing whether Project-related impacts could result in significant conversion or degradation.

The second consideration is particularly relevant because the IDB definition also encompasses sites that maintain conditions vital to the viability of protected areas. The assessment therefore considers relevant hydrological connections, drainage pathways, ecological connectivity and other processes extending beyond the formal Ramsar boundary where supported by evidence.

5.1.3.2. Significant Conversion, Degradation and Mitigation Requirements

For Critical Natural Habitat, the principal compliance question is whether the Project could result in **significant conversion or degradation**. IDB describes this as a long-term major or catastrophic change in habitat. Significance is determined on a case-by-case basis, considering the vulnerability and irreplaceability of the

biodiversity feature together with the magnitude, spatial extent, reversibility and likelihood of impacts, including relevant cumulative effects.

The IDB requires biodiversity impacts to be addressed through the mitigation hierarchy, prioritizing **avoidance**, followed by minimization, restoration or rehabilitation and, where appropriate, compensation for residual impacts. The Bank will not finance projects resulting in significant conversion or degradation of Critical Natural Habitat after application of the mitigation hierarchy, and biodiversity offsets cannot be used to compensate for such impacts.

These requirements provide the basis for the subsequent assessment of Project–KBF interactions, impact significance, mitigation, monitoring and follow-up requirements.

5.1.4. Assessment Area and Methodology

Rapid CHA Approach

The Critical Habitat Assessment (CHA) applies a rapid, evidence-based and precautionary approach, making maximum use of existing environmental and biodiversity information. Available information is consolidated and evaluated specifically against the applicable IDB Critical Natural Habitat criteria, supplemented by targeted technical consultation and field verification where necessary to confirm current conditions, important Project–habitat interfaces or material information gaps.

This approach reflects the availability of an existing ESIA, ESMP and ESMS for BA-L1063, together with earlier ecological studies, national biodiversity and wetland assessments, Ramsar information and more recent technical reviews of Graeme Hall. The assessment therefore does not seek to replicate the existing ecological baseline, but to determine whether the available evidence is adequate to support a defensible Critical Habitat determination and assessment of Project-related risks.

The assessment follows seven linked steps: (1) definition of the Critical Habitat Assessment Area (CHAA); (2) desktop evidence review, biodiversity feature identification and species screening; (3) preliminary Critical Habitat screening; (4) targeted technical consultation and field verification; (5) final Critical Habitat determination; (6) Project impact and significant conversion/degradation assessment; and (7) identification of mitigation, management, monitoring and follow-up requirements.

Critical Habitat Assessment Area (CHAA)

The CHAA is defined on an ecological rather than solely project-footprint basis. It encompasses the Project footprint and relevant associated infrastructure, the Graeme Hall Ramsar Site, and hydrologically or ecologically connected areas where plausible Project impact pathways to Key Biodiversity Features may occur.

This approach is consistent with the historical understanding of Graeme Hall as a nested ecological and hydrological system. Earlier assessments distinguished between the approximately 33-ha recognized wetland, the wider 100-year floodplain and associated buffer areas, and the approximately 1,158-acre Graeme Hall watershed as the broader hydrological management unit (Williams, 2008). The 2010 Mangrove Ecosystem Assessment identifies Graeme Hall as receiving surface-water and groundwater inputs from a substantially wider catchment and documents hydrological connections among surrounding drainage areas, the wetland, the Bisecting Canal and the coastal outlet (EEC, 2010). These historical boundaries are informative rather than determinative for the present CHA; the CHAA is defined according to ecological functionality and plausible pathways by which BA-L1063 could affect biodiversity features.

The final functional boundary is therefore refined according to evidence of ecological connectivity and plausible Project impact pathways rather than adopting either the Project footprint, Ramsar boundary or entire watershed as an automatic assessment boundary.





Figure 58: Project Habitat Interface & Functional Ecological Area Map

5.1.4.1. Evidence Review, Species Screening and KBF Identification

Existing ecological and biodiversity information was systematically reviewed to establish the CHA evidence base. Core sources include the BA-L1063 ESIA/ESMP/ESMS; earlier NEMUS assessments and ecological studies; Ramsar documentation; national biodiversity and wetland assessments; recent technical studies of Graeme Hall; relevant Project-specific environmental assessments; and current conservation information, including the IUCN Red List.

Sources were evaluated according to their temporal and spatial relevance, reliability, limitations, and alignment with the Critical Habitat criteria. Species records were screened with particular attention to threatened and Near Threatened, endemic, range-restricted, migratory and congregatory species. Presence alone was not treated as demonstrating Critical Habitat relevance; consideration was given to the importance of the habitat for feeding, breeding, refuge, congregation or movement.

The evidence was then synthesized into a set of **candidate Key Biodiversity Features (KBFs)** representing the principal habitats, species groups and ecological processes warranting formal Critical Habitat assessment. The candidate KBFs are presented in Section 5.1.5, with the detailed evidence register and species screening retained in the annexes.

5.1.4.2. Critical Habitat Screening and Determination

Each candidate KBF is assessed systematically against the six Critical Habitat criteria established in Section 5.1.3. Four categories are used to communicate the strength of the determination:

- **Confirmed Trigger** – adequate evidence demonstrates that the criterion is met;
- **Potential Trigger** – reasonable evidence indicates that the criterion may be met, but additional confirmation is required;
- **Not Triggered** – available evidence demonstrates that the criterion is not applicable; and

- **Insufficient Information** – evidence is inadequate to reach a defensible conclusion.

Graeme Hall's Ramsar designation is treated as an established trigger under Criterion A. The remaining assessment identifies the KBFs and ecological processes requiring protection and evaluates whether functionally connected areas outside the formal Ramsar boundary also warrant consideration. The resulting Critical Habitat determinations are presented in Section 5.1.6.

5.1.4.3. Impact Assessment, Mitigation and Follow-up

Project activities are assessed against the identified KBFs to determine plausible **direct, indirect, operational, accidental/emergency and cumulative impacts**. Significance is evaluated with reference to KBF vulnerability and irreplaceability, impact magnitude, extent, duration, reversibility, likelihood and cumulative context, leading to an assessment of whether residual impacts could result in significant conversion or degradation of Critical Habitat.

Mitigation requirements are identified according to the hierarchy **Avoid → Minimize → Restore/Rehabilitate → Compensate, where appropriate**, with priority given to avoidance of significant conversion or degradation. Existing ESIA/ESMP measures are reviewed for adequacy and additional CHA-specific measures identified where necessary. The impact assessment and resulting mitigation, monitoring and follow-up requirements are presented in Sections 5.1.7 and 5.1.8.

5.1.4.4. Limitations and Data Gaps

The CHA recognizes limitations associated with the age, quality and temporal coverage of some existing ecological information. Technical consultation and targeted field verification are used where necessary, but rapid verification is not treated as a substitute for comprehensive ecological surveys, and non-detection during a rapid visit is not interpreted as evidence of absence.

A proportional approach is applied to uncertainty: additional investigation is recommended only where an information gap could materially change the Critical Habitat determination, impact significance assessment or required mitigation. Other gaps are documented as limitations or addressed through appropriate monitoring and adaptive management.

5.1.5. Existing Biodiversity Evidence and Key Biodiversity Features

5.1.5.1. Evidence Base and Data Reliability

The biodiversity evidence base for the CHA comprises multiple sources spanning site-specific ecological studies, Project environmental assessments, national biodiversity and wetland assessments, Ramsar documentation and current conservation-status information. Core sources include the 2024 BA-L1063 ESIA/ESMP/ESMS (ESL, 2024); the earlier South Coast ESIA/ESMP and associated ecological studies (NEMUS, 2021); Ramsar documentation for Graeme Hall; the *Barbados National Biodiversity Strategy and Action Plan 2020*; the *Barbados National Wetland Inventory* (Mahon et al., 2023); and the recent synthesis of studies, surveys and management information for Graeme Hall prepared by Mahon et al. (2025). Project-specific information from the Workers' Camp ESIA/ESMP and current IUCN Red List information were also considered where relevant.

Collectively, these sources provide a substantial evidence base extending over several decades. The more recent national wetland inventory and Graeme Hall review are particularly useful for consolidating historical studies and interpreting changes in ecological character. However, the evidence varies in age, survey method, spatial coverage and taxonomic detail, and systematic long-term ecological monitoring has been limited.

Accordingly, older species records are treated as evidence of historical occurrence rather than automatic confirmation of current presence unless supported by more recent information. Current conservation status has been verified separately for species carried forward in the priority species screening.

The detailed Biodiversity Evidence Register and species screening are provided in **Annexes 1 & 2** respectively. The following sections synthesize the evidence most relevant to identification of candidate Key Biodiversity Features (KBFs).

5.1.5.2. Graeme Hall Wetland Habitats and Ecological Character

Graeme Hall is Barbados' largest remaining coastal wetland complex and contains a mosaic of aquatic, wetland and terrestrial habitats. The approximately 33-ha Ramsar site includes the island's largest body of inland water and supports red mangrove (*Rhizophora mangle*) and white mangrove (*Laguncularia racemosa*) communities, open-water habitats, drainage canals, sedge and other wetland vegetation, and associated woodland and shrub habitats (Mahon et al., 2023; Ramsar Sites Information Service, 2005). The 2024 ESIA similarly identifies Graeme Hall as the location of the last significant mangrove forest ecosystem in Barbados (ESL, 2024).

The ecological character of the wetland has changed over time in response to physical modification, altered water exchange, surrounding land use and water-quality pressures. Nevertheless, available evidence continues to identify the system as important for mangrove and wetland habitat, aquatic communities, resident and migratory birds and wider ecosystem functions. National land-use planning has also recognized the broader Graeme Hall swamp, beach, seagrass and reef system as an environmentally sensitive terrestrial and marine complex (Mahon et al., 2023).

5.1.5.3. Hydrology and Ecological Connectivity

Hydrological processes are fundamental to the ecological character of Graeme Hall. The wetland receives water from a wider catchment and is influenced by surface drainage, groundwater, precipitation and controlled exchange with the sea. Historical alteration of the coastal connection and management of the sluice system have affected water levels, salinity, circulation and water quality, with consequential implications for mangrove and aquatic habitat condition (Mahon et al., 2023; Mahon et al., 2025).

The National Wetland Inventory identifies obstruction of historical connections with the sea as contributing to desalination of the naturally brackish system, nutrient accumulation, reduced circulation, low dissolved oxygen and elevated bacterial levels. Runoff and periodic wastewater inputs have imposed additional pressures. These relationships indicate that hydrology, salinity and water quality are not simply background environmental conditions but ecological processes capable of influencing the viability and character of the wetland and its associated biodiversity.

The available evidence also supports consideration of ecological connections between the wetland and adjacent coastal environment. This functional connectivity is relevant to defining the KBFs carried forward for assessment but does not, at this stage, establish the spatial extent of Critical Habitat.

5.1.5.4. Terrestrial and Wetland Biodiversity

The wetland supports a heterogeneous assemblage of vegetation and fauna associated with mangrove, freshwater/brackish, open-water, sedge, grassland, shrub and woodland habitats. Mangrove habitat is of particular conservation relevance because of its limited extent nationally and its role in wetland ecological functioning. Earlier ecological assessments and subsequent reviews document changes in mangrove condition associated with water quality, salinity, hydrology and other environmental pressures (NEMUS, 2021; Mahon et al., 2023; Mahon et al., 2025).

The surrounding terrestrial and wetland habitat also provides feeding, refuge, roosting and nesting opportunities for fauna. Although parts of the system are modified or degraded, ecological modification does not necessarily remove the conservation significance of remaining habitat, particularly where it continues to support important species or ecological processes.

5.1.5.5. Avifauna

Avifauna represents one of the best documented biodiversity values of Graeme Hall. The Ramsar documentation and subsequent assessments identify the swamp as supporting a high diversity of both resident and migratory birds, with historical assessments reporting at least 84 species associated with the wetland. Historical records include species such as the **Caribbean Coot (*Fulica caribaea*)**, **Yellow Warbler (*Setophaga petechia*)** and **Peregrine Falcon (*Falco peregrinus*)**, alongside a diverse assemblage of resident and migratory waterbirds (Lashley, 2016). Species recorded from or associated with the wetland include migratory shorebirds and waterbirds such as the **Semipalmated Sandpiper (*Calidris pusilla*)**, **Lesser Yellowlegs (*Tringa flavipes*)** and **Greater Yellowlegs (*Tringa melanoleuca*)**, together with resident wetland birds including herons, egrets and other water-associated species (ESL, 2024; Mahon et al., 2023).

Graeme Hall provides feeding, refuge, roosting and, for some species, nesting habitat. Its value to migratory birds is particularly relevant given the limited extent of comparable wetland habitat in Barbados. Resident avifauna also includes species with restricted Caribbean distributions, including the **Barbados Bullfinch (*Loxigilla barbadensis*)**, which is endemic to Barbados, and other regionally restricted taxa identified through the species screening (Mahon et al., 2023; Mahon et al., 2025).

These examples are indicative rather than exhaustive. The **full Priority Species Screening Matrix is provided in Annex 3**, including the evidence source, current conservation status, residency or migratory status, habitat association and relevance to the Critical Habitat criteria.

5.1.5.6. Aquatic and Fish Communities

Graeme Hall supports freshwater, brackish and marine-associated fish assemblages whose composition reflects the historically variable salinity and connection between the swamp and coastal environment. Recorded taxa include species tolerant of brackish conditions as well as marine-associated species capable of using the wetland system. The wider ecological evidence also identifies species of particular functional interest, including **Atlantic Tarpon (*Megalops atlanticus*)**, a large predatory fish whose presence contributes to the trophic structure and food-web function of aquatic habitats (Mahon et al., 2025).

Fish-community condition is also an indicator of broader wetland ecological health. Earlier ecological work informed the recommendation for continued monitoring of fish communities alongside mangrove habitat and water quality, reflecting their sensitivity to changes in salinity, dissolved oxygen, nutrient loading and hydrological conditions (NEMUS, 2021; Mahon et al., 2023). The NEMUS monitoring framework consequently proposed monitoring from pre-construction through early operation to distinguish Project effects from other pressures on wetland condition.

5.1.5.7. Coastal and Marine Biodiversity

The ecological setting of Graeme Hall extends toward the adjacent Worthing/St Lawrence coastal environment, where seagrass and coral reef habitats occur. Ramsar and national planning documentation historically describe the swamp, beach, seagrass bed and reef as components of a connected coastal ecosystem, while more recent technical reviews continue to recognize the relevance of the adjacent marine environment to understanding the Graeme Hall system (Mahon et al., 2023; Mahon et al., 2025).

Species of conservation interest associated with the wider coastal and marine setting include threatened reef-building corals such as **Elkhorn Coral (*Acropora palmata*)** and **Staghorn Coral (*Acropora cervicornis*)**, as well as marine turtles including the **Green Turtle (*Chelonia mydas*)** and **Hawksbill Turtle (*Eretmochelys imbricata*)**. Of particular relevance to the assessment is the association of Green Turtle with the St Lawrence Lagoon seagrass habitat, which is considered in relation to drainage and ecological connectivity with the Graeme Hall system.

The presence of these species or habitats does not, by itself, establish that the relevant coastal or marine area constitutes Critical Habitat. Their inclusion identifies biodiversity values for which the importance of the habitat and the plausibility of Project-related impact pathways require further assessment in Section 5.1.6.

5.1.5.8. Threatened, Endemic, Range-Restricted and Migratory Species

The consolidated species screening identified a subset of species requiring closer consideration because of their current conservation status, restricted distribution, migratory behavior or ecological dependence on habitats within or functionally connected to the CHAA. Examples include the **Green Turtle (*Chelonia mydas*)**, **Hawksbill Turtle (*Eretmochelys imbricata*)**, **Elkhorn Coral (*Acropora palmata*)**, **Staghorn Coral (*Acropora cervicornis*)**, **Semipalmated Sandpiper (*Calidris pusilla*)**, **Atlantic Tarpon (*Megalops atlanticus*)**, and endemic or regionally restricted resident birds such as the **Barbados Bullfinch (*Loxigilla barbadensis*)**.

These species represent different pathways of potential Critical Habitat relevance. For threatened species, the key consideration is the importance of affected habitat to survival, feeding, breeding, refuge or movement; for endemic or range-restricted species, the significance of the site is considered relative to the species' distribution and habitat availability; and for migratory species, the assessment considers the importance of Graeme Hall as feeding, refuge, roosting or congregatory habitat.

Importantly, recorded presence or conservation status alone is not treated as sufficient to trigger Critical Habitat. The assessment considers the ecological importance of the relevant habitat to each species and the strength and currency of the supporting evidence. The complete species-level assessment is provided in the Priority Species Screening Matrix in Annex 3, while species materially influencing the Critical Habitat determination are addressed further in Section 5.1.6.

5.1.5.9. Candidate Key Biodiversity Features

The evidence review initially identified numerous individual biodiversity features, including mangrove communities, open-water and brackish habitats, resident and migratory birds, fish assemblages, species of conservation concern, hydrological processes and wetland–coastal connectivity. For purposes of the CHA, closely related features have been consolidated into **six candidate KBFs** that capture the principal biodiversity values and ecological processes requiring formal Critical Habitat assessment (see Table 50).

Table 50: Candidate Key Biodiversity Features

CANDIDATE KBF	BASIS FOR INCLUSION
KBF 1 – GRAEME HALL RAMSAR WETLAND AND ECOLOGICAL CHARACTER	Internationally recognized wetland containing nationally significant mangrove, open-water and associated wetland habitats and supporting diverse aquatic and terrestrial biodiversity.
KBF 2 – HYDROLOGICAL AND ECOLOGICAL PROCESSES SUPPORTING GRAEME HALL	Surface-water, groundwater, drainage, salinity and coastal-exchange processes influence water quality, habitat condition and maintenance of wetland ecological character.

CANDIDATE KBF	BASIS FOR INCLUSION
KBF 3 – MIGRATORY/CONGREGATORY WETLAND BIRDS	Graeme Hall provides feeding, refuge, roosting and other wetland functions for migratory waterbirds and shorebirds within a landscape where comparable wetland habitat is limited.
KBF 4 – ENDEMIC AND RANGE-RESTRICTED RESIDENT BIRDS	Resident avifauna includes species with endemic or restricted Caribbean distributions for which remaining wetland and associated terrestrial habitat may be important.
KBF 5 – CONNECTED COASTAL AND MARINE HABITATS	Adjacent seagrass and coral reef habitats form part of the wider Graeme Hall coastal ecological setting and may be connected to the wetland through hydrological and ecological pathways.
KBF 6 – THREATENED SPECIES ASSOCIATED WITH THE PROJECT/CHAA	Threatened and Near Threatened species recorded or credibly associated with wetland, coastal or marine habitats require assessment of the importance of affected habitat to their conservation.

The identification of these KBFs is a screening outcome rather than a Critical Habitat determination. Each KBF is therefore carried forward to Section 5.1.6 for systematic assessment against the applicable IDB criteria, including consideration of the strength of evidence, ecological importance and spatial relevance to the Project.

5.1.6. Critical Habitat Screening and Determination

The six candidate Key Biodiversity Features (KBFs) identified in Section 5.1.5 were assessed against the applicable IDB Critical Habitat criteria established in Section 5.1.3. The assessment integrates the desktop evidence base, priority species screening and targeted ecological field verification undertaken on 21, 24 and 28 August 2026 (see **Annex 3** for the *Ecological Field Verification Report*). Each criterion was classified as a **Confirmed Trigger, Potential Trigger, Not Triggered or Insufficient Information**, according to the strength and relevance of the available evidence.

The field verification was used principally to confirm current habitat condition, hydrological and ecological connectivity, Project–habitat interfaces and credible impact pathways. It was not designed as a comprehensive ecological or species survey and was not used to establish species abundance, population size or seasonal habitat use. Accordingly, non-detection during the field exercise is not interpreted as evidence of absence. The detailed Final Critical Habitat Screening and Determination Matrix is provided in **Annex 4**.

The assessment confirms that Graeme Hall qualifies as Critical Habitat/Critical Natural Habitat under the applicable IDB framework. **Criteria A, B and F are confirmed triggers**, while Criteria C, D and E identify additional species-based biodiversity values that remain relevant to the assessment but are not independently confirmed by the available evidence.

5.1.6.1. Criterion A – Protected or Internationally Recognized Area

Final determination: Confirmed Trigger

Graeme Hall Swamp is designated as a Wetland of International Importance under the Ramsar Convention (Ramsar Site No. 1591). As established in Section 5.1.3, the applicable IDB guidance recognizes Ramsar sites within the protected and internationally recognized areas relevant to Critical Natural Habitat determination. The Ramsar designation therefore provides an independent basis for confirming Criterion A.

The field verification does not alter this determination. Rather, observations from the accessible portions of the wetland confirmed the continuing presence of the principal habitat types identified through the desktop evidence, including marsh, open and standing water, drainage channels and mature mangrove habitat. Overall condition within the accessible interior wetland was assessed as Moderate to Good, notwithstanding localized disturbance and degradation.

The Critical Habitat determination therefore does not depend on demonstrating that every individual species or biodiversity feature associated with Graeme Hall independently meets a Critical Habitat threshold. The remaining criteria are nevertheless important for identifying the biodiversity features and ecological processes requiring protection and for establishing the appropriate spatial and ecological basis for the subsequent impact assessment.

5.1.6.2. Criterion B – Areas Necessary to Maintain a Protected or Internationally Recognized Area

Final determination: Confirmed Trigger

The desktop assessment identified hydrology, drainage, salinity and wetland–sea exchange as fundamental processes influencing the ecological character of Graeme Hall. Historical evidence demonstrates that the wetland functions within a substantially wider hydrological system and that changes in seawater exchange, salinity, water quality and drainage have contributed to changes in mangrove, aquatic and other wetland communities.

The field verification exercise materially strengthened this finding by confirming the functional connections between the Project area, the wetland and downstream coastal environment (*see photo collage in Figure 59*). The Project area lies within the natural watershed, with drainage generally directed southwards towards Graeme Hall. A natural gully was observed immediately east of the Project site, while four drainage pipes/areas were identified as conveying surface water from the surrounding southeast urban environment into the Eastern Marsh.

Within the wetland, the Upper Drainage and Bisecting Canal form part of an interconnected hydrological network. The Bisecting Canal was confirmed as a waterbody connecting wetland areas, while the southern wetland interface and existing SCSTP conveyance infrastructure continue towards the sluice/coastal outlet. The field exercise consequently found no basis for materially contracting or expanding the preliminary Critical Habitat Assessment Area (CHAA); rather, the verified drainage network, internal wetland connectivity and coastal outlet support retaining the functional spatial framework established in Section 5.1.4.

The combined desktop and field evidence therefore demonstrates that ecological processes and hydrologically connected areas extending beyond the formal Ramsar boundary contribute to maintaining the functioning and ecological character of the internationally recognized wetland. **Criterion B is consequently confirmed.**



Figure 59: Field verification of key habitats and hydrological connections supporting the Critical Habitat determination: Eastern Marsh, internal mangrove/drainage system and downstream sluice/coastal connection (August 2026).

5.1.6.3. Criteria C and D – Threatened, Endemic and Range-Restricted Species

Criterion C – Potential Trigger: Not Independently Confirmed

The priority species screening identified several threatened or Near Threatened species associated with the Project area or wider CHAA. These include threatened corals and marine turtles associated with the connected coastal environment, Atlantic Tarpon (*Megalops atlanticus*) within the Graeme Hall aquatic system, and conservation-priority flora associated with the Project interface. The preliminary screening specifically identified *Acropora palmata*, *A. cervicornis*, Hawksbill Turtle, Leatherback Turtle, Atlantic Tarpon, lignum-vitae (*Guaiaecum officinale*) and West Indian mahogany (*Swietenia mahagoni*) for further consideration. Current conservation status and the detailed basis for screening individual species are provided in the Priority Species Screening Matrix in **Annex 2**.

Field verification strengthened occurrence evidence for some biodiversity features, including direct confirmation of lignum-vitae at the Project interface. However, occurrence of a threatened species does not, by itself, demonstrate that the affected habitat is crucial to its survival, feeding, breeding or movement. The available evidence does not establish the relative importance of the CHAA to the populations or wider ranges of the candidate threatened species, and the rapid field exercise was not designed to provide this information.

Similarly, the evidence confirms the occurrence of endemic and range-restricted resident birds associated with Graeme Hall and its surrounding habitats but does not provide sufficient population-level information to demonstrate that the site meets Criterion D independently. The August verification was not a systematic avifaunal survey, and access to the Graeme Hall Nature Sanctuary was not obtained during the exercise. Observations from the field officer's previous visit to the Sanctuary on 10 April 2026 provide supporting context but are not treated as contemporaneous August field verification.

Criteria C and D therefore remain **Potential Triggers rather than independently confirmed triggers**. Importantly, this does not mean that the associated species are excluded from the CHA. They remain KBFs and sensitive receptors requiring consideration in the Project impact, mitigation and monitoring assessment.

5.1.6.4. Criterion E – Migratory and Congregatory Species

Final determination: Potential Trigger – High Confidence

Graeme Hall has a long documented history of supporting resident and migratory wetland birds and providing feeding, refuge, roosting and nesting habitat. The evidence summarized in Section 5.1.5. demonstrates that migratory avifauna forms an important component of the wetland's biodiversity value, while the priority species screening identifies individual migratory species requiring consideration.

Field verification confirmed that habitat capable of supporting migratory and congregatory birds remains present. The accessible wetland contained marsh, open/standing water, canal and mature mangrove habitat, and birds were recorded opportunistically, including Little Egret at the Project/wetland interface. These observations are consistent with, but do not independently demonstrate, the historical importance of Graeme Hall to migratory and congregatory birds.

The rapid verification exercise did not quantify abundance or seasonal use and therefore cannot establish whether current concentrations satisfy applicable population or congregatory thresholds. The inability to access the Nature Sanctuary during August further limits contemporary verification of important open-water and mangrove bird habitat. Criterion E is consequently retained as a **Potential Trigger – High Confidence** rather than upgraded to a confirmed trigger.

This precautionary position is appropriate given the substantial historical evidence, continuing availability of suitable habitat, and limitations of the rapid field exercise. Migratory and congregatory wetland birds are therefore retained as a priority KBF in the subsequent impact assessment.

5.1.6.5. Criterion F – Habitat of High Biodiversity Conservation Significance

Final determination: Confirmed Trigger

The evidence demonstrates that Graeme Hall retains substantial biodiversity-conservation significance despite historical modification and ongoing environmental pressures. The wetland contains nationally scarce mangrove, marsh and open-water habitat and supports important hydrological and ecological functions, resident and migratory fauna, aquatic communities and connectivity with the wider coastal environment.

The field verification exercise strongly corroborated this conclusion. Accessible portions of the wetland retained established marsh and open-water habitat and mature red and white mangrove communities. The Upper Drainage and Bisecting Canal, in particular, contained substantial mature mangrove habitat and standing/open water, with the Bisecting Canal continuing to function as an internal hydrological connection between wetland areas.

Existing pressures were also evident, including localized illegal dumping, urban stormwater inputs, existing wastewater infrastructure, hurricane-related mangrove damage, an apparently inoperable sluice gate and erosion at the coastal interface. However, these pressures have not eliminated the wetland's ecological value. The field assessment concluded that the accessible wetland remained overall in **Moderate to Good ecological condition**. Existing degradation is therefore relevant to the baseline and cumulative impact context, but does not negate the rarity, ecological functions, biodiversity-support value or restoration potential of the Graeme Hall system.

Criterion F is consequently retained as a **Confirmed Trigger**.

5.1.6.6. Overall Critical Habitat Determination

The final screening results are summarized below (Table 51):

Table 51: Summary of Final Critical Habitat Screening and Determination¹⁶

CRITERION	FINAL DETERMINATION	PRINCIPAL BASIS
A. EXISTING OR PROPOSED PROTECTED AREA / INTERNATIONALLY RECOGNIZED SITE	Confirmed Trigger	Graeme Hall Ramsar designation
B. AREA NECESSARY TO MAINTAIN A PROTECTED AREA	Confirmed Trigger	Verified watershed, drainage, internal wetland and downstream hydrological/ecological connectivity
C. HABITAT CRUCIAL FOR CR/EN/VU/NT SPECIES	Potential Trigger – Not Independently Confirmed	Qualifying species present/associated, but crucial-habitat importance not established
D. ENDEMIC OR RANGE-RESTRICTED SPECIES	Potential Trigger – Not Independently Confirmed	Relevant species present, but population/range significance not established
E. MIGRATORY SPECIES, ROUTES OR CONGREGATIONS	Potential Trigger – High Confidence	Strong historical evidence and continuing suitable habitat; current population/congregatory thresholds not established
F. HABITAT HIGHLY SUITABLE FOR BIODIVERSITY CONSERVATION	Confirmed Trigger	Nationally significant wetland/mangrove habitats, ecological functions, remaining condition and restoration value

Overall, Graeme Hall Swamp is confirmed as Critical Habitat/Critical Natural Habitat under the applicable IDB framework. Criterion A independently establishes the internationally recognized status of the Ramsar wetland, while Criteria B and F provide additional ecological support for the determination. In particular, the confirmation of Criterion B demonstrates that the Critical Habitat assessment cannot be confined solely to the formal Ramsar boundary: hydrological and ecological processes extending through the Project–wetland interface, interconnected wetland system and downstream coastal connection are relevant to maintaining the ecological character of Graeme Hall.

¹⁶ The detailed Final Critical Habitat Screening and Determination Matrix is provided in Annex 4

The species-based assessment further identifies threatened, endemic/range-restricted and migratory/congregatory biodiversity features requiring protection, notwithstanding that Criteria C–E are not independently confirmed by the available evidence. The six KBFs identified in Section 5 are therefore retained for the subsequent Project-impact assessment.

The Critical Habitat determination does not, in itself, establish that the Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities will result in significant conversion or degradation of Critical Habitat. That determination requires consideration of the specific **Project pressure → impact pathway → KBF** relationships, the sensitivity and vulnerability of the affected features, the magnitude, extent, duration, reversibility and likelihood of potential effects, and the effectiveness of applicable mitigation. These matters are assessed in Section 5.1.7. – Project Impacts and Significant Conversion/Degradation Assessment.

5.1.7. Project Impacts and Significant Conversion/Degradation Assessment

Following confirmation of Critical Habitat in Section 5.1.6., the assessment considered whether construction and operation of the Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities could adversely affect the identified Key Biodiversity Features (KBFs) or the ecological processes supporting Graeme Hall, and whether such effects could result in **significant conversion or degradation of Critical Habitat**.

The assessment follows a source–pathway–receptor approach. For each credible interaction, the relevant Project activity or pressure was linked to an environmental pathway and potentially affected KBF. Impact significance was then considered with reference to the sensitivity and irreplaceability of the receptor, together with the anticipated magnitude, spatial extent, duration, reversibility, likelihood and cumulative context of the effect. Existing mitigation and management provisions are taken into account in considering residual significance, while additional measures required to protect Critical Habitat are identified in Section 5.1.8.

Particular attention is given to effects capable of altering the area, integrity, ecological character or functioning of the Graeme Hall wetland, including effects on hydrology, water quality, mangrove and marsh habitat, habitat connectivity and the ability of the system to continue supporting priority species. The detailed **Critical Habitat Impact and Significance Matrix** is provided in **Annex 4**.

The field verification did not identify evidence of direct Project encroachment into wetland habitat at the Project interface. Rather, it confirmed that the principal Project–Critical Habitat relationship is predominantly **indirect and hydrological**, arising from the Project's location within the watershed immediately upstream of the wetland and the connectivity between the Project area, Eastern Marsh, internal wetland system and downstream coastal environment.

5.1.7.1. Principal Project–Critical Habitat Impact Pathways

The assessment identifies a limited number of credible pathways through which Project activities could affect Critical Habitat. These pathways are not equally significant and differ between construction and operation.

5.1.7.1.1. Construction Runoff, Sediment and Water-Quality Effects

The most direct construction-phase pathway is:

Project construction/disturbed ground → stormwater runoff and sediment transport → Eastern Marsh and internal wetland → wetland habitat and ecological processes.

Field verification confirmed that the proposed Water Reclamation Facility site lies within the natural watershed and that drainage generally moves southwards towards Graeme Hall. A natural gully occurs along

the eastern side of the Project area, while the Eastern Marsh lies immediately downslope and receives surface-water drainage from the surrounding watershed.

The Eastern Marsh was assessed as being in Good to Moderate condition and supported established marsh vegetation, open/standing water and wildlife. No obvious construction-related sedimentation was observed during the August visits. Existing shade cloth was also observed as a dust-control measure at the Project site. These observations establish the current condition but do not eliminate the prospective pathway during earthworks or other construction activities, particularly during rainfall.

Uncontrolled runoff could introduce sediment, suspended solids, construction contaminants or other pollutants to the wetland. Depending on magnitude and duration, this could affect water quality, aquatic habitat and wetland vegetation and could contribute cumulatively to existing water-quality and hydrological pressures. The pathway is principally relevant to **KBF 1 – Graeme Hall Ramsar Wetland and Ecological Character** and **KBF 2 – Hydrological and Ecological Processes Supporting Graeme Hall**, with secondary implications for aquatic fauna and bird habitat.

With effective erosion, sediment and stormwater controls, the pathway is considered manageable. However, because the receiving environment is confirmed Critical Habitat, prevention of uncontrolled construction runoff into the wetland should be treated as a priority avoidance/minimization requirement rather than relying solely on downstream remediation.

5.1.7.1.2. Changes to Hydrology and Water Management

Hydrological change represents the most important cross-cutting pathway because the ecological character of Graeme Hall is closely linked to water quantity, drainage, salinity, water quality and wetland–coastal exchange.

Field verification confirmed the physical continuity of this system. Surface water enters the Eastern Marsh from the surrounding watershed; the Upper Drainage and Bisecting Canal connect wetland components; and the southern wetland interface continues toward the sluice/coastal outlet. The sluice gate appeared inoperable during the August visits, with low/stagnant water and no visible active seawater exchange.

The project is intended to alter the existing wastewater-management arrangement by directing treated water from the existing facility to the new water-reclamation system for beneficial reuse, including aquifer recharge and/or agricultural use. The field exercise traced existing SCSTP outflow infrastructure through the southern wetland and toward the coastal outlet, confirming that changes to the existing treatment and conveyance system occur within an already hydrologically connected setting.

The ecological consequence of such changes cannot be inferred simply from whether the volume of water entering the wetland increases or decreases. Given the documented historical alteration of Graeme Hall's hydrology, the relevant issue is whether Project-related changes could materially alter the water balance, water quality, salinity regime or hydrological functioning necessary to maintain or restore wetland ecological character.

Accordingly, Project-related hydrological change is treated as a potentially important pathway for **KBFs 1 and 2**. Effects on KBFs 3, 4 and 6 could occur secondarily if hydrological change resulted in deterioration of feeding, roosting, breeding, aquatic or other habitat.

5.1.7.1.3. Habitat Disturbance and Edge Effects

The field verification found no evidence that the Project footprint directly occupies or encroaches upon the Ramsar wetland at FV-01. A physical separation between the Project area and wetland habitat remained

evident. Direct permanent loss of Ramsar wetland or mangrove habitat is therefore not identified from the available Project and field evidence as a principal impact pathway.

Nevertheless, construction and operation immediately upstream of a sensitive wetland can generate indirect edge effects, including dust, noise, artificial lighting, human activity and accidental physical disturbance. Existing lighting and limited operational noise from the SCSTP were observed at the Project interface.

These pressures are principally relevant where they could affect wetland fauna, particularly birds using nearby habitat. Given the absence of direct wetland occupation and the existing developed context surrounding portions of Graeme Hall, such effects are expected to be spatially localized. Their significance will depend on the timing, intensity and duration of construction activities and the effectiveness of controls, particularly where activities occur close to sensitive wetland margins or during periods of significant bird use.

Direct disturbance or clearance of mature vegetation at the Project interface also warrants specific attention because *lignum-vitae* (*Guaiacum officinale*) was confirmed during field verification. The presence of this conservation-priority species does not independently establish Criterion C, as discussed in Section 5.1.6., but it does establish a receptor requiring avoidance or appropriate management during site preparation. The photographic record confirms the species within the SCSTP / Project Interface.

5.1.7.1.4. Wastewater, Accidental Releases and Pollution Events

Accidental releases represent a low-frequency but potentially higher-consequence pathway because contaminants entering the drainage system could be transported towards the wetland.

The field exercise confirmed that the Project and existing SCSTP occur within the upstream watershed and that hydrological connections exist between developed areas and the Eastern Marsh. Existing wastewater infrastructure also traverses the southern wetland and continues toward the coast. Consequently, failures, spills, untreated or inadequately treated discharges, fuel or chemical releases, or other pollution incidents require consideration even where they are not expected during normal operation.

The significance of such events would depend strongly on their nature, volume, duration, receiving conditions and response time. A substantial uncontrolled release reaching the wetland could affect water quality, aquatic fauna, mangrove/marsh habitat and other KBFs. Prevention, containment, emergency response and verification of discharge arrangements are therefore important components of the Critical Habitat mitigation framework addressed in Section 5.1.8.

5.1.7.1.5. Downstream Coastal and Marine Pathways

The field exercise confirmed a physical pathway between the Graeme Hall system and the downstream coastal environment at Sandy Beach. Existing SCSTP outflow pipes were traced through the southern wetland to Sandy Beach, where they continue offshore. The sluice/channel also represents the historical wetland–coastal connection, although observable exchange was constrained during the August visits.

This evidence supports retaining **KBF 5 – Connected Coastal and Marine Habitats** within the assessment. It does not, however, demonstrate that all nearshore habitats or threatened marine species identified during desktop screening are presently exposed to significant Project effects.

The principal relevant pathways are changes in the quality or quantity of water reaching the coastal environment, accidental releases conveyed downstream, and changes associated with existing wastewater conveyance/discharge arrangements. Potential receptors include nearshore water quality and associated seagrass, reef and marine fauna where a credible hydrological connection is established.

Because the field verification did not include marine habitat surveys or quantitative coastal water-quality assessment, conclusions regarding site-specific effects on individual marine species or habitats should remain proportionate to the available evidence. The confirmed physical connection warrants their consideration in the impact assessment but does not by itself demonstrate significant degradation of coastal or marine KBFs.

5.1.7.1.6. Existing Pressures and Cumulative Context

Potential Project impacts must be considered within an already modified ecological setting. Field verification documented several existing pressures, including illegal dumping in the Eastern Marsh, urban stormwater inputs, existing wastewater infrastructure through the wetland, developed wetland margins, hurricane-related mangrove damage, an apparently inoperable sluice gate, stagnant water and debris within the coastal outlet channel, and beach erosion at Sandy Beach (see Table 52).

The field exercise nevertheless found the accessible interior wetland to be generally in Moderate to Good condition, with substantial mature mangrove, marsh and open-water habitat remaining. The presence of existing degradation therefore does not reduce the requirement to protect Critical Habitat. Rather, it increases the importance of avoiding additional pressures that could interact cumulatively with existing hydrological, water-quality or habitat stress.

At the same time, the project is intended to improve wastewater treatment and beneficial reuse. Consequently, not all changes from the existing condition should be treated as adverse. Where the Project reduces existing wastewater-related pressure or improves management of treated effluent, it may result in environmental benefits. Such benefits do not remove the requirement to manage construction and operational risks, particularly where changes to existing water pathways could themselves affect wetland hydrology.

Table 52: Summary of Principal Project–Critical Habitat Impact Pathways and Assessment¹⁷

PRINCIPAL PATHWAY	PRIMARY KBF(S)	POTENTIAL EFFECT	OVERALL ASSESSMENT
CONSTRUCTION RUNOFF, SEDIMENT AND CONTAMINANTS → EASTERN MARSH/WETLAND	KBF 1, KBF 2	Water-quality deterioration, sedimentation, wetland/aquatic habitat effects	Manageable with stringent construction controls; degradation not anticipated with mitigation
PROJECT-RELATED CHANGE IN WATER MANAGEMENT/HYDROLOGY	KBF 1, KBF 2; indirectly KBFs 3, 4, 6	Altered water balance, water quality, salinity or ecological functioning	Priority Critical Habitat risk; requires hydrological safeguards and monitoring
CONSTRUCTION NOISE, DUST, LIGHTING AND ACTIVITY	KBF 3, KBF 4	Localized disturbance/displacement of fauna	Localized/manageable; significant degradation not anticipated
VEGETATION CLEARANCE/SITE PREPARATION	KBF 6	Loss/damage to conservation-priority flora at Project interface	Avoidable through pre-clearance identification/protection measures

¹⁷ The detailed Critical Habitat Impact and Significance Matrix is provided in Annex 5

PRINCIPAL PATHWAY	PRIMARY KBF(S)	POTENTIAL EFFECT	OVERALL ASSESSMENT
ACCIDENTAL WASTEWATER/CHEMICAL/FUEL RELEASE	KBF 1, KBF 2; potentially KBFs 3, 5, 6	Acute water-quality and habitat effects	Low frequency but potentially material; prevention and emergency response required
CHANGE IN EXISTING DOWNSTREAM CONVEYANCE/DISCHARGE PATHWAY	KBF 2, KBF 5	Changes to wetland/coastal water quantity or quality	Requires confirmation of future configuration and assessment/monitoring of hydrological implications
CUMULATIVE INTERACTION WITH EXISTING WETLAND PRESSURES	All relevant KBFs	Incremental degradation of already stressed ecological processes	Requires avoidance of additional material pressure and monitoring of key ecological conditions

5.1.7.1.7. Significant Conversion or Degradation Determination

The assessment distinguishes between the presence of an impact pathway and an effect capable of causing **significant conversion or degradation of Critical Habitat**. The latter would require an effect of sufficient magnitude, extent, duration or irreversibility to materially reduce the integrity, ecological character or biodiversity-support function of the Critical Habitat or substantially compromise the KBFs and ecological processes for which it is important.

Based on the Project information, desktop evidence and field verification currently available, **direct significant conversion of Graeme Hall Critical Habitat is not anticipated**, as the Project footprint does not involve identified direct occupation or permanent conversion of Ramsar wetland or mangrove habitat. Field verification similarly identified no Project encroachment into wetland habitat at the immediate Project interface.

The more material risk is therefore **significant degradation through indirect effects**, particularly if Project activities were to cause substantial or sustained deterioration in wetland hydrology or water quality. Uncontrolled construction runoff, significant sediment or pollutant inputs, major accidental releases, or material adverse alteration of water quantity, quality or hydrological connectivity could affect KBFs 1 and 2 and, through habitat-mediated effects, the species-based KBFs.

On the available evidence, these outcomes represent credible risks requiring management rather than predicted unavoidable outcomes of the Project. The identified pathways are generally amenable to avoidance and minimization through appropriate construction controls, hydrological safeguards, pollution prevention, operational management and monitoring.

Accordingly, the Project is not presently assessed as likely to result in significant conversion or degradation of Critical Habitat, provided that the identified Critical Habitat safeguards are incorporated into Project design, construction and operation and their effectiveness is verified through appropriate monitoring. Particular priority should be given to maintaining the hydrological and water-quality conditions necessary to protect the ecological character of Graeme Hall, preventing uncontrolled runoff or contaminant releases to the wetland, avoiding direct impacts to sensitive vegetation and habitat, and ensuring that changes to wastewater conveyance and water management do not result in material adverse alteration of wetland hydrology.

The mitigation, management, monitoring and follow-up measures necessary to support this conclusion are set out in Section 5.1.8. and the detailed Critical Habitat Mitigation, Monitoring and Follow-up Action Matrix in **Annex 5**.

5.1.8. Mitigation, Management, Monitoring and Follow-up Requirements

The Critical Habitat Assessment confirms that Graeme Hall qualifies as Critical Habitat/Critical Natural Habitat and that the principal Project risks arise predominantly through **indirect hydrological and water-quality pathways**, rather than direct conversion of wetland habitat. As assessed in Section 5.1.7., significant conversion or degradation is not anticipated provided that existing ESIA/ESMP measures are effectively implemented and supplemented by the Critical Habitat requirements identified through this assessment.

Mitigation should therefore follow the hierarchy of avoidance, minimization, restoration/rehabilitation and, only where necessary, compensation. For the present Project, priority is placed on avoidance and minimization. In particular, the Project should avoid direct encroachment into wetland habitat, prevent uncontrolled sediment or contaminant inputs, maintain the hydrological and water-quality conditions necessary to support Graeme Hall's ecological character, and prevent accidental or emergency releases from causing material effects on the wetland or connected coastal environment.

The CHA does not replace the biodiversity, pollution-prevention, drainage, waste-management, emergency-response and monitoring provisions already established through the existing ESIA/ESMP. Rather, it identifies where those measures require particular emphasis, verification or supplementation because of the sensitivity of the receiving environment. The detailed requirements are provided in the **Critical Habitat Mitigation, Monitoring and Follow-up Action Matrix in Annex 5**.

5.1.8.1. Avoidance and Protection of Critical Habitat

The primary Critical Habitat requirement is to maintain the physical separation between Project activities and the Graeme Hall wetland. Field verification found no evidence of Project encroachment into wetland habitat at the immediate Project interface. This separation should be maintained throughout construction and operation through clearly defined construction boundaries and no-go areas.

No temporary or permanent works, storage, equipment placement, spoil disposal or construction access should extend into Ramsar wetland, mangrove, marsh or drainage habitat unless specifically assessed and authorized. Construction personnel should be informed of the ecological sensitivity of the adjoining wetland and the importance of remaining within approved work areas.

Vegetation clearance within the Project footprint should similarly be limited to the minimum necessary. Conservation-priority vegetation identified during field verification, including *lignum-vitae* (*Guaiaacum officinale*) at the Project interface, should be identified before clearance and avoided where practicable. Where avoidance is not feasible, appropriate management should be determined before removal.

These measures are principally relevant to **KBF 1 – Graeme Hall Ramsar Wetland and Ecological Character** and **KBF 6 – Threatened Species Associated with the Project/CHAA**.

5.1.8.2. Construction Runoff, Sediment and Pollution Prevention

The verified hydrological connection between the Project area and the Eastern Marsh makes construction stormwater and pollution control a priority Critical Habitat safeguard. Erosion, sediment and drainage controls established through the ESIA/ESMP should be installed before significant ground disturbance and maintained throughout construction.

Particular attention should be given to areas from which runoff could move towards the natural gully, Eastern Marsh or other wetland drainage pathways. Controls should be inspected routinely and following significant rainfall, with deficiencies corrected promptly. Stockpiles, spoil, construction materials and waste should be located and managed so that they cannot be transported into the wetland.

Fuel, chemicals and other hazardous materials should similarly be stored and handled away from wetland margins and drainage pathways, with appropriate secondary containment and spill-response materials available. Any spill or uncontrolled release with potential to reach Graeme Hall should trigger immediate containment, notification, investigation and corrective action.

These measures primarily protect **KBF 1 – Graeme Hall Ramsar Wetland and Ecological Character and KBF 2 – Hydrological and Ecological Processes Supporting Graeme Hall**, while also reducing indirect risks to aquatic fauna, birds and other biodiversity dependent on wetland habitat.

5.1.8.3. Protection of Hydrological and Water-Quality Conditions

Maintenance of the hydrological processes supporting Graeme Hall is the most important longer-term Critical Habitat management requirement arising from the CHA. Desktop evidence and field verification demonstrate that the wetland is influenced by the wider watershed, internal drainage pathways and its downstream coastal connection. Historical changes in drainage, seawater exchange, salinity and water quality have already contributed to changes in wetland ecological condition.

Project design and operation should therefore avoid any material adverse alteration of the water balance, drainage regime, water quality, salinity or hydrological connectivity necessary to maintain the ecological character of Graeme Hall. This requirement applies both to drainage associated with the Project footprint and to changes arising from the transition from the existing wastewater-management arrangement to reclaimed-water treatment and reuse.

Two targeted technical matters should be confirmed by the Project team:

1. the **function and future configuration of the drainage/outflow infrastructure** observed at the Eastern Marsh and along the existing SCSTP conveyance route; and
2. the **operational status, management responsibility and intended future arrangements for the sluice gate/coastal outlet**.

These are targeted design and operational confirmations rather than requirements for a further broad ecological survey. Their purpose is to ensure that final Project arrangements are understood sufficiently to verify that the Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities will not materially adversely alter hydrological conditions supporting Critical Habitat.

Where Project design or operational arrangements are subsequently modified in a manner capable of changing drainage, discharge, groundwater interaction or wetland water balance, the ecological implications should be reviewed before implementation.

5.1.8.4. Operational and Emergency Safeguards

Normal operation should maintain the treatment, water-quality and containment standards established through the Project's environmental management framework. Particular attention should be given to ensuring that changes in treated-water conveyance and reuse do not inadvertently create adverse effects on Graeme Hall through changes in water quantity, water quality or existing drainage relationships.

Emergency and plant-failure arrangements should explicitly address the proximity and connectivity of Critical Habitat. The Project should confirm that credible failure scenarios, including loss of treatment capacity,

overflow, equipment failure, power interruption and maintenance events, can be managed without substantial uncontrolled discharge of untreated or inadequately treated wastewater to Graeme Hall or connected coastal pathways.

Emergency-response procedures should identify relevant containment measures, responsibilities, notification requirements and response actions where a release could reach the wetland. Any material release should be followed by appropriate environmental verification to determine whether water quality, habitat or other KBFs have been affected and whether corrective or restorative action is necessary.

5.1.8.5. Management of Disturbance to Biodiversity

Construction-related noise, artificial lighting and human activity should be managed to minimize unnecessary disturbance of wetland fauna, particularly migratory/congregatory and resident birds associated with **KBF 3 – Migratory/Congregatory Wetland Birds** and **KBF 4 – Endemic and Range-Restricted Resident Birds**.

Lighting near the wetland interface should use the minimum illumination required for safe operation, be directed away from wetland habitat and incorporate shielding or other measures to minimize light spill. Night-time inspection should be undertaken where necessary to verify that lighting is not unnecessarily illuminating adjoining habitat.

Construction activities should remain within approved working areas and hours, with unnecessary high-disturbance activity adjacent to wetland margins avoided. The rapid CHA does not establish a basis for routine seasonal construction restrictions. However, if significant nesting, roosting or other sensitive fauna activity is identified immediately adjacent to active works, targeted temporary measures should be implemented based on the circumstances observed.

5.1.8.6. Critical Habitat Monitoring and Adaptive Management

Monitoring should verify both implementation of mitigation measures and whether the ecological conditions relevant to Critical Habitat remain protected. It should build on existing ESIA/ESMP monitoring rather than establish a parallel monitoring programme.

Priority monitoring should focus on parameters capable of providing early warning of Project-related change in the pathways identified in Section 5.1.7. These should include, as applicable:

- construction drainage, erosion and sediment-control performance;
- evidence of sediment, contaminant or wastewater entry into wetland drainage pathways;
- wetland water quality conditions at locations relevant to Project pathways;
- hydrological conditions sufficient to identify material Project-related changes in water level, flow or other relevant water-regime characteristics;
- operational discharge/reclaimed-water performance relevant to the wetland;
- incidents, spills, overflows and corrective actions; and
- condition of relevant Project–wetland interface areas and sensitive vegetation.

Monitoring of individual species should be proportionate to the risk pathway. The CHA does not identify a need for broad new biodiversity surveys solely because Criteria C–E remain potential triggers. Additional species-specific monitoring should instead be required where Project activities could plausibly affect a priority species or where monitoring results indicate deterioration of the habitat conditions upon which the relevant KBF depends.

Monitoring results should be periodically reviewed against baseline/reference conditions and Project performance requirements. Where monitoring identifies an adverse trend reasonably attributable to the Project, the cause should be investigated and corrective measures implemented. Where the cause is uncertain, the Project should determine whether additional targeted investigation is required.

This adaptive management approach is particularly important for hydrology and water quality because Graeme Hall is already influenced by multiple historical and ongoing pressures. Monitoring should therefore seek, where practicable, to distinguish Project-related change from wider baseline variation and existing sources of degradation.

5.1.8.7. Follow-up and Information Requirements

The CHA does not identify a need for additional broad ecological survey before the Critical Habitat determination can be completed. Graeme Hall's Critical Habitat status is already confirmed, and the field verification provided sufficient evidence to establish the principal Project–habitat interfaces and impact pathways.

Follow-up should instead be limited to information capable of materially affecting the assessment of Project risk or the effectiveness of required mitigation. The principal outstanding matters are therefore:

Project design and operational confirmation. Confirm the function and future configuration of relevant drainage/outflow infrastructure, the final arrangements for wastewater/reclaimed water conveyance, and the operational and management arrangements for the sluice/coastal outlet where these could influence wetland hydrology or downstream pathways.

Implementation verification. Confirm that construction boundaries, drainage and sediment controls, pollution-prevention measures, sensitive vegetation protection and emergency safeguards are incorporated into relevant contractor and operational environmental-management requirements.

Monitoring and adaptive management. Establish appropriate monitoring locations, parameters, responsibilities and response mechanisms for the priority hydrological and water-quality pathways identified by the CHA.

If subsequent Project design changes introduce a new footprint within wetland habitat, materially change drainage or water-management arrangements, create a new discharge pathway, or otherwise establish an impact pathway not considered in this CHA, the biodiversity implications should be reviewed before the change is implemented.

5.1.8.8. Critical Habitat Management Requirements

The principal requirements arising from the CHA are summarized in the table below. The detailed allocation of measures, mitigation hierarchy, existing ESMP provisions, responsibilities, timing and monitoring/verification requirements is provided in the **Critical Habitat Mitigation, Monitoring and Follow-up Action Matrix in Annex 5 (see Table 53 for a summary)**.

Table 53: Summary of Critical Habitat Mitigation, Monitoring and Follow-up Requirements

PRIORITY RISK / KBF	CRITICAL HABITAT REQUIREMENT	MITIGATION HIERARCHY	IMPLEMENTATION STAGE
DIRECT WETLAND/HABITAT DISTURBANCE – KBF 1	Maintain Project boundaries and no-go areas; no encroachment, storage, spoil disposal, or unauthorized works within wetland/mangrove habitat	Avoid	Pre-construction / Construction

PRIORITY RISK / KBF	CRITICAL HABITAT REQUIREMENT	MITIGATION HIERARCHY	IMPLEMENTATION STAGE
CONSERVATION-PRIORITY VEGETATION – KBF 6	Identify sensitive vegetation before clearance; avoid where practicable and manage appropriately where unavoidable	Avoid / Minimize	Pre-construction / Construction
CONSTRUCTION RUNOFF AND SEDIMENT – KBFS 1 & 2	Prevent uncontrolled sediment-laden or contaminated runoff reaching Eastern Marsh or connected wetland drainage	Avoid / Minimize	Construction
FUEL/CHEMICAL SPILLS – KBFS 1, 2 & 6	Maintain separation from drainage/wetland pathways, containment and rapid spill response	Avoid / Minimize	Construction / Operation
HYDROLOGICAL CHANGE – KBFS 1 & 2	Demonstrate no material adverse alteration of wetland water balance, drainage, water quality, salinity or ecological functioning	Avoid / Minimize	Design / Operation
EXISTING OUTFLOW/COASTAL PATHWAY – KBFS 2 & 5	Confirm future infrastructure configuration and sluice arrangements and assess implications for wetland/coastal hydrology	Avoid / Minimize	Design / Pre-operation
PLANT FAILURE/EMERGENCY DISCHARGE – KBFS 1, 2, 3, 5 & 6	Confirm engineering containment and emergency arrangements capable of preventing/minimizing uncontrolled discharge to Critical Habitat	Avoid / Minimize	Design / Operation
NOISE/LIGHT DISTURBANCE – KBFS 3 & 4	Minimize unnecessary noise/activity and light spill towards wetland habitat	Minimize	Construction / Operation
HYDROLOGY AND WATER QUALITY – PRINCIPALLY KBFS 1 & 2	Monitor relevant conditions and investigate material adverse Project-related changes	Monitor / Adaptive management	Construction / Operation
CUMULATIVE PRESSURES – ALL RELEVANT KBFS	Review monitoring trends in context of existing pressures and implement corrective action where Project-related deterioration is identified	Minimize / Adaptive management	Construction / Operation

5.1.9. Conclusions and Key Requirements

This Rapid Critical Habitat Assessment was undertaken to determine whether biodiversity features potentially affected by the Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities qualify as Critical Habitat under the applicable IDB framework and, where Critical Habitat is present, whether the Project could result in significant conversion or degradation. The assessment integrated the existing biodiversity evidence base, priority species screening, Critical Habitat criteria screening and targeted field verification undertaken in August 2026. The field exercise was used to verify current habitat conditions, Project–habitat interfaces, hydrological and ecological connectivity and the principal pathways through which Project activities could interact with Graeme Hall.

The assessment **confirms that Graeme Hall Swamp qualifies as Critical Habitat/Critical Natural Habitat**. Criterion A is confirmed on the basis of Graeme Hall's designation as a Wetland of International Importance under the Ramsar Convention. Criteria B and F are also confirmed. In particular, the combined desktop and field evidence demonstrates that hydrological and ecological processes extending through the Project–wetland interface, interconnected wetland drainage system and downstream coastal connection are functionally relevant to maintaining the ecological character of Graeme Hall. The wetland also retains nationally significant mangrove, marsh and open-water habitats, ecological functions and biodiversity-support value despite historical modification and localized degradation.

Species-based screening additionally identified threatened, endemic/range-restricted and migratory/congregatory biodiversity features requiring protection. Criteria C and D remain potential triggers that are not independently confirmed by the available population-level evidence, while Criterion E is retained as a high-confidence potential trigger. These findings do not affect the overall Critical Habitat determination, which is independently established through the confirmed criteria. The associated species remain KBFs and sensitive receptors for Project environmental management and monitoring.

The Project is **not expected to result in direct significant conversion of Critical Habitat**, as the available Project information and field verification do not indicate direct occupation or permanent conversion of Ramsar wetland or mangrove habitat. The principal risks instead arise through **indirect hydrological and water-quality pathways**. These include construction runoff and sediment transport towards the Eastern Marsh, changes in drainage or wastewater/reclaimed-water management, accidental or emergency releases, and changes associated with the existing downstream conveyance and coastal connection. Noise, artificial lighting and vegetation disturbance represent additional, but more localized, biodiversity pressures.

On the basis of the assessment undertaken, the **Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities is not expected to result in significant conversion or degradation of Critical Habitat, provided that the mitigation, management, monitoring and follow-up requirements identified by the CHA are incorporated into Project design, construction and operation and effectively implemented**. In particular, the Project should maintain physical separation from wetland habitat; prevent uncontrolled sediment, pollutant and wastewater inputs; avoid material adverse alteration of the hydrological and water-quality conditions supporting Graeme Hall; maintain appropriate emergency containment and response arrangements; and minimize unnecessary disturbance of sensitive biodiversity.

Targeted technical confirmation is required regarding the function and future configuration of relevant drainage/outflow infrastructure and the operational status, management responsibility and intended future arrangements for the sluice gate/coastal outlet. These matters are required to verify the effectiveness of the proposed hydrological and operational safeguards; they do not represent information gaps that prevent completion of the Critical Habitat determination. Similarly, the CHA does not identify a need for additional broad ecological surveys at this stage. Further ecological or technical investigation should be targeted only where subsequent Project information, monitoring results or design changes identify a matter capable of materially changing impact significance or required mitigation (see Figure 60).

The assessment does not identify a present requirement for biodiversity offsets or other compensatory measures. The identified risks can be addressed primarily through avoidance, minimization, effective environmental management, monitoring and adaptive management. Should subsequent Project changes introduce direct wetland impacts, materially alter drainage or water-management arrangements, establish a new discharge pathway, or otherwise create an impact pathway not assessed in this CHA, the Critical Habitat implications should be reviewed before the change is implemented.

Overall, the CHA supports progression of the **Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities subject to implementation and verification of the identified Critical Habitat safeguards**. Particular priority should be given to maintaining the hydrological and ecological processes that sustain Graeme Hall and ensuring that Project activities do not add materially to the existing pressures affecting the wetland. Integration of the CHA requirements into the Project's ESIA/ESMP and operational environmental-management arrangements, supported by monitoring and timely corrective action, provides the basis for protecting the Critical Habitat values identified through this assessment.



Figure 60: Ecological Field Verification Stations

Wetland habitats comprising marsh, mangrove, canal/open water and coastal interface were assessed as Moderate to Good. Localized degradation was observed, including storm-related mangrove damage from Hurricane Beryl, illegal dumping and urban edge influence.



Figure 61: Project Interface - Site for the new Water Reclamation Facility

Connectivity was confirmed as a defining feature of the system. Watershed drainage flows south into the Eastern Marsh, internal canals maintain linkages between wetland compartments, and existing SCSTP outflow infrastructure continues through the southern wetland to the coastal outlet (see Figure 61).

Recorded pressures included illegal dumping, hurricane damage to mangroves, urban stormwater inflows, wastewater conveyance infrastructure, physical disturbance at wetland margins, an inoperable sluice gate, stagnant water in the outlet channel and beach erosion at Sandy Beach (see Figure 62).



Figure 62: Eastern Marsh – Illegal Dumping

Field observations reinforced KBF 1 (Graeme Hall Ramsar wetland character), KBF 2 (hydrological and ecological processes) and KBF 5 (connected coastal and marine habitats). Opportunistic fauna records

supported KBF 3 (migratory birds), while earlier Nature Sanctuary observations provided context for KBFs 3 and 4 (endemic and range-restricted birds).

No modification of the preliminary CHAA boundaries is required. Verified drainage networks, internal connectivity and coastal outlet conditions confirm hydrological and ecological processes as the principal basis for subsequent impact assessment, mitigation and monitoring requirements.

5.1.10. Alternatives considered

The siting of the works as a whole, including the decision to reclaim water at the existing South Coast plant rather than build on a new site, was settled in the appraisal of the parent project and is assessed in the Environmental and Social Impact Assessment for the Barbados Climate Resilient South Coast Water Reclamation Project. This assessment does not revisit it. What follows is the narrower set of choices that were open once the parent decision had been taken, and which this assessment can properly examine.

Three were considered. The first was to house the workforce off site in existing rented accommodation on the south coast rather than build a camp. That option removes the construction and operation of the camp altogether, and with it the sanitary loading, the noise and the lighting adjacent to the wetland. It was not adopted because the workforce includes eighty non-local skilled workers on fixed-term assignment, because the volume of rooms required on a coast with high seasonal occupancy could not be secured for the duration, and because dispersal of the workforce into residential neighborhoods transfers the labor influx risk from a managed and monitored setting into an unmanaged one. That trade-off should be stated plainly: the camp concentrates the risk, and concentration is what makes the controls in the Environmental and Social Management Plan enforceable.

The second was an alternative location within the plant boundary, further from the swamp edge. The available footprint is constrained by the treatment works themselves, by the access road and by the area required for construction laydown, and no alternative arrangement was found that increased the separation from the wetland without displacing operational plant. The layout adopted places the accommodation blocks at the greatest distance from the swamp that the site permits, with the vehicle areas and workshops on the landward side.

The third was the sanitation arrangement. Discharging the camp's sewage to the existing works was chosen over on-site package treatment or septic pumping off site. That choice depends on the works having capacity for the camp's load, which is the point examined in the impact evaluation and which is the subject of an open item, because the sanitary systems are sized on ninety-eight resident workers while up to two hundred and three people may be on site during the working day.

The no-project case for the camp is the first alternative described above, and it is not a null option: the workforce still arrives and still has to be housed somewhere.

5.2. Community Health Assessment

The community health assessment assesses the potential effects of the Project on the health of surrounding communities – including vulnerable groups (women, girls, boys, men, youth, older persons, persons with disabilities (PWDs), migrants, informal workers, and female-headed households) – and establishes the programme through which those effects will be prevented, minimized, monitored and managed. Part A presents the Community Health Assessment. Section 8.8. presents the Community Health Plan.

The document treats community health as a discipline distinct from occupational health and safety (OHS). Occupational exposures affecting the Project workforce are governed by the Workers' Health and Safety Plan and the Health and Safety Manual. This document addresses persons outside the workforce, together with the pathways by which conditions inside the camp reach the community. However, it should be noted that the failure of OHS can have direct and indirect impacts on the community.

The boundary between the two disciplines is set by the identity of the person exposed. Where the person exposed is a worker inside the Workers' Campsite or on a work front, the matter is occupational health and safety and belongs to the Workers' Health and Safety Plan and the Health and Safety Manual. Where the person exposed is a resident, a road user, a schoolchild, a vendor, a visitor or another person outside the workforce, the matter is community health and belongs here. Measures described in Part B are included only where they act on a pathway that reaches persons outside the workforce.

That boundary does not sever the two disciplines, because a failure of occupational health and safety is itself a community health pathway. The connection operates in four ways on this Project. A communicable disease outbreak inside the campsite does not remain inside it, since workers move through the surrounding community during off-duty hours and local personnel return to households in the Area of Influence each day; camp illness rates are therefore monitored as a leading indicator for community transmission at CH-07. A failure of camp sanitation, wastewater containment or waste storage produces vector breeding, odor and effluent release that cross the site boundary and reach the nearest residences approximately 250 meters away, assessed at CH-01, CH-03 and CH-05. A driver fatigue, competence or vehicle maintenance failure, which is an occupational matter inside the gate, becomes a pedestrian strike on the shared access road outside it, assessed at CH-06. An emergency inside the campsite, whether fire, chemical release or structural failure, generates smoke, released material or an evacuation demand that affects adjacent residents and can draw on the same emergency services the community depends upon, assessed at CH-10.

The occupational measures that control these four pathways are set out in the Workers' Health and Safety Plan and the Health and Safety Manual and are not repeated in Part B. What this Assessment records is the community-facing consequence of their failure, the monitoring that would detect it, and the notification and response owed to affected residents. Occupational performance indicators are accordingly relied upon as leading indicators of community health risk, and a sustained deterioration in occupational performance is treated as a trigger for review of the community health controls at Section 15.

5.2.1. Scope

The Assessment covers the effects of people who live, travel, learn, work and seek care within the Area of Influence including, women, girls, boys, men, youth, older persons, persons with disabilities, migrants, informal workers, and female-headed households. Workers' and Management Campsite, the South Coast Sewage Treatment Plant upgrade, and the South Coast Water Reclamation and Re-use Facility. It addresses site preparation, construction, commissioning and early operation, together with decommissioning of the campsite. Long-term operational health effects of the completed facilities are addressed at a screening level and are to be revisited when the operational Environmental and Social Management Plan is finalized including further analysis of long-term, gender-differentiated community health outcomes

5.2.2. Methodology

The Assessment applies a determinants-of-health approach consistent with Good International Industry Practice and with the World Bank Group General Environmental, Health and Safety Guidelines.¹⁸ It identifies the environmental, social including gender-related determinants, differentiated vulnerability by sex, age and disability, and risks of SH/SEA/GBV and institutional determinants through which Project activities can alter health outcomes and assesses each pathway individually.

Six steps were applied. Screening identified Project activities with credible health pathways across all components and phases. Receptor mapping established the communities, sensitive receptors and vulnerable groups including women, girls, boys, men, youth, older persons, persons with disabilities, migrants, informal workers, and female-headed households within the Areas of Influence. Baseline characterization described existing health status, health service arrangements and the environmental and social determinants operating in the receiving area using disaggregated data where available. Impact assessment evaluated each pathway using the rating methodology at Section 3.3. Mitigation design applied the mitigation hierarchy of avoidance, minimization, restoration and offset to produce the Programme in Part B. Residual evaluation determined post-mitigation significance and specified monitoring indicators, responsibilities, frequencies and corrective action triggers.

Document Review and Secondary Data

Sources reviewed comprise the Updated Environmental and Social Impact Assessment and Management Plan for the Barbados Climate Resilient South Coast Water Reclamation Plant, revised April 2024;¹⁹ the Workers' Camp Environmental and Social Impact Assessment, Version 2B, prepared by BrinsJen Systems Development Specialists;²⁰ the Workers' Code of Conduct of China Railway Shanghai Engineering Group, Version 2.0, July 2026;²¹ the draft Grievance Redress Mechanism; the draft Sexual Exploitation and Abuse, Sexual Harassment and Gender-Based Violence Prevention and Response Plan; the Health and Safety Manual, Revision 2; the Environmental, Social, Health and Safety requirements of the tender documentation, including Form CCESHS and the Employer's Requirements;²² the Environmental and Social Management Plan for the R's for Climate

¹⁸ World Bank Group, *General Environmental, Health and Safety Guidelines*, Section 3: Community Health and Safety, together with the *Environmental, Health and Safety Guidelines for Water and Sanitation*.

¹⁹ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

²⁰ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

²¹ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

²² *Standard Bidding Document for Design and Build of Civil Works*, Barbados Climate Resilient South Coast Water Reclamation Project: Section V Bidding Forms, including Form ESHS, Form CCESHS and Form LSER; Section VI Employer's Requirements, Environmental, Social, Health and Safety Requirements, listing the required management plans and the minimum content for the Contractor ESHS Framework and Code of Conduct; Section VIII Particular Conditions of Contract, Part C, ESHS metrics for progress reports, and Part D, Contractor's Code of Conduct.

Resilience Wastewater System in Barbados prepared by Nemus;²³ and the Graeme Hall Swamp review published as CERMES Technical Report Number 110.²⁴

Regulatory review correspondence reviewed comprises Environmental Report Number 004, Revision 02, issued by the Project Execution Unit on 22 July 2026,²⁵ and the combined comments of the Inter-American Development Bank Environmental and Social Governance team of 24 July 2026.²⁶

Information Gaps and Assumptions

This Assessment applies conservative assumptions where data are incomplete, consistent with risk management practice. The following limitations are recorded, and the verification actions required to close them are specified in Section 5.7 and scheduled in Section 17.

Community-level health status data have not been compiled. The baseline at Section 5.2 draws on national demographic data reported in the Workers' Campsite Environmental and Social Impact Assessment, on health concerns recorded during consultation for the Updated Environmental and Social Impact Assessment, and on the epidemiological and ecological findings of the Graeme Hall Swamp review. Parish-level and enumeration-area morbidity data from the 2021 Population and Housing Census are the appropriate source for quantitative characterization and are to be compiled during baseline verification, with analysis disaggregated by sex, age and where possible identification of female-headed households and other vulnerable groups.

Health service capacity within the Area of Influence has not been surveyed. The Assessment therefore treats potential displacement of community access to health services as a credible pathway requiring management, and specifies the coordination arrangements needed, with available capacity and access barriers for different groups, including women, children, older persons, PWDs and migrants to be quantified through baseline verification.

Environmental baseline coverage is complete for noise and incomplete in two respects relevant to health. Ambient noise monitoring was undertaken at four locations representing the closest positions to sensitive receptors, together with four locations within the existing facility compound.²⁷ Air quality sampling locations

²³ Nemus, *Environmental and Social Impact Assessment and Environmental and Social Management Plan for the R's for Climate Resilience Wastewater System in Barbados Preparation Project, Final ESMP*, April 2021.

²⁴ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

²⁵ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

²⁶ Inter-American Development Bank Environmental and Social Governance Team, *Annex 1: BA-L1063 Combined Comments on CRSEG Worker's Campsite*, 24 July 2026. Emergency preparedness and response at item 1; biodiversity assessment at item 2; worker influx and community interaction at item 3; SEA/SH/GBV management at item 4; worker health and safety, including heat stress and wastewater exposure risks, at item 5.

²⁷ BrinsJen Systems Development Specialists, *Noise Assessment Results, South Coast Reclamation Project*, results table for Locations 1 to 8. Assessment conducted 15, 16 and 17 April 2026 by M. Franklin-Lynch using REED R8080 Type 2 sound level meters, serial numbers 220106871 and 230604542, factory calibration 2 September 2025 with calibration due 2 September 2027, field calibration 13 April 2026.

lie near the campsite, and exposure change at dwellings and schools cannot presently be measured at the receptor. Water quality data for the Graeme Hall system remain dated, with historical records extending to 2018, and a groundwater quality baseline has been identified as an outstanding requirement across successive reviews.²⁸ Workforce composition is established by the Labor Management Plan and applied throughout this Assessment.²⁹ Camp occupancy figures are drawn from the Workers' Campsite Environmental and Social Impact Assessment.³⁰ Gender disaggregation within the local subcontracted workforce and rotation patterns for non-resident personnel remain to be confirmed and are carried at verification action BV-12, given their importance for assessing SH/SEA/GBV risks, worker-community interaction patterns and the design of gender-responsive mitigation measures.

Community health consultation specific to this Assessment has not been undertaken. Health findings therefore rest on concerns recorded during earlier consultation, and validation with affected residents, including separate arrangements to hear from women, youth, older persons, migrants, informal workers, female-headed households and PWDs, is scheduled before commencement of works.

A Critical Habitat Assessment has been identified as a requirement by both the Project Execution Unit and the Inter-American Development Bank.³¹ Ecosystem service pathways relevant to health, including the water regulation and vector regulation functions of Graeme Hall Swamp, are characterized qualitatively in this Assessment and are to be refined when that assessment is complete.

Ecosystem service pathways are examined with attention to how different groups use and depend upon Graeme Hall Swamp, since the same ecosystem function carries different health consequences for different users. The vector regulation function, comprising saltwater intrusion, hydrological connectivity and the larvivorous fish supported by the system, protects all residents from mosquito-borne disease, and its weakening falls hardest on those least able to avoid exposure. That group includes older persons, who constitute 25.8 percent of residents in the Area of Influence, lower-income households without screening or air conditioning, infants and young children, and persons with disabilities or chronic illness whose mobility is limited. The water regulation and drainage function protects the same households from standing water and flood exposure, and its failure reaches those living closest to the drainage network first.

Use of the swamp and its surroundings is also differentiated. Women and girls in adjacent households carry domestic and caregiving roles that place them in and around the home during the day, which increases exposure to daytime vector activity and to nuisance from dust, odor and noise, and which places on them the

²⁸ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

²⁹ China Railway Shanghai Engineering Group Co., Ltd., *Labor Management Plan*, revised 7 August 2026, and accompanying workforce analysis. Total workforce, local content and peak deployment at the Labor Overview sheet; workforce composition by work area at the Labor Plan sheet; quarterly and phase deployment at the Deployment Plan sheet.

³⁰ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

³¹ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

additional burden of caring for household members who fall ill. Children use the roads and open areas around the swamp margin when traveling to and from the two schools identified at Section 4.3, and one of those schools has an environmental focus that brings pupils into the area for teaching purposes. Informal vendors position themselves along the access route and at the compound perimeter, which places them in prolonged outdoor exposure to traffic, dust and vectors for the duration of a working day. Visitors and tour operators use the Nature Sanctuary and the coastal zone, and their use is sensitive to water quality and to odor. Fishers and users of the coastal waters depend on effluent quality at the point of discharge.

These differentiated uses are carried into the receptor table at Section 4.3, into the vulnerable group analysis at Section 4.4, and into the monitoring and outreach arrangements at Section 11.1 and Section 11.12. When the Critical Habitat Assessment is completed, the ecosystem service identification is to be refined against its findings, and the differentiated use analysis above is to be validated through the community health consultation scheduled at verification action BV-13, which includes separate arrangements to hear from women, older persons and persons with disabilities.

5.2.3. Legal and Institutional Framework

Community health obligations on this Project arise from three directions at once, and they do not align neatly. Barbadian law establishes what is owed to residents as a matter of statute and policy. The financing arrangement imports the Inter-American Development Bank Performance Standards, which in several respects set a higher bar than national requirements. The tender documentation binds the Contractor to a defined set of management plans and reporting metrics. Where these overlap, the higher requirement governs; where national standards rest on policy, the Project adopts them contractually so that they bind irrespective of enforceability. Across these three directions the SCWRP pays particular attention to obligations and expectations related to vulnerable groups, including women, girls, boys, youth, older persons, PWDs, migrants, informal workers and female-headed households and to the prevention and response to SH/SEA/GBV.

This section establishes the legal and institutional basis on which community health is managed for the Project. It covers three bodies of requirement. National legislation and policy determine the statutory obligations owed to communities in Barbados and are summarized at Table 1. The Inter-American Development Bank Environmental and Social Performance Standards determine the requirements attaching to Project financing, with Standard 4 on Community Health, Safety and Security governing this document, including its provisions on differentiated impacts, vulnerable groups and gender-based violence. Contractual requirements arising from the tender documentation determine what the Contractor is bound to deliver and report.

The section closes by assessing the enabling environment these instruments create, identifying where national requirements meet the Performance Standards, where they rest on policy, and where project-level instruments carry the compliance burden, particularly for gender equality, SH/SEA/GBV prevention and protections for vulnerable groups. That assessment determines the design of the Programme in Part B.

2.1 National Legislation of Barbados

The Health Services Act, Chapter 44, is the principal public health statute applicable to the Project and governs sanitation, nuisance abatement and communicable disease control.³² The Health Services (Collection and

³² BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

Disposal of Refuse) Regulations establish waste definitions and disposal requirements, and waste is tracked nationally under the Integrated Solid Waste Management Programme. Barbadian law categorizes waste into three primary definitions, being refuse as general non-liquid waste material, rubbish as combustible and non-combustible items including paper, yard waste and tires, and swill as organic food waste.³³ These definitions govern the segregation arrangements on which vector control depends. Implementation of these provisions has particular relevance for vulnerable groups such as children, older persons, PWDs and low-income households for whom inadequate waste management, sanitation and vector control translate quickly into elevated health risks and acre burdens that are often borne by women and girls.

The Safety and Health at Work Act, Chapter 356, establishes occupational duties with community consequence and confers on workers the right to refuse work in unsafe conditions without fear of reprisal.³⁴ Occupational duties and worker welfare provisions have community consequences including the way worker accommodation, working hours and supervision arrangements influence worker-community interaction and associate risks of SH/SEA/GBV. The Employment Rights Act 2012 and the Severance Payment Act, Chapter 355A, govern employment terms relevant to accommodation, welfare and workforce turnover. The Labor Laws, Chapter 346, define a child as a person who has not attained the age of 16 years for the purposes of Barbadian employment law.³⁵ This definition underpins safeguarding obligations towards children within the project's Areas of Influence, including prohibitions on child labor and protections for adolescents who may be indirectly affected by worker-community interactions.

The Environmental Protection Department administers air, noise, effluent and waste requirements. The Marine Pollution Control Act governs discharge to coastal waters. The Road Traffic Act governs vehicle movement and road safety. The Data Protection Act 2019 governs the handling of personal information, including health-related information arising in grievances, incident records and health screening, and requires that such data be processed lawfully, fairly and confidentially.³⁶ Road safety obligations have heightened significance for school children, pedestrians, public transport users and people with limited mobility, groups that include a high proportion of women, youth, older persons and low-income residents. The Prevention of Corruption Act, the Anti-Corruption and Anti-Terrorism Agency Act and the Whistleblower Protection Act apply to reporting and non-retaliation obligations and provide an enabling framework for workers and community members to report health and safety concerns, SH/SEA/GBV incidents and other misconduct without fear of reprisal.³⁷

³³ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

³⁴ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

³⁵ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

³⁶ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

³⁷ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety

The Barbados National Biodiversity Strategy and Action Plan of 2020 identifies the need for mosquito and rat control in Graeme Hall Swamp, connecting national biodiversity policy directly to a community health function at this location.³⁸

2.1.1 Sexual Harassment, Gender and Personal Safety Legislation

The Employment Sexual Harassment (Prevention) Act, 2017 establishes direct obligations on the Contractor as an employer operating in Barbados, and is particularly relevant for women and other workers in subordinate positions who may be at heightened risk of harassment and face barriers to reporting. Every employer must issue a clearly articulated written policy statement against sexual harassment in the workplace, provided to each employee on commencement of employment and to all existing employees within six months of the commencement of the Act. The policy statement must define sexual harassment as defined by the Act and set out a clear procedure for the filing and hearing of complaints. The Act protects workers in both the public and private sectors, provides a framework for the reporting of claims, and establishes procedures for the hearing and determination of complaints by the employer, the Chief Labor Officer or the Tribunal.³⁹

The definition of workplace under the Act extends beyond the employee's usual office to any place the employee is assigned to carry out duties, together with any conference or training to which the employee is sent. For this Project that definition reaches the construction sites, the workers' campsite where duties are performed, and training venues.⁴⁰

Penalties attach to non-compliance. Failure to establish a policy statement, or breach of the confidentiality requirements of the legislation, carries a fine of up to ten thousand dollars, a term of imprisonment, or both. Making a false complaint carries a fine of ten thousand dollars or twelve months' imprisonment.⁴¹

The Act therefore establishes a statutory floor beneath the sexual exploitation and abuse, sexual harassment and gender-based violence commitments carried in the Workers' Code of Conduct and in the Prevention and Response Plan. The Programme measures at Section 11.8 operate in addition to the statutory policy statement and complaint procedure.

The Data Protection Act 2019 governs the handling of personal information arising in complaints and health records and interacts directly with the confidentiality requirements of the sexual harassment legislation.⁴² The

requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

³⁸ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

³⁹ *Employment Sexual Harassment (Prevention) Act, 2017* (Barbados), passed by the Parliament of Barbados on 21 October 2017. Employer obligation to issue a written policy statement, the definition of workplace, the complaint procedure and the applicable penalties. See also Labor Department, Government of Barbados, guidance on the Act, and the Model Workplace Policy Statement against Sexual Harassment published by the Ministry of Labor.

⁴⁰ *Employment Sexual Harassment (Prevention) Act, 2017* (Barbados), passed by the Parliament of Barbados on 21 October 2017. Employer obligation to issue a written policy statement, the definition of workplace, the complaint procedure and the applicable penalties. See also Labor Department, Government of Barbados, guidance on the Act, and the Model Workplace Policy Statement against Sexual Harassment published by the Ministry of Labor.

⁴¹ *Employment Sexual Harassment (Prevention) Act, 2017* (Barbados), passed by the Parliament of Barbados on 21 October 2017. Employer obligation to issue a written policy statement, the definition of workplace, the complaint procedure and the applicable penalties. See also Labor Department, Government of Barbados, guidance on the Act, and the Model Workplace Policy Statement against Sexual Harassment published by the Ministry of Labor.

⁴² BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety

Employment Rights Act 2012 governs unfair dismissal and disciplinary process, which bears on the enforcement of sanctions for conduct violations. The Safety and Health at Work Act, Chapter 356, confers a right to refuse unsafe work without reprisal, which operates alongside the non-retaliation commitments in the Code of Conduct.⁴³

2.1.2 Environmental Noise

Barbados has no dedicated noise legislation. Environmental noise is addressed through the nuisance provisions of the Health Services Act, together with noise provisions in the Marine Pollution Control Act and restrictions on horns and other noise-making devices under the Road Traffic Regulations. In the absence of enacted standards, Cabinet acceded to the National Noise Policy, which adopts the World Health Organization Community Noise Guidelines as reference standards indicating the sound levels at which persons would be minimally impacted by noise.⁴⁴

The National Environmental Noise Perception and Social Survey, conducted by the Environmental Protection Department, is the national instrument addressing community perception of and social response to environmental noise in Barbados.⁴⁵ The Survey addresses perception and social response, and it does not set emission limits, and it is applied in this Assessment to inform the characterization of receptor sensitivity.

The two instruments perform distinct functions and are applied together. The Survey informs how sensitive a given receptor is and therefore what magnitude rating a noise impact attracts. The World Health Organization Community Noise Guideline values adopted under the National Noise Policy supply the measurable threshold against which monitoring is assessed and are the reference standard for the boundary monitoring at Section 11.4 and indicator KPI-07 at Section 14.1.

Consistent with established noise impact assessment practice, community response to a construction noise event reflects the contrast between that event and the ambient background at the receptor, so that an identical absolute level produces different response depending on the baseline against which it occurs. Establishing the ambient baseline is therefore a prerequisite to rating the noise pathway.

Receptor sensitivity in the Project area requires determination against the local ambient baseline. The Area of Influence combines residential settlement with tourism and entertainment activity characteristic of the south coast, and the ambient environment reflects that mixed character. Entertainment noise on the south coast has previously been the subject of enforcement action, with an establishment in St. Lawrence Gap ordered by the court to regulate outdoor noise following action brought by a neighboring hotel.⁴⁶ The ambient baseline established under verification action BV-07 therefore determines the sensitivity classification applied to the noise pathway, and that classification is confirmed before the magnitude rating at CH-04 is finalized.

requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

⁴³ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

⁴⁴ Environmental Protection Department, Government of Barbados, *National Noise Policy*, together with Environmental Protection Department guidance on Noise Pollution Control, recording that Barbados has no dedicated noise legislation, that Cabinet acceded to the Barbados Noise Policy adopting the World Health Organization Community Noise Guidelines as reference standards, and that noise is otherwise addressed through the nuisance provisions of the Health Services Act, the Marine Pollution Control Act and the Road Traffic Regulations.

⁴⁵ Environmental Protection Department, Government of Barbados, *National Environmental Noise Perception and Social Survey (NENPASS)*.

⁴⁶ Environmental Protection Department, Government of Barbados, *National Noise Policy*, together with Environmental Protection Department guidance on Noise Pollution Control, recording that Barbados has no dedicated noise legislation, that Cabinet acceded to the Barbados Noise Policy adopting the World Health Organization Community Noise Guidelines as reference standards, and that noise is otherwise addressed through the nuisance provisions of the Health Services Act, the Marine Pollution Control Act and the Road Traffic Regulations.

Enforcement of community noise is understood to present practical difficulty in the absence of dedicated legislation. The Programme accordingly relies on Contractor-side controls, monitoring and grievance response as the primary management mechanism, with external enforcement operating as a secondary layer.

Table 54: Summary of Applicable National Instruments

Instrument	Community health function	Application to the Project
Health Services Act, Chapter 44	Public health, sanitation, nuisance abatement, communicable disease control	Governs camp sanitation, nuisance complaints, outbreak notification
Health Services (Collection and Disposal of Refuse) Regulations	Waste definitions, storage and disposal	Governs segregation and disposal arrangements on which vector control depends
Safety and Health at Work Act, Chapter 356	Occupational duties with community consequence; right to refuse unsafe work	Applies to worker conduct and to conditions with off-site effect
Employment Sexual Harassment (Prevention) Act, 2017	Workplace sexual harassment policy, complaint procedure and penalties	Establishes the statutory floor beneath Section 11.8
Sexual Offences Act of 2016 (Cap. 154)	Supports broader goals of preventing GBV and fostering community wellbeing	Establishes protection of women and other vulnerable groups from GBV/SH/SEA
Rights of Persons with Disabilities Bill, 2025	Ensures equal access, protection, and participation for PWDs, thereby promoting inclusive wellbeing	Establishes protection, inclusion and wellbeing for PWDs
Child Protection Act, 2024.	Safeguards children from abuse, neglect, and exploitation	Protects the wellbeing and safety of children (defined as those under the age of 18)
Employment Rights Act, 2012	Employment terms, disciplinary process, unfair dismissal	Governs enforcement of sanctions for conduct violations
Severance Payment Act, Chapter 355A	Severance arrangements	Applies to termination arising from Code of Conduct breach
Labor Laws, Chapter 346	Definition of child for employment purposes	Applies to age verification, alongside the contractual definition at Section 2.3
Data Protection Act, 2019	Privacy of personal and health information	Governs health screening records, grievances and case registers

Instrument	Community health function	Application to the Project
National Noise Policy	Environmental noise, adopting World Health Organization Community Noise Guidelines	Supplies the measurable threshold for noise monitoring at Section 11.4 and KPI-07
National Environmental Noise Perception and Social Survey	National evidence base on community perception of and social response to noise	Determines receptor sensitivity classification applied to the noise pathway at CH-04
Marine Pollution Control Act	Discharge to coastal waters; noise provisions	Applies to effluent reaching coastal waters
Road Traffic Act and Regulations	Vehicle movement, speed, noise-making devices	Applies to the traffic controls at Section 11.6
Prevention of Floods Act	Drainage and standing water	Applies to drainage maintenance and vector control
Environmental Protection Department requirements	Air, noise, effluent and waste standards	Applies to monitoring and incident notification
Prevention of Corruption Act; Anti-Corruption and Anti-Terrorism Agency Act; Whistleblower Protection Act	Reporting and non-retaliation	Supports the grievance and non-retaliation arrangements at Section 11
National Biodiversity Strategy and Action Plan, 2020	Identifies the need for mosquito and rat control in Graeme Hall Swamp	Connects national biodiversity policy to the vector control function at Section 11.1

Table 1. National instruments applicable to community health management.

5.2.3.1. Enabling Environment and Implications for Compliance

The national framework provides a generally supportive basis for managing community health, safety and security for managing community health, safety and security, including the protection of vulnerable groups such as women, girls, boys, youth, older persons, PWDs, migrants, informal workers and female-headed households. Public health, occupational safety, sexual harassment, data protection, waste, water and road safety are each addressed by statute or policy, and institutional responsibility is assigned to identifiable agencies including the Ministry of Health and Wellness, the Environmental Protection Department, the Sanitation Service Authority and the Labor Department.

The framework carries three characteristics that shape how compliance is achieved on this Project.

Coverage is distributed across several instruments. Community health obligations arise across public health, environmental, labor and traffic instruments, with no single statute addressing construction-phase community health. Compliance is therefore demonstrated through project-level instruments that draw the requirements together, including specific measures on gender equality, SH/SEA/GBV risk management, of which this Programme is one.

Standards are in several instances adopted by policy. Environmental noise is the clearest example, where reference standards derive from World Health Organization guidelines adopted through national policy.

Where a standard rests on policy, the Project adopts it contractually so that it operates as a binding commitment irrespective of enforceability at national level.

Enforcement capacity is a practical constraint. Institutional capacity within the Ministry of Health, the Environmental Protection Department and the Sanitation Service Authority is subject to concurrent demand this has particular implications for enforcement of protections related to vulnerable groups and to SH/SEA/GBV where under-reporting and limited institutional capacity are well-documented challenges, as recorded in the cumulative assessment at Section 7.2. The Programme therefore places primary reliance on Contractor-delivered monitoring, supervision and corrective action, with regulatory engagement structured as coordination with specific attention to safeguarding women, children and other vulnerable groups.

Compliance with the Inter-American Development Bank Environmental and Social Policy Framework accordingly depends on project-level instruments and evidence in addition to the national framework. Where a national requirement meets or exceeds the corresponding Performance Standard requirement, the national standard applies. Where the Performance Standard sets the higher requirement, the gap is filled through the measures in Section 8.8., including those addressing gender equality, SH/SEA/GBV, vulnerable groups and survivor-centered grievance handling. The relationship between the two is set out in the following section.

Inter-American Development Bank Environmental and Social Performance Standards

Environmental and Social Performance Standard 1 requires assessment and management of environmental and social risks and impacts and establishes the mitigation hierarchy applied throughout this Assessment. Environmental and Social Performance Standard 2 governs labor and working conditions, which operate as determinants of community health through accommodation density, worker welfare and disease transmission pathways. Environmental and Social Performance Standard 3 governs resource efficiency and pollution prevention, including emissions, effluent, waste and hazardous materials reaching community receptors. Environmental and Social Performance Standard 4 governs community health, safety and security and is the standard under which this document is prepared. Environmental and Social Performance Standard 6 governs biodiversity conservation, including ecosystem service pathways with health consequence. Environmental and Social Performance Standard 9 governs gender equality, including differentiated health risks and sexual exploitation and abuse, sexual harassment and gender-based violence. Environmental and Social Performance Standard 10 governs stakeholder engagement and information disclosure, including consultation and grievance access on health matters.⁴⁷

The Workers' Code of Conduct records alignment with Environmental and Social Performance Standards 1, 2, 4, 9 and 10, and this Assessment maintains that alignment.⁴⁸

Contractual Requirements

The Employer's Requirements specify that the Contractor's Environmental and Social Management Plan shall include an Occupational Health and Safety Plan, a Community Health and Safety Plan, Labor Management Procedures, an Emergency Response Plan, a Disaster Risk Management Plan, a Traffic and Pedestrian Management Plan to ensure the safety of local communities from construction traffic, a Noise Management

⁴⁷ Inter-American Development Bank, *Environmental and Social Policy Framework*, and the associated Environmental and Social Performance Standards, in particular ESPS 1, ESPS 2, ESPS 3, ESPS 4, ESPS 6, ESPS 9 and ESPS 10. ESPS 4 on Community Health, Safety and Security is the governing standard for this document.

⁴⁸ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

Plan, a Water Resource Protection Plan to prevent contamination of drinking water and groundwater, a Solid and Hazardous Waste Management Plan, an Air Quality Management Plan, a Sexual and Gender-Based Violence Prevention and Response Action Plan, a Security Management Plan and an Environmental and Social Monitoring Plan.⁴⁹ This Programme operates as the community health layer across those instruments, with particular attention to the protection of women, girls, boys, youth, older persons, PWDs, migrants, informal workers and female-headed households within the Area of Influence.

Contractual reporting metrics require reporting on health and safety incidents, worker accommodation inspections, gender-disaggregated workforce data, training including sexual and gender-based violence sensitization, community grievances including SH/SEA/GBV-related complaints handled through confidential, survivor-centered channels, traffic accidents involving project vehicles, and compliance status of the sexual and gender-based violence prevention and response action plan.⁵⁰ The indicators at Section 13 are structured to feed those returns.

The Employer's Requirements further specify that for the purposes of the Contractor framework, specific management plans and the code of conduct applicable to workers, the term child means any person under the age of 18 years.⁵¹ This Assessment applies that definition for all child protection purposes including safeguarding measures around the workers' camp and construction sites, prohibitions on any sexual activity with persons under the age of 16, and protocols for managing any allegations involving minors in the Area of Influence, while noting that Barbadian employment law defines a child as a person under 16 years for employment purposes.

International Guidance

The World Bank Group General Environmental, Health and Safety Guidelines, Section 3, address community health and safety and inform the control measures in Part B.⁵² The World Bank Group Environmental, Health and Safety Guidelines for Water and Sanitation address exposure pathways specific to wastewater infrastructure. World Health Organization guidance on sanitation and health and on drinking water quality inform the water and sanitation components. Pan American Health Organization guidance informs the vector surveillance approach adopted for the Caribbean context.

5.2.4. Assessment Approach

Health Determinant Pathways

Twelve pathways were identified through screening and are assessed in Section 6.

⁴⁹ *Standard Bidding Document for Design and Build of Civil Works*, Barbados Climate Resilient South Coast Water Reclamation Project: Section V Bidding Forms, including Form ESHS, Form CCESHS and Form LSER; Section VI Employer's Requirements, Environmental, Social, Health and Safety Requirements, listing the required management plans and the minimum content for the Contractor ESHS Framework and Code of Conduct; Section VIII Particular Conditions of Contract, Part C, ESHS metrics for progress reports, and Part D, Contractor's Code of Conduct.

⁵⁰ *Standard Bidding Document for Design and Build of Civil Works*, Barbados Climate Resilient South Coast Water Reclamation Project: Section V Bidding Forms, including Form ESHS, Form CCESHS and Form LSER; Section VI Employer's Requirements, Environmental, Social, Health and Safety Requirements, listing the required management plans and the minimum content for the Contractor ESHS Framework and Code of Conduct; Section VIII Particular Conditions of Contract, Part C, ESHS metrics for progress reports, and Part D, Contractor's Code of Conduct.

⁵¹ *Standard Bidding Document for Design and Build of Civil Works*, Barbados Climate Resilient South Coast Water Reclamation Project: Section V Bidding Forms, including Form ESHS, Form CCESHS and Form LSER; Section VI Employer's Requirements, Environmental, Social, Health and Safety Requirements, listing the required management plans and the minimum content for the Contractor ESHS Framework and Code of Conduct; Section VIII Particular Conditions of Contract, Part C, ESHS metrics for progress reports, and Part D, Contractor's Code of Conduct.

⁵² World Bank Group, *General Environmental, Health and Safety Guidelines*, Section 3: Community Health and Safety, together with the *Environmental, Health and Safety Guidelines for Water and Sanitation*.

Table 55: Health determinant pathways and health domains.

Reference	Health determinant pathway	Health domain	Principal source activities
CH-01	Vector-borne disease	Environmental health; human health	Excavation, standing water, waste storage, drainage and canal alteration
CH-02	Respiratory health and particulate exposure	Environmental health; human health	Earthmoving, site levelling, unpaved tracks, haulage
CH-03	Odor, hydrogen sulphide and bioaerosol exposure	Environmental health; human health	Plant operation during construction, sludge handling, camp wastewater
CH-04	Noise, vibration and sleep disruption	Environmental health; social and gender-related health	Heavy machinery, generators, night works, structural anchoring
CH-05	Water, sanitation and gastrointestinal illness	Environmental health; human health	Camp wastewater discharge, spills, drainage to Graeme Hall Swamp, emergency bypass
CH-06	Transport and Road traffic injury	Environmental health, Community safety and security; social and gender-related health	Heavy vehicles with not well maintenance could emit, by bad combustion, CO that could affect air quality. Heavy vehicles on a narrow residential road, school-hour movements, pedestrian and public transport use by children, caregivers and older persons
CH-07	Communicable disease and labor influx	Human health; social and gender-related health	Concentrated non-local workforce, camp density, worker-community contact
CH-08	Sexual exploitation and abuse, sexual	Social and gender-related health;	Workforce presence, economic asymmetry,

Reference	Health determinant pathway	Health domain	Principal source activities
	harassment and gender-based violence	community safety and security	reporting barriers, power imbalances
CH-09	Food safety and zoonoses	Environmental health; human health	Camp catering, vegetable garden, rodent and vector attraction
CH-10	Emergency, disaster and climate events	Community safety and security; human health; social and gender-related health	Fire, flooding, storm surge, hazardous material release affecting nearby households, schools, and health facilities
CH-11	Health service capacity displacement	Human health; social and gender-related health	Camp population demand on local services used by residents, including women, caregivers, children, older persons and PwDs
CH-12	Nuisance-mediated wellbeing and livelihood loss	Social and gender-related health	Cumulative amenity degradation affecting income and mental health

Impact Rating Methodology

The rating methodology follows the structure required by the Project Execution Unit for all Project environmental and social assessments, ensuring that health impacts are directly comparable with environmental and social impacts assessed elsewhere in the Project documentation.⁵³

Extent is classified as on-site, local, regional, national, or transboundary and international. Duration is classified as temporary, short-term, long-term, or permanent.

Likelihood or probability is scored on a five-point scale.

⁵³ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

Table 56: Likelihood or probability scale

Score	Descriptor
1	Rare or highly unlikely
2	Unlikely
3	Possible
4	Likely
5	Highly likely or almost certain

Magnitude is scored on a five-point scale and is considered in terms of the sensitivity of the receptor.

Table 57: Magnitude scale and health interpretation

Score	Descriptor	Health interpretation
1	Negligible	No measurable change in health status or health-related quality of life
2	Low	Transient discomfort or nuisance with no clinical presentation expected
3	Moderate	Symptomatic effects, increased primary care attendance, exacerbation of existing conditions in sensitive individuals
4	High	Serious illness or injury, hospitalization, sustained community-level effect
5	Catastrophic	Fatality, permanent disability, or outbreak conditions

Risk significance is derived from likelihood and magnitude and is expressed as Low, Medium, High, Very High or Critical, consistent with the risk level interpretation required by the Project Execution Unit.⁵⁴

Each pathway is assessed before mitigation and after mitigation. Impact tables record activity, potential impact, risk, nature and type of impact, extent, duration, likelihood, magnitude, pre-mitigation risk significance, summary of mitigation measures, post-mitigation likelihood and magnitude, residual risk significance, and management measures addressing residual impacts, following the table structure specified for the Social Impact Assessment Matrix.⁵⁵

5.2.5. Area of Influence and Community Receptors

Direct Area of Influence

The Direct Area of Influence comprises the area within which Project activities may cause a measurable change in a health determinant.

⁵⁴ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

⁵⁵ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

Expressed as distances, the Direct Area of Influence for physical exposure pathways is a radius of approximately 500 meters, being 0.5 kilometers or 0.31 miles, measured from the site boundary. The socio-economic sphere of influence is a radius of approximately 1 kilometer, being 0.62 miles, measured from the compound boundary. The nearest residential area lies approximately 250 meters, being 0.25 kilometers or 0.16 miles, to the south-east of the project site. The Indirect Area of Influence is not expressed as a fixed radius, because it follows haulage routes, the receiving water body and service catchments in place of a circle drawn around the site; its extent is set by those features and is delineated on the Area of Influence map.

For physical exposure pathways including particulates, noise, odor and vectors, the Direct Area of Influence extends approximately 500 meters from the site boundary. The nearest residential area lies approximately 250 meters to the south-east of the project site, and the campsite is located north of the nearest community.⁵⁶

For socio-economic pathways, the Direct Area of Influence extends approximately one kilometer from the compound boundary, within which interactions between project personnel, residents, informal vendors, nearby businesses and service providers are most likely to occur.⁵⁷ This includes vulnerable groups (women, girls, boys, men, youth, older persons, PWDs, migrants, informal workers, and female-headed households), road users (e.g. public transport users and users of public access roads to the site such as Harmony Hall, used by school children, caregivers who are predominantly women, older persons, and PWDs) as well as swamp users.

The Direct Area of Influence further comprises the public access road serving the site, including the approach through Harmony Hall, and the Graeme Hall Swamp hydrological system insofar as it receives site drainage or discharge.

Indirect Area of Influence

The Indirect Area of Influence comprises areas where health effects may arise through secondary pathways. These are haulage and material delivery routes between the site and ports, quarries and disposal sites, together with communities along those routes including vulnerable groups, particularly women, girls, men, boys, youth, schoolchildren, caregivers, women caregivers, older persons, PWDs, migrants and informal workers; health facilities receiving Project-related demand; the wider parish of Christ Church for labor market, accommodation and service demand effects; and the coastal zone and beaches used by residents, informal vendors and visitors, where effluent quality affects recreational water exposure for children, families and workers in tourism and livelihoods.

Precise delineation of the Indirect Area of Influence is required for the Workers' Campsite Environmental and Social Impact Assessment,⁵⁸ and the mapped delineation prepared for that document applies to this Assessment.

⁵⁶ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

⁵⁷ *Environmental and Social Impact Assessment, Workers Compound Area*, Revision RS, 3 April 2026, socio-economic sphere of influence and informal vendor considerations.

⁵⁸ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

Community Receptors

Identification of receptors determines who the Assessment is about. A pathway carries significance only where a person or institution is positioned to be exposed to it, and the magnitude ratings applied throughout Section 6 turn on the sensitivity of the receptor as well as the intensity of the source. This section therefore establishes who is exposed, where they are, and what characteristics make them more or less vulnerable such as age, sex, disability, economic status and caregiving roles etc. make them more or less vulnerable to a given exposure.

Receptors are identified by their exposure to one or more of the health determinant pathways at Section 3.1 and are grouped into four categories.

Residential receptors comprise the nearest dwellings, approximately 250 meters south-east of the site, and the Graeme Hall community. These carry exposure to the full range of physical pathways with heightened vulnerability among children, pregnant women, older persons, PwDs and female-headed households.

Institutional receptors comprise the two schools in the vicinity and the Ministry of Health fish breeding station. Schools attract the highest sensitivity rating because exposure is concentrated among children at fixed times coinciding with peak vehicle movement and because safeguarding obligations towards girls and boys extend to risks associated with construction traffic and worker-community interaction. The fish breeding station is a public health asset whose disruption would degrade an existing vector control function.

Economic and mobility receptors comprise road users on the access route including public transport users and users of public access roads to the site such as Harmony Hall used by school children, caregivers who are predominantly women, older persons, and PwDs, informal vendors at the compound perimeter, and local businesses and visitor accommodation dependent on the tourism economy.

Environmental and recreational receptors comprise users of Graeme Hall Swamp and the Nature Sanctuary, road users including schoolchildren, women, caregivers, women caregivers, older persons and PwDs, coastal water users, and the health facilities serving the area.

The summary finding is that sensitivity is concentrated in particular receptors. The two schools and the residential cluster west of the campsite carry the highest ratings, and the access route is the single feature through which the greatest number of receptors are exposed, since it serves residents, schoolchildren, vendors and Project traffic simultaneously.

Table 58: Community receptors and exposure pathways

Receptor	Location and description	Sensitivity	Principal exposure pathways
Nearest residential area	Approximately 250 m south-east of the site; mixed residential area including small businesses, households with young children, migrants, older persons, PwDs and female-headed households	High	Particulates, noise, odor, vectors, traffic and worker-community interaction.

Receptor	Location and description	Sensitivity	Principal exposure pathways
Graeme Hall community	Adjacent se mixed residential area including businesses, households with young children, migrants, older persons, PwDs and female-headed households settlement;	High	Vectors, drainage, noise, particulates, worker interaction (SH/SEA/GBV risk), nuisance and livelihood disruption
St. Luke's Academy	Private Montessori-inspired school in the Graeme Hall area, focused on environmental education serving young children	Very High	Traffic on the access route, particulates, noise during school hours pedestrian safety for students and caregivers, and safeguarding risks associated with increased worker and vehicle presence
St Lawrence Composite School	Publicly managed school in the Parish of St. Lawrence, on the outskirts of Harmony Hall serving young children	Very High	Haulage route traffic pedestrian safety for students and caregivers, and safeguarding risks associated with increased worker and vehicle presence
Road users on the access route	Narrow public road shared with heavy vehicles used by residents, school children, caregivers (predominantly women), older persons, PwDs and public transport users.	High	Vehicle strike, road surface degradation reduced pedestrian safety and increased travel stress, especially during peak commuting hours
Informal vendors	May congregate at the compound perimeter in response to workforce demand vendors are expected to include	High	Roadside safety, congestion, waste accumulation, food safety, livelihood disruption and exposure to SH/SEA/GBV in

Receptor	Location and description	Sensitivity	Principal exposure pathways
	women and low-income informal workers.		worker-vendor interactions.
Local businesses and visitor accommodation	Village economy driven by tourism, agriculture and services with employment of women and youth	Medium	Nuisance affecting trade, worker interaction with visitors and perceived safety and reputational risks that may influence income and employment.
Ministry of Health fish breeding station	Larvivorous fish production facility adjacent to the sewage plant	High	Construction disturbance, runoff, access interference
Graeme Hall Swamp and Nature Sanctuary users	Visitors and adjacent residents using the Swamp and Sanctuary for recreation, education, tourism and livelihoods including women, youth and older persons	Medium	Water quality, ecosystem service change with implications for health, wellbeing and tourism-related incomes.
Coastal water users	South coast recreational waters used by residents, families, children and workers	Medium	Effluent quality, recreational water exposure and perceived safety affecting tourism and livelihoods.
Health facilities serving the area	Polyclinic and hospital services with service to women, children, older persons, PwDs and migrants	Medium	Service demand, emergency referral service for injuries, communicable diseases and SH/SEA/GBV cases linked to the SCWRP, potential crowding and waiting times affecting access for vulnerable users.

5.2.6. Vulnerable and Differentially Affected Groups

The following groups are identified as likely to experience Project health impacts differently or more severely, consistent with Environmental and Social Performance Standard 9 and with the gender and vulnerable group considerations applied across the Project documentation. Vulnerable groups include women, girls, boys, men, youth, older persons, persons with disabilities, migrants, informal workers, and female-headed households. While these groups are in and of themselves vulnerable, it is important to note that vulnerabilities are overlapping and intersectional, compounding the risks which these groups face.

Infants and young children carry heightened respiratory vulnerability to particulates and lower awareness of traffic hazard. Residents raised the position of babies explicitly during consultation for the Updated Environmental and Social Impact Assessment.⁵⁹

Older persons constitute a substantial share of the Barbadian population, with 13.57 percent aged 65 years and over and a further 13.91 percent aged 55 to 64 years.⁶⁰ This cohort carries heightened vulnerability to particulate exposure, heat, noise-related sleep disruption and exacerbation of non-communicable disease. Residents raised the position of the elderly explicitly during consultation.⁶¹

Persons with pre-existing respiratory or cardiovascular conditions were described by residents during consultation as those whose underlying ailments and conditions could be exacerbated by dust and noise.⁶² This group is the principal receptor for particulate and odor pathways.

Persons with disabilities face mobility constraints affecting evacuation and road safety, together with accessibility barriers to grievance channels and health information. The Inter-American Development Bank has required that persons with disabilities and other vulnerable groups be included consistently across the Code of Conduct and associated instruments.⁶³

Women and girls face risks of sexual exploitation and abuse, sexual harassment and gender-based violence associated with workforce presence, together with differential exposure through domestic and caregiving roles and barriers to reporting. Women working in local businesses, visitor accommodation and informal vending around the construction site may be particularly exposed to worker-community interactions. Vulnerability is increased for women and girls who are older, living with disabilities, migrants or in low-income or female headed households.

School-attending children experience concentrated exposure at fixed times that coincide with peak vehicle movement and are vulnerable to both traffic incidents and nuisance effects (noise, dust etc.) along school

⁵⁹ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

⁶⁰ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

⁶¹ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

⁶² Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

⁶³ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labor Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

routes. Adolescent girls may also face heightened risks of SH/SEA/GBV near access routes. Caregivers, predominantly women, share these exposures when accompanying children. Lower-income households have reduced capacity to mitigate exposure privately through means such as alternative transport or private healthcare. They are more likely to rely on walking and public transport along affected routes, to live in housing with lower noise and dust insulation and to experience income shocks from any disruption to tourism, informal vending or casual work. Vulnerability is often higher among low-income, female headed households.

Occupants of the workers' campsite constitute a concentrated, predominantly non-local population with distinct health vulnerabilities and their own interface with local services. Particular attention is required for any women accommodated on site.

5.2.7. Community Health Baseline

Demographic Profile

The population of Barbados is predominantly of Black African descent at 92.4 percent, with mixed at 3.1 percent, White at 2.7 percent, South Asian at 1.3 percent and other populations at 0.4 percent.⁶⁴

Table 59: National age structure, 2020 estimates.

Age band	Share of population	Male	Female
0 to 14 years	17.49%	25,762	25,764
15 to 24 years	12.34%	18,024	18,330
25 to 54 years	42.69%	62,655	63,093
55 to 64 years	13.91%	19,533	21,430
65 years and over	13.57%	16,398	23,571

The figures above describe the national population and are applied here as the framing context for the receptor profile. They do not describe the communities within the Area of Influence, whose demographic and health characteristics differ from national averages and determine actual exposure sensitivity.

Community-level engagement for this Project is sequenced, with commencement staged. The sequence governs when the outstanding community health data become available. The first stage is a desk review of existing Project documents and stakeholder engagement records, undertaken to establish what information already exists, where data sets overlap across different elements of the Project, and which gaps are material. The second stage is consolidation and gap analysis against that review. The third stage is the design of new fieldwork addressed to the gaps that remain. The social data collection methodology arising from this process is being prepared separately and is to be shared with the South Coast Water Reclamation Project team.

The absence of current dedicated community-level data is a gap, and the sequenced approach is designed to close it in a structured manner. In the interim, the enumeration-area census data at Section 5.1 carry the demographic and socio-economic profile, and the verification actions at Section 5.7 remain open until the fieldwork is complete. Verification action BV-13, which requires community health consultation and validation of the findings of this Assessment with affected residents including separate arrangements to hear from

⁶⁴ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

women, older persons and persons with disabilities, is to be sequenced within that program instead of being conducted as a separate exercise, so that residents are not approached twice for overlapping purposes.

Two features of this profile carry direct consequence for the Assessment. Persons aged 55 years and over constitute over 27 percent of the population, with a pronounced female majority in the older bands, establishing a receptor profile with elevated sensitivity to particulate exposure, heat and noise. Approximately one in six residents is a child under 15 years, concentrating road safety and respiratory risk in the receptor population closest to the haulage route and the two schools identified at Section 4.3.

English is the official language and is used for administration and public services throughout the island. A regional variant known locally as Bajan is spoken by most Barbadians in everyday settings, and in its full form differs markedly from Standard English.⁶⁵ The workforce includes Chinese nationals, and Project instruments including the Worker Declaration are provided in written Standard Chinese using simplified characters.⁶⁶

Written Standard Chinese serves readers across spoken varieties, and it is the appropriate medium for documents that are read, such as the Code of Conduct, the Worker Declaration and posted health information. Spoken delivery requires a further determination, because Standard Chinese in its spoken form, known as Putonghua or Mandarin, is not necessarily the first language of every worker, and Cantonese and other varieties may be represented within the workforce. Toolbox talks, inductions, health education sessions and emergency instruction depend on comprehension in the spoken form, and the spoken varieties present in the workforce are therefore confirmed during workforce composition verification under Section 5.7 so that interpretation is provided where written Standard Chinese alone is insufficient.

Health communication accordingly operates across three requirements: written worker-facing material in Standard Chinese and English; spoken worker-facing delivery in the confirmed spoken varieties; and community-facing material in accessible plain English.

Area-specific characterization is derived from the 2021 Population and Housing Census at enumeration-area level for the settlements within the Area of Influence, together with parish-level data for Christ Church. The required variables are total population and sex distribution; age structure with particular reference to children under 15 years and persons aged 65 years and over; number and composition of occupied households, with attention to one and two person households indicating older persons living alone; and the non-communicable disease tabulation recording reported conditions including hypertension, asthma, diabetes, kidney disease, heart disease and mental illness. These variables establish the receptor sensitivity profile applied to the particulate, noise, odor and traffic pathways, and identify the households requiring targeted notification under Sections 11.2 and 11.4.

The 2021 Census is understood to have experienced an unusually high undercount, and enumeration-area figures are accordingly applied as indicative planning data. Compilation is undertaken during baseline verification under Section 15 through a formal data request to the Barbados Statistical Service.

5.2.8. Health Status and Burden of Disease

Vector-Borne Disease

⁶⁵ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

⁶⁶ *Workers' Declaration, Chinese Translation*, Section 13 of the Workers' Code of Conduct, 2026.

Vector-borne disease is the health concern most consistently raised by communities adjacent to Graeme Hall Swamp and carries the strongest documented causal mechanism of the pathways assessed.

Three mosquito species capable of transmitting disease are present within Graeme Hall Swamp. *Aedes aegypti* transmits dengue, chikungunya and Zika. *Anopheles* species transmit malaria. *Culex* species are principally a nuisance and can transmit West Nile fever.⁶⁷ Barbados has recorded incidence of dengue, Zika and chikungunya, and in 2023 suspected malaria-carrying mosquitoes were identified in selected areas.⁶⁸

The vector ecology of the swamp has shifted in a direction that increases breeding potential. Two natural controls have historically limited mosquito populations. Saltwater intrusion suppresses breeding because these species do not breed in brackish water. Larvivorous fish consume mosquito larvae. With the blocking of the canal to the sea, Graeme Hall Swamp has become primarily freshwater, increasing the probability of mosquito breeding. When the canals of the marsh become clogged and water cannot move freely between areas, the movement of fish is also restricted. Keeping the canals clear has accordingly been a recommended mosquito control measure.⁶⁹

The Ministry of Health manages the East Unit of Graeme Hall Swamp for mosquito control. This management includes periodic clearing of vegetation from the freshwater canals and adjacent banks, trimming of mangroves that overhang the embankment and clog the exit canal to the sea, and fogging with malathion. The Ministry has established a fish breeding station adjacent to the sewage plant to produce fish for distribution in the waterways to predate on mosquito larvae.⁷⁰

The presence of this facility carries direct Project consequence. A public health vector control asset operates immediately adjacent to the Project footprint, and construction activity, drainage alteration, runoff, spill or access disruption affecting that facility would degrade an existing community health protection independently of any breeding sites the Project itself creates. Protection measures are specified at Section 11.1.

Residents in communities adjacent to the swamp have complained about the incidence of mosquitoes over an extended period, with complaints documented from 1986 onward.⁷¹ Contemporary community discussion

⁶⁷ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

⁶⁸ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

⁶⁹ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

⁷⁰ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

⁷¹ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp

of mosquito nuisance and drainage conditions in the south coast area, including on publicly accessible community forums and social media, provides a further indication of persistence and is reviewed as supporting evidence during community consultation under verification action BV-13. Residents of the Graeme Hall area again identified mosquitoes as a major concern during consultation for the Updated Environmental and Social Impact Assessment, observing that existing drainage issues could be exacerbated by the proposed construction, that this could enhance environmental conditions favoring mosquito populations, and that rising mosquito populations could produce a proportional rise in vector-transmitted diseases such as dengue.⁷² The pathway is therefore established as a pre-existing community grievance with a documented causal mechanism that Project activities can plausibly aggravate.

Quantitative notification data for dengue, Zika, chikungunya and malaria at parish level provide the baseline against which change is detected and are compiled during baseline verification under Section 17.

Non-Communicable Disease

Barbados carries a substantial non-communicable disease burden characteristic of the wider Caribbean, in which diabetes, hypertension, cardiovascular disease, chronic respiratory disease and obesity are principal contributors to morbidity.

This burden is material to the Assessment because a population with high prevalence of chronic respiratory and cardiovascular conditions constitutes a sensitive receptor for particulate matter and odor exposure. Residents articulated this position directly during consultation, identifying that dust and noise impacts were of greater concern for vulnerable members of the community including babies, the elderly and the infirmed, given the possibility of exacerbating ongoing or underlying ailments and conditions.⁷³

Quantitative characterization is drawn from two complementary sources. Prevalence data for hypertension, diabetes, asthma and chronic obstructive pulmonary disease at enumeration-area and parish level are available through the 2021 Population and Housing Census non-communicable disease tabulation and provide the local receptor profile. National estimated prevalence published by the Pan American Health Organization and the World Health Organization provides the comparator against which the local profile is assessed and supplies estimates for conditions not captured in the census tabulation. Both are compiled during baseline verification under Section 17.

Communicable Disease

Baseline prevalence for tuberculosis, human immunodeficiency virus and other sexually transmitted infections, gastrointestinal illness and respiratory infection establishes the reference against which labor influx effects are assessed. Notifiable disease returns and surveillance data held by the Ministry of Health and Wellness provide these data and are compiled during baseline verification under Section 17.

Water-Related Illness

at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

⁷² Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

⁷³ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

The Project context of an operating sewage treatment plant adjacent to residential areas and a wetland system makes baseline gastrointestinal illness rates relevant to the Assessment. Historical presentation data at local polyclinics, together with any complaint or illness records associated with operation of the South Coast Sewage Treatment Plant, provide this baseline and are compiled during baseline verification.

5.2.9. Health System and Service Arrangements

Health service arrangements determine both the capacity available to respond to Project-related health events and the extent to which Project-generated demand may displace community access with particular implications for women, as primary caregivers, children, older persons, PWDs, migrants and low-income households.

The following elements are established during baseline verification and are prerequisites to finalization of the referral and emergency arrangements at Sections 11.10 and 11.11: the location, hours, services and staffing of the nearest polyclinic including any barriers to access for women, children, older persons, PWDs and migrants; travel time to the Queen Elizabeth Hospital emergency department under normal and peak traffic conditions; ambulance response time to the site and the notification protocol; the location and capacity of private providers used by residents; occupational health provision for the workforce and the extent to which it draws on public capacity; the coverage, spraying schedule and contact arrangements of the Ministry of Health vector control unit; and the availability and referral routes for mental health and psychosocial services required for survivor support including SH/SEA/GBV victims, with attention to confidentiality, accessibility and stigma. Estimated costs for a part-time provider of mental and psychosocial support services is BBD \$400-900 dollars a month ⁷⁴.

The Assessment treats service displacement as a credible pathway requiring management. A workforce of up to 80 construction workers together with approximately 25 management personnel, predominantly non-local, will generate demand on health services, and the controls at Section 11.11 are designed to meet routine worker health needs through on-site and private provision so that public capacity remains available to the community particularly for women in caregiving roles, children, older persons, PWDs, low-income households and victims of SH/SEA/GBV who require urgent access to confidential support services.

Provision of survivor support services, comprising medical, psychosocial, legal and referral arrangements for persons affected by sexual exploitation and abuse, sexual harassment or gender-based violence, is treated as part of the Contractor's extended social responsibility and not as an optional welfare measure. The reasoning is that the risk arises from the presence of the Project workforce, so the cost of the response arrangements properly sits with the Project and not with the national health system or with survivors themselves. Specific costs for these services are not presently established, and an indicative estimate is provided in the text that follows. The Contractor is to confirm actual costs and the funding arrangement before mobilization, and the confirmed provision is to be recorded against the resourcing requirements at Section 18.

Two features of the commitment carry community health consequence. Access must be available to community members and not to workers alone, since the persons most likely to require support are residents as well as employees. Access must also be free at the point of use for the affected person, since a referral that a survivor cannot afford is not a functioning referral. Both features are carried into the survivor referral directory established before mobilization and verified quarterly under Section 11.8.

⁷⁴ AI-generated estimate of part-time mental and psychosocial support provider in Barbados.

5.2.10. Environmental Determinants of Health

Drainage and Standing Water

Existing drainage problems in the Graeme Hall area were identified by residents as a determinant of mosquito breeding.⁷⁵ Site works, excavation, material stockpiling and temporary works create additional opportunity for standing water. Drainage and stormwater management provisions for the campsite reference the wetland area, and the Project Execution Unit has required that the wetland be identified as Graeme Hall Swamp, the Graeme Hall Nature Sanctuary being the private portion of the whole swamp area.⁷⁶ This Assessment applies that convention.

Air Quality

Baseline sampling for the campsite covered particulate matter at 2.5 and 10 micrometers and selected gaseous pollutants relevant to site activities and nearby receptors, being sulfur dioxide, nitrogen dioxide, carbon monoxide and hydrogen sulphide, at three locations near the campsite.⁷⁷ The data provide a baseline reference point for future monitoring, as no project activities had commenced at the site at the time of collection.⁷⁸

Carbon dioxide, methane and other greenhouse gases were not included in the sampling. The Project Execution Unit has recorded that these parameters are required because the Contractor must measure the carbon footprint during construction and operation, and that a non-carbon emissions agreement is stipulated in the Contract.⁷⁹

Monitoring at community receptors establishes the exposure change experienced at dwellings and schools and is provided for at Section 11.2.

Odor, Hydrogen Sulfide and Bioaerosols

Baseline sampling for the campsite included hydrogen sulphide among the gaseous pollutants measured at three locations, which partially addresses the exposure pathways identified below and establishes a pre-

⁷⁵ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

⁷⁶ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

⁷⁷ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

⁷⁸ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

⁷⁹ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

construction reference for the principal odor-related determinant.⁸⁰ Biological aerosols and direct wastewater contact were not sampled, and are addressed through the control and monitoring measures at Section 11.3.

The campsite adjoins an operating sewage treatment plant. The Inter-American Development Bank Environmental and Social Governance team has identified biological aerosols, hydrogen sulphide exposure, direct or indirect wastewater contact, and vector-borne diseases associated with wastewater and standing water as exposure pathways requiring specific assessment and management, and has required identification of monitoring requirements, control measures, emergency response procedures and worker training related to these risks.⁸¹ These pathways apply to camp occupants and, at attenuated concentrations, to the nearest residents.

Water Quality and the Emergency Bypass

Water quality data for the Graeme Hall system and for the treatment plant influent and effluent have been assessed as dated and limited in sampling number across successive review cycles, with historical records extending to 2018.⁸² Establishment of a groundwater quality baseline has been identified as an outstanding requirement, on the basis that absence of information on the aquifer and groundwater allows inadequate preparation and mitigation and inaccurate identification of risks and impacts.⁸³

The South Coast Sewage Treatment Plant was commissioned in 2003 and designed to provide preliminary screening treatment, with wastewater repumped to an ocean outfall. The plant was designed with an emergency bypass line directed into the Graeme Hall Bisecting Canal, comprising two eight-inch lines constructed in 2003 that release raw sewage into the canal in the event of an emergency at the treatment plant. The design of the emergency discharge structure depended on the sluice gate being fully operational to allow discharge of raw sewage out to sea. With the sluice gate closed, the pipes allow raw sewage to flow freely into the main lake of the Sanctuary.⁸⁴

Periodic emergency discharge of high volumes of untreated sewage into the wetland has been associated with increased levels of nitrogen, ammonia, phosphorus, orthophosphate, bacteria, algae and total suspended solids in the wetland ecosystem. A raw sewage spill from the treatment plant in 2005 discharged between

⁸⁰ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

⁸¹ Inter-American Development Bank Environmental and Social Governance Team, *Annex 1: BA-L1063 Combined Comments on CRSEG Worker's Campsite*, 24 July 2026. Emergency preparedness and response at item 1; biodiversity assessment at item 2; worker influx and community interaction at item 3; SEA/SH/GBV management at item 4; worker health and safety, including heat stress and wastewater exposure risks, at item 5.

⁸² Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

⁸³ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

⁸⁴ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

three million and six million gallons of preliminary treated sewage, which travelled by overland flow across the government-owned spikerush marsh and into the lake, carrying organic waste, nutrients and pathogens together with chemicals, cleaners, oil and grease. It has been reported that the Environmental Protection Department advised there was no formal protocol for dealing with sewage spills and that each occurrence would be dealt with on an individual basis, and that the emergency sewage discharge lines did not include automatic controls to open the downstream sluice gate when the emergency discharge is activated.⁸⁵

This condition exists independently of the Project. It bears on this Assessment for three reasons. A credible pathway exists for raw sewage to reach a water body adjacent to residences and used by visitors. Construction works interfacing with an operating plant increase the likelihood of an emergency event occurring during the Project period. An emergency discharge occurring during construction will be attributed to the Project irrespective of cause, making advance clarification of bypass status, responsibility, notification protocol and response arrangements a Project management requirement. These are specified at Section 11.5 and scheduled at Section 15.

Noise

Pre-construction ambient noise monitoring was undertaken at the Workers' Campsite and along the primary access route on 15, 16 and 17 April 2026 by BrinsJen Systems Development Specialists, using calibrated Type 2 REED R8080 sound level meters.⁸⁶ Monitoring locations were selected to represent the closest positions to sensitive receptors, and measurements were taken across the working day before the start of work, mid-morning, at midday, after lunch and in late afternoon, with an evening period recorded at two locations as a reference point for future night-time monitoring.⁸⁷

Table 60: Pre-construction ambient noise levels, April 2026.

Location	Description and relevance	Max dB(A)	Min dB(A)	Average dB(A)
1	Downwind of the Workers' Campsite; expected maximum exposure to site-related noise	82.1	43.0	51.7 to 58.6
2	Within the existing facility compound,	72.5	60.4	63.8

⁸⁵ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

⁸⁶ BrinsJen Systems Development Specialists, *Noise Assessment Results, South Coast Reclamation Project*, results table for Locations 1 to 8. Assessment conducted 15, 16 and 17 April 2026 by M. Franklin-Lynch using REED R8080 Type 2 sound level meters, serial numbers 220106871 and 230604542, factory calibration 2 September 2025 with calibration due 2 September 2027, field calibration 13 April 2026.

⁸⁷ BrinsJen Systems Development Specialists, *Noise Baseline Monitoring Methodology*, section 1, Overview of Noise Monitoring, and section 2, Baseline Monitoring Methodology, together with *Noise Assessment Methodology*, sections on Relevant Standards, Equipment, and Testing and Assessment Methodology, 2026.

Location	Description and relevance	Max dB(A)	Min dB(A)	Average dB(A)
	downwind of pump; most significant existing noise source			
3	Downwind of the Workers' Campsite, west of Harmony Hall community; noise propagation toward the nearest residential cluster	81.7	55.7	56.3 to 60.5
4	Upwind of the campsite, downwind of the Ministry of Agriculture and the highway; background influenced by continuous vehicular traffic	77.9	42.1	50.6
5	Upwind of the campsite at the boundary with farmlands; background influenced by vehicles entering the farming area	66.4	56.3	57.3
6	Within the existing facility compound, downwind of generator set, generator off during assessment	74.4	50.4	55.8
7	Within the existing facility compound at the security hut	89.2	60.9	70.9

Location	Description and relevance	Max dB(A)	Min dB(A)	Average dB(A)
8	Within the existing facility compound at the fenceline between the new and existing facilities	67.3	44.7	51.5

Three findings follow from these data and carry directly into the impact assessment at CH-04.

The nearest residential cluster is already exposed to elevated ambient levels. Location 3, which captures propagation toward Harmony Hall, records daytime averages between 56.3 and 60.5 dB(A). The World Health Organization Community Noise Guidelines, adopted as reference standards under the National Noise Policy, identify 55 dB(A) as the daytime threshold for serious annoyance in outdoor living areas.⁸⁸ The Health and Safety Manual specifies the following construction noise limits: i) Normal hours (Mon–Fri 07:00–18:00, Sat 07:00–12:00): $L(A)_{eq}(8h) = 85$ dB(A), max 115 dB(A); ii) Restricted hours (Mon–Fri 18:00–22:00, Sat 12:00–22:00, Sun/holidays 10:00–18:00): $L(A)_{eq}(4h) = 65$ dB(A), max 80 dB(A); and iii) All other times: $L(A)_{eq}(4h) \leq 50$ dB(A), max 55 dB(A). Ambient conditions at this receptor therefore sit at or above the guideline value before any Project activity commences, and construction noise will be an increment upon an existing exceedance in an environment already at guideline level.

Ambient levels at this receptor are consistent across the day, ranging narrowly between 56.3 and 60.5 dB(A), which indicates a persistent source. Maximum readings of 81.7 dB(A) reflect transient events, most plausibly vehicle passages on the adjacent road network.

Background levels away from the residential cluster are materially lower, with Location 4 averaging 50.6 dB(A) and Location 1 ranging between 51.7 and 58.6 dB(A). The receiving environment is accordingly not uniform, and receptor sensitivity varies across the Area of Influence.

Under the National Noise Policy, which references the World Health Organization Community Noise Guidelines, night-time noise limits apply only to residential areas, while commercial and industrial activities are evaluated against a twenty-four-hour average.⁸⁹ Project activities are not presently expected to extend beyond 17:00, and the evening measurements at Locations 1 and 3 accordingly serve as a reference point for any future night-time monitoring.

Community perception of and social response to environmental noise in Barbados is addressed nationally through the National Environmental Noise Perception and Social Survey conducted by the Environmental Protection Department, which informs the characterization of receptor sensitivity applied in this Assessment.⁹⁰ Consistent with established assessment practice, the same construction activity produces

⁸⁸ Environmental Protection Department, Government of Barbados, *National Noise Policy*, together with Environmental Protection Department guidance on Noise Pollution Control, recording that Barbados has no dedicated noise legislation, that Cabinet acceded to the Barbados Noise Policy adopting the World Health Organization Community Noise Guidelines as reference standards, and that noise is otherwise addressed through the nuisance provisions of the Health Services Act, the Marine Pollution Control Act and the Road Traffic Regulations.

⁸⁹ BrinsJen Systems Development Specialists, *Noise Baseline Monitoring Methodology*, section 1, Overview of Noise Monitoring, and section 2, Baseline Monitoring Methodology, together with *Noise Assessment Methodology*, sections on Relevant Standards, Equipment, and Testing and Assessment Methodology, 2026.

⁹⁰ Environmental Protection Department, Government of Barbados, *National Environmental Noise Perception and Social Survey (NENPASS)*.

different community response depending on the background level at the receptor, and establishing the local ambient baseline is therefore a prerequisite to rating the noise pathway.

The Area of Influence combines residential settlement with tourism and entertainment activity characteristic of the south coast, and the baseline established under verification action BV-07 determines the receptor sensitivity classification applied at CH-04. Noise complaints have been a recurring subject of national policy attention, and enforcement has been recognized as presenting practical difficulty in the absence of dedicated legislation.⁹¹

Two features of the receiving environment increase sensitivity. The community includes a substantial older population and persons with pre-existing conditions, identified during consultation as those for whom noise impacts carry greater consequence.⁹² The two schools identified at Section 4.3 are noise-sensitive receptors during teaching hours, and one is an educational institution with an environmental focus situated in the Graeme Hall area.⁹³ Construction noise, generator operation and haulage therefore intersect with receptors whose sensitivity exceeds that of a general residential population.

Waste and Sanitation

Camp waste generation, segregation, storage and collection frequency operate as determinants of vector proliferation and odor. The Waste Collection, Transportation and Disposal provisions for the campsite have been assessed as written in narrative form, with segregation methods, storage arrangements outstanding, together with the mapped location of any larger storage area, the solid waste collection route, and identification of the authorized service company or companies to transport municipal solid waste.⁹⁴ According to the Health and Safety Manual, solid waste disposal destinations include Mangrove Landfill at the Sustainable Barbados Recycling Center for general/domestic waste, with a minimum twice-weekly collection frequency for waste collected and stored in covered storage facilities at designated on-site locations. It identifies the Bagatelle scrap metal facility as the disposal site for metal waste. Solid waste is to be disposed of only at a government-approved disposal site, with advice sought from the Sanitation Service Authority or the Environmental Protection Department on disposal methods and procedures.⁹⁵ Segregation follows

⁹¹ Environmental Protection Department, Government of Barbados, *National Noise Policy*, together with Environmental Protection Department guidance on Noise Pollution Control, recording that Barbados has no dedicated noise legislation, that Cabinet acceded to the Barbados Noise Policy adopting the World Health Organization Community Noise Guidelines as reference standards, and that noise is otherwise addressed through the nuisance provisions of the Health Services Act, the Marine Pollution Control Act and the Road Traffic Regulations.

⁹² Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

⁹³ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

⁹⁴ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

⁹⁵ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

Barbados normative practice, including the color bag arrangements proposed by government and current Barbadian initiatives.⁹⁶

5.2.11. Social and Economic Determinants of Health

Workforce Composition and Labor Influx Profile

Workforce composition is a primary determinant of the labor influx, communicable disease and community interaction pathways assessed at CH-07 and CH-08 (the composition can be seen in the Labour Management Plan).

Three features of this profile bear on the health assessment.

The workforce is majority local. Reported local content of 61.1 percent means the Project is not characterized by a wholly imported workforce, and the labor influx pathway is correspondingly narrower than the assumption applied at earlier stages of Project review. The non-local component comprises 98 Chinese nationals and is expected to be predominantly male, which in combination with language and cultural differences, increases the importance of managing SH/SEA/GBV risks and power imbalances in worker-community interactions, particularly affecting women and girls, informal vendors and service providers in surrounding communities, which corresponds closely to the campsite accommodation capacity and identifies the camp population as the group through which influx-related health pathways principally operate.

Local content declines as construction intensifies, falling from 79.0 percent at mobilization to 46.5 percent through the peak construction period of Q3 2027 to Q4 2028. The period of greatest non-local presence coincides with the period of greatest construction activity, so labor influx risk and nuisance exposure peak together. Programme intensity at Sections 11.7 and 11.8 is calibrated to that profile.

The local workforce is concentrated in subcontracted and service functions, comprising material supply, landscaping, road works, laboratory testing, geotechnical investigation, utility connection, customs brokerage and professional services, while civil works, mechanical and electrical installation and plant operation are staffed by Chinese personnel. Local personnel are therefore distributed across the Area of Influence and beyond it, with limited concentration at the campsite, which reduces camp-mediated transmission risk while extending community interaction across a wider footprint.

At national level, the labor force participation rate is 63.3 percent, with 57.4 percent of the population employed and 4.9 percent unemployed, and the working poverty rate recorded at 0.3 percent in 2025.⁹⁷ These are national aggregates and are applied here as context. Employment and income characteristics within the Area of Influence, including dependence on visitor accommodation, hospitality and informal vending sectors in which women and youth are strongly represented and which often lack formal social protection, are established through the census compilation at Section 5.7 and the vendor survey at verification action BV-14. The village economy mirrors the broader national environment, with tourism and related services as the primary drivers of growth. In communities directly affected by the Project, tourism, agriculture and services

⁹⁶ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

⁹⁷ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

form the core economic activity. Homeowners including female headed households generate income by renting properties to visitors, farmers sustain local food production, and small bars provide entrepreneurial opportunity.⁹⁸

Three implications follow for community health.

Household income in the Area of Influence derives partly from visitor accommodation and hospitality, so particulate, noise and odor impacts affect income alongside amenity. Economic loss operates as a health determinant in its own right, and this pathway is assessed at CH-12.

The households most affected by this pathway are identifiable from the census profile at Section 5.1. Owner-occupier households renting rooms or property to visitors carry the most direct exposure, since owner occupation stands at 60.3 percent and rental income depends on an environment free of dust, odor and construction noise. Households headed by older persons are a large group, with 292 persons aged 65 and over recorded as household heads, and they combine fixed or reduced income with the highest sensitivity to the physical impacts themselves. Households dependent on a single earner in the hospitality and service sector are exposed where visitor numbers fall, and service occupations account for 12.4 percent of employment in the area. Informal vendors at the compound perimeter and along the access route hold the least secure position of all, since their income depends on physical presence at a location that the Project may restrict, and they have no contractual protection if access arrangements change.

The knock-on effects of income loss operate as health determinants in their own right. Reduced household income constrains food purchasing, and food security deteriorates first in single-earner and older-person households with the least financial buffer. It also constrains the ability to mitigate exposure privately, so households that lose income become less able to afford the fans, screening, alternative transport or private medical consultation that would otherwise reduce their exposure to the physical pathways, which compounds the original impact. Chronic financial stress carries recognized mental health consequences, including anxiety and sleep disturbance, and these interact with the sleep disruption already assessed at CH-04 so that the two effects reinforce one another. Within households, the burden of managing reduced income and of caring for members who fall ill falls disproportionately on women, consistent with the caregiving roles described at Section 5.6. Where income loss is sustained, households may defer health-seeking behavior, which converts a treatable condition into a more serious one and adds demand to the health services assessed at CH-11.

These effects are monitored through the complaint trend analysis by category and household at CH-12, through the engagement satisfaction assessment, and through the wellbeing enquiry incorporated into complaint investigation at Section 11.4. Where a household demonstrates Project-attributable income loss, the matter is escalated to the Community Liaison Officer and recorded so that the pattern across households can be assessed as a pattern instead of as a series of isolated complaints.

The presence of a concentrated workforce may stimulate informal vending and service provision around the compound perimeter. While this creates income opportunity, unmanaged vending introduces safety hazards, congestion, waste accumulation and social tension, and vendors positioning themselves in unsafe or restricted areas creates conflict between site security requirements and livelihood activity.⁹⁹ Women and youth are

⁹⁸ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

⁹⁹ *Environmental and Social Impact Assessment, Workers Compound Area*, Revision RS, 3 April 2026, socio-economic sphere of influence and informal vendor considerations.

expected to be among those vendors and may face heightened risks of SH/SEA/GBV as well as barriers to raising complaints. Informal vendors are accordingly treated as a receptor group at Section 4.3.

Local employment operates as a health-protective factor. The Inter-American Development Bank has requested local hiring targets and commitments where applicable, together with a community awareness and outreach plan, a worker-community interaction protocol, a multilingual communication strategy and monitoring indicators for tracking community complaints and concerns.¹⁰⁰

Ecosystem Services with Health Function

Graeme Hall Swamp performs functions with direct community health consequence. The wetland provides water regulation and drainage functions that bear on standing water and flood exposure. It supports the larvivorous fish populations that constitute one of the two natural mosquito controls identified at Section 5.2.1. The connectivity of water bodies within the system allows access by fish that control mosquito larvae and clearing of canals to maintain that connectivity is a recognized control measure.¹⁰¹

The Project Execution Unit has required that the Environmental and Social Impact Assessment for the campsite identify the ecosystem services of the area, both direct and indirect, where the camp will be installed and operate, and that prioritization follow identification.¹⁰² The health-relevant functions identified in this section, being water regulation and drainage, support for larvivorous fish populations, and hydrological connectivity permitting fish access for larval control, constitute the identification and prioritization required for community health purposes. These are qualitative determinations drawn from the published record and require no additional field programme.

Economic valuation of these ecosystem services falls outside the scope of this Assessment; however, an economic valuation is a useful consideration for future studies relating to Component 1. Valuation of the Graeme Hall wetland system would require a specialist economic team and a data collection programme disproportionate to the community health questions at issue, and the health-relevant functions are adequately characterized for management purposes by identification and prioritization alone. Where the Critical Habitat Assessment produces further information on these functions, it is incorporated at the next revision.

Baseline Verification Requirements

The following verification actions establish the quantitative baseline supporting this Assessment. Each is scheduled at Section 15 and tracked through indicator KPI-21 at Section 13.

¹⁰⁰ Inter-American Development Bank Environmental and Social Governance Team, *Annex 1: BA-L1063 Combined Comments on CRSEG Worker's Campsite*, 24 July 2026. Emergency preparedness and response at item 1; biodiversity assessment at item 2; worker influx and community interaction at item 3; SEA/SH/GBV management at item 4; worker health and safety, including heat stress and wastewater exposure risks, at item 5.

¹⁰¹ Mahon, R. et al., *Graeme Hall Swamp: A Review*, Centre for Resource Management and Environmental Studies, University of the West Indies, CERMES Technical Report No. 110, 2025. Mosquitos and other disease vectors at section 4.3.2, p. 74, covering species composition, the shift to freshwater conditions, larvivorous fish, Ministry of Health management of the East Unit and the fish breeding station. Sewage discharges into Graeme Hall Swamp at section 4.2.1, p. 67, covering the 2003 emergency bypass lines, sluice gate condition and the absence of a formal spill protocol. The 2005 discharge volume at p. 33. Sources cited within the review and relied upon here include CZMU (2007), EEC (2010; 2019a), Spielman and Nathan (1990), ARA (1997; 1998), Cumming Cockburn et al. (1996), Nurse et al. (2012), Foster (1986) and the Government of Barbados National Biodiversity Strategy and Action Plan (2020).

¹⁰² Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

Table 61: Baseline verification requirements.

Reference	Verification action	Source	Timing
BV-01	Compile enumeration-area and parish-level demographic and non-communicable disease data for settlements in the Area of Influence and for Christ Church, covering population and sex, age structure, household composition and reported conditions	Barbados Statistical Service, 2021 Population and Housing Census	Before commencement of works
BV-02	Compile five-year notification data for dengue, Zika, chikungunya, malaria and <i>Oropouche virus</i> by parish	Ministry of Health and Wellness	Before commencement of works
BV-03	Compile notifiable communicable disease returns and sexually transmitted infection surveillance data	Ministry of Health and Wellness	Before commencement of works
BV-04	Compile gastrointestinal illness presentation data and any records associated with plant operation	Ministry of Health and Wellness, local polyclinic	Before commencement of works
BV-05	Survey health service capacity, travel times and ambulance response	Ministry of Health and Wellness, Queen Elizabeth Hospital	Before mobilization
BV-06	Establish air quality baseline at community receptors including dwellings and schools	Project monitoring programme	Before commencement of works
BV-07	Extend ambient noise monitoring to the two	Project monitoring programme ¹⁰³	Before commencement of works

¹⁰³ BrinsJen Systems Development Specialists, *Noise Assessment Results, South Coast Reclamation Project*, results table for Locations 1 to 8. Assessment conducted 15, 16 and 17 April 2026 by M. Franklin-Lynch using REED R8080 Type 2 sound level meters, serial

Reference	Verification action	Source	Timing
	school receptors during teaching hours, the April 2026 baseline having established levels at the campsite, the access route and the nearest residential cluster		
BV-08	Update Graeme Hall Swamp water quality data and establish groundwater baseline	Project monitoring programme, Barbados Water Authority	Before commencement of works
BV-09	Confirm quality and composition of the water supply to be used at the campsite	Contractor, supplier records	Before camp occupation
BV-10	Confirm location, operating arrangements, water supply and protection requirements of the Ministry of Health fish breeding station	Ministry of Health and Wellness, site survey	Before commencement of works
BV-11	Confirm status of the emergency bypass lines and sluice gate and the existence of a formal sewage spill protocol	Barbados Water Authority, Environmental Protection Department	Before construction adjacent to the operating plant
BV-15	Obtain parish and national health estimates from Pan American Health Organization and World Health Organization country data to supplement Ministry of Health returns	PAHO Barbados country profile; WHO Global Health Observatory	Before commencement of works
BV-12	Confirm workforce composition including	Contractor human resources records	Before mobilization

numbers 220106871 and 230604542, factory calibration 2 September 2025 with calibration due 2 September 2027, field calibration 13 April 2026.

Reference	Verification action	Source	Timing
	gender disaggregation, nationality, rotation, local hiring, and the written and spoken language varieties represented, so that interpretation requirements for training and emergency instruction are established		
BV-13	Undertake community health consultation and validate Assessment findings with affected residents, including women, older persons and persons with disabilities	Community Liaison Officer	Before commencement of works
BV-14	Survey existing and anticipated informal vending at the compound perimeter	Community Liaison Officer	Before mobilization

5.2.12. Community Health Impact Assessment

This section is the analytical core of the Assessment. It takes each pathway by which Project activity can alter a health outcome, establishes how likely that alteration is and how severe it would be, including how these risks differ for women, men, girls, boys, youth, older persons, PWDs, migrants, informal workers and female headed households. It also applies the controls set out in Part B, and determines what risk remains once those controls are operating as designed. The residual figure is what the Programme is built to manage and what supervision is calibrated against with specific attention to the protection of vulnerable and differentially affected groups.

The issues assessed fall into four groups. Environmental exposure pathways cover vector-borne disease, particulates, odor and hydrogen sulphide, noise and vibration, and water and sanitation, and arise from the physical conduct of construction next to an established community and an operating treatment plant. Community safety pathways cover road traffic injury and emergency events, and arise from heavy vehicles on a shared access road and from the concentration of workers, fuel and hazardous materials at a single site. Social and health service pathways cover communicable disease and labor influx, sexual exploitation and abuse together with sexual harassment and gender-based violence, and displacement of health service capacity, and arise from the presence of an accommodated non-local workforce. Wellbeing pathways cover food safety and zoonoses and the cumulative effect of nuisance on quality of life and livelihood.

Each pathway is presented in a standard table, the first of which appears at Section 6.1. The table records, in order, the source activity giving rise to the impact; the potential impact on the receiving environment; the resulting risk to human health; the nature and type of the impact; its extent and duration; the likelihood and magnitude scores before mitigation and the risk significance these produce; a summary of the mitigation measures to be applied, cross-referenced to the corresponding Programme component in Part B; the likelihood and magnitude scores after those measures are operating; the residual risk significance; and the management measures that address whatever risk remains. Reading a table from top to bottom therefore traces a single pathway from its cause through to the arrangements that will control it in practice.

This section assesses each of the twelve health determinant pathways identified at Section 3.1 against the rating methodology at Section 3.2. Each pathway is presented in a standard table recording the source activity, the potential impact, the risk to health, including any differentiated risks for women, girls, boys, youth, older persons, PwDs and other vulnerable groups, the nature and type of impact, extent, duration, likelihood and magnitude before mitigation, the resulting pre-mitigation significance, a summary of mitigation measures with a cross-reference to the corresponding Programme component in Part B, likelihood and magnitude after mitigation, residual significance, and the management measures addressing residual impact with explicit consideration of gender and vulnerability factors for each pathway.

Four pathways attract Critical or Very High significance before mitigation: road traffic injury with highest exposure for school children, caregivers (predominantly women), older persons, PwDs, and low-income public transport users along the access route, sexual exploitation and abuse together with sexual harassment and gender-based violence with heightened risk for women and girls in surrounding communities, women working in local businesses and informal vending, students, and any women workers accommodated on site, and emergency and disaster events at Critical; vector-borne disease, water and sanitation, and communicable disease and labor influx at Very High with particular consequences for infants and young children, pregnant women, older persons, persons with chronic illness and women in caregiving roles. These reflect the Project's defining characteristics, being a narrow, shared access road used by schoolchildren, an accommodated non-local workforce adjacent to an established community, a wetland system with documented vector ecology and sewage contamination history, and construction proceeding alongside an operating treatment plant.

Three pathways retain High residual significance after mitigation, on the basis that consequence severity cannot be reduced below serious harm. These are identified at Section 6.13 and carry priority supervision throughout the Programme. Supervision priority includes the monitoring of impacts on vulnerable groups and SH/SEA/GBV outcomes.

Tables 6.1 to 6.12 present the assessment tables for each health pathway, including the source activities, affected populations, potential health outcomes, significance ratings, risks, mitigation measures, and management requirements. Table 13 presents an overview of significance rating across each health pathway. Collectively, the tables provide the basis for the Community Health Programme and establish the risk priorities that inform the management measures, monitoring indicators, communication requirements, corrective-action procedures and emergency-response arrangements presented in Part B.

CH-01 Vector-Borne Disease

Table 62: Vector-borne disease impact assessment

Field	Assessment
Activity	Excavation and earthworks; temporary works; material and waste storage; alteration of drainage

Field	Assessment
	and canal flow; camp wastewater treatment; works in proximity to the Ministry of Health fish breeding station
Potential impact	Creation of standing water and harborage supporting <i>Aedes aegypti</i> , <i>Anopheles</i> species and <i>Culex</i> species; obstruction of canal flow reducing larvivorous fish movement; disruption of Ministry of Health vector control operations
Risk	Increased incidence of dengue, Zika, chikungunya and <i>Oropouche virus</i> in the adjacent community; degradation of an existing public health control
Nature and type	Adverse; indirect; construction and operation
Extent	Local
Duration	Short-term, with a long-term component where drainage or canal connectivity is permanently altered
Likelihood	4, Likely
Magnitude	4, High. Three disease-competent species are present in the adjacent swamp; the system has shifted toward freshwater conditions favorable to breeding; vector-borne disease produces clinical illness and hospitalization; the community carries pre-existing exposure and identifies this as a primary concern
Pre-mitigation significance	Very High
Mitigation summary	Weekly vector inspection; elimination of standing water within 24 hours; covered waste receptacles; sealed wastewater systems; maintenance of canal and drainage flow to preserve larvivorous fish movement; protection of the Ministry of Health fish breeding station from disturbance, runoff and access interference; coordination with Ministry of Health vector control including its fogging and canal-clearing schedule; community larval source reduction outreach; post-rainfall inspection trigger ; use of insect repellents containing DEET, picaridin, or lemon eucalyptus oil on exposed skin, wearing of long-sleeved shirts and long pants, especially during peak mosquito activity, installation of insect screens

Field	Assessment
	on windows and doors, and elimination of stagnant water (Section 11.1)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	3, Moderate
Residual significance	Medium
Residual management	Monthly vector index monitoring reported to the Project Execution Unit; escalation where the index exceeds baseline or where three or more mosquito-related complaints are received in a month; contribution to community-level vector control where Project attribution is established

CH-02 Respiratory Health and Particulate Exposure

Table 63: Particulate and respiratory health impact assessment

Field	Assessment
Activity	Earthmoving, site levelling, movement on unpaved tracks, material handling, haulage
Potential impact	Elevated concentrations of particulate matter at 10 and 2.5 micrometers at residential and school receptors
Risk	Exacerbation of asthma, chronic obstructive pulmonary disease and cardiovascular conditions; acute respiratory symptoms in children and older persons
Nature and type	Adverse; direct; construction
Extent	Local
Duration	Short-term, intermittent
Likelihood	4, Likely
Magnitude	3, Moderate. Symptomatic effects and increased primary care attendance in a population carrying high chronic respiratory and cardiovascular prevalence
Pre-mitigation significance	High
Mitigation summary	Water suppression of exposed soil, haul routes and site entrance; covered stockpiles and secured loads; wheel-wash and road cleaning; continuous

Field	Assessment
	monitoring at community receptors; work-stop trigger on visible dust migration beyond the boundary; advance notice to households with sensitive occupants (Section 11.2)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	2, Low
Residual significance	Low
Residual management	Monthly reporting of exceedances and correlation with complaints; review of controls following any exceedance recorded at a school receptor

CH-03 Odor, Hydrogen Sulfide and Bioaerosol Exposure

Table 64: Odor, hydrogen sulphide and bioaerosol impact assessment

Field	Assessment
Activity	Construction adjacent to the operating treatment plant; temporary bypass arrangements; sludge and wastewater handling; camp wastewater treatment
Potential impact	Community exposure to hydrogen sulphide, odor compounds and biological aerosols
Risk	Headache, nausea and respiratory irritation; anxiety and reduced amenity; acute toxicity at elevated concentrations
Nature and type	Adverse; direct and indirect; construction, commissioning and operation
Extent	Local
Duration	Short-term and intermittent during construction; long-term where operational odor control is inadequate
Likelihood	4, Likely. The interface between construction and continued plant operation is inherently disruptive to odor control
Magnitude	3, Moderate
Pre-mitigation significance	High
Mitigation summary	Continuous hydrogen sulphide monitoring with alarm at the camp and the nearest community receptor; odor management procedure for bypass

Field	Assessment
	and sludge operations; scheduling of high-odor operations with reference to wind direction; advance community notification of planned high-odor works; enclosure and spray suppression for bioaerosol control; siting of camp intake and amenity areas outside the plume envelope (Section 11.3)
Post-mitigation likelihood	3, Possible
Post-mitigation magnitude	2, Low
Residual significance	Medium
Residual management	Odor complaint log with response within 24 hours; quarterly review of monitoring against adopted guideline values; escalation to the Project Execution Unit on any exceedance of the alarm threshold

CH-04 Noise, Vibration and Sleep Disruption

Table 65: Noise, vibration and sleep disruption impact assessment

Field	Assessment
Activity	Heavy diesel machinery, structural anchoring, generators, night-time operations, haulage
Potential impact	Elevated noise at residential receptors; vibration in close-proximity dwellings
Risk	Sleep disruption, psychological stress and annoyance; structural cracking generating anxiety and dispute; cardiovascular effects arising from chronic sleep disturbance
Nature and type	Adverse; direct; construction
Extent	Local
Duration	Short-term, recurrent
Likelihood	4, Likely
Magnitude	3, Moderate. The nearest residential cluster records daytime ambient averages of 56.3 to 60.5 dB(A), at or above the 55 dB(A) World Health Organization daytime threshold for serious annoyance, so construction noise represents an increment upon

Field	Assessment
	an existing exceedance. ¹⁰⁴ Receptor sensitivity is characterized against that measured baseline and informed by the National Environmental Noise Perception and Social Survey ¹⁰⁵
Pre-mitigation significance	High
Mitigation summary	Restriction of high-noise activity to approved daytime hours; generator attenuation and siting for maximum separation from dwellings; night work by exception with prior notification; pre-construction condition survey of the nearest dwellings; monitoring at residential and school boundaries; downward-directed and shielded lighting (Section 11.4)
Post-mitigation likelihood	3, Possible
Post-mitigation magnitude	2, Low
Residual significance	Medium
Residual management	Complaint-triggered monitoring against the World Health Organization Community Noise Guideline values adopted under the National Noise Policy; ¹⁰⁶ enquiry into effects on sense of safety and wellbeing incorporated into complaint investigation, consistent with the commitment carried in the Community Health and Safety Plan ¹⁰⁷

CH-05 Water, Sanitation and Gastrointestinal Illness

Table 66: Water, sanitation and gastrointestinal illness impact assessment

Field	Assessment
Activity	Camp wastewater generation and pre-treatment; discharge to the receiving environment; fuel and chemical storage; drainage to Graeme Hall Swamp; construction interfacing with an operating plant

¹⁰⁴ BrinsJen Systems Development Specialists, *Noise Assessment Results, South Coast Reclamation Project*, results table for Locations 1 to 8. Assessment conducted 15, 16 and 17 April 2026 by M. Franklin-Lynch using REED R8080 Type 2 sound level meters, serial numbers 220106871 and 230604542, factory calibration 2 September 2025 with calibration due 2 September 2027, field calibration 13 April 2026.

¹⁰⁵ Environmental Protection Department, Government of Barbados, *National Environmental Noise Perception and Social Survey* (NENPASS).

¹⁰⁶ Environmental Protection Department, Government of Barbados, *National Noise Policy*, together with Environmental Protection Department guidance on Noise Pollution Control, recording that Barbados has no dedicated noise legislation, that Cabinet acceded to the Barbados Noise Policy adopting the World Health Organization Community Noise Guidelines as reference standards, and that noise is otherwise addressed through the nuisance provisions of the Health Services Act, the Marine Pollution Control Act and the Road Traffic Regulations.

¹⁰⁷ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

Field	Assessment
	that retains an emergency raw sewage bypass to the Graeme Hall Bisecting Canal
Potential impact	Contamination of surface water, groundwater or coastal water with pathogens or chemicals; increased likelihood of an emergency bypass event during the construction period
Risk	Gastrointestinal illness; skin and eye infection among recreational water users; contamination of local abstraction; acute exposure of residents and Sanctuary users to raw sewage
Nature and type	Adverse; indirect; construction and operation
Extent	Local to regional
Duration	Temporary for incidents; long-term for chronic discharge
Likelihood	3, Possible
Magnitude	4, High. Waterborne outbreak potential with recreational and tourism exposure; the documented 2005 discharge of three to six million gallons establishes the scale credible at this location
Pre-mitigation significance	Very High
Mitigation summary	Closed and maintained camp wastewater systems with approved discharge only; potable water verification at source and point of use; monitoring at the discharge point; spill prevention and containment; groundwater baseline and monitoring; prohibition of night soil use in the vegetable garden; confirmation of bypass status, sluice gate functionality and a formal sewage spill protocol before construction adjacent to the operating plant; agreed community notification arrangements for any bypass event (Section 11.5)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	3, Moderate
Residual significance	Medium
Residual management	Monthly effluent and receiving water monitoring; immediate community notification protocol for any release carrying exposure potential

CH-06 Transport and Road Traffic Injury

Table 67: Road traffic injury impact assessment

Field	Assessment
Activity	Transport vehicles do not have up-to-date technical inspections, generating polluting gases into the atmosphere that increase GHGs. Heavy trucks, delivery trailers and commuter vehicles transiting a narrow residential access road used by residents, school children, caregivers, older persons, PwDs, and public transport users.
Potential impact	Collision with pedestrians, cyclists or vehicles especially school children and other pedestrians with limited protection and; degradation of local road sub-base
Risk	Pedestrian strike, particularly of schoolchildren and accompanying caregivers (predominantly women) during school-hour movements and of older persons, PwDs and low-income pedestrians relying on the access route; serious injury or fatality and associated psychosocial distress.
Nature and type	Adverse; direct; construction; social and gender-differentiated
Extent	Local
Duration	Short-term, continuous through construction
Likelihood	4, Likely
Magnitude	5, Catastrophic. Fatality is a credible outcome of a pedestrian strike by a heavy vehicle
Pre-mitigation significance	Critical
Mitigation summary	Prohibition of heavy vehicle transit between 07:00 and 08:00 and between 15:00 and 16:30; speed limit of 15 kilometers per hour on the community access route and 10 kilometers per hour at the camp entrance and internal areas; trained traffic wardens at critical bends, access points and the main gate; off-site vehicle staging with no queuing on public roads; route planning avoiding school frontages; driver induction and monitoring gender and child-sensitive engagement with schools; students and caregivers on road safety, targeted communication

Field	Assessment
	with residents, including older persons, PwDs and informal vendors on safe road use; road condition inspection and prompt removal of mud and spillage (Section 11.6)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	4, High
Residual significance	High
Residual management	Consequence severity remains irreducible below serious injury, and management concentrates on likelihood. Weekly compliance auditing of transit windows and speeds; immediate investigation and suspension of the responsible driver following any pedestrian near-miss; quarterly review with school administrations and where feasible periodic consultation with residents, older persons, PwDs, informal vendors and public transport operators on perceived traffic risk. Traffic related complaints and near-miss reports are channeled through the GRM with options for anonymous reporting

Vehicles without current technical inspection generate elevated exhaust emissions, and the Contractor operates under a non-carbon emissions agreement stipulated in the Contract, so the matter is a live Project obligation. Quantification of the Project carbon footprint, the emissions inventory across construction and operation, and performance against that contractual commitment are functions of the wider Environmental and Social Impact Assessment and Environmental and Social Management Plan, which hold the air quality and greenhouse gas monitoring programs. They are not repeated in this Assessment.

The community health consequence of the same vehicle condition falls within this Assessment. Poorly maintained vehicles emit particulate matter, nitrogen dioxide and sulfur dioxide at the roadside, and the receptors exposed are the residents, schoolchildren, caregivers and vendors along the shared access route, and not the atmosphere at large. That exposure is assessed at CH-02, monitored at community receptors under Section 11.2 and indicator KPI-03, and controlled through the vehicle maintenance, emission standard and idling restrictions in the Traffic Management Plan. The two treatments are complementary: the wider Assessment addresses the climate obligation and the emissions inventory, and this Assessment addresses the health of the people breathing the exhaust at the point of emission.

The greenhouse gas parameters identified as missing from the campsite air quality baseline at Section 5.4.2, being carbon dioxide, methane and other greenhouse gases, are to be added to the wider Project monitoring program instead of to the community health monitoring at Section 11.2, which measures the pollutants with direct health effect at the receptor.

CH-07 Communicable Disease and Labor Influx

Table 68: Communicable disease and labor influx impact assessment

Field	Assessment
Activity	Mobilization and accommodation of a concentrated, predominantly non-local workforce of up to 80 workers together with approximately 25 management personnel at peak; worker movement in the community during off-duty hours, including interaction with women, girls, youth and informal vendors in surrounding areas
Potential impact	Introduction or amplified transmission of communicable disease between the camp population and the host community, including respiratory infection, tuberculosis, gastrointestinal illness and sexually transmitted infection, with differential impacts on women and girls who may face higher risks to communicable diseases, greater care burdens and increased stigma where infection is associated with SH/SEA/GBV or transactional sex.
Risk	Community outbreak; increased local disease burden particularly for infants and young children, older persons and people with chronic illness; increased demand on health services and on unpaid care work carried out predominantly by women.
Nature and type	Adverse; indirect; construction; social and gender differentiated.
Extent	Local to national
Duration	Short-term, extending to long-term where transmission becomes established
Likelihood	3, Possible. Majority local content of 61.1 percent narrows the influx pathway relative to a wholly imported workforce, while non-local presence and construction intensity peak together in Q3 2027 to Q4 2028 ¹⁰⁸
Magnitude	4, High
Pre-mitigation significance	Very High

¹⁰⁸ China Railway Shanghai Engineering Group Co., Ltd., *Labour Management Plan*, revised 7 August 2026, and accompanying workforce analysis. Total workforce, local content and peak deployment at the Labour Overview sheet; workforce composition by work area at the Labour Plan sheet; quarterly and phase deployment at the Deployment Plan sheet.

Field	Assessment
Mitigation summary	Pre-mobilisation health assessment consistent with Barbadian law, non-discrimination obligations and the Data Protection Act 2019; camp occupancy density and ventilation standards; isolation and referral procedure for suspected communicable disease; food handler certification and health surveillance; worker health education in Chinese and English using gender-sensitive content and formats accessible to workers with different literacy levels; sexually transmitted infection awareness and confidential access to sexual and reproductive health services; outbreak notification to the Ministry of Health; recording of camp illness rates as a leading indicator (Section 11.7)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	3, Moderate
Residual significance	Medium
Residual management	Monthly camp morbidity reporting disaggregated by sex, age, and job position/category (where possible) as a basis for identifying differential risks; outbreak response arrangements tested annually; coordination with the Ministry of Health; maintaining access to essential services for vulnerable community members, findings are fed back into the Community Health Programme Plan.

CH-08 Sexual Exploitation and Abuse, Sexual Harassment and Gender-Based Violence

Table 69: Sexual exploitation and abuse, sexual harassment and gender-based violence impact assessment

Field	Assessment
Activity	Presence of a predominantly male non-local workforce; economic asymmetry between workers and community members; worker movement in the community
Potential impact	Sexual exploitation and abuse, sexual harassment and gender-based violence affecting community members, particularly women, girls, women working in local businesses and informal vending, students, PwDs, migrants and other vulnerable persons

Field	Assessment
Risk	Physical and psychological injury; sexually transmitted infection; unintended pregnancy; social stigma; community conflict; loss of income or schooling for victims; and increased risk of further violence or retaliation when incidents are disclosed.
Nature and type	Adverse; direct; construction; social and gender differentiated.
Extent	Local
Duration	Short-term, with long-term consequence for survivors
Likelihood	3, Possible
Magnitude	5, Catastrophic. Harm to individuals is severe and enduring
Pre-mitigation significance	Critical
Mitigation summary	Delivered through the Sexual Exploitation and Abuse, Sexual Harassment and Gender-Based Violence Prevention and Response Plan and the Workers' Code of Conduct, prohibition of any sexual activity with persons under the age of 16 and of sexual relationships between workers and project beneficiaries; confidential and anonymous reporting accessible to community members, including women and girls, Pwds, migrants and informal workers; Community-facing elements comprise awareness of prohibited conduct and reporting channels; confidential and anonymous reporting accessible to community members; survivor-centered referral to medical, psychosocial and legal services established in advance and coordinated with national protocols; non-retaliation protection; mandatory training for workers; clear supervisor accountability; and enforced sanctions (Section 11.8)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	5, Catastrophic
Residual significance	High
Residual management	Consequence severity remains irreducible, and management concentrates entirely on likelihood. Confidential case register held separately from the

Field	Assessment
	general grievance log with strictly limited access; quarterly reporting of case numbers and resolution times without identifying detail; periodic consultation with service providers to assess the quality and timeliness of response; and an annual independent review of channel accessibility for women and girls, PWDs, migrants, informal workers and other vulnerable groups.

CH-09 Food Safety and Zoonoses

Table 70: Food safety and zoonoses impact assessment

Field	Assessment
Activity	Camp catering for up to 105 occupants; on-site vegetable garden; food waste storage
Potential impact	Foodborne illness within the camp with onward community transmission; rodent proliferation affecting adjacent properties
Risk	Gastrointestinal outbreak; leptospirosis and other rodent-associated disease
Nature and type	Adverse; indirect; construction
Extent	On-site to local
Duration	Temporary
Likelihood	3, Possible
Magnitude	3, Moderate
Pre-mitigation significance	High
Mitigation summary	Food handler certification and periodic health checks; kitchen hygiene inspection; cold chain verification; prohibition of night soil use in the vegetable garden; produce washing protocol; sealed food waste storage with frequent removal; integrated rodent control with perimeter monitoring (Section 11.9)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	2, Low
Residual significance	Low

Field	Assessment
Residual management	Weekly kitchen inspection records; camp gastrointestinal illness rate monitored against an outbreak threshold

CH-10 Emergency, Disaster and Climate Events

Table 71: Emergency, disaster and climate event impact assessment

Field	Assessment
Activity	Camp operation; hazardous material and fuel storage; works during hurricane season; open excavations during extreme rainfall affecting workers and nearby residents and households with children, older persons and PWDs.
Potential impact	Fire in accommodation; flooding and storm surge; fuel or chemical release; failure of emergency response affecting the community including displacement, loss of housing or livelihoods and significant psychosocial stress, particularly for female-headed and low-income households, older persons and PWDs. This pathway covers three distinct categories of event. They share a community health consequence and differ in cause, likelihood and control, and each is therefore managed on its own terms. A fourth category falls outside this Assessment. The first category is natural hazards and climate events. Barbados is exposed to a broad hazard profile that extends well beyond the hurricane season alone. It comprises drought, flooding, earthquake, tsunami, tropical cyclones in their several forms including hurricane, tropical storm and tropical depression, heavy rainfall, extreme heat and sun exposure, sea level rise, wildfire including grass and bush fires, volcanic ashfall, Saharan and other desert dust, landslide, land degradation, coastal erosion, and water-borne and vector-borne disease events that follow flooding or drought. Several of these interact with the community health pathways already assessed. Heavy rainfall and flooding create standing water and mobilize contaminated material, which acts on

Field	Assessment
	CH-01 and CH-05. Extreme heat and Saharan dust act on the respiratory pathway at CH-02 and on the older population identified at Section 5.1. Drought concentrates effluent and reduces dilution in the receiving environment. Storm surge and coastal erosion act on the coastal zone and on evacuation routes. The Project cannot influence the occurrence of these events, so control rests on preparedness, on the seasonal scheduling of vulnerable activities, and on ensuring that Project works do not worsen the community's exposure when an event occurs. The HSE Management Manual, Revision 2, assesses twelve natural hazard types for this project and identifies the control point for each. They are tropical cyclones, with a June to November peak and wind speeds that may exceed 150 kilometers per hour; heavy rain and flooding, the Manual recording that the project sits near Graeme Hall Swamp on the boundary of a one hundred year floodplain; earthquakes, with a ten per cent probability of a destructive event within fifty years; tsunamis, at the same stated probability, with camps sited above the potential inundation line and evacuation routes planned; sea level rise; volcanic ash fallout from eruptions on neighboring islands; Saharan dust between June and August, which reduces air quality and causes respiratory problems; landslides triggered by excavation and heavy rainfall; coastal erosion; waterborne and vector-borne disease, which the Manual links directly to sewage projects and controls through weekly mosquito control, removal of stagnant water and personal protection; drought affecting construction and domestic water supply; and wildfires during the dry season, controlled through firebreaks around camps and storage yards and a prohibition on open burning. Three of those hazards carry community health consequences that this Assessment addresses directly. The floodplain position bears on CH-01 and CH-05, because heavy rainfall creates standing water and mobilizes contaminated material toward

Field	Assessment
	the same receptors. Saharan dust bears on CH-02, since it raises particulate concentrations at residential and school receptors independently of Project activity and compounds construction dust during the June to August period. The waterborne and vector-borne disease category bears on CH-01 and CH-05 and is the point at which the occupational controls in the Manual and the community controls in this Programme act on a single pathway. The second category is technological and hazardous material incidents. These comprise fuel and chemical release, fire originating in stored materials or plant, structural or excavation failure, and uncontrolled wastewater release including any activation of the emergency bypass described at Section 5.4.4. These events are within the Project's control, and likelihood is reduced through containment, inspection, maintenance and permit systems. They differ from natural hazards in that they are preventable, in that liability rests with the Project, and in that they require immediate notification to the Environmental Protection Department and the Ministry of Health as well as to affected residents. The third category is failure of emergency response itself. This is a management failure and not an initiating event, and it converts either of the first two categories into a more severe community outcome. It includes unmapped or obstructed evacuation routes, incomplete emergency contacts, untested arrangements, and absence of a protocol for notifying residents. Control rests on the preparedness measures at Section 11.10 and on verification that those arrangements exist before camp occupation. The fourth category, occupational emergencies affecting workers inside the campsite or on a work front, falls outside this Assessment. Drowning, heat stroke, struck-by incidents, mechanical injury, falls from height and electrical incidents are governed by the Health and Safety Manual, Revision 2, which

Field	Assessment
	establishes an Emergency Response Leadership Group and scenario procedures for each. Those events enter this Assessment only where they generate a community consequence, through demand on shared emergency services, through release of material beyond the boundary, or through the pathways described at Section 1.2.
Risk	Injury and fatality; community exposure to released materials; evacuation failure with highest risk for children, older persons, PwDs and households without access to private transport and increased care burdens for women as primary caregivers.
Nature and type	Adverse; direct; all phases; social and gender differentiated
Extent	Local
Duration	Temporary, with catastrophic potential
Likelihood	3, Possible
Magnitude	5, Catastrophic
Pre-mitigation significance	Critical
Mitigation summary	Dedicated Camp Emergency Response Plan addressing fire in accommodation facilities, severe weather including hurricanes and flooding, wastewater or sewage releases, fuel and hazardous material spills, medical emergencies and disease outbreaks, and security incidents; determination of the highest point and establishment of mapped evacuation routes known to workers; completed and verified emergency contacts; mutual notification with emergency services; coordination with local authorities on community-facing alerts and evacuation support with specific attention to children, older persons, PwDs, and households without vehicles, greater sensitive arrangements for any use of shelters including privacy and safety measures for women and girls; prohibition of smoking in dormitories, cooking restrictions and prohibition of garbage burning (Section 11.10)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	4, High

Field	Assessment
Residual significance	High
Residual management	Quarterly drills with records; annual plan review informed by drill outcomes and feedback from vulnerable groups; quarterly verification that the emergency contact table is complete and current; and periodic review of security and shelter arrangements to minimize SH/SEA/GBV risks during emergency situations.

CH-11 Health Service Capacity Displacement

Table 72: Health service capacity displacement impact assessment

Field	Assessment
Activity	Presence of approximately 105 predominantly male and non-local camp occupants drawing on local health services that are also relied on by women caregivers, children, older persons, PwDs, and low-income households.
Potential impact	Increased demand at polyclinics and the emergency department; displacement of community access for women (including pregnant and postpartum), children, older persons, PwDs, people with chronic conditions and low-income users; missed or delayed consultations and treatment.
Risk	Delayed care for residents especially for maternal and child health; chronic disease management and emergency care for older persons and PwDs; reduced service quality and increased wait times, additional time and cost burdens on women as primary caregivers.
Nature and type	Adverse; indirect; construction; social and gender differentiated
Extent	Local
Duration	Short-term
Likelihood	3, Possible
Magnitude	3, Moderate
Pre-mitigation significance	High

Field	Assessment
Mitigation summary	On-site first aid and primary care provision sufficient for routine worker health needs; private medical arrangements for non-emergency care; advance coordination with the receiving polyclinic and hospital to identify sensitive services; contribution to service capacity where displacement is demonstrated (Section 11.11)
Post-mitigation likelihood	2, Unlikely
Post-mitigation magnitude	2, Low
Residual significance	Low
Residual management	Quarterly review of worker presentations to public facilities disaggregated by sex, age and type of service; and adjustment of on-site provision and private referral pathways where displacement is evidenced

CH-12 Nuisance-Mediated Wellbeing and Livelihood Loss

Table 73: Wellbeing and livelihood loss impact assessment

Field	Assessment
Activity	Cumulative particulate, noise, odor, traffic and visual impacts over an extended construction period particularly affecting nearby residents including children, older persons and PwDs; and local businesses and informal vendors along the access route.
Potential impact	Chronic annoyance, stress and reduced quality of life; loss of income from visitor accommodation and hospitality trade; disruption to informal vending with disproportionate effects on women and youth who are in tourism/hospitality management and informal vending and on low-income and female headed households that depend on these livelihoods.
Risk	Mental health deterioration; economic hardship operating as a health determinant; erosion of community trust with heightened caregiving and emotional burdens on women, and potential knock-

Field	Assessment
	on effects on family relationships and in some cases risk of domestic tension or violence.
Nature and type	Adverse; indirect and cumulative; construction; social and gender differentiated.
Extent	Local
Duration	Long-term
Likelihood	4, Likely
Magnitude	3, Moderate
Pre-mitigation significance	High
Mitigation summary	Proactive schedule communication enabling businesses to plan delivered in accessible formats and timed to reach women and other vulnerable groups; visible and responsive complaint resolution with confidential channels accessible to women and other vulnerable groups; controlled vendor engagement arrangements that protect the safety, income and dignity of informal vendors including women and youth; local procurement and hiring where practicable implemented on a non-discriminatory basis and encouraging participation of women and youth; community liaison presence; periodic wellbeing enquiry within engagement that explores differentiated impacts on women, men, girls, boys, older persons, PwDs, and informal workers (Section 11.12)
Post-mitigation likelihood	3, Possible
Post-mitigation magnitude	2, Low
Residual significance	Medium
Residual management	Complaint trend analysis by category and household disaggregated by sex, age and where possible household type and livelihood; identification of under-represented groups in complaints and targeted outreach where needed; engagement satisfaction assessment at defined intervals, analyzed by sex, age, and key vulnerability characteristics to adjust communication, mitigation and support measures accordingly.

5.2.12.1. Summary of Significance

Table 74: Pre-mitigation and residual risk significance by pathway.

Reference	Impact	Pre-mitigation	Residual
CH-01	Vector-borne disease	Very High	Medium
CH-02	Respiratory health and particulates	High	Low
CH-03	Odor, hydrogen sulphide and bioaerosols	High	Medium
CH-04	Noise, vibration and sleep disruption	High	Medium
CH-05	Water, sanitation and gastrointestinal illness	Very High	Medium
CH-06	Road traffic injury	Critical	High
CH-07	Communicable disease and labor influx	Very High	Medium
CH-08	Sexual exploitation and abuse, sexual harassment and gender-based violence	Critical	High
CH-09	Food safety and zoonoses	High	Low
CH-10	Emergency, disaster and climate events	Critical	High
CH-11	Health service capacity displacement	High	Low
CH-12	Nuisance-mediated wellbeing and livelihood loss	High	Medium

Three pathways retain High residual significance. In each case the consequence severity remains irreducible below serious harm, and management concentrates on driving likelihood as low as reasonably practicable while maintaining response capability. Road traffic injury, sexual exploitation and abuse together with sexual harassment and gender-based violence, and emergency and disaster events are accordingly designated priority areas for supervision, auditing and reporting throughout the Project.

5.2.13. Cumulative Community Health Impacts

Within-Project Cumulation

Simultaneous works at the treatment plant and the reclamation facility, together with camp operation, may intensify particulate, noise, odor, traffic and community nuisance beyond the significance of any individual component.

The most material cumulative pathway combines construction traffic, sludge and waste transport, material deliveries and workforce movement on a single narrow access road. Road safety exposure compounds through frequency, and the mitigation at Section 11.6 accordingly operates as a single integrated movement plan across all three components.

A second pathway combines excavation, drainage disturbance and waste storage across three sites during the wet season, multiplying vector breeding opportunity in an area where residents already identify mosquitoes as a primary concern.

A third pathway arises from construction proceeding while the existing treatment plant remains operational, which increases the likelihood of odor, bioaerosol and emergency discharge events during a period when camp occupants and residents are both present.

Beyond-Project Cumulation

Concurrent construction activity elsewhere in Barbados places combined pressure on the road network for heavy haulage, on landfill capacity for construction and demolition waste, and on the institutional capacity of the Ministry of Health, the Environmental Protection Department and the Sanitation Service Authority to supervise and respond. Works by the Barbados Water Authority on other treatment infrastructure would add demolition and construction waste to the same waste stream and place concurrent pressure on road networks, the importation system and institutional capacity.¹⁰⁹

Management of Cumulative Health Risk

Cumulative health risks are managed through coordinated scheduling across the three components, a single integrated traffic movement plan, consolidated community notification, joint monitoring at shared receptors, and a combined complaint register permitting attribution across components. Where residual cumulative risk remains material, additional controls and review triggers are applied under Section 14.

5.2.14. Conclusions and Recommendations

Conclusions

Community health risks associated with the Project are manageable to acceptable residual levels. Of the twelve pathways assessed, nine reduce to Medium or Low residual significance through the controls set out in Part B. This conclusion is conditional on implementation of the pre-mobilization actions at Section 17, sustained supervision of the three priority pathways, and completion of the baseline verification actions at Section 5.7.

Three pathways retain High residual significance because consequence severity cannot be reduced below serious harm. Road traffic injury, sexual exploitation and abuse together with sexual harassment and gender-based violence, and emergency and disaster events each retain post-mitigation magnitude of 4 or 5 while post-mitigation likelihood falls to 2. Management of these pathways depends on maintaining likelihood at that level throughout construction and on preserving response capability, since residual risk at these pathways has been reduced and remains present.

¹⁰⁹ SAEDI Consulting, *Methodology for the Development of the Code of Conduct, Updated ESIA and ESMP for the SCSTP and SCWRRF*, 3 August 2026.

The Project's health profile is determined by four site-specific characteristics. A single narrow access road serves residents, schoolchildren, caregivers and women caregivers, older persons, PWDs, informal vendors and Project traffic simultaneously. An accommodated non-local workforce of 98 personnel sits adjacent to an established residential community. The Graeme Hall Swamp system carries three disease-competent mosquito species, has shifted toward freshwater conditions favorable to breeding, and hosts a Ministry of Health fish breeding station immediately adjacent to the Project footprint. Construction proceeds alongside an operating treatment plant that retains an emergency raw sewage bypass into the Graeme Hall Bisecting Canal.

The receiving environment is already at or above guideline levels for noise at the nearest residential cluster. Measured daytime ambient averages of 56.3 to 60.5 dB(A) at the receptor west of the campsite exceed the 55 dB(A) World Health Organization daytime threshold for serious annoyance. Construction noise is an increment upon an existing exceedance, which raises the significance of noise control beyond what an absolute-level assessment would indicate.

Labor influx risk is narrower than earlier Project review assumed and is concentrated in time. Reported local content of 61.1 percent means the workforce is majority Barbadian. The non-local component is concentrated at the campsite, and local content falls to 46.5 percent through the peak construction period of Q3 2027 to Q4 2028, so non-local presence and construction intensity peak together.

Two conditions must be resolved before specific activities proceed. The status of the emergency bypass, the sluice gate and the existence of a formal sewage spill protocol require confirmation before construction adjacent to the operating plant. The Camp Emergency Response Plan, including determination of elevation and mapped evacuation routes, requires completion before camp occupation.

The assessment rests on a partially complete quantitative baseline. Noise and air quality baselines are established, and workforce composition is confirmed. Community-level morbidity data, health service capacity, updated water quality and groundwater baseline, and community health consultation remain outstanding, and are scheduled at Section 5.7. None prevents identification of the pathways or the design of proportionate controls, and each constrains quantification while leaving the direction of the finding intact.

8.2 Recommendations

R1. Designate the Community Health Focal Point and introduce the appointee to the Project Execution Unit before mobilization. The Programme assigns coordination of vector control, health service liaison, outbreak notification and baseline verification to this role, and no component operates without it.

R2. Treat the three priority pathways as a distinct supervision tier. Road safety, sexual exploitation and abuse together with sexual harassment and gender-based violence, and emergency preparedness warrant weekly compliance auditing, immediate escalation on any trigger event, and separate reporting to the Project Execution Unit in addition to routine monthly reporting.

R3. Confirm the status of the emergency bypass and the sewage spill protocol with the Barbados Water Authority as a condition precedent. Any emergency discharge occurring during construction will be attributed to the Project irrespective of cause, and responsibility, notification and response arrangements should be settled in advance.

R4. Establish protection arrangements for the Ministry of Health fish breeding station before works commence. An exclusion zone, runoff and sediment control, and maintained access for Ministry staff should

be agreed directly with the Ministry, since disruption of that facility would degrade an existing community health protection.

R5. Complete the outstanding baseline verification actions before commencement of works. Priority attaches to community-level morbidity data through the Barbados Statistical Service and the Ministry of Health, health service capacity survey, and extension of noise monitoring to the two school receptors during teaching hours.

R6. Undertake community health consultation and validate the findings of this Assessment with affected residents. Separate arrangements should be made to hear from vulnerable groups including women, girls, boys, men, youth, older persons, persons with disabilities, migrants, informal workers, and female-headed households, whose exposure and reporting barriers differ from those of the general population.

R7. Calibrate programme intensity to the deployment profile. Communicable disease and community interaction measures should be strengthened through Q3 2027 to Q4 2028, when non-local presence and construction activity peak together.

R8. Establish the survivor referral directory and confirm health service coordination before mobilization. Referral arrangements that are assembled after an incident occurs will not meet survivor-centered requirements, and the directory should be verified quarterly thereafter.

R9. Report against the twenty-one indicators from the first month of mobilization. Early reporting establishes the trend baseline against which corrective action triggers operate and defers no indicator to a later phase.

Transition to the Community Health Programme

The Programme at Part B gives effect to these conclusions. Each of the twelve pathways assessed in Section 6 has a corresponding management component at Section 11, with the correspondence recorded in the consolidated matrix at Annex A. The three priority pathways receive the most prescriptive components. Recommendations R1 to R9 are carried into the governance arrangements at Section 10, the programme components at Section 11, the monitoring architecture at Section 14 and the implementation schedule at Section 17.

5.3. Cumulative impacts

The camp does not sit in isolation. Three other pressures act on the same receptors over the same period, and the significance of the camp's own effects has to be read against them.

The first is the construction of the water reclamation works themselves, immediately adjacent and running for approximately three years. Noise, traffic, dust and workforce presence from the two activities overlap in time and place, and the residential receptors to the north and the users of the beach and the sanctuary to the south experience them as one disturbance rather than two. Where the camp's own contribution is assessed as low but the combined level approaches the IFC daytime guideline of 55 dBA, the mitigation has to be set by the combined level. The Contractor is the same entity for both, which makes joint scheduling of noisy activities practicable and is recorded as a commitment in the Noise Management section.

The second is the condition of the receiving wetland. Graeme Hall is already eutrophic, already carries fecal indicator counts far above contact limits, already holds legacy organochlorines and elevated zinc in water and in fish tissue, and is losing its brackish character through the loss of tidal exchange. A discharge that would be minor into a well-flushed system is not minor here. This is the principal reason the assessment treats the camp's wastewater and drainage controls as critical rather than routine.

The third is the tourism and residential development along the St Lawrence and Worthing corridor, which places its own demand on the same road network, the same water supply and the same sewerage system that the camp will use. The camp's incremental demand is small in each case, but it arrives during a period when the sewerage network is being rebuilt, so the margin available to absorb it is smaller than the totals suggest.

The programme is wider than the two adjacent sites. The Inception Report for the South Coast Water Reclamation Project and the South Coast Sewage Treatment Plant records that the upgrade of the treatment plant, the construction of the water reclamation and re-use facility and the Barbados Water Authority's separate works, including the Bridgetown Sewage Treatment Plant upgrade, run concurrently. The effects that accumulate across them are noise, dust, odor, traffic congestion and sludge and waste handling, and the Inception Report recommends a consolidated risk register and coordinated scheduling across the three sites rather than site-by-site management. This assessment adopts that position for the matters within its scope, and the camp's traffic and noise commitments are framed to be capable of joint scheduling with the other works.

Three matters in the wider package remain unresolved and bear on this assessment even though they fall outside its scope. No standalone environmental and social assessment for the construction and operation of the water reclamation and re-use facility has been shared, so the cumulative position stated here rests on the camp assessment and the treatment plant documentation alone. The reclaimed water intended for irrigation of edible crops has not been tested against irrigation suitability parameters, which matters because the camp's own vegetable plot is proposed to draw on the site water supply. And the environmental documentation for the seven megawatt solar facility has not been integrated into the project package, so its construction traffic and land take are not counted in the cumulative assessment above. Each is recorded in the information request register.

Taken together, the cumulative position is that the camp's individual effects are mostly low to medium in significance, while the systems receiving them have little headroom. The assessment therefore relies on the

controls holding rather than on the receiving environment absorbing the load, and the monitoring obligations are set accordingly.

5.4. Impact assessment methodology

Before the methodology is set out, it is worth fixing where the effects actually go. Every impact assessed in this chapter reaches a receptor along one of four pathways, shown at Figure 63: airborne to the residential receptor to the south-east, by drainage or accidental discharge to the wetland to the south, by vehicle movement along the shared community access to the west, and as foul flow to the treatment works to the east. The receptor, the direction and the distance are fixed for each.

Exposure pathways from the Workers' Camp

Every impact assessed in this EIA travels along one of four pathways. The diagram fixes the receptor, the direction and the distance for each.

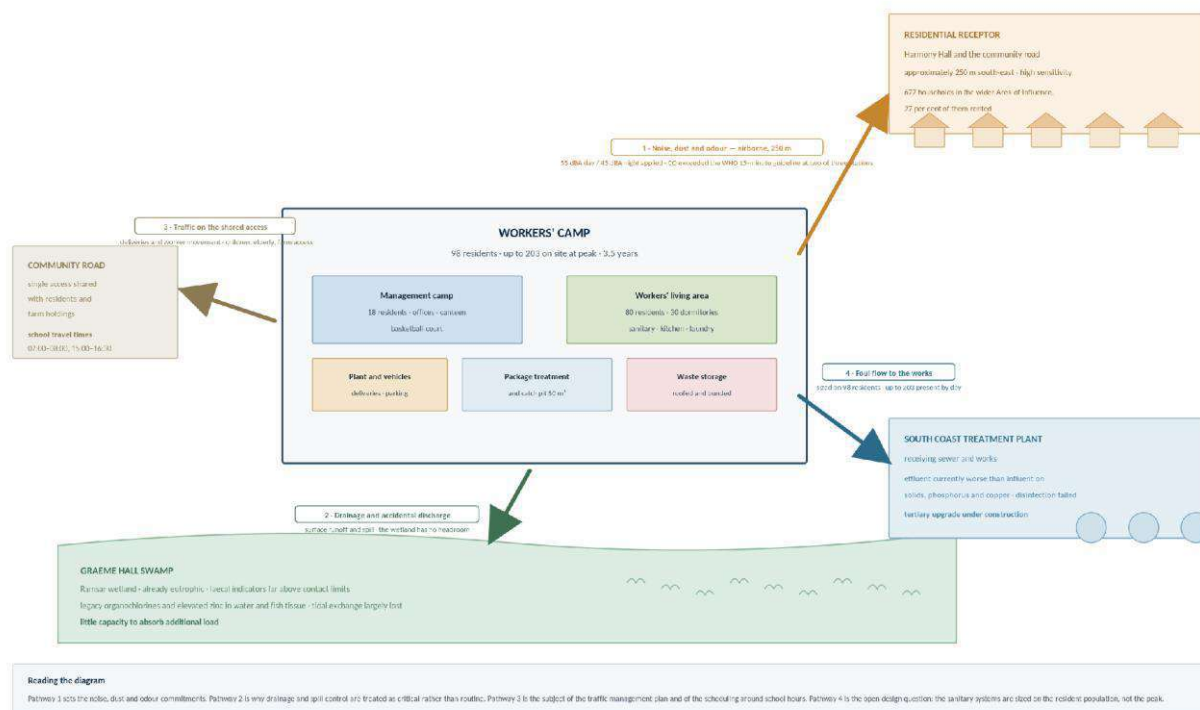


Figure 63: Exposure pathways from the Workers' Camp. The four pathways account for every impact assessed in this chapter. Pathway 4 carries the open question in this assessment, since the sanitary systems are sized on the resident population of 98 while up to 203 people may be on site during a working day.

In accordance with ISO 14001:2015, an environmental impact may be defined as a change to the environment, whether adverse or beneficial, wholly or partially, resulting from an organization's environmental aspects (i.e., elements of the organization's activities, products or services that can interact with the environment). In the context of this project, this definition also applies to the assessment of social impacts.

The assessment of potential impacts associated with the construction and operation/use of the Workers' Campsite, which may be categorized as positive/beneficial, negative/adverse, direct, indirect, cumulative, or induced, involved four key actions as follows:

- 1. Prediction-** Clearly defining the project activities and impacts to determine what will happen to the environment as a result of the project. The measure taken is to avoid.
- 2. Evaluation-** Determine whether the project activities will have an adverse or beneficial effect; how big the effect/change will be (**magnitude**), and how important/significant it will be to the receptors (**significance**). The measure taken is to minimize (for negative and enhance for beneficial)

3. **Mitigation**-If the impact is of concern, can anything be done to avoid, minimize or offset the impact or enhance the potential benefits? The measure taken is to restore.
4. Determination of **Residual Impact**- After mitigation, is the impact still of concern? If so, the measure taken is to offset.

Figure 64 shows a depiction of the impact identification and assessment process.

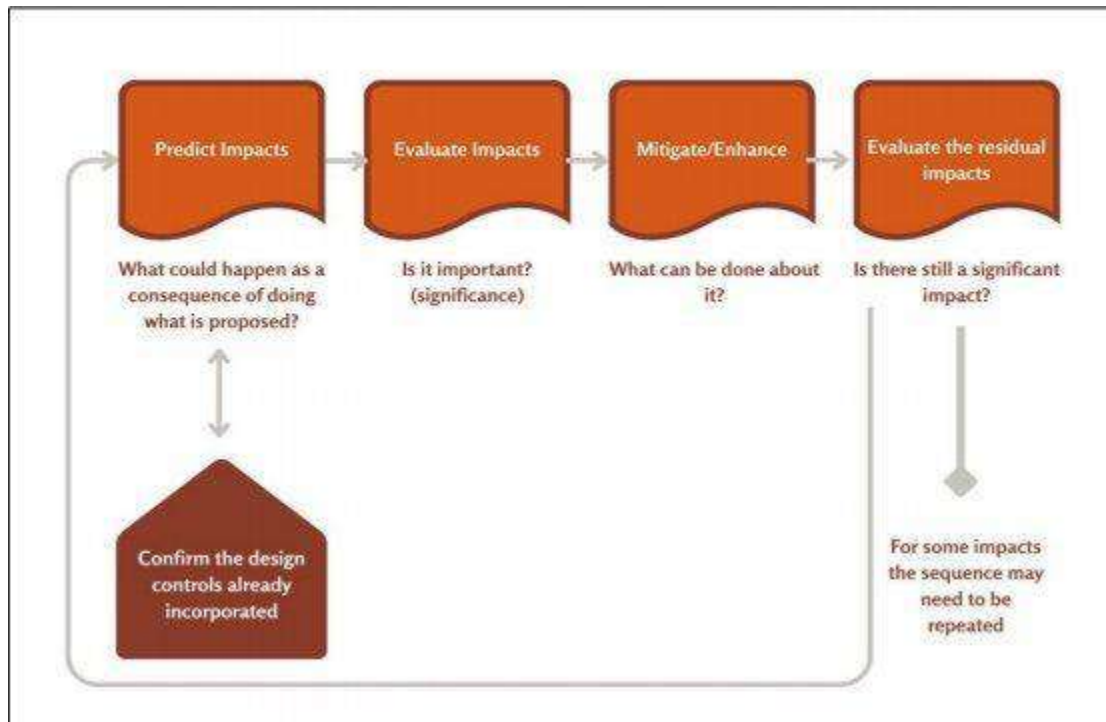


Figure 64: Impact Identification and Assessment Process

5.5. Impact prediction

This first stage of the impact assessment process was impact prediction, which involved a clear identification of the project activities and receptors. Project activities may include the presence of infrastructure or physical action associated with the operation of equipment, vehicles, machinery, or the action of personnel, such as project employees. Information relevant to the project activities was gathered from a review of the project description. A receptor may be a person or something that can be influenced by the project, and includes elements such as water resources, air quality, human resources, ecological resources, cultural heritage, and the wider environment. Prediction of impacts, therefore, relied on the interaction between these two variables and the effect this interaction may cause. The impact prediction process was therefore supported by the following:

1. An understanding of the baseline conditions and potential receptors- Information obtained from reconnaissance surveys, community walkthroughs, discussions with the contractor, and the conduct of environmental and social baseline assessments.
2. Defining the project's area of direct and indirect influence
3. Information received from relevant stakeholders
4. Application of professional knowledge and experience

Throughout this project, the impact prediction process will continue to be iterative as more information on project activities and the environmental and social baseline becomes available.

5.5.1. Impact nature and type (Impact designations)

An impact may be defined by its nature as negative/adverse or positive/beneficial and by the way it is related to the project, i.e., its type of impact, whether direct, indirect, cumulative, or induced.

Table 75 below describes the factors that are considered to define the nature and type of impact.

Table 75: Definition of Impact Nature and Type

Impact Nature	
Adverse or Negative Impact	Impacts that are considered to represent an adverse change from the baseline condition or introduce a new undesirable factor, e.g., an increase in noise levels above ambient conditions during construction
Beneficial or Positive Impact	Impacts that are considered to represent an improvement on the baseline condition or introduce a new desirable factor e.g., additional employment opportunity
Impact Type	
Direct/Primary	Impacts that result from a direct interaction between a Project Activity and the receiving environment (e.g., sewage discharge into the Graeme Hall wetlands).
Indirect/Secondary	Impacts that follow on from the primary interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., loss of part of a habitat (e.g., from the Graeme Hall wetland) affects the viability of a species population over a wider area).
Cumulative	Impacts that act together with other impacts, from other existing, planned, and reasonably predictable future projects and developments, to affect the same environmental resource or receptor. e.g. noise from the construction of the tertiary sewage treatment plant and operation of the existing plant
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g. increased demand for local goods, services, and utilities).

5.6. Impact evaluation

The impact evaluation aspect of the assessment was critical in assessing the extent of controls and mitigation measures that need to be implemented. This required an evaluation of the likelihood and magnitude of each impact.

5.6.1. How to determine the likelihood or probability of a risk occurring

The likelihood or probability pertains to the extent of how likely it is for a risk to occur. To prevent avoidable losses, determining likelihood is essential. In a statistically informed 5×5 matrix, probability levels can be interpreted as approximate likelihood ranges based on historical frequency data or exposure rates (2026, Guevara). The 5 risk rating levels under this component are presented in the table below.

Table 76: Probability of Risk Levels

Score	Level	Interpretation (Statistical and Mitigation)
5	Highly likely/ Almost certain	Almost certain to occur and/or have major consequences. Typically, risks with 91% or more likelihood.
4	Likely	Almost sure to happen and/or to have major consequences (<i>a 61%– 90% chance of occurring</i>). These risks need regular attention and a consistent mitigation strategy.
3	Possible Moderate	/Likely to happen and/or to have serious consequences (<i>a 41%–60% chance of occurring</i>). Active monitoring required.
2	Unlikely	Possible to happen and/or to have moderate consequences (<i>an 11%– 40% chance of occurring</i>). Lower priority but still tracked.
1	Highly unlikely / Rare	Unlikely to happen and/or have minor or negligible consequences. While there is a low probability of occurrence, there can be high- impact instances (e.g., fatal workplace injury) that may still warrant a mitigation plan.

5.6.2. How to determine the magnitude of impact occurring

The impact magnitude refers to the size or degree of change expected to occur. In considering the magnitude of each impact, the measure of the resulting change in baseline conditions was determined in the context of the following characteristics:

1. **Extent:** spatial extent (e.g. On-site, local, regional, national, or transboundary/international)
2. **Duration:** how long the impact will interact with the receiving environment. Will the interaction be temporary, short-term, long-term or permanent?
3. **Sensitivity:** refers to a receptor's degree of vulnerability to project impacts
4. **Reversibility:** How long before impacts on receptors cease to be evident?

Thus, these characteristics collectively describe the nature, physical extent, and temporal condition of the impact. To facilitate a structured description of impact magnitude, a quantitative scale was applied, ranking the magnitude of change as negligible (1), low (2), moderate (3), high (4), or catastrophic (5).

Table 77: Magnitude of Risk Levels

Score	Level	Interpretation
5	Catastrophic / Severe	Bio-physical and/or social functions and/or processes might be severely altered; emissions or releases are far above permissible limits. The impacts extend beyond national boundaries, persist in the environment, and may cause irreversible damage to ecological or social systems. Reversal is unlikely without major intervention, cessation of activities, or long-term remediation programs
4	High / Major	Bio-physical and/or social functions and/or processes might be considerably altered; emissions or releases are significantly higher than permissible limits. The impacts extend thousands of meters beyond the project site but remain within national boundaries. They may persist for moderate durations, potentially affecting sensitive receptors or community well-being. Reversal requires substantial mitigation, operational changes, and continuous monitoring.

Score	Level	Interpretation
3	Significant/Moderate / Medium	Bio-physical and/or social functions and/or processes might be notably altered; emissions or releases exceed permissible limits for limited periods. The impacts extend hundreds to thousands of meters beyond the project site, may cause temporary disturbance to nearby receptors, but can be managed and reversed through targeted mitigation and monitoring. Residual impacts are minor once corrective actions are implemented.
2	Low / Minor	Bio-physical and/or social functions and/or processes might be slightly altered; emissions or releases are marginally higher than permissible limits. The impacts extend tens to hundreds of meters beyond the project site, remain short-term and localized, do not persist in the environment, and can be reversed through routine mitigation measures
1	Negligible Insignificant	/Bio-physical and/or social functions and/or processes might be negligibly altered; emissions or releases are lower than permissible limits. The impacts are confined to the project site or within 100 m of the site boundary, do not persist in the environment, or can be reversed.

The determination of the overall impact magnitude rating was made based on professional judgment and good international industry practice, considering all four characteristics (extent, duration, receptor sensitivity, reversibility) collectively where relevant.

5.6.3. Risk significance

Impact magnitude and probability (likelihood) of risk were used to assess risk significance according to the impact assessment matrix (Figure 65). For adverse impacts, this methodology was applied to both pre- and post-mitigation scenarios for all impacts identified. The significance matrix provides basic guidance for the determination of impact significance; however, the resulting significance level was also interpreted based on professional judgment and expertise.

Table 78 below defines each impact significance rating.

Table 78: Risk Significance Rating

Beneficial Impacts	An impact that has been identified as having a positive effect on the receptor/resource.
Adverse Impacts	An impact that has been identified as resulting in an adverse change from the baseline condition or introduces a new undesirable factor.
1. Low	Any impacts with “Low” significance are expected to be indistinguishable from the baseline or within the natural level of variation. As such, a resource/receptor (including people) would not be affected by a particular activity, or the predicted effect is deemed to be imperceptible or is indistinguishable from natural background variations. These impacts do not require mitigation and are not a concern of the decision-making process.
2. Medium	Impacts with a “Medium” significance are expected to be noticeable with changes to baseline conditions, beyond natural variation, but are not expected to cause hardship, degradation, or impair the function and value of the resource or receptor. This means that the magnitude is sufficiently small (with or without mitigation) and/or the likelihood of impact to the resource/receptor is rare. Nevertheless, these impacts warrant the attention of decision-makers and should be avoided or mitigated where practicable.

Beneficial Impacts	An impact that has been identified as having a positive effect on the receptor/resource.
3. High	Impacts with a “High” significance are likely to be noticeable and result in lasting changes to baseline conditions, which may cause hardship to or degradation of the resource or receptor, although the overall function and value of the resource or receptor is not disrupted. These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact. An impact of high significance also has an impact magnitude that is within applicable standards but may be just short of breaching a legal limit.
4. Very High	Impacts with a “Very High” significance are expected to cause substantial and lasting change to baseline conditions that materially impairs the function or value of the resource or receptor, affects a wide group of receptors, or persists beyond the life of the project. Mitigation must be designed into the activity rather than added to it, and the impact must be reduced before the activity proceeds.
5. Critical	Impacts with a “Critical” significance are likely to disrupt the function and value of the resource/receptor and may have broader systemic consequences (e.g. ecosystem or social well-being). These impacts are a priority for mitigation in order to avoid or reduce the significance of the impact.

5.6.4. Risk assessment matrix

The risk assessment matrix serves as a visual tool used to prioritize potential risks based on their level of probability and impact. The 5×5 risk matrix aims to identify the probability and impact levels of risk exposure during the construction and operational phase of the project. It is used during the risk assessment stage of project planning to systematically evaluate and manage risks, ensuring that the most significant threats are addressed appropriately. The 5×5 matrix: 25 combinations was selected as it is preferred for enterprise risk management, regulated industries, and any programme/ project that needs to differentiate between "moderate" risks.

5.6.5. Calculating risks

A cumulative risk score was assigned by multiplying the likelihood/ probability score by the magnitude of impact score.

5.6.6. Probability (or Likelihood) × Magnitude of Impact = Risk Level

On a 5×5 matrix, scores range from 1 to 25. Cut-offs are set at 1–4 (Low: green), 5–9 (Medium: yellow), 10–14 (High: orange), 15–19 (Very High: red) and 20–25 (Critical: dark red). The same five bands and the same cut-offs are applied to the Social Impact Assessment Matrix so that the environmental and social assessments are directly comparable.

Impact: How severe would the outcomes be if the risk occurred?

Probability: What is the probability/ likelihood the risk will happen?

Likelihood	Likelihood 1 (Highly Unlikely/ Rare)	Likelihood 2 (Unlikely)	Likelihood 3 (Possible)	Likelihood 4 (Likely)	Likelihood 5 (Highly Likely/ Almost Certain)
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Adverse Impacts

Magnitude of Impact	5 (Catastrophic/ Severe)	5 (medium)	10 (high)	15 (high)	20 (critical)	25 (critical)
	4 (High/ Major)	4 (low)	8 (medium)	12 (high)	16 (very high)	20 (critical)
	3 (Significant/ Moderate/ Medium)	3 (low)	6 (medium)	9 (medium)	12 (high)	15 (very high)
	2 (Low/ Minor)	2 (low)	4 (low)	6 (medium)	8 (medium)	10 (high)
	1 (Negligible/ Insignificant)	1 (low)	2 (low)	3 (low)	4 (low)	5 (medium)

Beneficial Impacts

Magnitude of Impact	Not Applicable	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
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Figure 65: Risk level interpretation¹¹⁰

Table 79 below sets out how each risk level is interpreted. Risks are classified based on their probability (or likelihood) and their magnitude of impact.

Table 79: Risk Level Interpretation

Score	Risk Level	Interpretation
1–4	Low	- Corresponds to events of very low likelihood and/or minor consequence - No further action required beyond existing controls - Maintain existing control measures and monitoring
5–9	Medium	- Moderate likelihood or moderate consequence - Mitigation measures to be applied and their effectiveness monitored - Monitor trends and incident data
10–14	High	- Significant likelihood and/or serious consequence - Must be reviewed in a timely manner - Improvement strategies to be implemented - Engineering or administrative controls to be considered
15–19	Very High	- High likelihood and/or severe consequence - Mitigation must be designed into the activity before it proceeds - Requires management sign-off and formal monitoring against defined indicators

¹¹⁰ Safety Culture. (n.d.). Risk Assessment. Accessed at <https://safetyculture.com/topics/risk-assessment/5x5-risk-matrix-its-2-components>

Score	Risk Level	Interpretation
20–25	Critical	• Very high likelihood and/or catastrophic consequence • Activity must not proceed in its current form • Immediate corrective and preventive action required, with escalation to the PEU

Beneficial impacts are scored on the same likelihood and magnitude scales as adverse impacts, but the resulting product is reported as a beneficial outcome rather than banded as a severity. A beneficial impact with a high score therefore denotes a large and likely positive effect, not a serious risk, and no mitigation is sought for it. Where a beneficial impact depends on a design feature or a management commitment, that dependency is recorded in the management measures column so that the benefit is not assumed to arise on its own.

5.6.7. Mitigation

The development of mitigation measures is one of the primary objectives of an environmental impact assessment. It allows for the enhancement of positive/beneficial impacts, and the avoidance, reduction, remediation, or compensation for negative impacts associated with a project (*International Association of Impact Assessment, 2013*) and takes the following actions:

1. **Avoid**- Make changes so that the impact is avoided altogether (i.e., removing the source)
2. **Reduce/Minimize**- Apply measures to reduce the size of the impact (impact magnitude reduced)
3. **Repair/Remediate**-Take action to repair/restore the affected environment (action taken after the impact has occurred)
4. **Compensate**-Implement measures to offset or compensate for the impact (addresses the loss or change to a resource by replacing that loss in kind or with a different resource of equal value)

The development of mitigation measures for this project followed the mitigation hierarchy so that adverse impacts identified were carefully examined to determine whether they could be avoided and if not, minimized. The mitigation measures proposed in this document represent those avoidance, management, and monitoring actions that CRSEG will commit to. As part of the impact assessment process, both the pre- and post-mitigation impact significance were assessed, with the latter resulting in residual impact, which remains after controls are implemented.

5.6.8. Residual impact

Upon identification and agreement on feasible mitigation measures, potential impacts were reassessed, considering the effective implementation of all planned mitigation measures. The conclusion of this reassessment was determining the significance of residual impacts (i.e., those impacts that are predicted to remain after both embedded controls and committed management measures have been considered). While receptor sensitivity/ vulnerability/importance remained unaffected in most cases, by the proposed management measure(s), the magnitude of predicted impacts was generally lessened, to reduce the overall significance of the predicted impacts. While low residual impacts denoted that the impacts were not of concern to the development of the project, an iterative process was undertaken for medium, high and critical impacts, to further identify opportunities for mitigation in accordance with the mitigation hierarchy.

The impact assessment is presented by topic in the tables that follow: general construction impacts in Tables 80- 87, water and biodiversity in Table 88, air quality, occupational health and safety and waste in Table 89, and noise in Table 90. Each records the activity, the potential impact and the risk, the nature, extent and duration of the impact, the likelihood and magnitude scored from 1 to 5, the pre-mitigation significance, the mitigation measures, the post-mitigation likelihood, magnitude and significance, and the measures addressing residual impact.

Workers' Campsite Construction – Impact Assessment Table and Proposed Mitigation Measures (General)

The assessment is set out as a summary table followed by a detail panel for each of the seven activities, giving the impact, the receptors at risk, the nature and extent of the effect, the mitigation measures, the ratings before and after mitigation, and the residual management required.

Risk is scored as likelihood times magnitude on the five by five matrix used throughout this assessment: 1 to 4 Low, 5 to 9 Medium, 10 to 14 High, 15 to 19 Very High, 20 to 25 Critical.

Table 80: Workers' Campsite Construction – Impact Assessment Table and Proposed Mitigation Measures (General)

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
61.1	Site clearing and vegetation removal	Loss of local flora, habitat fragmentation, and displacement of nesting birds and terrestrial fauna	5 × 3 = 15 Very High	2 × 2 = 4 Low
61.2	Earthworks, excavation and site levelling	Soil erosion, stormwater runoff, sedimentation, and heavy fugitive dust generation affecting ambient air quality	4 × 3 = 12 High	2 × 2 = 4 Low
61.3	Civil works and concrete foundation construction	Surface water contamination from high-pH concrete washout water, fuel spills or chemical leaks	3 × 4 = 12 High	1 × 2 = 2 Low
61.4	Installation of camp utilities and sewerage system	Pollution of soil or nearby sensitive aquatic ecosystems from untreated sewage leaks or system failure	3 × 4 = 12 High	1 × 2 = 2 Low
61.5	Operation of heavy machinery and construction vehicles	Elevated noise and vibration causing physiological stress to workers, annoyance to residents, and change in wildlife living patterns	4 × 3 = 12 High	2 × 2 = 4 Low
61.6	Sourcing and transport of construction materials	Increased heavy vehicle traffic on public roads, road safety hazards, structural damage to local roads and traffic delays	4 × 3 = 12 High	2 × 1 = 2 Low
61.7	Setup and management of temporary waste storage areas	Attraction of disease vectors and pests, offensive odors, and soil contamination from poorly managed refuse and hazardous waste	3 × 3 = 9 Medium	2 × 1 = 2 Low

Table 81: Site clearing and vegetation removal

Potential impact	Loss of local flora, habitat fragmentation, and displacement of nesting birds and terrestrial fauna.
Risk to	Terrestrial biodiversity and habitat integrity; soil.
Nature, extent, duration	Adverse · Direct · Cumulative — Local (site and immediate boundary) — Long-term (decades for mature regrowth)
Mitigation measures	1. Clearly delineate clearing limits using high-visibility silt fencing to prevent machinery encroaching into surrounding scrub.

Potential impact	Loss of local flora, habitat fragmentation, and displacement of nesting birds and terrestrial fauna.
	2. Restrict clearing strictly to the approved project footprint; carry out vegetation removal outside peak bird-nesting seasons; perform pre-clearance walkthroughs to relocate slow-moving fauna.
	3. Salvage topsoil and store it under geotextile covers for use in progressive rehabilitation.
Rating	Pre-mitigation $5 \times 3 = 15$ VERY HIGH Post-mitigation $2 \times 2 = 4$ LOW
Residual management	Conduct weekly boundary inspections to prevent encroachment. Implement a Habitat Restoration Plan aimed at replanting native Barbadian plant species in buffer zones after construction. That Plan is to be prepared by the Contractor and submitted to the Project Execution Unit for approval before site clearance begins; it is implemented progressively during construction and completed at decommissioning, and responsibility for delivery rests with the Contractor's Environmental and Social Manager.

Table 82: Earthworks, excavation and site levelling

Potential impact	Soil erosion, stormwater runoff, sedimentation, and heavy fugitive dust generation affecting ambient air quality.
Risk to	Air quality; soil; local drainage channels; nearby residents.
Nature, extent, duration	Adverse · Indirect · Cumulative — Local (site and immediate boundary) Short-term (active construction phase)
Mitigation measures	1. Implement regular water spraying or dampening of exposed soils and haul roads, at least twice daily; cover or wet soil stockpiles; install silt fences and sediment traps along the perimeter; stabilize bare soil areas with geotextiles or mulching. 2. Cover and bund all fine material stockpiles.
Rating	Pre-mitigation $4 \times 3 = 12$ HIGH Post-mitigation $2 \times 2 = 4$ LOW
Residual management	Conduct daily visual dust monitoring at the site boundary. Operate the community grievance mechanism to log and rapidly resolve dust or runoff complaints. Install dust screens around the site while these activities are under way.

Table 83: Civil works and concrete foundation construction

Potential impact	Surface water contamination from high-pH concrete washout water, fuel spills or chemical leaks.
Risk to	Water quality (surface water and public drainage); soil.
Nature, extent, duration	Adverse · Direct · Cumulative — Local (site and immediate boundary) — Short-term (active construction phase)
Mitigation measures	1. Establish dedicated, lined concrete washout pits with zero discharge to the environment; store all fuels and hazardous chemicals in double-walled tanks or bunded areas with 110 per cent containment capacity; maintain spill kits on site.
Rating	Pre-mitigation $3 \times 4 = 12$ HIGH Post-mitigation $1 \times 2 = 2$ LOW
Residual management	Perform daily integrity inspections of chemical storage and bunds. Clean up any accidental discharge immediately and conduct the applicable investigation. Conduct periodic pH testing of nearby water bodies.

Table 84: Installation of camp utilities and sewerage system

Potential impact	Pollution of soil or nearby sensitive aquatic ecosystems from untreated sewage leaks or system failure.
Risk to	Water resources; Graeme Hall wetland; soil; public health.

Potential impact	Pollution of soil or nearby sensitive aquatic ecosystems from untreated sewage leaks or system failure.
Nature, extent, duration	Adverse · Direct · Cumulative — On site and local — Short-term (active construction and operation phase)
Mitigation measures	1. Install a certified prefabricated tertiary sewage treatment plant complying fully with Environmental Protection Department and Barbados Water Authority effluent discharge criteria; hydro-test and pressure-test all sewer pipelines before backfilling. 2. All utilities are to be installed by registered and certified technicians.
Rating	Pre-mitigation 3 × 4 = 12 HIGH Post-mitigation 1 × 2 = 2 LOW
Residual management	Establish a strict preventative maintenance schedule for the sewage treatment unit. Conduct periodic laboratory testing of treated effluent parameters before reuse or disposal.

Table 85: Operation of heavy machine and construction vehicles

Potential impact	Elevated ambient noise and vibration causing physiological stress to workers, annoyance to residents, and change in wildlife living patterns.
Risk to	Wildlife, particularly birds; nearby residents; workers.
Nature, extent, duration	Adverse · Direct · Cumulative — On site and local — Short-term (active construction and operation phase)
Mitigation measures	1. Restrict heavy equipment operation to standard daytime hours, 07:00 to 18:00; enforce the use of well-maintained mufflers and silencers on all machinery exhausts; prohibit unnecessary engine idling. 2. Implement a proactive maintenance plan so that all equipment is kept in good condition throughout these activities and for the duration of the project.
Rating	Pre-mitigation 4 × 3 = 12 HIGH Post-mitigation 2 × 2 = 4 LOW
Residual management	Conduct weekly boundary noise monitoring to verify compliance with the applicable standards. Mandate appropriate hearing protection for workers in high-noise zones.

Table 86: Sourcing and heavy transport of construction materials

Potential impact	Increased heavy vehicle traffic on public roads leading to road safety hazards, structural damage to local roads and traffic delays.
Risk to	Living patterns of the local community; road users; public road infrastructure.
Nature, extent, duration	Adverse · Direct · Cumulative — On site and local — Short-term (active construction and operation phase)
Mitigation measures	1. Develop and enforce a site-specific traffic management plan; coordinate bulk material deliveries during off-peak hours; require strict adherence to legal speed limits and load-covering regulations.
Rating	Pre-mitigation 4 × 3 = 12 HIGH Post-mitigation 2 × 1 = 2 LOW
Residual management	Maintain routine liaison with the Planning and Development Department and the local traffic police. Coordinate and engage with community representatives on traffic activities and issues.

Table 87: Setup and management of temporary waste storage areas

Potential impact	Attraction of disease vectors and pests, offensive odors, and soil contamination from poorly managed refuse and hazardous waste.
Risk to	Worker health; soil; water and air quality.
Nature, extent, duration	Adverse · Direct · Cumulative — On site and local — Short-term (active construction and operation phase)

Potential impact	Attraction of disease vectors and pests, offensive odors, and soil contamination from poorly managed refuse and hazardous waste.
Mitigation measures	1. Provide labelled, covered bins for source segregation of organic, recyclable and hazardous waste; construct a secure, fenced and roofed waste storage area with an impermeable concrete floor; contract licensed haulers for frequent disposal.
Rating	Pre-mitigation $3 \times 3 = 9$ MEDIUM Post-mitigation $2 \times 1 = 2$ LOW
Residual management	Perform weekly housekeeping and sanitation audits of the waste storage facility. Maintain a comprehensive waste disposal log, including chain-of-custody forms for hazardous materials.

5.6.9. Water and biodiversity – impact assessment table and proposed mitigation measures

Table 88: Water and Biodiversity – Impact Assessment Table and proposed Mitigation Measures

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
65.1	Site preparation: site clearing, vegetation removal, cut-and-fill grading, and soil compaction	- Land clearing and surface compaction for camp tents, trailers, and heavy machinery pathways will create impermeable surfaces - During heavy rainfall events, this increases the volume and velocity of stormwater runoff. - Alteration of natural surface runoff patterns; potential for temporary ponding or erosion. Turbidity, siltation of nearby water bodies, and blocked natural drainage.	$3 \times 2 = 6$ Medium	$2 \times 2 = 4$ Low
65.2	Construction of workers' camp: temporary storage of materials and construction waste	Unmanaged runoff carrying sediment, oil, grease, and construction debris poses a direct contamination threat to any nearby water body (the closest being the fragile brackish water ecology of the Graeme Hall Swamp and nearby marine ecosystems).	$2 \times 2 = 4$ Low	$1 \times 1 = 1$ Low
65.3	Heavy machinery refueling, equipment maintenance, and chemical storage.	Hydrocarbons (oil, diesel) and heavy chemicals infiltrating groundwater or waterways, harming aquatic life	$3 \times 3 = 9$ Medium	$2 \times 2 = 4$ Low
65.4	Washing down concrete mixer trucks, tools, and paint equipment.	Extreme shifts in pH levels of water bodies and toxic runoff from cement additives.	$3 \times 3 = 9$ Medium	$2 \times 2 = 4$ Low

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
65.5	Wastewater & Sewage discharge: Domestic waste generation from kitchens, showers, and toilets in the workers' camp	- Interconnecting the camp discharge into the SCSTP relies heavily on the plant's operational capacity. Any unmitigated surge in high-volume sanitary waste could strain localized processing, leading to accidental overflows or localized odor nuisances. - Introducing toxic chemicals or high nutrient loads that harm aquatic ecosystems (eutrophication). Pathogen contamination, elevated biological oxygen demand (BOD), and nutrient enrichment causing algal blooms.	$3 \times 3 = 9$ Medium	$2 \times 2 = 4$ Low
65.6	Clearing land for accommodation, storage, and access roads	Habitat Loss & Fragmentation removes native vegetation, permanently displacing local wildlife and fragmenting biological corridors	$5 \times 3 = 15$ Very High	$2 \times 2 = 4$ Low
65.7	Daily human activity and use of heavy machinery, vehicle traffic.	Stress, behavioral changes, and temporary abandonment of breeding or feeding grounds by wildlife. Continuous 24/7 security or floodlighting in camps disrupts the natural day-night cycles of nocturnal animals, insects, and migratory birds.	$5 \times 3 = 15$ Very High	$2 \times 1 = 2$ Low
65.8	Unmanaged waste and imported construction materials	Unmanaged waste and imported construction materials can attract pests and introduce invasive non-native plants, which outcompete native flora and alter local food webs.	$3 \times 2 = 6$ Medium	$2 \times 1 = 2$ Low
65.9	Campsite operations	Increased human traffic heightens the risk of wildlife-vehicle collisions, illegal poaching, or wildlife being trapped in trenches or open pipes	$4 \times 2 = 8$ Medium	$1 \times 1 = 1$ Low

5.6.10. Air quality, occupational health and safety, and waste – impact assessment table and proposed mitigation measures

Table 89: Air quality, occupational health and safety, and waste – Impact Assessment Table and proposed Mitigation Measures

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
66.1	Site Clearance and internal road preparation	Removal of vegetation, soil disturbance, dust generation, and increased movement of equipment	$4 \times 3 = 12$ High	$3 \times 2 = 6$ Medium
66.2	—	Injuries to personnel	$3 \times 4 = 12$ High	$1 \times 4 = 4$ Low
66.3	—	Improper stockpiling, disposal, or reuse of vegetation and topsoil may cause odor, pest attraction, blocked drainage, sediment runoff, and loss of reusable material	$5 \times 1 = 5$ Medium	$1 \times 1 = 1$ Low
66.4	Levelling/grading of the Site	Erosion, sediment-laden runoff, localized flooding or ponding, dust nuisance, equipment-related safety hazards, and damage to unprotected drainage pathways.	$3 \times 3 = 9$ Medium	$3 \times 1 = 3$ Low
66.5	—	Contact with graders, compactors, dump trucks, uneven ground, and reversing equipment may cause struck-by incidents, slips, trips, falls, and crush injuries.	$3 \times 3 = 9$ Medium	$1 \times 4 = 4$ Low
66.6	Placing Crush & Run material	Delivery, spreading, and compaction of aggregate may generate dust and traffic management issues. and worker exposure to moving plant and dust	$4 \times 3 = 12$ High	$3 \times 3 = 9$ Medium
66.7	Installation of embedded parts and Casting of the foundation base. Construction of auxiliary facilities (e.g. sump/sediment pond)	Concrete works, preparation for foundation base, installation of embedded parts, and construction of sump or sediment pond may create wastewater and safety risks.	$3 \times 3 = 9$ Medium	$1 \times 3 = 3$ Low

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
66.8	—	Contact with workers' skin, face, or eyes, causing irritation, burns, or respiratory issues.	$3 \times 3 = 9$ Medium	$1 \times 2 = 2$ Low
66.9	—	Scrapes and bodily strains from cement pouring and poor ergonomics while laying pipes and installing embedded parts.	$3 \times 2 = 6$ Medium	$1 \times 2 = 2$ Low
66.10	—	Generation of waste, such as cement sacks and excess concrete	$3 \times 3 = 9$ Medium	$1 \times 2 = 2$ Low
66.11	Erection and placement of prefab buildings	Lifting, movement, and placement of prefab units may cause noise, traffic congestion, temporary access restrictions, and safety risks from working at height or suspended loads.	$3 \times 5 = 15$ Very High	$3 \times 3 = 9$ Medium
66.12	—	Being struck by equipment	$3 \times 4 = 12$ High	$3 \times 3 = 9$ Medium
66.13	Installation and connection of utilities (water, electricity/generation)	Trenching, cable laying, plumbing, generator installation, testing, and utility tie-ins may cause electrical hazards and waste generation.	$3 \times 4 = 12$ High	$1 \times 4 = 4$ Low
66.14	—	Poor ergonomics. Cuts and bruises to employees, back pain and strains	$3 \times 2 = 6$ Medium	$1 \times 2 = 2$ Low
66.15	—	Waste Generation (Equipment wrappers, pieces of electrical wire/cable)	$2 \times 2 = 4$ Low	$1 \times 2 = 2$ Low

5.6.11. Noise – impact assessment table and proposed mitigation measures

Table 90: Noise – Impact Assessment Table

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
67.1	Removal of vegetation and topsoil	Elevated intermittent and continuous noise resulting from use of equipment such as the excavator causing speech	$4 \times 2 = 8$ Medium	$3 \times 1 = 3$ Low

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
		unintelligibility, annoyance and sleep disturbances		
67.2	Entry and exit of heavy-duty vehicles (trucks) to transport cleared vegetation	Intermittent traffic noise; annoyance and sleep disturbance from increased vehicle movement on access roads and at the site; revving of engines	5 × 3 = 15 Very High	3 × 2 = 6 Medium
67.3	Levelling of land using roller	Elevated, continuous noise resulting in annoyance, speech unintelligibility, sleep disturbance if extended to evenings; vibrations	2 × 2 = 4 Low	1 × 2 = 2 Low
67.4	Laying of pipelines for drainage of water from site	Noise from use of equipment can result in temporary annoyance and speech interference	3 × 2 = 6 Medium	2 × 1 = 2 Low
67.5	Assembly and placement of prefabricated buildings using crane and simple tools	Intermittent impact noise (hammering); annoyance during hoisting and assembling buildings resulting in speech unintelligibility and sleep disturbance if work extends into the night	3 × 2 = 6 Medium	2 × 2 = 4 Low
67.6	Delivery of construction materials and removal of construction waste	Intermittent traffic noise, engine revving, loading/unloading noise resulting in annoyance, speech unintelligibility and potential sleep disturbance	5 × 3 = 15 Very High	3 × 2 = 6 Medium
67.7	Operation of generator during construction	Continuous noise from generator resulting in annoyance, speech unintelligibility, sleep disturbance and potential exceedance of ambient levels at receptors near generator	4 × 3 = 12 High	3 × 2 = 6 Medium
67.8	Operation of generator during camp operation	Continuous noise from generator resulting in annoyance, speech	4 × 3 = 12 High	3 × 2 = 6 Medium

#	Activity	Potential impact	Pre-mitigation	Post-mitigation
		unintelligibility, sleep disturbance and potential exceedance of ambient levels at receptors near generator		
67.9	Compactor trucks for removal of waste	Short-duration impulse noise during compaction and bin handling causing annoyance, especially early morning	high $3 \times 2 = 6$ Medium	$2 \times 2 = 4$ Low
67.10	Staff movement, shift changes, muster calls from emergency drills	Periodic peaks in human and vehicle noise; alarm noise during drills causing startle and annoyance if frequent or at night	$3 \times 2 = 6$ Medium	$2 \times 2 = 4$ Low
67.11	Noise from kitchen and recreational area (music)	Group conversation, clatter and music causing disturbance and annoyance if done at night	$3 \times 3 = 9$ Medium	$2 \times 2 = 4$ Low
67.12	Traversing internal road, parking light vehicles	Intermittent traffic noise, door slams, alarms causing annoyance, especially at night	$3 \times 2 = 6$ Medium	$2 \times 1 = 2$ Low

Table 91: Noise – Impact Assessment Table and proposed Mitigation Measures: Mitigation and Residual Management

#	Activity	Potential Impact	Risk	Nature, Extent, Duration	Mitigation Measures	Residual Management
67.1	Removal of vegetation and topsoil	Elevated intermittent and continuous noise from excavator causing speech unintelligibility, annoyance, sleep disturbance	Community disturbance via exposure to elevated noise levels	Adverse; Direct, On-site, Short-term	Restrict activity to daytime; use mufflers; train workers; provide hearing protection	None required
67.2	Entry/exit heavy-duty vehicles	Intermittent noise; annoyance, sleep disturbance; engine revving	Community disturbance along routes; occupational exposure	Adverse; Direct Local Short-term	Plan haul routes; restrict to daytime; sensitize drivers; enforce speed limits; prohibit honking/revving; maintain vehicles	Traffic Management Plan; preventive maintenance; stakeholder info; GRM
67.3	Levelling of land using roller	Continuous vibrations, annoyance, speech unintelligibility	Community disturbance	Adverse; Direct	Limit to daytime; train operator; preventive	None required

#	Activity	Potential Impact	Risk	Nature, Extent, Duration	Mitigation Measures	Residual Management
			occupational exposure	On-site, Short-term	maintenance; provide hearing protection	
67.4	Laying of pipelines	Equipment causing temporary annoyance, interference	noiseCommunity disturbance; speechoccupational exposure	Adverse; Direct, On-site, Short-term	Limit to daytime; maintain equipment; avoid idling; provide hearing protection	None required
67.5	Assembly prefabricated buildings	ofIntermittent noise (hammering), annoyance, unintelligibility, disturbance	impactCommunity disturbance; speechoccupational exposure	Adverse; Direct, On-site, Short-term	Restrict assembly to daytime; use rubber mallets; avoid banging; provide hearing protection	None required
67.6	Delivery/removal of construction materials	Traffic noise, engine revving, loading/unloading noise, annoyance, disturbance	Community disturbance; occupational exposure	Adverse; Direct Cumulative, Local, Short-term	Plan haul routes; restrict to daytime; sensitize drivers; enforce speed limits; prohibit honking/revving; maintain vehicles	Traffic Management Plan; preventive maintenance; stakeholder info; GRM
67.7	Generator during construction	Continuous generator noise, annoyance, speech unintelligibility, sleep disturbance	Community disturbance; occupational exposure	Adverse; Direct, On-site, Short-term	Use sound-attenuated generator; acoustic enclosure; vibration-damping mounts; locate away from receptors; maintain; provide hearing protection	Noise monitoring plan; inform receptors; GRM
67.8	Generator during camp operation	Continuous generator noise, annoyance, speech unintelligibility, sleep disturbance	Community disturbance; occupational exposure	Adverse; Direct, On-site, Short-term	Same as 67.7	Noise monitoring plan; inform receptors; GRM
67.9	Compactor for waste trucks	Short-duration impulse noise during compaction/bin handling, annoyance	Community disturbance; occupational exposure	Adverse; Direct Cumulative Local Short-term	Schedule daytime collection; avoid early/late hours; specify quieter compactors; inform contractors; maintain vehicles	None required
67.10	Staff shift drills	movement,Peaks in human/vehicle changes,noise; alarms causing startle/annoyance	Minimal community disturbance	Adverse; Direct, Local Short-term	Schedule drills daytime; notify residents; avoid loudspeakers at night; limit alarm duration; manage traffic/parking	None required

#	Activity	Potential Impact	Risk	Nature, Extent, Duration	Mitigation Measures	Residual Management
67.11	Kitchen recreation noise	&Group conversation, clatter, music causing disturbance, annoyance at night	Disturbance to campsite workers	Adverse; Direct, On-site, Short-term	Locate away from dormitories; limit amplified music; curfew; close outdoor areas by set time	None required
67.12	Internal traffic, parking	roadIntermittent noise, door alarms annoyance	trafficDisturbance to campsite workers	Adverse; Direct, On-site, Short-term	Internal speed limits; speed bumps; parking away from dormitories; discourage alarms at night; maintain road surface; staff induction	None required

6. SOCIAL BASELINE

6.1. Overview

The Social baseline is a carefully selected set of social indicators (social variables) with accompanying qualitative data pertinent to the project's area of influence. The baseline refers to a point of comparison – in other words, to the data (social indicators) about the affected communities that will be used as the reference data against which to measure the impacts of the project on communities affected by the project.

In accordance with local and international legislation, policy and good practice, the social baseline examines the existing social, economic, and physical environment to understand the existing situation within the project's area of influence prior to the commencement of the project. The baseline provides the parameters for analyzing how potential anthropogenic inducements could affect the social, health, gender, and economic conditions within the project's area of influence.

The social baseline was compiled using secondary and primary data. Secondary data was derived from preexisting sources for example national legislative regime, census data, and economic data, while primary data was compiled through a field visit and engagements with key project stakeholders and project affected persons (PAPs) within the Project's direct area of influence. The baseline conditions for the project are stated in this chapter.

6.2. Project area

The [parish](#) of Christ Church is one of the original six parishes of the eleven parishes of [Barbados](#). It has a land area of 57 km² (22 sq miles) and is found at the southern end of the island. [Oistins](#) is the main town and former [capital](#) of the parish. The Parish was founded in 1629 by Governor Sir William Tufton (1589–1650), the 5th Governor of Barbados. The community of Graeme Hall is nested within the Christ Church Parish. The neighborhood can be described as high society, meaning that many affluent persons reside in the community of Graeme Hall¹¹¹.

One of the notable landmarks of the Graeme Hall Community is the last remaining mangrove swamp in the country, the Graeme Hall Nature Sanctuary. The wetland complex is designated as Ramsar Site No. 1591 and covers 33 hectares and is a protected area under the Physical Development Plan. It supports bird and other wildlife populations of recognized ecological value and plays a critical role in preserving biodiversity on the island. The Graeme Hall Nature Sanctuary is a privately owned facility within the complex; it has been closed to the public since late 2008 or 2009 following environmental and regulatory disputes, so the Ramsar designation and the Sanctuary should not be treated as the same thing. (Graeme Hall Nature Sanctuary: About Us, History & Mission)

The sanctuary reopened in May 2025, having been closed for sixteen years, and was restored and is now managed by the Barbados Wetland Trust. It is important to the assessment that the sanctuary is not the whole of the protected wetland: it covers roughly thirty-eight per cent of the area designated under the Ramsar Convention, and the balance remains in government ownership without an active management regime. The two parts are hydrologically and ecologically continuous, so an effect arising in one is not contained within it.

Also, within the Christ Church district and proximately to Graeme Hall is the community of Harmony Hall, which is adjacent to the existing South Coast Sewerage Treatment Plant. Other notable areas to be found in

¹¹¹ The observation was made by the researcher during the field scoping activities. Affluence is determined by the quality of houses and personalities that reside in the area.

Christ Church Parish is the taverns, clubs, and hotels of St Lawrence Gap, which are very busy with island tourists.

6.3. Population demographics

The population of Barbados is predominantly black (92.4%) or mixed (3.1%). 2.7% of the population is white and 1.3% South Asian. The remaining 0.4% of the population includes East Asians (0.1%) and Middle Easterners (0.1%). The population is a youthful population with 24.69% averaging 25-54 years of age. With a larger percentage of females.

- 0-14 years: 17.49% (male 25,762/female 25,764)
- 15-24 years: 12.34% (male 18,024/female 18,330)
- 25-54 years: 42.69% (male 62,655/female 63,093)
- 55-64 years: 13.91% (male 19,533/female 21,430)
- 65 years and over: 13.57% (male 16,398/female 23,571) (2020 est.)

6.4. Education

Barbados' education philosophy ensures that every child has access to opportunities that maximize their abilities and contribute to national development. The system spans four tiers: **pre-primary** (ages 3–5), **primary** (ages 5–12+), **secondary** (ages 10+–16+), and **tertiary** (post-secondary academic, technical, vocational, and university education). Alongside public institutions, Barbados has **private schools**, mostly secular, with some denominational ones open to all faiths. (*Ministry of Education, 2000*). It is estimated that private schools account for about 9% of the primary and secondary school population (*Rudder 2014 as cited in Brisette, 2021*) (*Brisett, 2021*). Additionally, assisted **private secondary schools** receive government support through grants, bursaries, and subventions, ensuring broad access to quality education across the country (*Ministry of Education, 2000*).

To address the changing needs of education in Barbados the Government has embarked on a number of transformational initiatives. One key initiative is the strengthening of foundational learning skills in pre-primary and primary education, improving access to a climate-resilient and inclusive learning environment. (*Bank, 2026*)

According to (Griffith, 2002; World Bank¹¹²; AACRAO EDGE¹¹³, Barbados boasts one of the highest literacy rates in the world. This feat has been achieved as a result of substantial public subsidization of education.

There are two educational institutions located within Graeme Hall and surrounding communities. These include St. Luke's Academy, a private Montessori-inspired school, focused on environmental education and, St Lawrence Primary School, a publicly managed school, located nearby in the Parish of St. Lawrence, situated on the outskirts of Harmony Hall. The second of these institutions has been known as St Lawrence Primary School since 2000; the former name St Lawrence Composite is no longer in use.

¹¹² World Bank. (2026). Literacy rate, adult total (% of people ages 15 and above) – Barbados. Accessed at <https://data.worldbank.org/indicator/SE.ADT.LITR.ZS?locations=BB>

¹¹³ AACRAO. (n.d.). Barbados. Accessed at <https://www.aacrao.org/edge/country/barbados>

6.5. Religion

According to the 2010 census, 75.6% of the population of Barbados is considered Christian, 2.6% have a non-Christian religion and 20.6% have no religion.

Anglicanism constitutes the largest religious group, with 23.9% of the population. It is represented by the Church in the Province of the West Indies, within which the island belongs to the Diocese of Barbados. Pentecostals are the second largest group (19.5%).

The next largest group are Seventh-day Adventists, 5.9% of the population, followed by Methodists (4.2%). 3.8% of the population are Roman Catholics. Other Christians include Wesleyans (3.4%), Nazarenes (3.2%), Church of God (2.4%), Jehovah's Witnesses (2.0%), Baptists (1.8), Moravians (1.2%), Brethren (0.5%), the Salvationists (0.4%) and Latter-day Saints (0.1%).

The number of non-Christians is small. 0.7% of the population are Muslims, most of whom are immigrants or descendants of Indian immigrants from the Indian state of Gujarat. There are three mosques and an Islamic Centre. Other religious groups include the Rastafarians (1.0% of the population), which was introduced to Barbados in 1975, Hindus (0.5%), Jews (0.05%), the Baha is (0.04%) and Buddhists.

6.7. Languages

English is the official language of Barbados and is used for communications, administration, and public services all over the island. In its capacity as the official language of the country, the standard of English tends to conform to the vocabulary, pronunciations, spellings, and conventions akin to, but not exactly the same as, those of British English.

A regional variant of English referred to locally as Bajan is spoken by most Barbadians in everyday life, especially in informal settings. In its full-fledged form, Bajan sounds markedly different from the Standard English heard on the island. The degree of intelligibility between Bajan and general English depends on the level of creolized vocabulary and idioms. A Bajan speaker may be completely unintelligible to an English speaker from another country.

Bajan is influenced by other Caribbean English dialects.

6.8. Health

Barbados has a system of universal health coverage. However, there is a mix of private institutions that also serve the health sector in Barbados. Primary offerings encompass routine wellness exams, prenatal and postnatal care, cancer screenings (such as Pap smears and breast exams), and specialized menopause or fertility support.

The Ministry of Health and Wellness reported an infant mortality rate of 7.6 deaths per 1,000 live births for 2023. The Pan American Health Organization interagency series records 18.1 deaths per 1,000 live births for 2022 against 13.4 in 2000, while describing that movement as a decrease of 35.1 per cent, a statement that is internally inconsistent in the source. The two series are not reconciled here and the national vital statistics should be used in preference. The percentage of low-weight births below 2,500 g remained at 11 per cent between 2003 and 2022, and exclusive breastfeeding to six months of age was 19.7 per cent, unchanged from 2012 (PAHO, Health in the Americas, Barbados country profile, updated 21 October 2025)¹¹⁴.

¹¹⁴World Bank. (2023). 35 women die per 100,000 live births due to pregnancy-related causes in Barbados. Accessed at <https://genderdata.worldbank.org/en/economies/barbados>

The maternal mortality ratio is the number of women who die from pregnancy-related causes while pregnant or within 42 days of the termination of pregnancy, per 100,000 live births. PAHO estimates the ratio at 39.1 deaths per 100,000 live births in 2020, a reduction of 19.3 per cent on the estimate for 2000. The World Bank Gender Data Portal reports a different series, improving from 55 in 2000 to 35 in 2023; the two are drawn from different estimation methods and should not be read as a single trend. Total fertility was estimated at 1.7 children per woman in 2024. Adolescent fertility fell 25.8 per cent, from 60.6 live births per 1,000 women aged 15 to 19 in 2000 to 45.0 in 2024. In 2022, 98.2 per cent of births were attended by skilled personnel, and between 2011 and 2020 antenatal care coverage rose from 89 to 90 per cent (PAHO, 2025; World Bank Gender Data Portal).

In 2021, there were 0 new cases of tuberculosis per 100,000 population in Barbados. In 2019, the overall tuberculosis mortality rate (age-adjusted and per 100, 000 population) was 0.3 (0.2 in women and 0.3 in men).

In 2022, the estimated human immunodeficiency virus (HIV) infection incidence rate (new diagnoses) was 33.6 per 100 000 population. The age-adjusted mortality rate for HIV was 8.4 per 100 000 population in 2019. It should be noted that during the 2000-2019 period, this indicator decreased by 85.4%.

In Barbados in 2023, the prevalence of tobacco use among people aged 15 and older was 6.9%. In the same age group, the prevalence of overweight and obesity was 67.2% in 2022. Also in 2016, 42.9% of the population reported insufficient physical activity.

In 2015, the reported prevalence of arterial hypertension (high blood pressure) among people aged 18 years or older was 24.4%, a decrease of 1.7 percentage points compared to 2000 (26.1%). The prevalence of diabetes mellitus, which stood at 9.1% in 2000, increased to 12.2% in 2014.

In 2019, the adjusted rate of potentially avoidable premature mortality in Barbados was 198.5 deaths per 100 000 population, a decrease of 29.5% from a rate of 281.5 in 2000. This meant that, in 2019, the rate in the country was 12.4% lower than the average rate reported for the Region of the Americas as a whole. Among potentially avoidable premature mortality, the rate for preventable causes was 88.6 per 100 000 population in 2019, which is 35.4% lower than the regional average rate; and the rate for treatable causes was 109.8 per 100 000 population, above the regional average of 89.6.

The overall age-adjusted mortality rate was 6 per 1 000 population in 2019, a decrease of 8.4% compared to 2000 (6.5 deaths per 1000 population).

When deaths are categorized into three main groups, it is observed that, in 2019, the age-adjusted mortality rate from communicable diseases was 82.7 per 100 000 population (93.3 per 100 000 in men and 73.0 per 100 000 in women), while the age-adjusted mortality rate from noncommunicable diseases was 477 per 100 000 population (533.4 per 100 000 in men and 430.9 per 100 000 in women). The rate of age-adjusted mortality from external causes was 36.9 per 100 000 population (52.4 per 100 000 in men and 22.1 per 100 000 in women), including road traffic accidents (8 per 100 000 population), homicides (10.2 per 100 000 population), and suicides (0.3 per 100 000 population). In 2000, the percentage distribution of causes was 80.6% for noncommunicable diseases, 15.9% for communicable diseases, and 3.4% for external causes; in 2019, the percentages were 82.8%, 12.9%, and 4.3%, respectively (PAHO).

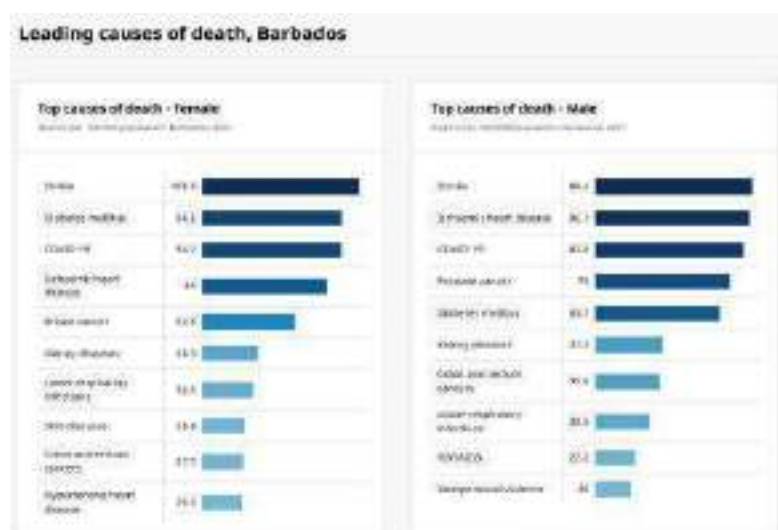


Figure 66: Leading Cause of Death in Barbados

The leading causes of death in Barbados are shown at Figure 66.

6.9. Education

The population of Barbados is assessed as very literate Barbados boasts one of the most robust and highly developed education systems in the Caribbean, featuring a near-universal literacy rate of over (99%). The government demonstrates a strong commitment to the sector, dedicating approximately (4.9%) of its GDP and over (12%) of total public expenditures to education. Women in Barbados experience exceptionally high levels of educational attainment, frequently outperforming men across multiple academic metrics. Female literacy stands at (99.6%), and girls boast a lower secondary school completion rate of (101.9%). Furthermore, women represent a significant majority in tertiary-level enrollments and degree completions across the country¹¹⁵.

Educational attendance in Christ Church, by sex, is given in Table 92.

¹¹⁵ World Bank. 2025. Barbados Gender Scorecard. Accessed at <https://documents1.worldbank.org/curated/en/099746402202539962/pdf/IDU19bfe3ce819af314f9c19f5515c59b19a4cb1.pdf>

Table 92: Educational Attendance Level Population of Christ Church

Parish Sex	Educational attendance level								
	Total	Preprimary (Nursery to Reception)	Primary (Infants A to Class 4)	Secondary (1st Form to 5th Form)	Post-secondary (includes 6th Form and Associate's degree lev	Tertiary	Other (Please Specify)	Not Stated	
	Count	Count	Count	Count	Count	Count	Count	Count	
Christ Church	Both Sexes	5054	328	1969	1541	342	786	87	1
	Male	2426	159	988	783	138	320	37	1
	Female	2628	169	981	758	204	466	50	0

Highest educational level attained, by five-year age group and sex, is given in Table 93.

Table 93: Highest Educational Level attained by Sex

5 Year Age Groups Sex	Highest educational level										
	Total	Preprimary (Nursery to Reception)	Primary (Infants A to Class 4)	Secondary (1st Form to 5th Form)	Senior\Composite	Post-secondary (includes 6th Form and Associate's degree lev	Tertiary	Other (Please Specify)	None	Not Stated	
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
Total	Both Sexes	98443	72	7918	53471	3580	11960	19645	1078	567	152
	Male	46359	32	3454	26907	1592	5631	7897	508	249	89
	Female	52084	40	4464	26564	1988	6329	11748	570	318	63
15 - 19	Both Sexes	3040	1	7	2452	16	379	150	24	9	2
	Male	1703	0	6	1431	6	170	61	20	7	2
	Female	1337	1	1	1021	10	209	89	4	2	0
20 - 24	Both Sexes	6227	1	15	3779	45	1112	1200	55	15	5
	Male	3283	1	5	2143	26	583	483	28	10	4
	Female	2944	0	10	1636	19	529	717	27	5	1
25 - 29	Both Sexes	6991	4	16	3714	42	1213	1917	58	20	7

5 Year Age Groups Sex	Highest educational level										
	Total	Preprimary (Nursery to Reception)	Primary (Infants A to Class 4)	Secondary (1st Form to 5th Form)	Senior\Composite	Post-secondary (includes 6th Form and Associate's degree lev	Tertiary	Other (Please Specify)	None	Not Stated	
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	
	Male	3493	3	11	2032	25	597	773	35	13	4
	Female	3498	1	5	1682	17	616	1144	23	7	3
30 and over	Both Sexes	82185	66	7880	43526	3477	9256	16378	941	523	138
	Male	37880	28	3432	21301	1535	4281	6580	425	219	79
	Female	44305	38	4448	22225	1942	4975	9798	516	304	59
Source: Barbados Statistical Service, Population and Housing Census 2021											

6.10. Economy

Barbados, one of the wealthiest and most developed nations in the Eastern Caribbean, boasts a dynamic, internationally competitive economy led by private sector innovation (*Worrell, 2017*). With a 2024 GDP estimated at USD 7.09 billion, it is the region's largest economy, supported by tourism, offshore finance, and information services, alongside a highly educated workforce. While historically reliant on sugarcane, diversification into light industry and services has strengthened resilience, though challenges remain with supply chain delays and volatile food and fuel prices. Inflation is recorded at 0.8% in 2025. The IMF projects 3% GDP growth for 2025. Strategic transformation policies prioritize **tourism** as the top driver, focusing on aviation, regulation, and digital management systems; the energy transition targeting net-zero emissions by 2035 with USD 9.5 billion in clean technology investments; agriculture through climate-smart practices, digital frameworks, and disaster management for food security; and the blue economy via marine asset valuation, coastal upgrades, and digital shipping systems. Together, these initiatives align with Barbados' sustainable development strategy, balancing growth, resilience, and environmental stewardship. (*OECD, 2025*)

Real GDP growth recorded between January and June 2025 is expected to continue into the second half of the year, with full-year growth projected at approximately 2.7 per cent¹¹⁶.

The village economy mirrors the broader national environment, with tourism and its related services serving as the primary drivers of growth. In communities directly impacted by the project, **tourism**, **agriculture**, and **services** form the core economic engines. Homeowners generate income by renting properties to visitors, farmers work diligently to sustain local food production, and small bars provide entrepreneurial opportunities, strengthening livelihoods and fostering community resilience.

6.11. Labor and migrant workers

The Barbados Labor force landscape is complex, impacted by migration trends, and social and legislative provisions for vulnerable groups (women, youth, persons with disabilities, and migrant workers).

In terms of migration, Barbados is undergoing significant demographic and migration transitions that directly affect its labor market and broader development goals. With an ageing and declining population reflected in a fertility rate of 1.8 and a rising age-related dependency ratio - the country faces labor shortages and economic sustainability challenges. The latest estimates indicate a population of approximately 282,336, with about 30 per cent under the age of 25 and an even split between women and men. The working-age population (16-64 years) represents 66 per cent of the total, while 16 per cent are 65 years or older. This results in an age-related dependency ratio exceeding 50 per cent, which is projected to increase. The statistical material in this and the following sub-sections is drawn from the publications of the Barbados Statistical Service, the International Labour Organization country profile for Barbados and the World Bank country data, and each figure is attributed at the point of use.

Migration significantly affects population trends, with over 25 per cent of Barbadian nationals residing abroad, while the country also attracts a significant share of migrant workers, especially from other CARICOM countries. While managed immigration will play an important role in addressing labor market challenges arising from an aging population – including increased demand for care services, the continued loss of skilled emigrants highlights the economy's limited capacity to generate attractive employment opportunities for many Barbadians.

¹¹⁶ <https://youtu.be/LkIOFyFGkhE?feature=shared>

As a result, Barbados has experienced a decline in both the total labor force and labor force participation rates over the past two decades, and some challenges persist in relation to job creation and unemployment. The labor force has declined from 146,300 in 2004 to 134,300 in 2023, while the participation rate has fallen from 69.5 per cent to 62.3 per cent over the same period. More than 81,000 adults were economically inactive in 2023, up from 64,000 in 2004, primarily due to an increasing number of retired persons. Total unemployment rates have steadily declined since 2004, although the 2024 rate of 7.7 per cent still exceeds the Caribbean average (6.8 per cent).

Additionally, many workers are engaged in forms of work that often lead to Decent Work deficits. This includes an increasing number of workers in non-standard forms of employment (NSFE), such as temporary service contracts and remote work for foreign employers, while as much as half of total employment may be informal. Youth and workers with lower levels of educational attainment are more likely to engage in NSFE and informal work. Inward migration, both intra- regional and international, is increasingly critical for filling workforce gaps.

Although Barbados compares favorably with other countries in the region on many gender equality measures, women continue to experience some labor market and employment challenges. In 2023, women's labor force participation rate was 58.1%, compared to 67.0% among men. Women are also more likely to experience long-term unemployment, indicating that many women face persistent challenges in securing employment.

Women are also disproportionately concentrated in sectors and occupations that are often characterized by low pay and poor working conditions, including in hospitality, retail, and the care economy. Women's disproportionate share of unpaid care work remains a principal barrier to increased participation in employment. Recent estimates suggest that Barbados could increase the female employment rate by around 10 percentage points over the next 10 years through targeted investment in care policies.

Finally, constituents acknowledge that discrimination on the basis of sex and gender, including sex-based violence and harassment in the world of work, are additional factors contributing to gender-based labor market inequalities.

There are additional challenges facing youth, people with disabilities, and migrant workers. Youth unemployment is a particular concern, with unemployment rates consistently above the rate for other working-age adults (estimates vary between 11 and 35%). There are no recent data on broader measures of youth economic activity, but data from 2016 estimated that 23% of young people were not in education, employment, or training (NEET) and thus at risk of long-term social and economic exclusion, with higher rates among men (26%) than women (20%).

There is no data on labor force participation of people with disabilities, but stakeholders report multiple barriers in access to decent employment, including discrimination, limited accessibility to training and workplaces, and inflexibility in social assistance schemes that may disincentivize transitions into employment.

Migrant workers play a key role in Barbados' labor market, but they are disproportionately exposed to Decent Work deficits due to concentration in low-paid and insecure forms of work (informal economy, construction, domestic work), lack of awareness of rights, and vulnerable legal and/or economic circumstances. Migrants accounted for around 12% of the population in 2019, with the majority of working age and employed in lower-skill occupations and sectors such as services, agriculture, and construction.

Addressing Barbados' complex labor market challenges requires integrated policy measures and stronger institutional capacities. Information gaps in national statistical data and institutional capacity hinder evidence-based policymaking and planning. A fragmented system, with no overarching framework to coordinate planning and policymaking on employment promotion, skills development, enterprise support, and labor

migration, makes it increasingly difficult to address market needs. As a starting point, the Government has recognized the need for a more structured and coherent labor migration policy framework to ensure that immigration responds to evolving labor market needs, while continuing to guarantee adequate protection of rights and Decent Work opportunities for both migrant and Barbadian workers.

The Government has recognized policy gaps, and the Ministry of Labour, Social Security and Third Sector (MLST) is currently leading the development of a new People Development Policy to provide strategic coherence to workforce development and employment promotion efforts, while the Government also plans to develop a labor migration policy as part of wider efforts to strengthen migration governance.

A new TVET Policy is also under development, alongside measures to enhance support for enterprise development and entrepreneurship (*e.g., through the new Small and Medium Enterprise (SME) Policy*). Beyond the policy level, limited institutional capacity remains a challenge in delivering effective labor market policies and programs.

Uneven availability of timely labor market data, for example, a lack of data on key labor market trends, including prevalence and characteristics of informality and NSFE, NEET youth, disability inclusion, and characteristics of labor migration. Limited demand, side labor, market data vacancies, skills needed, and lack of a systematic approach to skills forecasting remain an overarching challenge for evidence-based workforce planning and employment policymaking. Strengthening the national statistical system, including the establishment of a fully operational Labour Market Information System (LMIS), is critical to address Decent Work challenges and ensure the effective implementation of Barbados's Decent Work Country Program. The abbreviations used in this passage are set out in full at first use and in the Acronyms and Abbreviations list at the front of this document: NSFE denotes non-standard forms of employment and NEET denotes young people not in employment, education or training.

6.12. Household types and Poverty Analysis

Barbados exhibits relatively low overall inequality. The Gini coefficient was 34.1 in 2016 –among the lowest in LAC and well below the World Bank's high inequality threshold of 40. Still, disparities persist across population groups: smaller households headed by people who have attained higher levels of education and who are employed are less likely to be poor. Around 10.0 per cent of people in households headed by someone who is employed live on less than \$8.30 (2021 PPP) per day, compared to 18.5 per cent for households headed by someone who is not employed. Notwithstanding this, there are some differences in population groups, with poverty being more prevalent among women and girls, and more so in female-led households. Multidimensional poverty, or poverty that incorporates monetary poverty, education, and basic infrastructure, is also low, recorded as 0.3% of Barbadians were multidimensionally poor in 2016. Yet 4.1 per cent of people lacked access to limited standard sanitation, and 3.0% lacked access to electricity (Bank W., Barbados Poverty & Equity Brief, 2025, 2025). The Gini coefficient of 34.1 for 2016 and the high-inequality threshold of 40 are taken from World Bank country data. Where an international poverty line is cited in this section it is the upper-middle-income line used for cross-country comparison and not a national poverty line for Barbados; Barbados does not currently publish an official national poverty line, and the figure should therefore be read as a comparative indicator only. Its relevance to the project is that it indicates the margin by which households in the Area of Influence may be exposed to price increases in food, transport and rental accommodation during construction, which is the mechanism assessed under Inflationary Pressure in the Social Impact Assessment Matrix.

Barbados is ranked [36th in economic freedom](#), putting it within the moderate rating. In its 2026– 27 budget, the government announced a Barbados Republic Child Wealth Fund, under which every child born on or after 30 November 2021 will receive a “birthright investment,” held in trust and invested professionally until it can be used for education, housing, or other major life steps. It is universal, statutory once the law is passed, and designed as a permanent feature of the social contract, not a temporary programme. The low levels of poverty in the Barbadian society are congruent with Barbados’ high per capita income. In fact, Barbados boasts one of the highest per capita incomes in the Caribbean (Jennings, n.d.).

The country has a relatively well-developed social protection system, which could help sustain incomes if shocks strike. Around 55.3 per cent of the population was covered by at least one social protection benefit in 2021. However, the labor market – like the broader economy – depends on tourism, which is highly exposed to climate-related shocks. Wholesale and retail trade, along with accommodation and food services, are the largest employers, engaging 15.4 per cent and 12.0 per cent of workers respectively in Q3 2024. To address this challenge, the 2022 Barbados Economic Recovery and Transformation (BERT) plan supports diversifying the economy alongside efforts to reduce public debt, enhance competitiveness, invest in education and health, and provide affordable housing (Bank W., Barbados Poverty & Equity Brief, 2025, 2025) The labor force and social protection coverage figures in this passage are drawn from the Barbados Statistical Service labor force survey and from the International Labour Organization social protection data for Barbados respectively, for the years stated.

Group and multidimensional poverty measures are shown at Figure 67.

Group and Multidimensional Poverty

Poverty by Group	Poverty Rate (%)	Multidimensional Poverty Components	(% of Pop.)
Urban population	N/A	Daily income less than US\$3.00 per person	0.5
Rural population	N/A	At least one school-aged child is not enrolled in school	0.2
Males	14.7	No adult has completed primary education	0.4
Females	16.8	No access to limited-standard drinking water	0.9
0 to 14 years old	25.1	No access to limited-standard sanitation	4.1
15 to 64 years old	14.2	No access to electricity	3.0
65 and older	8.4		
Without education (16+)	14.6		
Primary education (16+)	12.1		
Secondary education (16+)	15.6		
Tertiary/post-secondary education (16+)	6.9		

Note:

N/A denotes a missing/removed value, while N/A* refers to a value which was removed due to having fewer than 30 observations.

The rates in the Poverty by Group table above are shown at the \$8.30 upper-middle income line.

Data for the Poverty by Group table is derived from a 2016 survey and data for the Multidimensional Poverty Components table is derived from a 2016 survey.

Figure 67: Group and Multidimensional Poverty

Table 94 gives the aggregated population of Graeme Hall, St Lawrence and Worthing by first-level occupation.

Table 94: Aggregated Population of Grame Hall, St. Lawrence, Worthing and Rendezvous by 5 year Age Group, Sex and 1st Level Occupation

	1st Level Occupation													
	Total	Legislat or, Senior Officials and Manage rs	Profession als	Technicia ns and Associate Profession als	Clerks	Service Worker s and Shop and Market Sales Worker s	Skilled Agricultu ral and Fishery Workers	Craft and Related Worker s	Plant and Machine Operato rs and Assembl ers	Elementa ry Occupati ons	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
Sex of Person	Total	5 Year Age Groups	Total	685	18	135	80	53	85	0	90	7	8	209
			0 - 4	0	0	0	0	0	0	0	0	0	0	0
			5 - 9	0	0	0	0	0	0	0	0	0	0	0
			10 -14	0	0	0	0	0	0	0	0	0	0	0
			15 -19	10	0	5	0	0	2	0	1	0	0	2
			20 -24	26	0	5	4	1	6	0	6	0	0	4
			25 -29	47	1	15	7	2	5	0	5	1	0	11
			30 -34	66	2	13	11	4	11	0	9	0	0	16
			35 -39	52	0	10	5	3	10	0	7	2	0	15

	1st Level Occupation													
	Total	Legislator, Senior Officials and Managers	Professionals	Technicians and Associate Professionals	Clerks	Service Workers and Shop and Market Sales Workers	Skilled Agricultural and Fishery Workers	Craft and Related Workers	Plant and Machine Operators and Assemblers	Elementary Occupations	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
			40 -44	52	1	10	4	2	2	0	10	1	0	22
			45 -49	52	1	6	9	2	6	0	7	0	0	21
			50 -54	56	1	10	2	3	6	0	8	2	2	22
			55 -59	59	3	11	8	7	8	0	8	0	0	14
			60 -64	59	3	14	6	7	5	0	10	0	0	14
			65 & over	206	6	36	24	22	24	0	19	1	6	68
	Male	5 Year Age Groups	Total	334	8	44	51	10	29	0	84	6	5	97
			0 - 4	0	0	0	0	0	0	0	0	0	0	0
			5 - 9	0	0	0	0	0	0	0	0	0	0	0

	1st Level Occupation														
	Total	Legislat or, Senior Officials and Manage rs	Profession als	Technicia ns and Associate Profession als	Clerks	Service Worker s and Shop and Market Sales Worker s	Skilled Agricultu ral and Fishery Workers	Craft and Related Worker s	Plant and Machine Operato rs and Assembl ers	Elementa ry Occupati ons	Not Stated				
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count				
			10 -14	0	0	0	0	0	0	0	0	0	0	0	
			15 -19	5	0	1	0	0	1	0	1	0	0	0	2
			20 -24	16	0	2	3	0	3	0	6	0	0	0	2
			25 -29	24	1	3	5	1	2	0	5	1	0	0	6
			30 -34	26	0	3	7	1	3	0	8	0	0	0	4
			35 -39	26	0	4	4	0	4	0	7	1	0	0	6
			40 -44	32	0	6	2	0	0	0	9	1	0	0	14
			45 -49	27	1	2	6	0	2	0	6	0	0	0	10
			50 -54	28	0	2	1	1	1	0	8	2	2	2	11
			55 -59	27	2	3	5	1	3	0	8	0	0	0	5

	1st Level Occupation													
	Total	Legislator, Senior Officials and Managers	Professionals	Technicians and Associate Professionals	Clerks	Service Workers and Shop and Market Sales Workers	Skilled Agricultural and Fishery Workers	Craft and Related Workers	Plant and Machine Operators and Assemblers	Elementary Occupations	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
			60 -64	26	0	4	4	0	1	0	9	0	0	8
			65 & over	97	4	14	14	6	9	0	17	1	3	29
	Female	5 Year Age Groups	Total	351	10	91	29	43	56	0	6	1	3	112
			0 - 4	0	0	0	0	0	0	0	0	0	0	0
			5 - 9	0	0	0	0	0	0	0	0	0	0	0
			10 -14	0	0	0	0	0	0	0	0	0	0	0
			15 -19	5	0	4	0	0	1	0	0	0	0	0
			20 -24	10	0	3	1	1	3	0	0	0	0	2
			25 -29	23	0	12	2	1	3	0	0	0	0	5

	1st Level Occupation													
	Total	Legislat or, Senior Officials and Manage rs	Profession als	Technicia ns and Associate Profession als	Clerks	Service Worker s and Shop and Market Sales Worker s	Skilled Agricultu ral and Fishery Workers	Craft and Related Worker s	Plant and Machine Operato rs and Assembl ers	Elementa ry Occupati ons	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
			30 -34	40	2	10	4	3	8	0	1	0	0	12
			35 -39	26	0	6	1	3	6	0	0	1	0	9
			40 -44	20	1	4	2	2	2	0	1	0	0	8
			45 -49	25	0	4	3	2	4	0	1	0	0	11
			50 -54	28	1	8	1	2	5	0	0	0	0	11
			55 -59	32	1	8	3	6	5	0	0	0	0	9
			60 -64	33	3	10	2	7	4	0	1	0	0	6
			65 & over	109	2	22	10	16	15	0	2	0	3	39
Source: Barbados Statistical Service Population and Housing Census, 2021														

Table 95 gives the same population by relationship to the head of household.

Table 95: Aggregated Population of Grange Hall St. Lawrence, Worthing, and Rendezvous by 5 Year Age Group, Sex, and Relationship to head of Household

	Relationship to Head of Household													
	Total	Head	Spouse/Partner	Child Of Head/Spouse	Son/Daughter In Law	Grandchild	Parent/Parent In Law	Other Relative	Visitor	Other Non-Relative	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
Sex of Person	Total	5 Year Age Groups	Total	1680	667	226	437	29	117	25	104	1	40	34
			0 – 4	53	0	0	31	0	14	0	4	0	3	1
			5 – 9	96	0	0	58	0	28	0	4	0	6	0
			10 - 14	68	0	0	34	2	23	0	6	0	3	0
			15 - 19	104	4	0	60	3	25	0	8	0	3	1
			20 - 24	65	2	1	41	3	9	0	2	0	5	2
			25 - 29	90	13	10	41	5	9	0	9	0	3	0
			30 - 34	108	28	16	44	5	6	0	5	0	3	1
			35 - 39	108	34	18	37	5	1	0	7	0	2	4
			40 - 44	96	50	16	19	2	0	0	5	1	3	0
			45 - 49	108	47	19	27	2	1	0	4	0	4	4
			50 - 54	94	47	20	15	0	0	0	10	0	1	1
			55 - 59	133	77	25	16	2	0	4	6	0	0	3

	Relationship to Head of Household													
	Total	Head	Spouse/Partner	Child Of Head/Spo use	Son/Daughter In Law	Grandchild	Parent/Parent In Law	Other Relative	Visitor	Other Non-Relative	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
			60 - 64	124	73	25	8	0	1	2	11	0	1	3
			65 and over	433	292	76	6	0	0	19	23	0	3	14
	Male	5 Year Age Groups	Total	786	320	58	233	17	62	6	55	1	24	10
			0 – 4	31	0	0	16	0	10	0	3	0	2	0
			5 – 9	50	0	0	32	0	13	0	1	0	4	0
			10 - 14	31	0	0	17	1	8	0	2	0	3	0
			15 - 19	55	2	0	33	2	13	0	4	0	1	0
			20 - 24	38	1	0	23	1	5	0	2	0	4	2
			25 - 29	48	7	2	21	2	8	0	7	0	1	0
			30 - 34	46	11	4	23	3	3	0	1	0	0	1
			35 - 39	49	16	7	18	4	1	0	2	0	1	0
			40 - 44	55	34	4	10	1	0	0	3	1	2	0
			45 - 49	51	23	3	15	1	1	0	3	0	4	1
			50 - 54	47	22	8	11	0	0	0	5	0	0	1
			55 - 59	57	39	6	5	2	0	1	4	0	0	0

	Relationship to Head of Household													
	Total	Head	Spouse/Part ner	Child Of Head/Spo use	Son/Daugh ter In Law	Grandc hild	Parent/Par ent In Law	Other Relativ e	Visitor	Other Non- Relativ e	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
			60 - 64	52	34	1	6	0	0	2	8	0	0	1
			65 and over	176	131	23	3	0	0	3	10	0	2	4
	Fem ale	5 Year Age Groups	Total	894	347	168	204	12	55	19	49	0	16	24
			0 – 4	22	0	0	15	0	4	0	1	0	1	1
			5 – 9	46	0	0	26	0	15	0	3	0	2	0
			10 - 14	37	0	0	17	1	15	0	4	0	0	0
			15 - 19	49	2	0	27	1	12	0	4	0	2	1
			20 - 24	27	1	1	18	2	4	0	0	0	1	0
			25 - 29	42	6	8	20	3	1	0	2	0	2	0
			30 - 34	62	17	12	21	2	3	0	4	0	3	0
			35 - 39	59	18	11	19	1	0	0	5	0	1	4
			40 - 44	41	16	12	9	1	0	0	2	0	1	0
			45 - 49	57	24	16	12	1	0	0	1	0	0	3
			50 - 54	47	25	12	4	0	0	0	5	0	1	0
			55 - 59	76	38	19	11	0	0	3	2	0	0	3

	Relationship to Head of Household													
	Total	Head	Spouse/Part ner	Child Of Head/Spo use	Son/Daugh ter In Law	Grandc hild	Parent/Par ent In Law	Other Relativ e	Visitor	Other Non- Relativ e	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count			
			60 - 64	72	39	24	2	0	1	0	3	0	1	2
			65 and over	257	161	53	3	0	0	16	13	0	1	10
Source: Barbados Statistical Service Population and Housing Census, 2021														

Table 96 gives it by housing tenure.

Table 96: Aggregated Population of Grame Hall, St. Lawrence, Worthing, and Rendezvous by 5 Year Age Group, Sex and House Tenure

	House tenure										
	Total	Owned	Private Rented\Leas ed	Government Rented\Leas ed	Rent free	Squatted	Other (Please Specify)	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count			
Sex of Person	Total	5 Year Age Groups	Total	677	408	182	5	46	0	5	31
			0 - 4	2	1	0	0	0	0	0	1
			5 - 9	3	0	0	0	3	0	0	0
			10 - 14	0	0	0	0	0	0	0	0

	House tenure										
	Total	Owned	Private Rented\Leas ed	Government Rented\Leas ed	Rent free	Squatted	Other (Please Specify)	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count			
			15 - 19	5	2	2	0	0	0	0	1
			20 - 24	5	0	2	0	1	0	0	2
			25 - 29	15	4	7	0	3	0	0	1
			30 - 34	27	8	13	0	4	0	0	2
			35 - 39	35	12	17	0	1	0	1	4
			40 - 44	51	17	30	0	2	0	0	2
			45 - 49	48	14	21	0	9	0	1	3
			50 - 54	45	20	14	2	5	0	0	4
			55 - 59	79	50	23	2	3	0	1	0
			60 - 64	74	55	14	0	2	0	0	3
			65 and over	288	225	39	1	13	0	2	8
	Male	5 Year Age Groups	Total	318	188	93	1	20	0	2	14
			0 - 4	0	0	0	0	0	0	0	0
			5 - 9	2	0	0	0	2	0	0	0
			10 - 14	0	0	0	0	0	0	0	0

	House tenure										
	Total	Owned	Private Rented\Leas ed	Government Rented\Leas ed	Rent free	Squatted	Other (Please Specify)	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count			
			15 - 19	3	1	1	0	0	0	0	1
			20 - 24	3	0	0	0	1	0	0	2
			25 - 29	9	3	3	0	2	0	0	1
			30 - 34	12	4	3	0	3	0	0	2
			35 - 39	16	5	7	0	1	0	1	2
			40 - 44	34	13	20	0	1	0	0	0
			45 - 49	22	7	11	0	2	0	0	2
			50 - 54	20	8	8	0	3	0	0	1
			55 - 59	40	28	12	0	0	0	0	0
			60 - 64	33	26	7	0	0	0	0	0
			65 and over	124	93	21	1	5	0	1	3
	Female	5 Year Age Groups	Total	359	220	89	4	26	0	3	17
			0 - 4	2	1	0	0	0	0	0	1
			5 - 9	1	0	0	0	1	0	0	0
			10 - 14	0	0	0	0	0	0	0	0

	House tenure										
	Total	Owned	Private Rented\Leas ed	Government Rented\Leas ed	Rent free	Squatted	Other (Please Specify)	Not Stated			
	Count	Count	Count	Count	Count	Count	Count	Count			
			15 - 19	2	1	1	0	0	0	0	0
			20 - 24	2	0	2	0	0	0	0	0
			25 - 29	6	1	4	0	1	0	0	0
			30 - 34	15	4	10	0	1	0	0	0
			35 - 39	19	7	10	0	0	0	0	2
			40 - 44	17	4	10	0	1	0	0	2
			45 - 49	26	7	10	0	7	0	1	1
			50 - 54	25	12	6	2	2	0	0	3
			55 - 59	39	22	11	2	3	0	1	0
			60 - 64	41	29	7	0	2	0	0	3
			65 and over	164	132	18	0	8	0	1	5
Source: Barbados Statistical Service Population and Housing Census, 2021											

6.13. Community-Level Socio-Economic Profile

The socio-economic material presented above is drawn largely from national statistics. National data establish the context within which the project operates but they do not describe the communities within the Area of Influence, and the Social Impact Assessment requires the latter. This sub-section sets out what is established about those communities from the field exercise of 15 to 18 April 2026, and states plainly what is not yet established and how it will be closed.

What is established. Fifty households were identified within the direct Area of Influence during the field exercise, in the Harmony Hall area and along the community road serving it. The community is mixed in use, combining residential occupation, small business activity and agriculture within the same area. Tourism and its related services are the principal drivers of economic activity, alongside agriculture and services, mirroring the national pattern. Two private medical facilities and two educational institutions lie within proximity, as described in the Social Infrastructure section. For the avoidance of doubt, the fifty households lie within the socio-economic catchment of 1 km, which the April 2026 engagement was designed to cover, and not solely within the 500 m direct Area of Influence.

What is not yet established. The field exercise did not capture household composition, tenure, or the split between owner-occupied dwellings and properties let to visitors, which matters because competition for rental accommodation is one of the mechanisms by which a non-local workforce affects a host community. Nor did it capture local unemployment, the principal livelihoods pursued within the community, local income or poverty levels, or prevailing rental values against which any inflationary effect could later be measured. The engagement was conducted on a convenience basis rather than by a sampling frame, so the fifty households identified cannot be treated as a representative sample of the community.

That gap has since been closed by other means. The Community Health Assessment and Community Health Programme, revision 3.0, profiles the Area of Influence from census data rather than from the field exercise and gives both the household tenure structure and the population by age band and sex. Six hundred and seventy-seven households are recorded in the area, of which sixty per cent are owner-occupied, twenty-seven per cent privately rented or leased, seven per cent occupied rent free, and under one per cent government rented. The rental proportion is the figure that matters for labor influx: roughly one household in four in the area holds its home on a tenancy, and those households are the ones exposed if a non-local workforce competes for rental stock or if landlords convert to short-term letting.

The population profile is set out at Table 97. Two features bear on the assessment. Women outnumber men in every age band above twenty-five, and the imbalance widens with age, so the older population of the Area of Influence is predominantly female. And the twenty-five to fifty-four band is the largest at thirty-one per cent, which is the group most likely to be in the labor market and therefore most affected both by the employment opportunity and by competition for it.

Table 97: Population of the Area of Influence by age band and sex

Age band	Total	Male	Female	Share of area population
0 to 14 years	217	112	105	12.9%
15 to 24 years	169	93	76	10.1%
25 to 54 years	514	243	271	30.6%

Age band	Total	Male	Female	Share of area population
55 to 64 years	257	109	148	15.3%

The fifty households identified during the April 2026 field exercise are a subset of this population, being those in the Harmony Hall area and along the community road immediately serving the site. The two figures are not in conflict: fifty is the direct Area of Influence walked in the field, six hundred and seventy-seven is the wider area profiled from census data. The distinction should be preserved wherever either figure is used.

The nearest residential receptor is approximately two hundred and fifty meters to the south-east of the site and is assessed in the Community Health Assessment as of high sensitivity, exposed to particulates, noise, odor and vehicle movements. That distance and that rating govern the noise and dust commitments in the Environmental and Social Management Plan.

How the gap will be closed. A structured household profile of the direct Area of Influence will be undertaken as part of the Community Health Assessment and the continuing stakeholder engagement programme, covering household composition, tenure, livelihoods, employment status and current rental values. Until that profile is available, the impact ratings for Inflationary Pressure, Increased Pressure on Utilities and Beneficial Services and Adverse Social and Community Well-Being in the Social Impact Assessment Matrix rest on professional judgement informed by national data and by the field observations recorded, and are identified as such. The pre-construction price and rental baseline required to monitor inflationary effect must be established before construction begins, as no such baseline presently exists. The profile will cover the socio-economic catchment of 1 km, consistent with the structure set out in the Project Area of Influence section.

The labor force participation rate is 63.3%. 57. 4% of the Population of Barbados is recorded as being employed, while 4.9% are unemployed (Services). The working poverty rate is recorded at 0.3% in 2025¹¹⁷. The Central Bank of Barbados reports that [unemployment](#) declined to its lowest level in recent history, reinforcing business confidence and household spending. Building on this resilience, the economy is forecasted to sustain around 3 per cent annual growth beyond 2025, supported by tourism diversification, public and private investment in infrastructure and housing, expansion of the digital economy, and targeted productivity reforms. Together, these drivers reinforce a confident outlook for continued, inclusive growth through 2025 and beyond (*Barbados C. B., 2025*).

6.14. Local Service Capacity

There are two medical facilities within proximity to the Workers' Camp. These include Maxwell Medical Clinic and Elcourt Clinic. These institutions are privately owned; they operate Monday through Sunday, providing a range of general and family health services. Also, there are three police stations close to the project site: Oistins Police Station, Worthing Police Station, and District 'B' Police Station. The two clinics operate on weekdays and at limited weekend hours and provide general outpatient care; neither offers a twenty-four hour emergency service. The nearest hospital is the Queen Elizabeth Hospital in Bridgetown, approximately 7 km or 4.3 miles from Harmony Hall and ordinarily fifteen to twenty minutes by road, which provides twenty-four hour emergency care and post-incident care for survivors of sexual violence. The nearest stations of the Barbados Police Service, their hours and contact numbers, together with the Family Conflict Intervention Unit, national helplines, shelters and non-governmental support services, are listed in the referral pathway carried

¹¹⁷ ILO. (n.d.). Barbados. Accessed at <https://ilostat ilo.org/data/country-profiles/brb/>

in the SH/SEA/GBV Prevention and Response Plan and recorded in Table 107. The implication for the project is that serious injury, obstetric emergency or any incident requiring immediate specialist care must be routed to Bridgetown rather than treated locally, which is reflected in the Emergency Response Plan and in the on-site first-aid provision.

There are two educational institutions located within Graeme Hall and the surrounding communities. These include St. Luke's Academy (a private Montessori-inspired school focused on environmental education) and St Lawrence Primary School (a publicly managed school, located near the Parish of St. Lawrence situated on the outskirts of Harmony Hall). The school has been known as St Lawrence Primary School since 2000.

6.15. Social Infrastructure

6.15.1. Governance

Barbados operates a parliamentary democracy without elected local government, relying instead on appointed Constituency Councils (CCs) to deliver local governance. In 2021, Barbados transitioned to republican status, electing its first President to replace the British monarch as Head of State. The country is divided into 11 parishes plus Bridgetown, further subdivided into 30 constituencies, each with its own council under the oversight of the Department of Constituency Empowerment (DCE) in the Ministry of Social Care.

Each CC is a legally established body of 11 appointed members, including a chairperson and treasurer, with the local Member of Parliament serving ex officio. Councilors serve two-year terms, renewable once, and are selected through an application process tied to their residence or community association.

Councils receive a fixed annual allocation of BB\$100,000, representing about 0.07% of total government expenditure, and in 2010, women comprised 40.7% of councilors and 16.7% of chairpersons. Councils function as advocacy and resource management bodies, maintaining links with government agencies, lobbying on behalf of constituents, and delivering projects tailored to local needs.

Through sub-committees, CCs gather socioeconomic data, identify priorities, and implement initiatives—ranging from community-level projects to larger undertakings in partnership with the DCE and other stakeholders. Their mandate emphasizes good governance, efficient resource use, and community empowerment, positioning CCs as the primary mechanism for local representation and development in Barbados (Commonwealth Local Government Forum). Barbados generally performs above regional averages on most governance indicators such as rule of law, control of corruption, and political stability.

6.15.2. Water

Barbados is classified as a water-scarce country, with per capita availability of 306 m³/year. Nearly 80% of supply comes from fragile coastal aquifers, yet the island maintains a historic water network (1856) with 99% coverage and quality standards aligned to WHO guidelines. With 98% of groundwater fully developed and droughts increasing, challenges include reduced supply in high-elevation areas and rising coastal salinity (Honorable Santia Bradshaw, Deputy Prime Minister, 2023).

The Barbados Water Authority (BWA), established in 1980, manages potable water, wastewater treatment, and resource protection¹¹⁸.

¹¹⁸ Barbados Water Authority. (n.d.). About Us. Accessed at <https://barbadoswaterauthority.com/about-us/>

Groundwater supplies approximately 80 to 86 per cent of the public water supply, with the remaining 14 to 20 per cent produced by the Brighton seawater desalination plant, commissioned to supplement groundwater during periods of scarcity (Barbados Water Authority, BA-L1069 Strategic Environmental and Social Assessment, 2025). Around half of the groundwater abstraction is drawn from two wells operating close to capacity, and some 120 privately owned wells supply irrigation.

Agriculture is the largest single consumer. The consumption shares previously cited in this section derive from 1996 Barbados Water Authority figures and are approximately thirty years old; they are retained only as historical context and are not relied upon in the impact assessment. Current sectoral consumption data should be obtained from the Authority before submission. A \$37.5M desalination plant at Spring Garden (2000), serving 44,000 people (~1/6 of the population)¹¹⁹.

The quality of the water supply in Barbados meets the World Health Organization's drinking water guidelines which the island has adopted as its drinking water standards. Water quality is safeguarded by the Bridgetown (1982) and South Coast (2003) wastewater treatment plants, alongside the Spring Garden reverse osmosis facility. Reservoirs at Golden Ridge, Castle Grant, and Spring System support irrigation in parishes such as St. Andrew, St. John, St. Joseph, and St. Thomas areas facing chronic shortages.

Climate change and El Niño have intensified droughts, placing Barbados among the top 10 water- stressed countries. Rising costs of living have spurred household kitchen gardens, increasing demand. In 2016, BWA imposed a three-month water ban restricting non-essential uses. Long- term measures include:

- Eight water tankers for St. Joseph, St. Andrew, and St. John.
- Rehabilitation of a St. George well to add 500,000 gallons to Golden Ridge and Castle Grant.
- Completion of Lazaretto pumping station to channel desalinated water into St. Peter and St. Lucy.

Barbados' water governance reflects a balance of historic infrastructure, modern desalination, and adaptive drought strategies, but remains constrained by aquifer fragility and climate pressures.

6.15.3. Energy

The island's electric utility, The Barbados Light & Power Co. Ltd. (BLPC), established in 1899, was one of the earliest in the Caribbean. It is a vertically integrated monopoly, regulated by the Fair- Trading Commission (FTC), and is now totally owned by Emera Inc., a Canadian based company. Their existing license, which was gained in 1986, allows BLPC to have the sole franchise to sell electricity in Barbados up to 2028. Recent efforts in securing a more sustainable energy mix provide reason for optimism. The establishment of photovoltaic projects throughout the island in the last five years has led to many new players either getting involved or expanding in the market. The local utility has also played its part by establishing a 10 MW solar farm. The government has set a distributed generation target of at least 35,000 buildings with rooftop or ground-mounted solar PV systems that are resilient to extreme wind events (e.g. Category 4 Hurricanes).

While wind energy has not taken off significantly, there are plans to develop this technology to complement existing solar installations. BLPC continues to investigate the possibility of establishing a wind farm in Lambert's, St. Lucy alongside the existing PV farm there.

In light of a declining sugar cane industry on the island, there is increasing confidence in the agricultural sector that there can be greater use of biomass and biogas in the energy sector. Bagasse has, at times, been used to

¹¹⁹ Totally Barbados. 2025. Barbados Water. Accessed at <https://www.totallybarbados.com/articles/infrastructure/water/>

generate energy in the sugar cane industry and there is considerable interest in building on this experience, with some farmers considering switching to high fiber canes to produce biomass rather than sugar.

Natural Gas is used for Domestic Cooking and Industry. The National Petroleum Corporation (NPC) currently has approximately 22,000 customers of which approximately 1,000 are commercial entities. There is continued demand for piped natural gas for cooking as an alternative to liquified petroleum gas (LPG), influenced by the current pricing mechanism for natural gas and convenience. Similarly, industries use natural gas as the fuel source for their boilers. Current demand for natural gas is approximately 1.7 million cubic feet per day (approximately half of which is now imported as domestic supply has declined). It is noted that the National Petroleum Company plans to expand the natural gas distribution network. To achieve the 2030 Vision of zero fossil fuel consumption domestically, it will be necessary to switch from piped natural gas to a piped biogas if the distribution network is not to become a stranded asset.

The demand for energy in Barbados over the last ten years is characterized by a declining trend. The average demand of primary and secondary energy was estimated at 11,297 BOE per day. Energy demand over the period declined, reflecting the economic challenges that Barbados has been facing. Barbados' demand for energy peaked in 2008 at an estimated 12,056 barrels of oil per day (BOPD), while the lowest level of demand was observed in 2014, estimated at 10,132 BOPD.

Currently, fossil fuels, predominantly heavy fuel oil, dominate Barbados's energy mix: • Heavy Fuel Oil – 37% • Diesel - 18% • Gasoline – 17% • Kerosene – 7% • LPG – 2% • Sugar Cane Bagasse – 3% • Natural Gas – 2% • Other (electricity produced within utility) – 14% • Solar water heaters - < 1% The heavy fuel oil is mainly used in the generation of electricity.

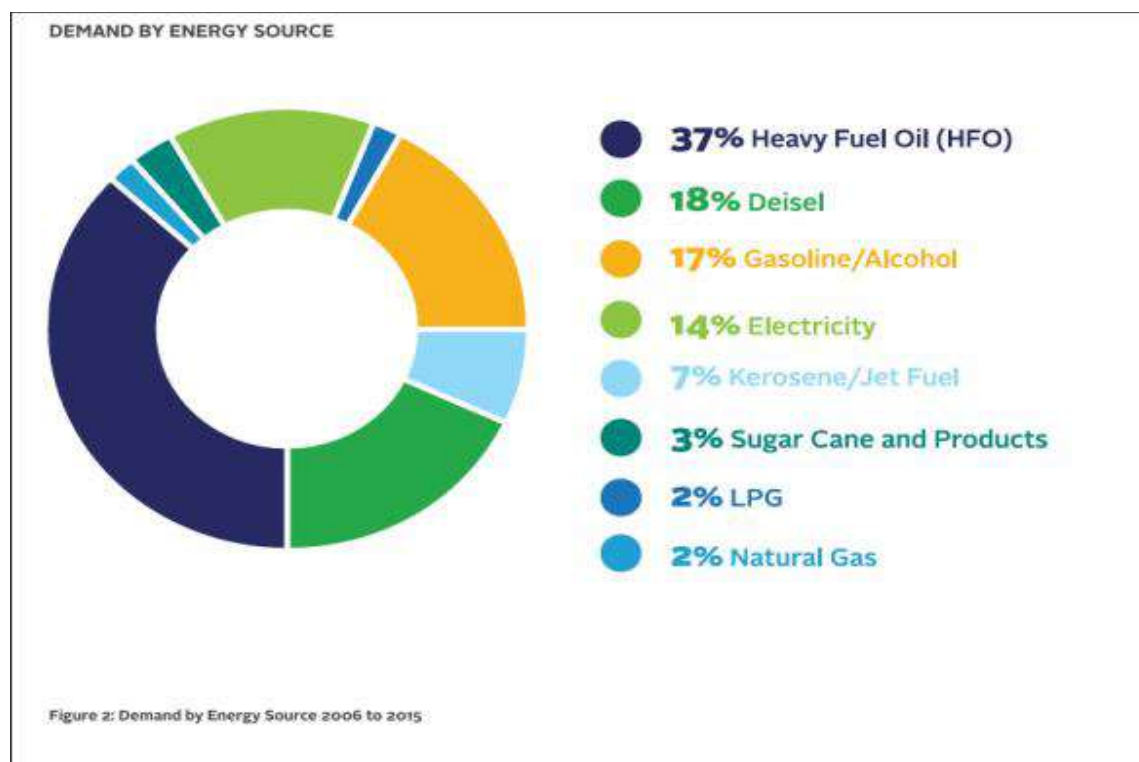


Figure 68: Demand by Energy Source 2006 to 2015

Energy demand by source between 2006 and 2015 is shown at Figure 68, and electricity sales by demand group at Figure 69.

Natural gas is not a significant contributor in the energy sector, adding only 2% to the energy mix. However, its widespread use in Barbados for (domestic) cooking, and various activities in the tourism and industrial sectors, has had a considerable social impact. The benefit of this fuel source is that it is less carbon intensive than other fossil fuels. However, it is still a fossil fuel, and its use without carbon capture and storage is unsustainable in the context of climate change. The use of solar water heaters for domestic water heating has also risen significantly since 1974. However, its effect on the overall energy mix is still under 1%.

Electricity consumption over the last ten years was distributed as follows: • Domestic – 33% • Commercial – 21% • Public – 16% • Tourism/Hotel – 15% • Industrial – 9% • Other – 6%

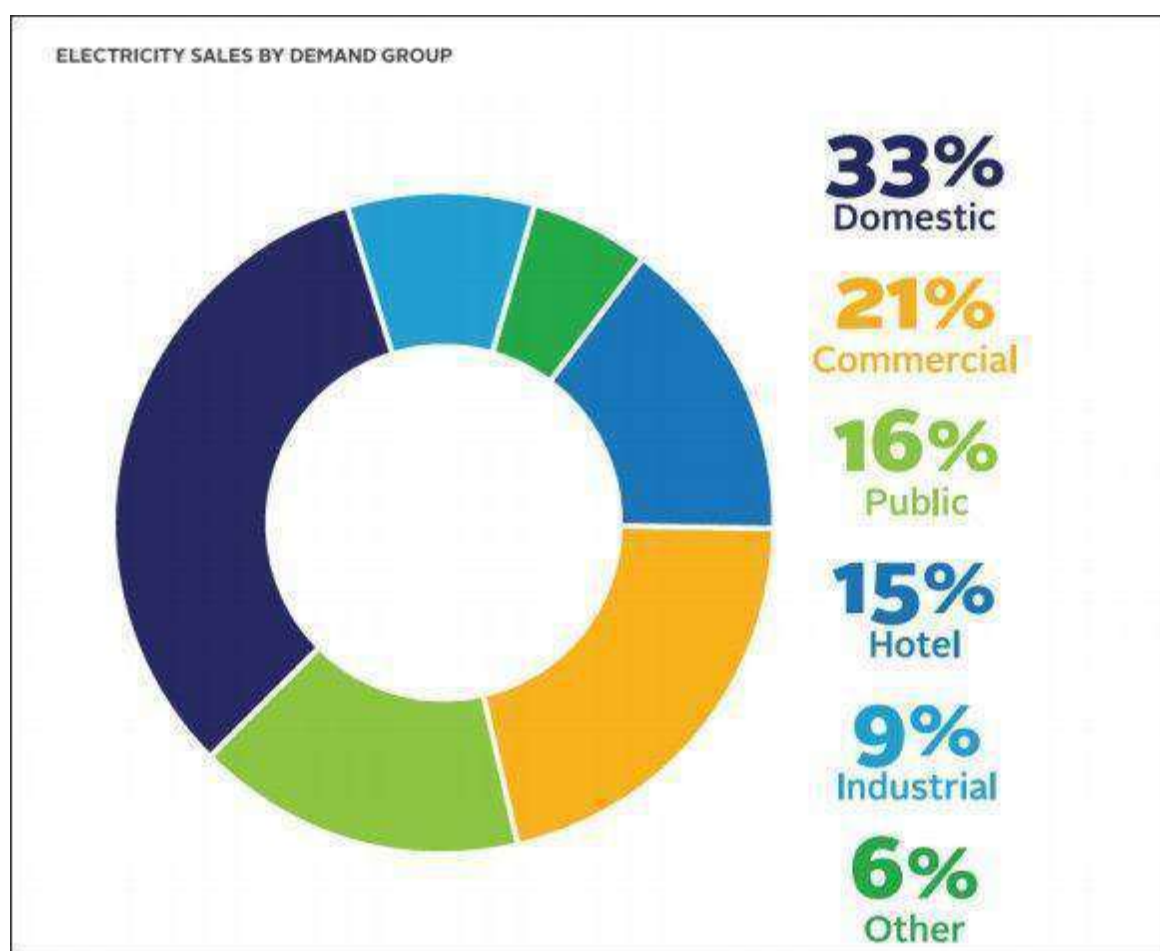


Figure 69: Electricity Sales by Demand Group

The average consumption for electricity in Barbados during the period under consideration is 926.8 MWh. Electricity is central to economic output in Barbados and brings significant value to the country from a social perspective. The social cost of the production of electricity was estimated to be \$0.06 for every dollar earned from the production and distribution of electricity, and the Barbados economy produced on average, BDS\$8.00 from every kWh produced and distributed.

The BNEP seeks to build on the value that the electricity sector brings to Barbados by introducing the appropriate energy sources and ensuring that the highest level of efficiency in electricity generation from these sources is achieved and maintained. This focus and the resulting activities will be important in improving the sustainability of the electricity supply. Additionally, the policy will attempt to provide a balance between the interests of society and those of the electricity producers. Barbados intends to steadily increase its share of renewable energy in the local market, widening the diversification of energy resources, promoting energy

security and eliminating the reliance on imported fossil fuels, which is now based on about 90% imported resources.

However, an analysis conducted by the MEWR suggests that this target could lead to high electricity prices if only solar PV installation is undertaken. There may be a more sustainable mix of renewable energy resources which will lead to a reduced long-term cost. Possible ways for achieving this target were identified as increased use of renewable energy technologies such as waste to energy, biomass, cogeneration, wind energy, solar photovoltaic and solar thermal. The Government has increased its efforts to achieve increased energy efficiency and sustainability by promoting energy efficient technologies and its vision of “green economics,” which provides incentives to the public to be energy efficient. Barriers to this sustainability effort have been identified as limited access to capital, lack of detailed regulations, limited access to technology and lack of grid connection rules. The BNEP further considers these issues as it seeks to provide strategies for overcoming some of the limitations to sustainable development in Barbados (Resources, 2019).

6.15.4. Transportation

Barbados’ public transport system is a hybrid of state and private operators, ensuring island-wide coverage. The Transport Board, established on August 24, 1955, by Act of Parliament under Governor Sir Robert Duncan Harris Arundell, KCMG, consolidated (took over) fragmented private concessionaire services. By September of that year, the Government had assumed control of 116 buses from eight concessionaires, forming the backbone of a new state-owned enterprise.

71 years later, the Transport department still continues to oversee a fleet of buses. In keeping with the country’s growth plan and sustainability agenda, amidst climate and energy nuances, the Country has transitioned its public transport fleet by procuring 300+ electronic buses. This move is set to help Barbados achieve its 2030 Vision, to eliminate diesel and gasoline in local transport. Centrally lowering operating costs, reducing emissions, and enhancing competitiveness. Plans are afoot to install electric vehicle charging ports across the country, as well as to train a cadre of technicals to support the sustainability of the electronic transport fleet.

The transport infrastructure includes three main terminals (Fairchild Street, Bridgetown; Princess Alice Highway, St. Michael; Speightstown, St. Peter), a central depot at Mangrove, St. Philip, a sub-terminal at Oistins, Christ Church, and headquarters at Roebuck Street, Bridgetown.

Private suppliers of transport operate licensed minibuses and taxis referred to as ZRs. They operate pre-determined routes under the transport Authority. It is important to note that all major roads are served by taxis, buses, minibuses, and ZRs. While many routes connect via Bridgetown’s central terminals, some Transport Board services run direct routes, reducing transfers.

6.16. Crime and Violence in Barbados

Barbados boasts a comparatively low violent crime rate when compared to other nations in the region. Most violent crime occurs between members of rival crime groups. Crimes of opportunity, such as petty larceny, burglary, automobile break-ins, as well as incidents of violent crime, such as murder, sexual assault, robbery, shootings, and drug-related crimes, do occasionally occur (OSAC, 2025).

Tourism is a major contributor to the Barbadian economy. The highest risk to foreign travelers is that of petty theft. Tourists are urged to exercise caution when travelling at night around Barbados, due to the prevalence of unmarked and unlit roads.

The United Nations Office on Drugs and Crime reports that violent crime, substance abuse, gender-based violence, firearm, and drug trafficking are significant concerns in Barbados. Porous borders and strategic geographical location pose challenges to law enforcement in combatting and intercepting the illegal trafficking of drugs and firearms, which fuel insecurity at the national level. Further, the UNODC identified several communities in hot spot areas in St. Michael and Christ Church, where crime, drugs, and violence were prevalent (UNODC, n.d.). Among the youth population, alcohol and marijuana consumed widely is believed to be a resultant factor in violence and suicide. Marijuana is reported to be quite accessible in the Barbadian society.

Human trafficking in Barbados remains present, though relatively limited in scale and scope – primarily involving sex and labor exploitation – with no major changes in its structure. Sex tourism continues, and migration for commercial sex has returned to pre-pandemic levels. Individuals from several Caribbean and South American countries – particularly undocumented migrants – are at heightened risk of labor exploitation. Traffickers increasingly operate independently, using social media and digital tools to recruit victims. Human smuggling is a related concern, although there is no clear evidence of market consolidation or recent incidents.

Economic conditions, meanwhile, attract irregular migrants who are at an increased risk of exploitation through practices such as document retention and movement restrictions. Moreover, while extortion and racketeering exist in Barbados, reported cases remain limited. Recent trends indicate that high-net-worth individuals are increasingly targeted by criminal groups for opportunistic gains.

The arms trafficking market in Barbados has shown little structural change in recent years. Most firearms originate from the US, and there is minimal evidence of alternative sources or trafficking routes. However, recent arrests involving seizures of both firearms and drugs suggest a potential convergence of these markets. While domestic production is negligible, improved law enforcement efforts appear to have disrupted access to illegal weapons, contributing to measurable reductions in violent firearm-related incidents.

The counterfeit goods trade is active in Barbados, with items such as luxury apparel and watches frequently sold through informal channels like street vendors, roadside stalls, and online platforms. While the market is limited in scale, enforcement of intellectual property rights remains weak. There is no evidence of an organized criminal market for excise goods.

The heroin trade remains fragmented, with no evidence of structured distribution networks or significant domestic consumption. Reports indicate that heroin use is minimal and primarily associated with transient populations, including tourists, rather than residents. In contrast, the cocaine trade is prevalent in Barbados. The country is a transit point, though not a major one, for regional cocaine trafficking. Recent cocaine seizures indicate a partially consolidated market, with trafficking, which has links to Venezuela, occurring primarily via boat.

Barbados is one of the Caribbean's principal locations for cannabis seizures. The Drug Abuse (Prevention and Control) (Amendment) Act 2019 removed possession of up to 14 grams from the ordinary criminal process, substituting a fixed penalty, and cultivation of up to four plants at a private residence for personal use is treated in the same way. Sale, trafficking and possession above the threshold remain criminal offences. The Medicinal Cannabis Industry Act 2019 established the Barbados Medicinal Cannabis Licensing Authority and a licensed medicinal industry, and the Sacramental Cannabis Act 2019 permits cultivation and use by certified members of the Rastafarian community for religious purposes. Reporting on the structure of the illicit market should be attributed to a named source.

Barbados hosts a significant gang presence, with groups such as Dawg Pound, Red Sea, and The Dungeon involved in a range of criminal activities, including drug and arms trafficking, robbery, and violence. While these gangs do not control territory, they operate under structured leadership, and there are concerns about their recruitment of vulnerable children. Efforts to address violence in the country include discussions among gangs aimed at establishing a truce and reducing violence, particularly gun-related incidents. These gangs also maintain connections with regional criminal networks, suggesting transnational influences in their operations. Less-structured criminal networks in Barbados are primarily engaged in the trafficking of firearms, drugs (notably cocaine and cannabis) and human trafficking. However, details about the groups involved – specifically in human trafficking – remain unclear. Ongoing cocaine trafficking suggests that the key players in the drug trade have remained largely consistent over time.

State-embedded actors remain a concern, though their influence appears limited rather than systemic. Reports suggest that low-level officials accept bribes to facilitate trafficking operations, and there are indications that certain politicians may be influenced by gang leaders. Recent incidents also highlight state actors' involvement in financial crimes. Similarly, foreign actors play a limited but notable role in Barbados's criminal markets, particularly human trafficking, arms smuggling and drug trafficking. For example, arms trafficking primarily involves US weapons, with US nationals profiting from the trade while laundering occurs abroad. Drug trafficking, especially of cocaine and cannabis, is largely controlled by foreign actors, with Venezuelan nationals implicated in shipments – often using vessels flagged from Venezuela. European nationals, including those from the UK and Norway, have been linked to smuggling operations connecting Latin America, the Caribbean and Spain, underscoring the transnational nature of these networks. With regard to private sector actors, there is little evidence of their involvement in organized crime, except for anecdotal and sporadic reports of money laundering.

Barbados is actively addressing organized crime, particularly human and drug trafficking, through both international cooperation and domestic efforts. The country has renewed its commitment to combat maritime trafficking and signed several key global agreements. Despite this progress, concerns remain over issues including gang violence and slow criminal prosecution times. In response, a new organized crime unit has been created, though it faces opposition.

Notably, the country has experienced a significant decline in homicides and violent incidents. However, challenges such as gun violence, with a surge in murders in 2024, persist. Political stability and governance indicators remain strong, but experts call for more comprehensive crime prevention strategies.

The current administration has made strides in curbing corruption, including by improving public procurement and strengthening anti-corruption measures. New legislation was enacted that requires cabinet members to declare their assets, addressing previous gaps in integrity laws. The government has focused on fiscal transparency and good governance; opposition personalities, however, highlight flaws in legislative and investigative processes.

While Barbados is a leader in the Caribbean for its anti-corruption efforts, concerns persist regarding issues including bribery, lack of transparency and growing public perception of corruption.

Barbados has strengthened its international cooperation efforts to combat organized crime, working closely with regional and global partners. The government has worked with organizations such as the EU and the International Organization for Migration to address transnational crime and corruption. Barbados participates in initiatives like the PACE Justice program, which is aimed at reducing criminal justice backlogs, and cooperates with the US and UK on asset forfeiture and strategic police assessments. The country has also

worked with the US and Trinidad and Tobago to combat arms and drug trafficking. In 2024, Barbados hosted a significant crime-fighting dialogue, further reinforcing its role in global policing efforts.

Domestically, Barbados has enacted several legislative measures to combat organized crime. These include a 2023 bill that addresses cybercrime and enhances international cooperation, and the Firearms Amendment Act, introduced in January 2023, which increased penalties for firearms offenses. In 2024, the government began advancing legislation to streamline maritime border procedures and prevent illegal entry using fraudulent documents. The Bail Bill 2024 seeks to limit bail access for individuals who have committed serious crimes. Cannabis possession was decriminalized in 2019. However, intellectual property enforcement remains an issue. Despite taking steps to revise its copyright laws, Barbados remains on the US Watch List.

Barbados' judicial system faces significant challenges, with slow and outdated procedures leading to lengthy prosecution times. Despite partnerships with the EU, the UN Development Programme, the US and the UK through the PACE Justice program, progress has been limited. Additionally, while the government has sought to address prison overcrowding and abuse, prison conditions remain poor. Analysts indicate that systemic deficiencies in both the judicial and prison systems continue to hinder the effectiveness of criminal justice reform.

The Barbados Police Service is a well-resourced agency that focuses on combating organized crime – particularly drug trafficking – and works closely with international and national partners, including the Barbados Coast Guard. The government created a Serious Organized Crime Unit to tackle gang violence and drug trafficking, though experts have raised concerns over its resource demands and potential for corruption. In response to rising crime in 2023, the government established new police outposts, which helped reduce criminal activity in certain areas. The PACE Justice program has supported law enforcement efforts. However, the increase in violent crime has raised concerns about the safety of probation officers and crime prevention challenges.

Barbados' main concerns with regard to border security are its ports and water routes, where illicit drug and human trafficking have occurred. The government maintains high security at ports but introduced the Facilitation of International Maritime Traffic Bill in 2024 to enhance port operations and combat trafficking. In response to increased gun smuggling, new surveillance measures were implemented at ports in 2024, focusing on improved technology to monitor firearm imports. Despite authorities successfully thwarting threats at Grantley Adams International Airport, some reports suggest vulnerabilities in both maritime and air routes. There is an emphasis on collaboration between law enforcement and the public to strengthen security (GOCI, 2025)

6.16.1. Gender-Based Violence

According to UN Women, Gender-based violence is a violation of human rights. It is an offence against human dignity and a manifestation of the historically unequal power relations between women and men. Women's human rights are protected by a legal framework which includes international and regional human rights instruments, statutes and constitutions. Article 1 of the Universal Declaration of Human Rights declares that all human beings are born free and equal in dignity and rights. Caribbean constitutions recognize and guard the equal and inalienable rights of all persons within the country's jurisdiction. Each person is secured with the right to life, liberty and security of the person and the right to protection of the law.

The Constitution holds the state accountable for violation of human rights. Each Caribbean State has a positive duty to take reasonable measures to protect women and girls from domestic violence and sexual violence. Barrow J in *Francois v Attorney-General of Saint Lucia* located this duty from the Bill of Rights of the

Constitution. To adequately safeguard the human rights of women and girls, each Caribbean country must respect the rule of law. The rule of law requires that the State has proper regard for gender equality and provides just and effective remedies for victims of gender-based violence. States should provide a fair and accessible legal system for victims of gender-based violence. The rule of law operates so that all persons are equal before the law. International and regional human rights recognize women's human rights and mandate State parties to act with due diligence in protecting women and girls from domestic violence and sexual violence. At the international and regional levels, there are specific instruments that deal with domestic violence and sexual violence. Barbados is a signatory to six of the eight conventions that exist to guarantee the human rights of women¹²⁰.

The World Bank Women, Business and the Law series measure the legal and institutional environment for women's economic participation. The 2026 edition, drawing on data to 2024, assesses ten topics across three pillars: the law as written, the supportive frameworks that give it effect, and expert opinion on how it operates in practice. Barbados scores 65.0 for legal frameworks, 25.8 for supportive frameworks and 75.0 for expert opinion, against global averages of 67, 47 and 53 respectively (World Bank, Women, Business and the Law 2026)¹²¹.

The pattern matters more than the headline. Barbados sits close to the global average on the law as written but at roughly half the global average on the systems that deliver it, and that is the widest of its three gaps. The 2022 edition of the same series, scored on a different eight-category basis, recorded full marks for workplace, marriage, assets and pension, weaker results for mobility, pay, parenthood and entrepreneurship, and an overall 80 out of 100. The two editions are not directly comparable and the 2026 result supersedes the earlier figure. For this project the finding reads as a caution rather than a reassurance: compliance with the letter of Barbadian employment and anti-harassment law is not by itself evidence that those protections will operate in practice, and the controls set out in the Environmental and Social Management Plan carry the weight accordingly¹²².

Despite challenges, women in Barbados have made significant strides in a number of areas. Women now outnumber men in tertiary education, and there is a growing awareness of the importance of gender equality in the country, and governmental leaders, through the Bureau of Gender affairs, are working to develop a National Plan of Action to address gender equality and the elimination of gender-based violence.¹²³

6.17. Gender Baseline

Gender Equality is a human rights principle which asserts non-discrimination, implicit or explicit, against, or in favor of only one sex. Countries that are signatories to the United Nations are expected to uphold the principle of gender equality as enshrined in the Universal Declaration of Human Rights. Barbados was admitted to membership in the United Nations by resolution A/RES/2175(XVI) of December 9, 1966.

¹²⁰ Un Women. (n.d.). GBV and State Accountability. Accessed at <https://caribbean.unwomen.org/en/caribbean-gender-portal/caribbean-gbv-law-portal/gbv-and-state-accountability>

¹²¹ World Bank. (2022). Women, Business, and The Law: Barbados. Accessed at <https://wbl.worldbank.org/content/dam/documents/wbl/2022/snapshots/Barbados.pdf>

¹²² UN Women. (n.d.) Barbados. Accessed at <https://data.unwomen.org/country/barbados>

¹²³ The Borgen Project. (2023). Women's Rights in Barbados. Accessed at <https://borgenproject.org/womens-rights-in-barbados/>

Upon accepting Barbados' membership to the UN Prime Minister Errol Barrow declared: Barbados accepts the obligations contained in the Charter of the United Nations and solemnly undertakes to fulfil them¹²⁴.

At the UN, Barbados has focused on major international issues and on areas of importance to its national economic development, to the establishment and maintenance of a just society, and to the development of an economic system that is equitably administered and enjoyed. Barbados' priorities at the UN include but are not limited to sustainable development; climate resilience; environment; renewable energy; disaster management; poverty eradication; promotion and protection of human rights; elimination of all forms of discrimination; Law of the Sea; oceans governance; financing for development; social development, education and health; equality and gender issues; multidimensional security and legal issues. Through Barbados' strong representation the Caribbean has been demonstrated strength in climate change mitigation strategy and development action planning.

At the 67th Meeting of the Committee on the Elimination of Discrimination Against Women, the delegation of Barbados to the Session was led by the Hon. Steven Blackett, then Minister of Social Care, Constituency Empowerment and Community Development. Barbados was commended for a number of legislative reforms undertaken in support of women's rights as well as the strengthening of related policy frameworks.

Issues of concern for the Committee during Barbados' review included weaknesses and gaps in Constitutional provisions against discrimination on the basis of sex, economic and labor disparities around women's high unemployment and the increasing gender pay gap¹²⁵ and challenges faced by Barbadian women in access to justice, and the potential risks posed by both new fiscal austerity measures and Barbados' status as an International Financial Centre, to reducing social protection for women, both nationally and internationally¹²⁶.

The government's response has been both comprehensive and multifaceted, national efforts have included a combination of legal and policy measures, social development programs, and community outreach initiatives; includes updates to the Employment (Prevention of Discrimination) Act. The Government, through the Bureau of Gender Affairs, aims to strengthen its response through additional initiatives, including a plan to develop a National Plan of Action. Some plans to align Barbados on this strategic direction are expected to commence this year, (LaToya Archer, First Secretary of the Permanent Mission of Barbados to the United Nations, March 2026)¹²⁷. The role of this national gender machinery is to ensure the integration of gender in all national development plans and policies, to achieve gender equity and equality.

Current policy instruments guiding the administration of gender equality include the National Strategic Plan of Barbados 2005 – 2025 (2005). Among its objectives, the Plan aims to incorporate gender and development into all areas of national development plans and policies so that women and men can benefit equally from existing opportunities¹²⁸. These plans are supported by enabling legal instruments in the form of complementary legislation¹²⁹.

¹²⁴ UN. (1966). Declaration of acceptance of the obligations contained in the Charter of the United Nations. Accessed at [https://treaties.un.org/doc/Publication/UNTS/Volume 581/volume-581-I-8437-English.pdf](https://treaties.un.org/doc/Publication/UNTS/Volume%20581/volume-581-I-8437-English.pdf)

¹²⁵ OHCHR. (2017). CEDAW – 67 session. Accessed at https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/SessionDetails1.aspx?SessionID=1078&Lang=en

¹²⁶ The Government of The Bahamas, Ministry of Foreign Affairs. (2017). 67th Session of the Committee on the Elimination of Discrimination Against Women. Accessed at <https://mofa.gov.bs/67th-session-committee-elimination-discrimination-women>

¹²⁷ Ministry of Foreign Affairs and Foreign Trade. (2026). Barbados Remains Committed to Eradicating Violence Against Women & Girls. Accessed at <https://www.foreign.gov.bb/barbados-remains-committed-to-eradicating-violence-against-women-girls/>

¹²⁸ IDB. (n.d.). Legal Framework and Institutional mechanisms. Accessed at <https://generoeninfraestructura.iadb.org/en/country/barbados>

¹²⁹ IDB. (n.d.). Legal Framework and Institutional mechanisms. Accessed at <https://generoeninfraestructura.iadb.org/en/country/barbados>

Although Barbados compares favorably with other countries in the region on many gender equality measures, women continue to experience some labor market and employment challenges. In 2023, women’s labor force participation rate was 58.1 per cent, compared to 67.0 per cent among men. Women are also more likely to experience long-term unemployment, indicating that many women face persistent challenges in securing employment. Women are also disproportionately concentrated in sectors and occupations that are often characterized by low pay and poor working conditions, including in hospitality, retail, and the care economy. Women’s disproportionate share of unpaid care work remains a principal barrier to increased participation in employment. Recent estimates suggest that Barbados could increase the female employment rate by around 10 percentage points over the next 10 years through targeted investment in care policies. Finally, constituents acknowledge that discrimination on the basis of sex and gender, including sex-based violence and harassment in the world of work, are additional factors contributing to gender-based labor market inequalities.

6.17.1. Political participation and Decision-Making

Today, women in Barbados enjoy legal protections against domestic violence and discrimination and have made significant gains in areas such as education and political representation. One major milestone in the history of women’s rights in Barbados was the [granting of suffrage to women in 1950](#). Since then, women have been able to participate in elections and hold political office, including the position of Prime Minister. Mia Mottley has held the position of Prime Minister in Barbados since 2018 to present and was [the first woman](#) to hold the title. However, women still face underrepresentation in political and economic leadership positions, and gender-based violence remains a persistent issue in the country.

Barbados also performs strongly on the composite measures. In the World Economic Forum Global Gender Gap Report 2025, Barbados ranks 15th of 148 economies with a score of 0.786, and scores 84.8 per cent on the economic participation and opportunity subindex, having reached parity in the share of legislators, senior officials and managers. That standing sits uneasily beside the labor market and violence data set out below, and the two should be read together rather than in isolation: the composite indices measure the gap between women and men, not the absolute position of either.

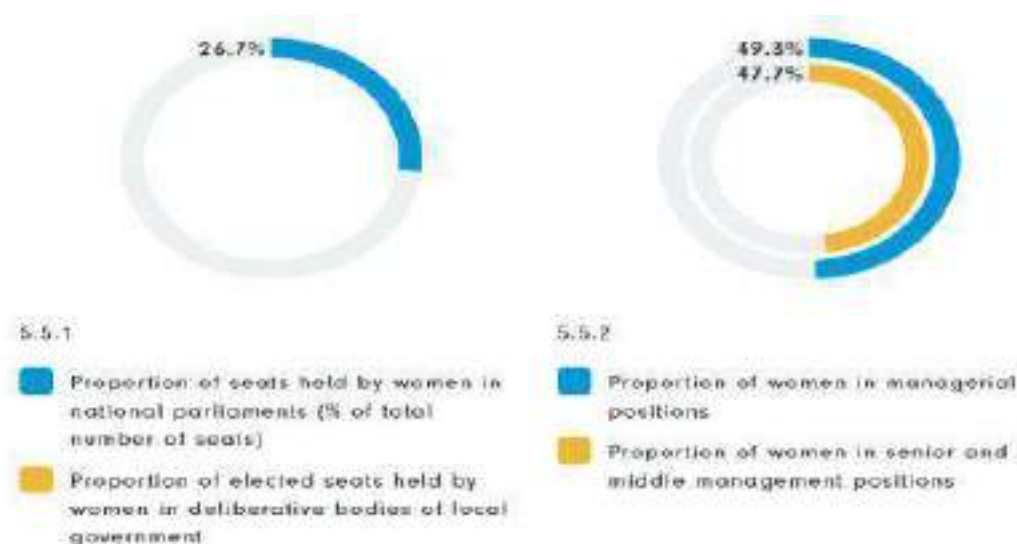


Figure 70: Women's Participation in Barbados Society

Women's participation across Barbadian society is shown at Figure 70.

6.17.2. Labour force Participation

According to the International Labour Organization report, Although Barbados compares favorably with other countries in the region on many gender equality measures, women continue to experience some labor market and employment challenges.

In 2023, women's labor force participation rate was 58.1%, compared to 67.0% among men. Women are also more likely to experience long-term unemployment, indicating that many women face persistent challenges in securing employment. Women are also disproportionately concentrated in sectors and occupations that are often characterized by low pay and poor working conditions, including in hospitality, retail, and the care economy. Women's disproportionate share of unpaid care work remains a principal barrier to increased participation in employment. Recent estimates suggest that Barbados could increase the female employment rate by around 10 percentage points over the next 10 years through targeted investment in care policies. Finally, constituents acknowledge that discrimination on the basis of sex and gender, including sex-based violence and harassment in the world of work, are additional factors contributing to gender-based labor market inequalities.

Women are generally overrepresented in education services, hospitality, and the care economy (including health, social work, and domestic work), while men predominate in sectors such as construction, manufacturing, and agriculture. These patterns of gender-based occupational segregation have implications for addressing prevalent labor market inequalities, with women disproportionately concentrated in several low-paying sectors (food and accommodation services, domestic work, social work, education, health) and underrepresented in some key emerging sectors with strong growth potential (such as energy, construction, and manufacturing). There are also notable patterns of vertical segregation, with one recent survey finding that almost three-quarters (73%) of private sector enterprises had a senior management team comprising only of men.

Gender-based segregation in Technical Vocational Education and Training (TVET) programs may limit women's access to high-growth sectors such as renewable energy and technology.

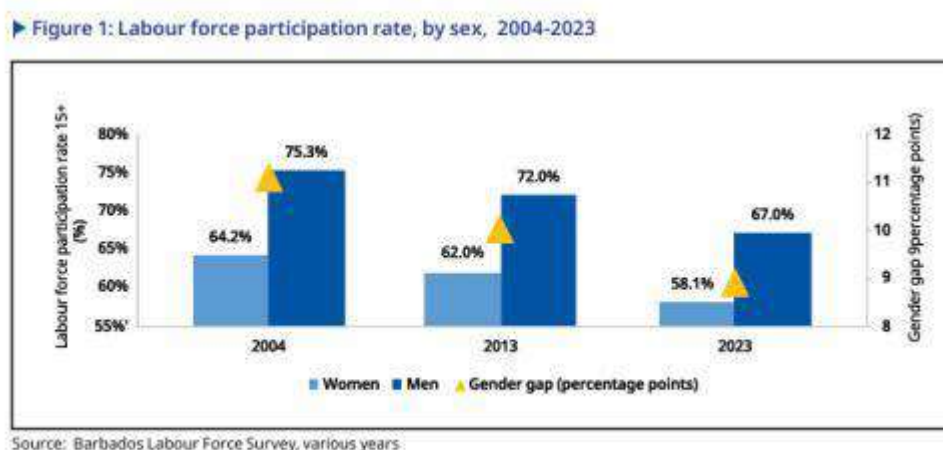
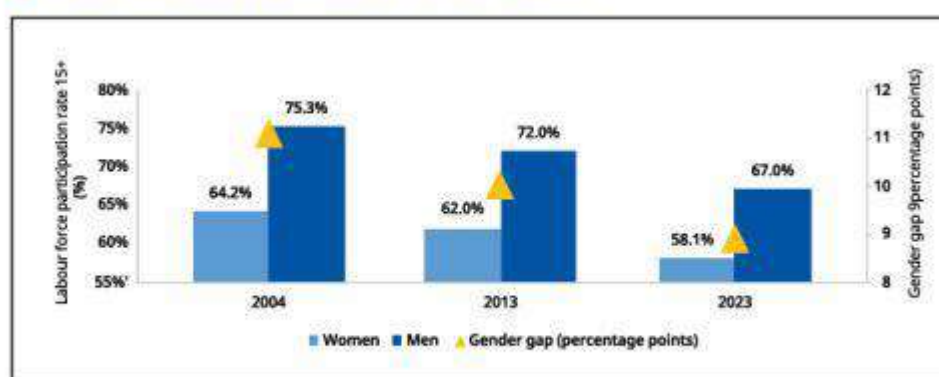


Figure 71: Labour force participation rate by sex.

The labor force participation rate from 2004 to 2024 is shown at Figure 71.

► Figure 1: Labour force participation rate, by sex, 2004-2023



Source: Barbados Labour Force Survey, various years

Figure 72: Trend analysis of Labour Force Participation Rate 2004-2024

6.17.3. Sexual and Gender-Based Violence

Caribbean scholars argue that remnants of colonialism in Barbados and the Commonwealth Caribbean are responsible for women and girls' high and escalating rates of violence, including physical and sexual violence¹³⁰. Cultural norms in the plantocratic, patriarchal culture are reasoned to be an enabler of sexual and gender-based violence against women and girls in Barbados. Sexual and Gender-Based Violence scholars opine that the state is a purveyor of violence against women as well¹³¹. Many of the historical, resource, and cultural issues in Barbados are replicated to varying degrees across the Commonwealth Caribbean, where healthcare responses are perpetuating harm among some of the most vulnerable women and girls. Many of the historical, resource, and cultural issues in Barbados are replicated to varying degrees across the Commonwealth Caribbean, where healthcare responses are perpetuating harm among some of the most vulnerable women and girls.

Despite Barbados being a signatory to a range of global health initiatives, including the most recent, PAHO/WHO Multi-Country Cooperation Strategy (MCCS) 2026–2031 in 2025, to improve healthcare responses to gender-based violence, women and girls cannot depend on healthcare services that support them¹³². Unlike other Caribbean neighbors like Trinidad and Tobago, Barbados does not have a formalized national plan to inform prevention and intervention measures. An example of the complex role of violence in Barbadian society is the investment of Barbadian heterosexual men in upholding rigid, traditional gender norms due to the power and privilege they provide – power not easily available in aspects of the society such as the economic sphere. Unlike other Caribbean neighbors like Trinidad and Tobago, Barbados does not have a formalized national plan to inform prevention and intervention measures. An example of the complex role of violence in Barbadian society is the investment of Barbadian heterosexual men in upholding rigid, traditional gender norms due to the power and privilege they provide – power not easily available in aspects of the society such as the economic sphere.

¹³⁰ Halimah A. F. DeShong, "Gendered Violence and Gender as a Site of Violence: Reflections from the Caribbean.

¹³¹ Ibid

¹³² PAHO. 2025. PAHO/WHO and Barbados and Eastern Caribbean Countries sign multi-country cooperation strategy 2026-2031 to advance health and resilience. Accessed at <https://www.paho.org/en/news/29-9-2025-pahowho-and-barbados-and-eastern-caribbean-countries-sign-multi-country-cooperation>

According to historian Beckles¹⁹⁹⁵, as cited in Myrie & Lord (2024), plantation societies are built on both racial and gendered oppression. While the Commonwealth Caribbean independence projects sought to dismantle the racial oppression within the class hierarchy of plantation society, the gendered oppression was maintained for its value to men, the group disproportionately responsible for crafting the national agendas in the independence movement. There is a reproduction of harmful colonial relics, including traditional gender norms, ableism, and a hierarchy of race/class relations in Barbados and the broader Commonwealth Caribbean (Myrie & Lorde, 2024).

Population-based studies demonstrate the rates of violence against women in Barbados and the Commonwealth Caribbean are similar to the trends of gender-based violence across the world (Bott et al.,^{2012;2019}; Le Franc et al.,²⁰⁰⁸, as cited in Myrie & Lord, 2024). According to a landmark national survey that campaigners say exposes the hidden scale of gender-based abuse and the urgent need for coordinated national action.

The National Intimate Partner Violence survey revealed that 62% of women have experienced at least one form of intimate partner violence — a figure officials and advocates on gender-based violence said is likely an underestimation, given how many survivors still hesitate to disclose abuse.

The survey, funded by the European Union, commissioned by Jabez House and led by DB Research Services, interviewed 515 individuals of different ages, genders, income levels, and nationalities.

Emotional abuse emerged as the most prevalent form at 37%, followed closely by social isolation and physical violence at 25% and 22%, respectively. One of the most significant findings, however, showed that 46% of respondents reported facing more than one category of abuse, suggesting that “violence often occurs as a pattern of behaviors rather than in isolation.” (Today, 2025)

In 2025, Barbados began working towards developing a Roadmap for a National Domestic Violence Action Plan, which will strengthen its domestic violence response framework. To this end, a National Consultation on Domestic Violence was held in March 2025 to advance a coordinated, multi-sectoral response to domestic violence. Consultations brought together policymakers, law enforcement, civil society representatives, service providers, and international partners to assess the current landscape, address critical gaps, and chart a path forward to develop the actionable roadmap. The Roadmap for a National Domestic Violence Action Plan will be structured around legislation, policy, social norms, prevention, essential services, data, and collaboration (Austin, 2025)

The work has since moved to the regional level. In October 2025 the Government of Barbados convened the first regional symposium on domestic violence in more than a decade, supported by the Inter-American Development Bank and the Caribbean Development Bank and bringing together Attorneys General, ministers, heads of bureaus of gender affairs, judicial leaders and law enforcement from eighteen Caribbean countries, with UN Women and UNFPA. The Government, through the Bureau of Gender Affairs, is working with UN Women and the Institute for Gender and Development Studies towards a comprehensive national policy on gender, and has signaled its intention to commission a national study on the prevalence of gender-based violence. No such national prevalence study had been published at the time of writing, which is why the Jabez House survey below remains the most substantial Barbadian evidence available.

Despite notable efforts by authorities, service providers, and academia to record and track the incidence of gender-based violence (GBV) in the Caribbean, the lack of comprehensive, systematic, nationally-owned data remains a serious bottleneck in responding to and preventing GBV, including its most prevalent form – that of violence against women (CARICOM, 2014)

“As a community, we continue to proactively address persistent inequalities in political representation, the development of policies to decrease the burden of unpaid care, and the unique challenges faced by women in marginalized communities, including indigenous women, rural women and those living with disabilities. The intersectionality of gender and other forms of inequality must guide our actions, ensuring that no woman is left behind. Notwithstanding the challenges, our women continue to make us proud. We celebrate the indomitable spirit, sterling accomplishments and remarkable contributions of our women and girls as they enrich our communities both in the Region and in the diaspora” (Dr Carla Barnett – Caricom Secretary- General, 2025) (Secretariat, 2025).

6.18. Legal Framework

The Legislative framework for Gendered Equality is undergirded by three layers of responsibility/ obligations Local legislature, international policies to which Barbados is a signatory and the projects Environmental and Social Policy Framework- ESPF 9: Gender Equality.

6.18.1. Local legislation

Constitution of Barbados Article 11

Whereas every person in Barbados is entitled to the fundamental rights and freedoms of the individual, that is to say, the right, whatever his race, place of origin, political opinions, color, creed or sex, but subject to respect for the rights and freedoms of others and for the public interest.

Labour Laws Chapter 346, L.R.O 1979

An act to repeal the employment of women, young persons, and Children Act and make provisions relating to the employment of persons generally including young persons and children.

Chapter 345A Employment of Women (Maternity Leave)

An act to provide for the grant of maternity leave to female employees and for the protection of the employment of those employees during such leave.

Section 3, subsection (1) (2) (3) (4) stipulates the entitlement of maternity leave to women, granted that Section 4 subsection (1)- (3) duration of maternity leave; Section 6 addresses the protection of employment. (Chapter 345A, Employment of Women: Maternity Leave).

Chapter 154 sexual offence

An act to revise and reform the law relating to sexual crimes. Part I of the Act sets out the various sexual offences. In particular Section (3), subsection (1) sets the offence of rape. Subsection (4) sets out the offences regarding persons under 14 years of age.

Subsection (5) sets out offences committed on persons between the ages of 14 and 16. Subsection (6) set out the offence of incest; subsection (9) set out the offence of buggery; subsection (10) set out the offence of bestiality, while subsection (11) set out the offence of indecent assault; subsection (12) out the offence of serious indecency; and Subsections (13) (14) sets out the offence of procuration of minors for the purpose of committing a sexual act. Subsection (15) sets out the offence of detention of a person against their will. (Chapter 154 Sexual Offences Act)

Employment sexual harassment (Prevention) act, 2017-21

This act is utilized to make provision for the protection of employees from sexual harassment in the workplace. It also prohibits discrimination of employees as it relates to recruitment, retention and promotions, whether based on sex, age or any other related factors.

Section 3 delineates the meaning of sexual harassment, Section 4 mandates employees to develop and post sexual harassment policies in the workplace, the clauses of the policies, and penalties for non-adherence to the Act. (Employment Sexual Harassment (Prevention) Act, 2017- 21), Barbados Employment (Prevention of Discrimination) Act, 2020-26)

This Act is functionally integrated into this document and addressed in the Social Impact Analysis, in the Social Impacts Chapter, and in the subsections. Featured in that section includes topics such as unfair treatment and discrimination of workers, discrimination in hiring, physical, psychological, or sexual harassment of project workers and community members: Sexual and Gender Based Violence, Adverse Social and Community Wellbeing, Health risks to the community: Inflationary pressure, Disruption to Daily Activities, Increased pressure on utilities and beneficial services, Job Creation. Additionally, information about this act is also featured in the gender monitoring matrix, where one of the KPIs is monitoring the number of men and women hired and the roles of women employed in technical, non-technical, and decision-making roles. However, for added project context, it should be mentioned that the Contractor will not directly employ female personnel. However, female workers will be available through the proposed local subcontractors and that female hiring will be promoted amongst the local subcontractors through the local content provisions of the labor management plan.

Opportunities for the employment of women arise through the subcontracted workforce as well as through direct hire. The Labour Management Plan records that local personnel are engaged across material supply, landscaping, road works, laboratory testing, geotechnical investigation, utility connection, customs brokerage and professional services, and these functions are contracted rather than staffed directly by the Contractor. Subcontractors are bound by the Workers' Code of Conduct and by the non-discrimination requirements of the Employment (Prevention of Discrimination) Act, 2020, and the Contractor is able to set gender provisions in subcontract terms. Reporting of workforce numbers to the Project Execution Unit is disaggregated by sex for both directly employed and subcontracted personnel, so that the effect of this route can be measured.

Employment (Prevention of Discrimination) Act, 2020-26

An Act to protect persons from discrimination related to employment, as well as Domestic Violence (1993). An Act to provide for the granting of protection orders in circumstances surrounding domestic violence and for related matters¹³³.

6.18.2. International Instruments

Barbados has signed, adopted, and/ or ratified a number of international Instruments/ policies; by these undertakings, the country is obligated to take action as necessary.

Convention on the elimination of all forms of discrimination against women (CEDAW)

The convention contains thirty (30) articles which espouse to eradicate discrimination of women and foster an environment where the economic, social, cultural, political, civil, or other rights and needs can be achieved. The Convention supports the structural development of legislation and policies to advance the enjoyment of

¹³³ Ibid

females in their respective societies. It provides a blueprint for national governments to ascribe to, to end such discrimination against women.

CEDAW is further elaborated through its General Recommendations, which address specific issues affecting women and girls. Two are directly relevant to this project: General Recommendation 37 on the gender-related dimensions of disaster risk reduction in the context of climate change, which bears on a project justified on climate resilience grounds, and General Recommendation 38 on trafficking in women and girls in the context of global migration, which bears on the management of a non-local workforce.

Beijing platform for action

The 1995 Beijing Platform for Action was crafted as a guide in response to global struggle against constraints and obstacles to the empowerment of women around the world. The Platform for Action contains 12 critical areas of concern namely: poverty; education and training; health; violence; armed conflict; economy; power and decision-making; institutional mechanisms; human rights; media; environment; and the girl child. For each critical area of concern, strategic objectives are identified, as well as a detailed catalogue of related actions to be taken by Governments and other stakeholders at the national, regional, and international level. The table below lists the policies that Barbados is obligated to act upon and the relevant country response.

The international instruments relevant to gender equality, and Barbados' response to each, are listed in Table 98.

Table 98: International Legal Instruments

Instrument	Purpose	Status	Country Response
Committee on the Elimination of Discrimination Against Women CEDAW (1980)	A landmark international treaty adopted by the UN in 1979. Often described as the "international bill of rights for women," it establishes legally binding standards to eliminate gender discrimination and ensure equal rights in political, economic, and social life.	Ratified 24 July 1980	
Violence Against Women (Belem do Para):	The Belém do Pará Convention is the landmark 1994 international treaty adopted in Brazil that establishes women's right to a life free from violence. It legally binds member states to criminalize and eliminate all forms of gender-based physical, sexual, and psychological harm in both public and private spheres.	Adopted on May 16, 1995	Enactment of the Domestic Violence Protections Order

Instrument	Purpose	Status	Country Response
ILO Convention C190	The first international treaty recognizing the right of everyone to a world of work free from violence and harassment, including gender-based violence. It mandates that governments, employers, and workers implement comprehensive, inclusive policies to prevent, address, and eliminate workplace abuse.	Adopted 01 September 2022	Enactment of Employment (Prevention of Discrimination) Act
ILO C111: Discrimination (Employment and Occupation) Convention, 1958:	Mandates Members to pursue national policies designed to promote, by methods appropriate to national conditions and practice, equality of opportunity and treatment in respect of employment and occupation, with a view to eliminating any discrimination in respect thereof.	Adopted 14 October 1974	
Beijing Platform for Action	Comprehensive blueprint and roadmap for advancing women's rights, gender equality, and the empowerment of women and girls globally to achieve gender equality across all spheres of life, the Platform outlines strategic objectives and concrete actions across 12 critical areas of concern.	Signed and adopted on platform in September 1995	

IDB environmental and social performance standard 9: gender equality

This ESPF recognizes that gender equality has intrinsic value. Gender equality is not only a matter of justice and human rights, but also a driver of sustainable development. There is overwhelming evidence that integrating gender equality in development projects contributes to their successful design, implementation, effectiveness, and environmental and social sustainability.

Therefore, the project is obliged 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.

- establish actions to prevent or mitigate risks and impacts due to gender throughout the project cycle.
- achieve inclusion in project-derived benefits of people of all genders, sexual orientations, and gender identities.
- prevent SGBV, including sexual harassment, exploitation and abuse, and when incidents of SGBV occur, to respond promptly.
- promote safe and equitable participation in consultation and stakeholder engagement processes regardless of gender, sexual orientation, and/or gender identity.
- meet the requirements of applicable national legislation and international commitments relating to gender equality, including actions to mitigate and prevent gender-related impacts¹³⁴.

¹³⁴ Publication of the Inter-American Development Bank, September 2021

Table 99 maps each applicable piece of national legislation to the IDB Performance Standard it activates and to the unit responsible for demonstrating compliance.

Table 99: National Legislation and applicable ESPS

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Constitution of Barbados	Chapter III of the Constitution of Barbados outlines and protects the fundamental rights and freedoms of citizens of Barbados. Sections 11 through 26 guarantee these rights to every person in Barbados Barbados' Constitution secures core fundamental rights, guaranteeing equality and dignity under the law. It protects the right to life, personal liberty, and freedom from slavery, inhuman treatment, and arbitrary search. Citizens are assured property rights, fair trial guarantees, and freedoms of conscience, expression, assembly, and movement. Together, these provisions form the backbone of a democratic society, affirming justice, security, and equality for all. <i>(Constitution of Barbados)</i>	ESPS 1: Assessment and Management of Social Risks and Impacts ESPS 2: Labor and Working Conditions ESPS 4: Community Health, Safety and Security (ESPS) Gender Equality	-Social Department -Social Management Plan, -Employee Code of Conduct, -Environmental Management Plan -Labour Influx Plan -Employee Contract
Chapter 345A: Employment of Women (Maternity Leave)	An act to provide for the grant of maternity leave to female employees and for the protection of the employment of those employees during such leave. Section 3, subsection (1) (2) (3) (4) stipulates the entitlement of maternity leave to women, granted that Section 4 subsection (1)- (3) duration of maternity leave; Section 6 addresses the protection of employment. <i>(Chapter 345A, Employment of Women: Maternity Leave)</i>	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site) ESPS 9: Gender Equality	-Human Resource Department -Employment Contract -Sexual Harassment Policy -Workers' Code of Conduct

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Chapter 348: Holidays with Pay Act	An Act to make provision for holidays with pay for employees. section 3, subsection (a) (B). Section 4 and subsection 4 (5) (6) stipulate the holiday entitlement for employees working with a company upon being employed for a period of one year. <i>(Chapter 348: Holidays with Pay Act)</i>	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Employment Contract
Chapter 349: Labour Clauses (Public Contracts)	An act to carry out the convention relating to labor clauses in public contracts. The act sets out the conditions for the publication of notices of working conditions, contracts of employment, payment of wages, execution of duties, limits of contractors, and subcontractors. The Schedule sets out the conditions under which the contractor shall operate concerning the treatment of public contracts and workers employed under said contracts. <i>(Chapter 349: Labour Clauses (Public Contracts))</i>	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Procurement Department -Employment Contract -Supplier/Procurement Contracts
Chapter 351: Protection of Wages Act	An act to make provision for the protection of the wages of workers. Section 3 Subsection (1) stipulates that all wages shall be made payable in legal tender and not otherwise; any contract in whole or in part paid by any other means shall be deemed to be illegal, null, and void. Notwithstanding subsection (1), the wages of workers may by consent, be paid via cheque, postal order, or money order. <i>(Chapter 351: Protection of Wages Act)</i>	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Employment Contract -Health and Safety Management Plan -Social Management Plan

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Chapter 352: Public Holidays	An Act to amend and consolidate the Acts relating to bank holidays and public holidays. Subsection (2) makes provisions for the Governor-General by order to a) appoint any other day in any year to be a public holiday in Barbados; b) if it appears to him to be inexpedient in any year that a day specified in the First Schedule should be a public holiday, declare that such day shall not be a public holiday in that year and in lieu thereof appoint such other day in that year as appears to him to be expedient to be a public holiday; or c) amend the First Schedule by adding thereto or deleting therefrom any day. The First Schedule stipulates the days that shall be considered as public holidays. <i>(Chapter 352: Public Holidays Act)</i>	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resources Department -Employment Contract
Chapter 356: Safety and Health at Work	An Act to make provision (a) for securing the health, safety and welfare of persons at work; (b) for protecting other persons against risks to health and safety in connection with the activities of persons at work; (c) for controlling certain emissions into the environment; (d) to consolidate the law relating to health, safety and welfare in the workplace; and (e) for related matters. <i>(Chapter 356 Safety and Health at Work)</i>	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Health and Safety Officer/ Department -Health and Safety Management Plan -Environmental Management Plan

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Chapter 154: Sexual Offence	An act to revise and reform the law relating to sexual crimes Part I of the Act sets out the various sexual offences. In particular, Section (3), subsection (1) sets the offence of rape. Subsection (4) sets out the offences regarding persons under 14 years of age. Subsection (5) sets out offences committed on persons between the ages of 14 and 16. Subsection (6) set out the offence of incest; subsection (9) set out the offence of buggery; subsection (10) set out the offence of bestiality, while subsection (11) set out the offence of indecent assault; subsection (12) out the offence of serious indecency; and Subsections (13) (14) sets out the offence of procurement of minors for the purpose of committing a sexual act. Subsection (15) sets out the offence of detention of a person against their will. <i>(Chapter 154 Sexual Offences Act)</i>	ESPS 9: Gender Equality	Human Resource Department Employment Contract Sexual Harassment Plan/ Policy Sexual and Gender-Based Violence Policy Workers' Code of Conduct Grievance Redress Mechanism
Chapter 361: Trade Unions	Subsection (39) sets out the rights of workers to congregate for peaceful protests and against malfeasance, while subsection (40) sets out the offence against anyone who seeks to coerce or intimidate another against exercising their right to participate in trade union activities. Subsection (40A) (a)(b)(c)(d) (e) sets out the offence of prejudicing workers who participate in union activities. <i>(Chapter 361: Trade Unions)</i>	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Employment Contract -Workers Rights Policy -Trade Union/ Collective Bargaining Agreement

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
National Employment Policy of Barbados, 2014	Local Policy designed to ensure that workers in Barbados have access to full, productive, and freely chosen employment.	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Employment Contract -Workers' Rights Policy -Trade Union/Collective Bargaining Agreement

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Planning And Development (Environmental Impact Assessment) Regulations, 2021	Public participation in the environmental impact assessment process ensures that communities are informed and consulted on proposed developments. Applicants must provide opportunities for affected persons to meet with assessors, share concerns, and have those concerns recorded in the environmental impact statement. The statement must include a description of the project, the affected environment, practical alternatives, potential impacts (direct, indirect, cumulative, short-and long-term), mitigation measures, knowledge gaps, possible cross-border effects, and a non-technical summary. Impacts should be assessed with detail proportionate to their significance. Once completed, the statement is submitted to the Director with proof of fee payment, within three years of the initial notice, or the application may be canceled. This framework embeds transparency, accountability, and community involvement into environmental governance.	ESPS 1-10	-Social Department - Administrative Department - Project Execution Department -Social Management Plan -Environmental Management Plan -Stakeholder Engagement Plan -Grievance Mechanism -Engineering/ Architectural Renderings -Labour Management Plan -Waste Management Plan -Traffic Management Plan

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Employment (Miscellaneous Provisions) Act, 2005	An Act to repeal the Employment of Women, Young Persons and Children Act and make new provision relating to the employment of persons generally, including young persons and children.	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Employment Contract -Workers Rights Policy -Trade Union/Collective Bargaining Agreement
Minimum Wage Act 2017	This act sets out the minimum wage that an employer shall pay to an employee in Barbados. Section 6 subsection 1 (a) (b) provides power to the minister to prescribe a national minimum wage and specify the minimum terms and conditions of service in respect of all employees. Subsection 2 sets forth the powers of the Minister to make, amend, or revoke any order made under subsection (1). Subsection 3 and Section 8 stipulate that the minimum wage paid to employees shall not be less than the national minimum wage. Further, Section (8) stipulates that employers retain any additional payment incentives, these payments in addition to the minimum wage. Section (9) mandates that employers keep records of minimum wage payments. Subsection (10) sets out the duty of employers to inform employees of the existing minimum wage order. Section (14) sets out the offences (<i>Minimum Wage Act 2017-4</i>).	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Employment Contract -Workers Rights Policy -Trade Union/Collective Bargaining Agreement

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Safety And Health at Work Act, 2007	The Safety and Health at Work Act makes provisions for securing the health, safety and welfare of persons at work; the protection of other persons against risks to health and safety in connection with the activities of persons at work; for controlling certain emissions into the environment; and to consolidate the law relating to health, safety, and welfare in the workplace. This act was amended to include provisions related to the issuance of a fire certificate relating to fire escape by the Chief Fire Officer.	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Health and Safety Officer/ Department -Health and Safety Management Plan -Environmental Management Plan
Employment Rights Act, 2012	An Act to make new provision for the right of employed persons and for related matters. The Employment Rights Act, 2012, modernizes labor law in Barbados by guaranteeing employees clear protections in their work relationships. It defines contracts and continuous employment, empowers the Chief Labour Officer to enforce compliance, and establishes the independent Employment Rights Tribunal to hear complaints and provide remedies. Workers are entitled to written employment particulars, itemized pay statements, minimum notice of termination, and certificates of employment record. The Act prohibits unfair dismissal, sets standards for redundancy, and provides remedies such as reinstatement or compensation. It further protects employees during lay-offs and short-time work, ensures priority rehiring, and outlines a structured dispute settlement process. Together, these provisions strengthen fairness, transparency, and justice in employment relations across Barbados. (<i>Employment Rights Act 2012-9, 2012</i>)	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Human Resource Department -Employment Contract -Workers Rights Policy -Trade Union/ Collective Bargaining Agreement

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Employment Sexual Harassment (Prevention) Act, 2017	An act to make provision for the protection of employees from sexual harassment in the workplace. Section 3 delineates the meaning of sexual harassment; Section 4 mandates that employers develop and post sexual harassment policies in the workplace, including the clauses of the policies and penalties for non-adherence to the Act. (<i>Employment Sexual Harassment (Prevention) Act, 2017-21</i>)	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site) ESPS 9: Gender Equality	-Human Resource Department -Employment Contract -Sexual Harassment Plan/ Policy -Sexual and Gender-Based Violence Policy -Workers' Code of Conduct -Grievance Redress Mechanism
Health Services Act, 1969	The Health Services Act (CAP 44), Barbados' primary public health legislation, was enacted to promote and preserve the health of Barbados' inhabitants. The Minister of Health is responsible for administering the Act, who, in accordance with section 10 (1), has the power to make subsidiary regulations which, among other things, address the prevention of overcrowding of premises, maintenance of proper sanitary conditions of the premises, and prevention, abatement, and removal of nuisances and insanitary conditions on premises.	ESPS 4: Community Health, Safety and Security (There are communities and foot traffic in the Project's area of influence)	-Health and Safety Officer/ Department -Health and Safety Management Plan -Environmental Management Plan

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Barbados Strategic Plan for Health, 2002	Road Map to Health Sector Development. Sets out the strategic objectives and direction of Public Health 2002-2012	ESPS 4 Community Health, Safety, and Security (There are communities and foot traffic in the Project's area of influence)	-Health and Safety Officer/ Department -Health and Safety Management Plan -Environmental Management Plan
National Strategic Plan for the Prevention and Control of Non-Communicable Diseases, 2020-2025	The Plan provides eight (8) priority areas for NCD prevention and control of the Government of Barbados, led and coordinated by the Ministry of Health and Wellbeing 2020-2025	ESPS 4 Community Health, Safety and Security (There are communities and foot traffic in the Project's area of influence)	-Health and Safety Officer/ Department -Health and Safety Management Plan -Environmental Management Plan

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
National Strategic Plan of Barbados, 2006- 2025, 2007	A national policy with a multi-sectoral approach. The timeframe of the Strategy is 20 years, between 2006 and 2025. The broad vision of the National Strategic Plan of Barbados is to achieve a fully developed society that is prosperous, socially just, and globally competitive.	ESPS 1-10 Assessment and Management of Social Risks and Impacts	-Social Department Health & Safety Department Project Execution Unit -Social Management Plan -Workers' Code of Conduct, -Environmental Management Plan -Labour Influx Plan -Employee Contract -Waste Management Plan
Minimum Wage (National and Sectoral Minimum Wage) Order, 2021	Pursuant to the Minimum Wage Act-2017-4, which gives power to the Minister to promulgate minimum wages. The minimum wage Order sets out the minimum wages. The First Schedule sets out the National Minimum Wage. The Second Schedule sets out the Sectoral minimum wage for Security Guards. The Minister by order may also amend Chapter 344, Domestic Employees (Rate of Pay and Hours of Duty), Order 2021. (Minimum Wage Order 2021)	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Employment Contract -Workers Rights Policy -Trade Union/ Collective Bargaining Agreement

National Legislation	Legislative Intent	ESPS	Responsible Unit & Evidence
Employment Rights Act- 2012 -9	An act to make new provision for the rights of employed persons and for related matters	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	-Employment Contract -Workers Rights Policy -Trade Union/ Collective Bargaining Agreement
Barbados Employment (Prevention of Discrimination) Act, 2020- 26	Employment (Prevention of Discrimination) Act, 2020-26. An Act to protect persons from discrimination related to employment.	ESPS 2: Labor and Working Conditions (Project will have direct and indirect workers on site)	

6.18.3. Gender sensitivity of the applicable legislation

The instruments listed above were reviewed a second time, against gender rather than against subject matter, to establish how far the legal framework governing this project addresses women, and whether it refers to vulnerable groups at all. Each instrument was placed on a five-point scale, from gender neutral, where the text is silent on gender, through gender aware, gender sensitive and gender responsive, to gender transformative, where the instrument sets out to change the structures that produce inequality. Twenty-nine instruments were classified. Table 100 sets out the result.

Table 100: Gender sensitivity of the legislation applicable to the Workers' Camp

Classification	What the classification means	Count	Instruments so classified
Gender neutral	Makes no mention of, or reference to, gender or women	20	Planning and Development Act 2019; Planning and Development (Environmental Impact Assessment) Regulations; Health Services Act 1969 (CAP 44) and Health Services (Amendment) Act 2025; Health Services (Food Hygiene) Regulations 1969; Health Services (Rodent Control) Regulations 1969; Health Services (Nuisance) Regulations 1969; Health Services (Collection and Disposal of Refuse) Regulations; Marine Pollution Control Act 2000 (CAP 392A); Storm Water Management Act 2025; Barbados Water Authority Act 1980 (CAP 274A) and amendments; Barbados Water Authority (Sewage) Regulations 1982; Safety and Health at Work (Drinking Water) Regulations 2022; Safety and Health at Work (Noise) Regulations 2022; Safety and Health at Work (Personal Protective Equipment) Regulations; Safety and Health at Work (Workstation) Regulations 2022; Safety and Health at Work (General Duties) Regulations; Accidents and Occupational Diseases (Notifications) Act 1952 (CAP 338); Protection of Wages Act 1951 (CAP 351); Recruiting of Workers Act 1938 (CAP 354); Road Traffic Act 1981 (CAP 295) and Amendment Act 2022
Gender aware	Gender-specific norms, roles and issues are addressed	2	Health Services (Building Regulations) 1969; Employment Sexual Harassment (Prevention) Act 2017 and amendments

Classification	What the classification means	Count	Instruments so classified
Gender sensitive	Sets out steps to ensure gender inequalities are not worsened as a result of the instrument	5	Health Services (Lodging Houses and Barracks) Regulations 1970; Safety and Health at Work Act 2005 (CAP 356) and amendments; Safety and Health at Work (Sanitary Conveniences) Regulations; Safety and Health at Work (Washing Facilities) Regulations; Employment Rights Act 2012 (Act 2012-9)
Gender responsive	Acknowledges differences and inequalities between women and men and sets out action to address them	2	Sexual Offences Act and Amendment Act 2024; Employment (Prevention of Discrimination) Act 2020
Gender transformative	Seeks to resolve structural inequality and to challenge social and cultural norms	0	None of the instruments reviewed

Two findings follow. The first is that twenty of the twenty-nine instruments, being sixty-nine per cent of the framework, are silent on gender. That silence is concentrated in exactly the instruments that govern the physical works: planning and environmental impact assessment, water supply and sewerage, storm water, marine pollution, refuse, noise, personal protective equipment and road traffic. The consequence is that gender considerations enter the design and operation of the camp through this assessment and through the Environmental and Social Management Plan, not through the permitting regime, and will not be picked up by regulatory compliance alone.

The second is that none of the instruments is gender transformative, and only two are gender responsive: the Sexual Offences Act and the Employment (Prevention of Discrimination) Act. Barbadian law engages with gender where violence and discrimination are the express subject and is largely silent elsewhere. The five gender sensitive instruments are, with one exception, the occupational health and welfare regulations that require separate sanitary and washing facilities, which is why those provisions carry disproportionate weight in the camp design and are treated as binding minima in the Workers' Health and Safety Plan rather than as good practice.

This classification is the analytical contribution of the gender baseline prepared for the project. It does not alter the legal obligations set out earlier in this chapter; it establishes where those obligations will and will not do the work of protecting women, and therefore where the project has to act on its own account.

7. SOCIAL IMPACT ASSESSMENT

7.1. Purpose

The purpose of the Social Impact Assessment is to aid in the decision-making and implementation process of this key national development initiative. The section seeks to accomplish two goals:

- The first is to provide an opportunity for ordinary Barbadians and state actors /administrators to participate in the decision-making process, by creating space for them to share their opinions by way of social consultations on the risks and impacts of the project.
- And secondly, to guide the project's implementers, ensuring that the project is socially responsive to the needs of the people of Barbados, and by extension, the Government of Barbados and its funders.

7.2. Scope

The assessment is prepared for the South Coast Water Treatment Plant for the construction of the Workers' Camp. The South Coast Water Treatment Plant project has entered its pre- construction phase, with preparatory works focused on the establishment of a Workers' Camp.

Given the reliance on a transient foreign workforce, the provision of suitable living accommodations is a critical enabling step before full construction activities can commence. The Workers' Camp will serve as the foundation for workforce mobilization, ensuring that logistical, welfare, and operational requirements are met in advance.

This development underscores the sequencing of project activities: contract award, workforce deployment, and preparatory infrastructure. The construction of the camp is therefore not ancillary but integral to the project's lifecycle, providing the necessary conditions for the commencement of full-scale construction. This document is prepared to reflect the current scope of work to be undertaken during the current stage of the project.

7.3. Methodology

The survey population for the South Coast Water Treatment Development Plant- Workers' Camp comprises residents of four communities, which include Harmony Hall, Graeme Hall, Rendezvous Gardens, and Amity Lodge. The team employed a convenience sampling approach, in which residents who were at home and willing to take part were interviewed by way of one-on-one, house-to-house interaction.

The house-to-house engagement described above is the primary data collection undertaken for this assessment. It sits within the wider Social and Gender Methodology submitted on 28 August 2026, which governs how social and gender data are collected, analyzed and integrated across the project. The methodology organizes assessment around six domains: community profile; socio-economic impacts; the labor and worker-community interface; gender and social inclusion; community health, safety and social wellbeing; and community perceptions and public acceptance. Data collection instruments comprise desk review, key informant interviews, focus group discussions, community consultations, worker consultations, and observation and community walks. A Social Risk and Vulnerability Matrix is maintained and updated through the project lifecycle, assessing each risk by severity, likelihood, exposure and vulnerability, and identifying who may be affected, how they may be affected differently, what factors increase their vulnerability, and what measures are already in place.

Vulnerable groups are named consistently across this ESIA/ESMP, the Labour Management Plan, the Community Health Assessment and Community Health Programme, the Stakeholder Engagement Plan and the Grievance Redress Mechanism, so that a group identified in one instrument is not omitted from another. The groups are: women and girls; children and young persons; older persons; persons with disabilities; persons with chronic illness or pre-existing respiratory or cardiovascular conditions; lower-income and single-earner households; households headed by older persons; non-local and migrant workers, including those for whom English is not a first language; informal vendors and other persons whose livelihood depends on physical presence near the site; and members of sexual and gender minorities.

Vulnerability is treated as intersecting. Gender may combine with age, disability, nationality, socio-economic circumstance, employment status or migration status to produce different levels of exposure and different barriers to information, employment, training, services and grievance mechanisms. Each assessment therefore asks four questions of every identified risk: who may be affected; how may they be affected differently; what factors increase their vulnerability; and what measures are already in place. Participation is measured by whether groups were able to take part meaningfully and influence decisions, and not by attendance numbers alone.

The social engagement methodology was a semi-formal interview approach.

The population size of the communities was anecdotally given as **50 households** according to information received by Community Liaison Officers of the Barbados Water Authority. The sample size was therefore distributed based on the youth and gender (males and females) demographics. It is anticipated that the sample will be representative of the general population as recorded in the 2021 National Population Data, which was recorded as 190 persons in the Parish of Christ Church,

distributed as follows: 93 males, 97 females, and 51 youth. The fifty households are those within the Harmony Hall area and the properties fronting the community road serving it, which together constitute the settlement within the direct Area of Influence. The figure was provided anecdotally by Community Liaison Officers of the Barbados Water Authority and has not been verified against a household listing or census enumeration district; it is therefore an estimate and is treated as such throughout. The targets derived from it are proportions of the intended engagement sample rather than of the community, and they do not sum to one hundred per cent because the youth proportion overlaps the male and female proportions rather than being additional to them. A verified household count will be established through the structured household profile described in the Community-Level Socio-Economic Profile.

Therefore, during the social engagement exercise, the team aimed to meet 48.95% males and 51.05% females, while youth (persons between ages 16-35) will represent 26.84%, mirroring the local population distribution. While this was not wholly accomplished during the first in-person stakeholder engagement, future interviews and engagements will deliberately seek out at-risk groups.

7.3.1. Inclusion and exclusion criteria

Inclusion Criteria:

- Persons residing within the socio-economic catchment, being 1 km from the site boundary. The April 2026 engagement was drawn against this catchment rather than the 500 m direct Area of Influence, because the effects the engagement was designed to capture, being labor influx, community interaction and pressure on local services, operate across it.
- Persons at home when the team visits
- Persons who consent to participate in the survey

Exclusion Criteria:

- Persons younger than 18 years of age (*to safeguard the rights, welfare, and protection of minors, the Social Specialist has determined that no direct engagement will be undertaken with persons under the age of 18 years unless prior informed parental or legal guardian consent has been obtained. Any interaction with minors will only occur after the appropriate consent has been documented and all required child safeguarding protocols have been implemented*)
- Persons not residing in the Project's Area of Influence

- The data collection period commenced from April 15th to April 18th, 2026, with in-person community visits, and will continue with virtual stakeholder engagements with other key stakeholders that the social consultant was unable to meet in person while in Barbados.

Data obtained from the Barbados Statistical Office. Note that the Population Census 2021 does not comprise demographic data for the elderly or disabled population in each parish hence the social parameters are limited to the population demographics herein.

7.3.2. Data collection instrument

The data collection instrument is an interview guide. The interview guide is a structured document, often a list of questions, topics, or prompts used by interviewers to ensure consistency, reduce bias, and cover key information from the research populations. It serves as a flexible script for conversations, allowing for both standardization and open-ended exploration.

Interview guides summarize the content that researchers cover during interviews. At one extreme, they may provide very minimal directions, leading to “less structured” interviews that are designed primarily to explore the participant's own perspective on the research topic. At the other extreme, interview guides may contain elaborate specifications to ensure that the researcher's topics of interest are thoroughly covered.

At the least structured end of the continuum are approaches such as James Spradley's ethnographic interviewing, which avoids substantively oriented topics in favor of general questions that draw out the participant's own accounts. For example, Spradley's approach often begins with “grand tour” questions such as “Tell me about a typical instance of. ...” These grand tour questions help to locate the basic elements that the participant associates with the research topic, and the interviewer follows them with 'mini-tour' questions such as “You mentioned [topic]; can you tell me more about ...?”

In contrast to unstructured interviews, the most highly structured format is undoubtedly the survey questionnaire, which amounts to an interview guide that prespecifies both the content and the possible responses for each question. Most qualitative interviewers prefer to position themselves between these two extremes by using a semi-structured interview. In that case, the interview guide typically contains a general framework for the interview, but the researcher also has the freedom to pursue the questions in a different order and to allocate more time to some questions than to others depending on what is most appropriate for discussing the research topic with each individual participant¹³⁵. (Given, 2008)

¹³⁵ Sagepub. (n.d.). Interview Guide. Accessed at <https://sk.sagepub.com/ency/edvol/research/chpt/interview-guide>

7.3.3. Data analysis and presentation

The qualitative data obtained during the social engagement activity will be presented using an inductive approach, presented thematically and categorically.

Objectives

- To understand and establish the baseline parameters/ conditions of the project
- To curate the views and opinions of project stakeholders
- To provide an assessment of the possible risks of the project on persons within the project's implementation zone
- to recommend mitigation measures to control, prevent, or mitigate, the risks identified by the project

Overview

This document is deemed as the Contractor's ***Social Assessment and Social Management Plan*** (hereinafter referred to as SIA/SMP). At this stage, it is mainly prepared for the construction of the temporary workers' camp.

The contents of this SIA/SMP include project introduction, campsite information, social impact assessment, and social management plan. The specific objectives of the project are to:

- (i) diversify Barbados's water supply sources and reduce water insecurity through the reuse of reclaimed wastewater; and
- (ii) strengthen key sector institutions on water resource management, operational efficiency, monitoring, and gender mainstreaming

This SIA/SMP sets out the expectations of the Barbados Water Authority (BWA) and the Inter-American Development Bank (IDB) and defines how the Joint Venture China Railway Shanghai Engineering Group Co., Ltd., Central & Southern China Municipal Engineering Design and Research Institute Co. Ltd. and GreenTech Environmental Co. Ltd, hereafter referred to as the Contractor, will implement and manage social matters related to the workers' camp.

Preparing an effective SIA/SMP and implementing effective measures are crucial to ensure the health and safety of workers, maintain community cohesion, ensure project security, protect residents, the Government of Barbados offices/ agencies, and farmers in the direct and indirect areas of influence of the project.

Purpose

The main objectives of this SIA/SMP are as follows:

- Guide the social management matters during the construction and use of the Worker's camp;
- Discuss the risks and impacts during the construction and operation of the workers' camp
- Outline mitigation measures for the identified /risks and impacts;
- Ensure that the construction and use of the campsite comply with relevant Barbadian legislation;
- Ensure the Contractor fulfils its social obligations as per contractual requirements;
- Ensure that all activities comply with IDB's Environmental and Social Policy Framework.

7.4. Guiding principles

The Social Impact Assessment (SIA) and the Social Management Plan (SMP) will follow the Human Rights and Participatory Approaches to project development. In this context, the right to development arises as the right of individuals and people to an enabling environment for development that is equitable, sustainable, participatory, and in accordance with the full range of human rights and fundamental freedoms. Anchored on the United Nations Declaration of Human Rights and rights-centered participation.

By adopting the Human Rights and Participatory approaches, the contractor commits to effectively managing social risks at the workers' camp by applying the SIA/SMP measures to ensure compliance, sustainability, and project efficiency, ultimately contributing to responsible construction and operational practices. The social and gender methodology developed utilizes the following eight specific guiding principles which will be used throughout the process; women, men, youth, older persons, PWDs, lower-income households, female-headed households, informal workers and vendors, migrant workers.

For the purposes of this assessment, vulnerability is understood as the combination of exposure to project-related impacts, sensitivity to those impacts, and the capacity of individuals or groups to anticipate, cope with, respond to and recover from them. Vulnerability may be influenced by factors including gender, age, disability, socio-economic status, household circumstances, employment status, migration status, language, access to transportation and services, and social isolation. These characteristics may overlap and compound one another, resulting in different levels of exposure and capacity to respond.

The assessment therefore considers where relevant and where data are available, the circumstances and potential needs of:

- women and girls, including women who may experience barriers to employment, participation or access to project benefits;
- children and young people, particularly in relation to traffic, construction-site safety, community health and safety, and exposure to inappropriate interactions with project workers;
- older persons who may have reduced mobility, increased sensitivity to noise, dust, traffic or disruption, or greater dependence on local services;
- persons with disabilities, including persons who may face physical, communication, informational or attitudinal barriers;
- low-income and economically vulnerable households that may have reduced capacity to absorb increased costs, disruption or loss of access to services;
- female-headed households and households with significant care responsibilities, where project activities may interact with existing time, mobility or economic constraints;
- migrant and non-local workers, recognizing that they may experience language, cultural, social-support and access-to-services barriers;
- persons or households with limited access to transportation, digital communication or other project information channels;
- persons who may be socially isolated or otherwise less visible in conventional stakeholder engagement processes; and
- other groups identified through ongoing stakeholder engagement, monitoring or changes in project circumstances.

7.5. Social Impacts

7.5.1. Overview

The sections that follow describe each social impact and the reasoning behind its assessment. They are the narrative counterpart to the Social Impact Assessment Matrix at Part A, which records the extent, duration, likelihood and magnitude of each impact and its significance before and after mitigation. Where the narrative and the matrix address the same impact, the narrative explains why the rating was reached and the matrix records the rating itself.

Prior to the identification and analysis of potential project impacts, an examination of the baseline characteristics of the social environment was conducted. The potential impacts of the proposed project features and activities on the existing environment were evaluated as part of this assessment. A qualitative analysis was carried out utilizing the experience and expertise of a social consultant to

determine the potential negative and positive impacts related to the social aspects of the proposed project.

It is assessed that the potential social impacts of the project's activities are both positive and negative. The positive impacts will be long-term, while the negative impacts will be short-term. These details are further expanded in the Social Impact Matrix. The negative impacts will occur during the construction phase, while positive impacts will be experienced in the post-construction / operational phase. These impacts are discussed as follows:

Traffic Congestion

During the construction phase of the project, it is anticipated that there will be disruption to the free movement of vehicular traffic, which will directly impact workers and residents utilizing the main access road to the project site at Harmony Hall. The congestion is short-term and localized, confined to the access route and the community road during construction, and it ends with demobilization. It is rated Medium at 4×2 at row A1.1 of the Social Impact Assessment Matrix on that basis. Where a known bottleneck exists on the community road, or where haulage coincides with school travel, the local significance is higher and the restricted movement of windows in the Traffic Management Plan are the control relied upon.

Some commuters who utilize the project's campsite to access their farms, as well as to access their home via the campsite, could also face difficulties as a result of increased vehicular traffic transporting construction supplies to the project site. This occurrence could cause delays in the execution of daily activities, commuter fatigue, and increased fuel usage due to vehicles idling for an extended period. Therefore, commuters should plan to utilize other traffic routes or leave ahead of time to avoid the delays that may arise.

Vehicular fatalities

Impatience of drivers, a lack of care, or a proper traffic mitigation/enforcement regimen could result in drivers' neglect of road safety, resulting in accidents / vehicular fatalities. The consequence of a vehicular fatality is permanent and irreversible, and magnitude is accordingly scored at 5. Significance is nonetheless rated High rather than Critical because the likelihood is low, at 2, and the controls are strong: restricted movement windows, trained flaggers at high-risk junctions, driver briefing and vehicle inspection. Residual significance remains in Medium after mitigation, which reflects that the consequence cannot be reduced, only its probability. The impact is recorded at row A1.2 of the Social Impact Assessment Matrix so that accidents without fatality are also captured.

Disruption to utilities

During the Construction phase of the project, it is anticipated that there could be disruption to utility services, including electricity, water, telephone, cable and internet, because utility companies may be required to install new connections to service the project site.

Increased pressure on utilities and beneficial services

During the construction phase, it is anticipated that the increased demand for water, electricity, health care, housing, schooling, waste management, sanitation, and transport for a transient population could induce pressure on the existing services. Water scarcity is especially a concern, given that the island suffers saltwater intrusion; the additional demand could result in heightened anxiety and conflict amongst community members. Pressure on water may also have economic impacts for those with resource-based livelihoods (e.g., agriculture, commercial, and recreation). Reliability of utilities such as water is an existential challenge faced by community members; population surges can exacerbate the issues further. On water specifically, saltwater intrusion is a serious concern for Barbados, but it is not the only pressure on supply. As a small island with no major rivers or lakes, Barbados depends on a limited number of underground aquifers, which are already under pressure from population growth and from tourism demand. The relevance to this project is twofold: the camp draws on the same constrained supply during construction, which is why it is designed for self-sufficiency so far as practicable and why consumption is monitored; and the reclaimed water produced during operation is intended to relieve that constraint by substituting for potable water in agricultural use.

Dust Pollution

The use of granular fill or aggregate placed during the construction process is prone to generating dust plumes. The dust plumes, when inhaled continuously, have the potential to induce dust pneumonia in human beings. Dust pneumonia results when the lungs are filled with dust. Symptoms include a high fever, chest pains, coughing, and breathing difficulties. Dust pneumonia is particularly lethal for infants, children, and the elderly.

Disruption to daily activities

The community is a multi- use community, where residential/business community, and agriculture coexist within the environment. The constant flurry of vehicles and extensive working hours (for example, operating a seven-day work week or operating beyond normal working hours) could disrupt the daily lives of community members, causing psychological fatigue from excess noise and from having to wake earlier to avoid the traffic. It could also deter tourists who may not wish to stay in noisy areas, and so reduce local business. Farmers may be unable to access their farms. This disruption could result in a loss of income. The communities within the Area of Influence are Harmony Hall, together

with the residential and agricultural properties fronting the community road that serves it and the adjoining part of Graeme Hall. Rendezvous Gardens and Amity Lodge were additionally included in the April 2026 stakeholder engagement, as recorded at Annex Table D.1. These are the communities referred to throughout this Social Assessment, and they are the receptors identified in the Social Impact Assessment Matrix.

Transient population

During the project's construction phase, it is expected that a transient Chinese workforce, as well as island nationals, will be attracted to short-term employment opportunities. According to the World Bank (2016), the impacts associated with transient populations include those described under the headings that follow.

Inflationary pressure

Influx, when significant in relation to local community size, transient populations often result in inflationary pressures due to increases in the demand for food, fuel, housing, and land. Price pressures on food, land, and housing may have the greatest impact on the most vulnerable in the location and exacerbate the economic vulnerability of marginal groups (e.g., women, ethnic minorities, elderly).

The project will be constructing housing accommodation for the workers it will be importing. Local employees will come from nearby communities. There is little to no likelihood of rental prices being induced by the construction of employee accommodation by this project. Local recruitment bears directly on the assessment because it determines the scale of several impacts rather than merely mitigating them. Prioritizing local hiring increases the employment, income and skills benefits captured within the Area of Influence and correspondingly reduces the size of the non-local workforce accommodated at the camp, which is the driver of the labor influx, community interaction and accommodation-pressure impacts assessed in the Social Impact Assessment Matrix. The distribution of that benefit across groups, including youth and women, is assessed under Job Creation in the matrix. The corresponding commitments on transparent local hiring, training, and fair conditions are carried out in the Labour Management Plan recorded in Table 107.

Economic boom and bust

Speculators and new businesses looking to capitalize on direct and indirect labor influx may create market distortions and force existing suppliers out of business. Communities, for their part, may experience "boom/bust" cycles associated with sharp growth during construction and decline due to project closure.

Health risks to the community

As transient populations develop, they could provoke higher rates of violence, injury, alcohol and/ or drug consumption and sexually transmitted diseases in host communities. Additionally, influx- related environmental impacts that affect subsistence agriculture or harvesting could change nutritional choices and affect health outcomes. Overcrowded or camp-based living conditions can significantly alter existing levels of communicable diseases including respiratory problems, diarrhea and vector-borne diseases and tuberculosis, which increases the risks of disease being introduced and spreading through host communities. This can strain public resources and affect overall service capacity. The community health baseline supporting this assessment, including communicable disease and vector-borne disease risk associated with wastewater and standing water, is provided by the Community Health Assessment and Community Health Plan, cross-referenced in Table 107.

Adverse social and community wellbeing

Transient labor migrants can have impacts on community cohesion. This can be particularly acute in smaller communities hosting a largely male workforce, and/or a workforce from other regions or countries – which may result in conflicts between locals and non-locals concerning employment opportunities, wages, natural resources, and cultural and social norms. Migrant workers can also contribute significantly to gender-based social impacts and risks. For example, changes in family structure. A mostly male workforce away from their families and normal social environments may lead to increases in unplanned pregnancies and the creation of single- parent households, changing the family structure.

Sexual and Gender-Based Violence

Increases in crime and violence against women and girls may be particularly acute in socio - economic settings where there is an existing gender differentiation in terms of power and norms, coupled with limited governance capacity. In locations with pre-existing sexual and gender-based violence (SGBV) issues, labor influx can exacerbate SGBV risks such as trafficking in girls, sexual exploitation of women and girls, sexual violence, and assault of women and girls.

For further details on this topic, please see the Social Impact Chapter, which discusses sexual and gender-based violence and explicitly addresses the impacts on women and girls. It also includes discussions on the physical, psychological, or sexual harassment of project workers and community members.

Noise pollution

During the construction phase, it is anticipated that there will be project-induced noise pollution, resulting from the combined use of heavy machinery. Noise above prescribed decibel levels can pose health impacts to persons residing in the surrounding areas. Continued exposure to loud noise can

cause the population to develop high blood pressure, heart disease, experience sleep disturbances, and stress. These health problems can affect all age groups, especially children, infants, persons with disabilities, and the elderly. For those working in the environment, excessive noise levels can result in hearing loss, stress, and reduced concentration among workers, which could result in accidents on the job.

Unfair treatment and discrimination of workers

Unfair treatment of workers could result from personal biases such as race, gender, ethnicity, religion, disability, or sexual orientation by members of the community or by management staff. This could result in violence being meted out to workers, causing physical injury or, in the most severe cases, loss of life.

Physical, psychological, or sexual harassment of project workers and community members

Physical, psychological, or sexual harassment of project workers could include both physical forms of harassment and abuse, for example violence and sexual assault, and non-physical forms of abuse such as emotional or verbal abuse, bullying and unsolicited sexual assault, especially of female workers. This includes the sexual exploitation of minors and exploitative sexual relations between workers and females who reside in the project's area of influence.

Human trafficking could also develop around the project site where women and girls are forced into having sex with workers for money.

Child labor

The need for a constant supply of labor makes the project susceptible to hiring persons who are below the minimum age for employment in Barbados, which is 16 years. In an environment where there is a limited supply of jobs the demand for jobs is high, and minors who are out of school, may seek to be employed by the project, putting the project at risk of flouting the law.

Discrimination in hiring

Because construction is a male dominated industry there is a possibility that ingrained cultural and sexist ideologies could result in:

- o Women not being hired.
- o Women being hired to fill lower-paying position.
- o Persons being hired or hired for lower paying positions because of their gender identity or sexual orientation.

- o Women and men being held to different or higher standards, or being evaluated more harshly, because of their gender identity, or because they don't act or present themselves in a way that conforms to traditional ideas of femininity or masculinity.
 - o Being written up or disciplined for something that other employees of a different gender do constantly but never get punished for.
- o Being insulted, called derogatory names or slurs because of sex or gender identity, or making hostile remarks about people of a certain sex, gender identity, or sexual orientation.
 - o Being subject to unwelcome sexual advances, requests for sexual favors, or other verbal or physical harassment of a sexual nature.
- o Being rejected for a job, forced out on leave, or given fewer assignments because of sex, gender, sexual orientation, pregnancy or childcare responsibilities.

Gender pay gaps

Given the traditional ideologies and existing gender pay gap trends. There is a likelihood that because of bias:

- o Skilled female workers could be paid comparatively less than skilled male workers.
- o Unskilled female workers could be paid less than unskilled male workers.

Workers' rights

Projects often disregard workers' rights, for example, the right to be provided with the requisite PPE, basic amenities such as gendered washroom facilities, shelters, drinking water, water for handwashing at mealtimes and water to clean the skin after work.

Workers may be denied Personal time-off (rest days) and be remunerated according to agreed rates and local labor laws, in a timely manner, as well as being given wages through accessible means (bank accounts, or cheque payment at accessible banking institutions). These types of neglect of workers' rights can create a situation where workers become disgruntled and produce substandard work or a high staff turnover. High staff turnover can impact the project's ability to complete the work in a timely manner.

Ultimately, the Workers' Camp operations are bound by the Laws of Barbados, which are clearly stated in the legislative section of the document. What this means is that the project is to adhere to the national laws and the provisions therein, which promulgate working hours, overtime, wages, freedom of association, and worker accommodation. Details on the physical accommodation of the camp are discussed in the earlier *Chapter – Workers' Camp Description*.

Communication/language barriers

Community members and foreign workers vice versa may become frustrated from being unable to properly communicate challenges, concerns, or instructions as a result of the difference in language. Language gaps, differing cultural norms, and technical terminology could severely hinder task execution, lower productivity, and introduce critical safety and compliance risks if left unmanaged within the project.

7.5.2. Positive Social Impact Analysis

The project is likely to induce several positive impacts, while many of the positive impacts are likely to occur during the operation phase, during the construction phase one positive impact that is likely to occur is job creation.

Construction phase

Job Creation: During the Construction phase of the project, it is anticipated that community members (men and women) will be able to access jobs with the project. The project will require laborers and specialists with technical skills such as engineers, cooks, masons, joiners, plumbers, electricians, machine operators and technicians (male and female).

Operational phase

During the operational phase/ post-construction phase of the project, it is expected to yield tremendous social and economic benefits for community members of the project area and the country at large, these impacts include:

- **Beneficial agreements for key populations:** The Project could provide significant transformative benefits for communities, driving economic growth by supporting local initiatives and businesses, empowering youth, women, the elderly, and disabled residents through skills training and civic engagement. These initiatives could help to build resilience and sustain neighborhoods while enhancing the overall quality of life of persons within the project area.
- **Increase access to diverse water resources for irrigation:** Increased availability of potable water. The development of the water treatment plant will reduce the use of potable water for agricultural purposes by providing treated water suitable for irrigation. This will increase the availability of potable water for households, businesses, including the tourism sector, and other essential uses, thereby contributing to improved water security. The long-term objective of the project is to enhance national water security by increasing the availability of water resources for irrigation in designated agricultural areas and for aquifer recharge.

- **Lower cost for irrigation to farmers:** Any reduction in the cost of irrigation water to farmers would depend on allocation and pricing decisions that rest with the Barbados Water Authority and that have not been confirmed. A lower cost to farmers is therefore identified as a potential benefit contingent on those decisions and is not presented as a confirmed outcome of the project. The Ministry of Agriculture has advised that farmers currently pay one Barbados dollar per cubic meter for irrigation water. That figure is the baseline against which any change in the cost of irrigation water to farmers is to be measured.
- **Increased food security:** Where reclaimed water is allocated to agriculture, more reliable irrigation supply can support plant growth, nutrient transport, photosynthesis and germination, and so improve the stability of local production. Any consequent effect on the cost of irrigation, and any wider effect on the agricultural sector, remains contingent on the allocation and pricing decisions of the Barbados Water Authority and is not asserted here as an established benefit.
- **Reduced food cost:** By providing treated water for agricultural irrigation, the project will support more reliable local food production, including during dry periods. Increased availability of locally grown produce can help reduce reliance on imported food, improve access to fresh, affordable produce for households, businesses and the tourism sector, and help keep food costs more stable over time. Any such effect is contingent on the allocation and pricing decisions of the Barbados Water Authority, which have not been confirmed. Greater availability of locally grown food for the tourism sector could increase savings and revenues for hoteliers and tourism establishments, and make Barbados a more cost-effective destination.
- **Improved environmental health and eco-system services:** The reduction of untreated effluent on marine life and nearshore coral reef ecosystems. Reducing untreated effluent discharge improves water quality, strengthening marine biodiversity, enhancing coral reef resilience, and supporting fisheries sustainability. A cleaner sea will also boost tourism, provide coastal protection, and safeguard community well-being. Together, these outcomes can reinforce ecological balance, economic opportunity, and resilience for Barbados.
- **Aquifer recharge:** By removing contaminants, treated water can safely infiltrate soil and replenish underground reservoirs, ensuring reliable supplies for agriculture, households, and industry. Reducing dependence on surface water during droughts. Recharged aquifers also act as natural buffers against seasonal variability, while protecting against over-extraction and land subsidence.

- **“Debt for Climate conversion”:** Barbados completed a pioneering debt-for-climate conversion that will free up funding for investments in water security, climate resilience and critical infrastructure without increasing the country’s debt. The initiative will generate approximately US\$125 million in savings to support the South Coast Water Reclamation Project, reduce water losses, improve the sewer network, protect marine ecosystems, and strengthen water and food security. By supporting these investments, the initiative also contributes to Barbados’ Nationally Determined Contributions by strengthening water security, improving water resource management and supporting climate-resilient agriculture. It also supports broader investments under the Roofs to Reefs Programme, while reinforcing Barbados’ position as a global leader in innovative climate finance and providing a model for other small island developing states (IDB, EIB, GCF and Government of Barbados). The description of the project’s objectives and benefits in this section is drawn from the published project documentation of the Inter-American Development Bank, the European Investment Bank, the Green Climate Fund and the Government of Barbados, and is confined to what those sources state. Benefits that depend on decisions not yet taken by the Barbados Water Authority, in particular the allocation and pricing of reclaimed water, are identified as contingent wherever they appear. The project will support Barbados’ Roofs to Reefs Programme (R2RP) which represents the sustainable development model for Barbados for the next decade. The savings earned will be used to transform the climate resilience of the country’s infrastructure and to determine the basis for Barbados’ Nationally Determined Contributions.

7.6. Understanding the social impact assessment matrix

The Social Impact Assessment applies the same methodology as the Environmental Impact Assessment, so that environmental and social impacts are assessed on a common basis and can be compared directly. Each impact is characterized by its nature and type, its extent and its duration. Its likelihood is scored from 1 to 5 in accordance with Table 57, and its magnitude is scored from 1 to 5 in accordance with Table 58, taking into account extent, duration, receptor sensitivity and reversibility. Risk significance is the product of likelihood and magnitude, banded in accordance with Tables 59 and 60 as Low (1–4), Medium (5–9), High (10–14), Very High (15–19) or Critical (20–25). Impacts identified as beneficial are recorded as such. Likelihood and magnitude are scored both before and after mitigation, so that the residual position is visible on the face of the matrix.

7.6.1. Evaluation/ Significance of Impacts



Figure 73: Evaluation/ Significance of Impacts

High IMPACT (Red): the impact will substantially affect communities. It demands immediate mitigation or an action plan to manage the impact.

Likelihood of occurrence is scored on the five-point scale set out in Table 101, and **spatial extent** is expressed using the categories applied in the environmental matrix, being on-site, local, regional, national or transboundary/international.

Impact Significance is the product of likelihood and consequence on a five-by-five scale. The pre-mitigation score is the position before any project commitment; the post-mitigation score is what remains once the measures in the row are in place and working. A residual score is not a prediction that nothing will go wrong. It is a statement of what the assessment expects if the measures are delivered, which is why every row carries a residual management line saying how that is checked.

Table 101: Significance bands

Band	Score	What the band means
Low	1 – 4	Managed by standard practice. No specific action beyond the measures already committed.
Medium	5 – 9	Requires defined mitigation, an owner and monitoring. Acceptable once those are in place.

Band	Score	What the band means
High	10 – 14	Requires mitigation before the activity proceeds, with monitoring and a reporting route to the PEU.
Very High	15 – 19	Not acceptable without mitigation. The activity should not begin until the controls are in place and verified.
Critical	20 – 25	The activity should not proceed in its current form.
Beneficial	scored on the same scale	A positive outcome. The score describes the scale of the benefit, not a risk to be reduced, so the post-mitigation figure is an enhancement target rather than a residual risk.

7.6.2. Part A: Adverse Impacts

Twenty rows. Two carry a Very High pre-mitigation score: labor influx (A5.1) and gender-based violence and harassment (A6.1). Only one remains above Medium after mitigation. Row A6.1 stays High because the consequence of any single incident is severe irrespective of how often it occurs, and no control brings that consequence down.

Table 102: Adverse social impacts

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A1 Access, traffic and road safety							

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A1.1	Movement of construction vehicles, material deliveries and worker transport along the access dam and community road	Congestion and delay on the community road and at the junction with the highway, particularly at shift change and delivery peaks	Residents, businesses and emergency services	Construction	$4 \times 2 = 8$ MEDIUM	$3 \times 2 = 6$ MEDIUM	—
A1.2	Movement of heavy vehicles and plant on the community road and site access	Vehicular accidents involving workers, community members or pedestrians, including the potential for serious injury or fatality	Road users, with particular exposure for school children, elderly persons and persons with disabilities	Construction	$2 \times 5 = 10$ HIGH	$1 \times 5 = 5$ MEDIUM	—
A2 Services and utilities							
A2.1	Site works, excavation and connection of camp services	Interruption to water, electricity or telecommunications supply serving nearby households and businesses	Nearby households and businesses, and the existing treatment plant	Construction	$2 \times 3 = 6$ MEDIUM	$2 \times 2 = 4$ LOW	—

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A2.2	Occupation of the camp by a resident workforce of 98 at peak construction, being 80 workers and 18 management personnel, with up to 105 further non-resident personnel on site by day	Increased demand on water, electricity, health care, waste services and housing within the surrounding community	Harmony Hall and settlements served by the same infrastructure	Construction	4 × 2 = 8 MEDIUM	3 × 2 = 6 MEDIUM	—
A3 Amenity: dust, noise and disruption							
A3.1	Site clearance, earthworks, excavation and vehicle movement on unsealed surfaces	Fugitive dust affecting nearby residences, farmland and the Ministry of Agriculture office	Nearby residences, farmland and the Ministry of Agriculture office	Construction	4 × 3 = 12 HIGH	3 × 2 = 6 MEDIUM	—
A3.2	Construction activity, deliveries and temporary closures	Disruption to daily routines, access, trading and community events	Residents, businesses and community events	Construction	4 × 2 = 8 MEDIUM	2 × 2 = 4 LOW	—

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A3.3	Construction plant, vehicle movement, generator operation and camp activity	Noise disturbance at the nearest residential receptors, with generator operation expected to continue overnight	Nearest residential receptors and the Ministry of Agriculture	Construction	$4 \times 3 = 12$ HIGH	$3 \times 2 = 6$ MEDIUM	Night-time noise baseline not yet measured
A4 Local economy and prices							
A4.1	Presence of a wage-earning workforce and project procurement in the local economy	Localised price escalation for food, goods, services and rental accommodation	Local households, particularly low-income households	Construction	$3 \times 2 = 6$ MEDIUM	$2 \times 2 = 4$ LOW	Pre-construction price baseline not yet established
A4.2	Concentration of employment and procurement during construction, ending at completion	Economic contraction at the end of construction as project spending and employment cease	Locally engaged workers and suppliers	Demobilization	$2 \times 2 = 4$ LOW	$2 \times 1 = 2$ LOW	—
A5 Community relations and public health							

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A5.1	Accommodation of a predominantly non-local workforce at the camp	Labour influx effects including pressure on community cohesion, altered social dynamics and worker-community friction	Harmony Hall and neighboring settlements – with differentiated impacts on women, men, girls, boys, older persons and PWDs	Construction	5 × 3 = 15 VERY HIGH	3 × 2 = 6 MEDIUM	<i>Workforce numbers and nationality mix to be confirmed by the Contractor</i>
A5.2	Camp occupation adjacent to an operating sewage treatment plant, and worker-community interaction	Communicable disease transmission, vector-borne disease associated with wastewater and standing water, and exposure to biological aerosols and hydrogen sulphide	Workers and the surrounding community, women who are primary caregivers.	Construction	4 × 3 = 12 HIGH	2 × 3 = 6 MEDIUM	<i>Community Health Assessment not yet complete</i>
A5.3	Presence of a non-local workforce and visible construction activity in a small residential and agricultural community	Adverse effects on community cohesion, sense of security and public confidence in the project	The community, and public confidence in the project	Construction	4 × 3 = 12 HIGH	3 × 2 = 6 MEDIUM	—

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A6 Gender-based violence, harassment and exploitation							
A6.1	Presence of a predominantly male non-local workforce in proximity to the community, and unequal power relations in employment	Sexual harassment, sexual exploitation and abuse, and gender-based violence affecting community members and workers, particularly women and girls	Community members and workers, particularly women and girls, including those with disabilities and LGBTIQ+ persons	Construction	$3 \times 5 = 15$ VERY HIGH	$2 \times 5 = 10$ HIGH	—
A6.2	Shared accommodation, supervision relationships and site working conditions	Physical, psychological or sexual harassment of workers by other workers, supervisors or security personnel	Workers	Construction	$3 \times 4 = 12$ HIGH	$2 \times 3 = 6$ MEDIUM	—
A7 Fair treatment, recruitment and pay							

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A7.1	Recruitment, supervision and management of the workforce	Unfair treatment and discrimination on grounds including sex, gender identity, sexual orientation, race, ethnicity, religion, age, disability, HIV status, pregnancy or marital status	Workers	Construction	3 × 3 = 9 MEDIUM	2 × 2 = 4 LOW	—
A7.2	Recruitment of workers, including through subcontractors and local labor suppliers	Engagement of persons below the legal working age, including out-of-school youth	Young persons, including both boys and girls, below the legal working age	Construction	2 × 4 = 8 MEDIUM	1 × 4 = 4 LOW	—
A7.3	Advertising, shortlisting and selection of workers	Discriminatory recruitment practices excluding women, persons with disabilities or other groups	Job applicants, particularly women and PWDs	Construction	3 × 3 = 9 MEDIUM	2 × 2 = 4 LOW	—
A7.4	Setting of wages and grading of roles across the workforce	Differential pay between women and men performing work of equal value	Women workers	Construction	3 × 3 = 9 MEDIUM	2 × 2 = 4 LOW	—

A8 Labour rights and communication

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
A8.1	Employment of workers by the Contractor and subcontractors	Breach of workers' rights concerning working hours, overtime, wages, rest days, freedom of association and living conditions	Workers, including subcontracted workers	Construction	$3 \times 3 = 9$ MEDIUM	$2 \times 2 = 4$ LOW	—
A8.2	Employment of a workforce including non-English-speaking workers alongside an English-speaking community	Communication failure affecting worker safety, community engagement and access to the grievance mechanism	Workers and the community	Construction	$4 \times 2 = 8$ MEDIUM	$2 \times 2 = 4$ LOW	Workforce language profile not yet provided

7.6.3. Part B: Beneficial Outcomes

Nine rows. Six are scored identically before and after, because the measures listed sustain the benefit rather than increase it. Only B1.1, employment and skills, is scored higher after enhancement. Four rows are contingent on decisions the Barbados Water Authority and the Ministry of Agriculture have not yet taken, and are marked accordingly; they should not be reported as delivered benefits until those decisions are made.

Table 103: Beneficial social outcomes

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
B1 Employment, skills and local enterprise							
B1.1	Recruitment for camp construction and for operation of the reclamation facility	Creation of employment and transferable skills for residents of the project area of influence	Residents of the project area of influence, including women and men, youth, PWDs and other vulnerable groups	Construction and operation	$5 \times 3 = 15$ BENEFICIAL	$5 \times 4 = 20$ BENEFICIAL	—
B1.2	Engagement with farmers, the Chamber of Commerce and other defined stakeholder groups during operation	Beneficial supply, offtake or service agreements with identified stakeholder groups	Farmers including women and men farmers, youth farmers, the Chamber of Commerce and other defined stakeholder groups	Operation	$3 \times 3 = 9$ BENEFICIAL	$3 \times 3 = 9$ BENEFICIAL	Stakeholder groups and terms of agreement not yet defined
B2 Water for agriculture and food security							

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
B2.1	Operation of the South Coast Water Reclamation and Reuse Facility	Increased availability of reclaimed water for irrigation in designated agricultural zones	Agricultural users in the designated zones including women and men farmers, young farmers, farm workers and producer /farmer organizations	Operation	4 × 4 = 16 BENEFICIAL	4 × 4 = 16 BENEFICIAL	—
B2.2	Supply of reclaimed water to agricultural users	Potential reduction in irrigation cost for farmers	Women and men farmers, young farmers, including small holders, tenant farmers and cooperatives (if applicable)	Operation	2 × 3 = 6 BENEFICIAL	2 × 3 = 6 BENEFICIAL	Contingent on BWA pricing policy

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
B2.3	Improved reliability of irrigation water during dry periods	Contribution to national food security through more reliable local production	National food security, women and men along the agricultural value chains (producers, processors, vendors and consumers)	Operation	3 × 3 = 9 BENEFICIAL	3 × 3 = 9 BENEFICIAL	<i>Contingent on allocation policy</i>
B2.4	More reliable local food production supported by reclaimed water	Greater availability of locally grown produce and more stable food costs over time	Households, businesses and the tourism sector	Operation	2 × 3 = 6 BENEFICIAL	2 × 3 = 6 BENEFICIAL	<i>Contingent on allocation and pricing</i>
B3 Environment, water security and fiscal space							
B3.1	Diversion of wastewater from the existing outfall and improved treatment performance	Improved environmental health and support to the ecosystem services of the Graeme Hall Swamp and the coastal zone	Graeme Hall Swamp and the coastal zone, surrounding communities, recreation and cultural practices by women, men and youth	Operation	4 × 3 = 12 BENEFICIAL	4 × 3 = 12 BENEFICIAL	—

#	Activity	Potential impact	Who is affected	Phase	Pre-mitigation	Post-mitigation	Depends on data outstanding
B3.2	Infiltration of treated water and reduced abstraction pressure	Recharge of underground reservoirs and improved resilience of supply during drought	National water users, and critical services during drought	Operation	$4 \times 4 = 16$ BENEFICIAL	$4 \times 4 = 16$ BENEFICIAL	Groundwater baseline not yet established
B3.3	Financing of the project through the debt-for-climate conversion	Release of fiscal space for investment in water security, climate resilience and critical infrastructure without increasing national debt	The national budget and public investment, women, men and vulnerable groups through improved water security, climate resilience and critical social infrastructure	Operation	$4 \times 3 = 12$ BENEFICIAL	$4 \times 3 = 12$ BENEFICIAL	—

7.6.4. Part C: Detail Sheets

Each sheet states the impact, who bears it, its character and duration, the measures committed, the scores before and after, and how the residual position is managed and checked.

A1.1 Movement of construction vehicles, material deliveries and worker transport along the access dam and community road

Potential impact	Congestion and delay on the community road and at the junction with the highway, particularly at shift change and delivery peaks
Risk	Reduced access for residents, businesses and emergency vehicles, heightened consequences for pregnant women, PWDs and households needing urgent medical care.
Who is affected	Residents, local businesses, public transport users schools and emergency services
Nature, extent, duration	Adverse, Direct, Short-term · Local (access route and community roads serving Harmony Hall) · Temporary (duration of construction)
Phase	Construction
Mitigation measures	Traffic Management Plan approved by the PEU/BWA covering haul routes, peak-hour restrictions, signage, safe crossing points, flaggers and temporary diversions; scheduled movement windows avoiding school travel times; access to residences, businesses and emergency vehicles maintained at all times except for short pre-notified closures. Reviewed in consultations with CLOs and community members
Significance	Pre-mitigation $4 \times 2 = 8$ MEDIUM → Post-mitigation $3 \times 2 = 6$ MEDIUM
Residual management	Monitor complaints through the GRM; review movement windows quarterly and after any change in delivery schedule, with feedback from community representatives

A1.2 Movement of heavy vehicles and plant on the community road and site access

Potential impact	Vehicular accidents involving workers, community members or pedestrians, including the potential for serious injury or fatality
Risk	Injury or loss of life; particular exposure for school children, older persons, PWDs, and more specifically, pedestrians and public transport users

A1.2 Movement of heavy vehicles and plant on the community road and site access

Who is affected	Road users, including pedestrians and public transport users, in particular school children, older persons and PWDs, roadside vendors and small businesses
Nature, extent, duration	Adverse, Direct, Permanent (consequence) · Local (access route and community roads) · Permanent where a fatality occurs; otherwise temporary
Phase	Construction
Mitigation measures	Driver briefing and induction covering speed limits, haul routes, reversing, pedestrian awareness and fatigue management; trained flaggers in high-visibility PPE at high-risk junctions and near schools, businesses and churches; restricted movement window from 14:30 to protect school children; vehicles inspected and maintained in safe working order; drivers fit for duty at all times. Identification of high-risk locations in consultations with community members.
Significance	Pre-mitigation 2 × 5 = 10 HIGH → Post-mitigation 1 × 5 = 5 MEDIUM
Residual management	All incidents and near-misses reported immediately to the PEU; driver behaviour complaints logged through the GRM; disciplinary framework applied under the Code of Conduct.

A2.1 Site works, excavation and connection of camp services

Potential impact	Interruption to water, electricity or telecommunications supply serving nearby households and businesses
Risk	Loss of service to the community and to the existing treatment plant
Who is affected	Nearby households, including female-headed households, PWDs, older persons and home-based and formal businesses, and the existing treatment plant
Nature, extent, duration	Adverse, Indirect, Temporary · Local (Harmony Hall and adjacent properties) · Temporary (hours to days per event)
Phase	Construction

A2.1 Site works, excavation and connection of camp services

Mitigation measures	Utilities management schedule agreed in advance with each utility operator; risks, planned outages and restoration procedures agreed before work begins; advance notification through the Stakeholder Engagement Plan; unplanned disruptions reported and addressed through the GRM.
Significance	Pre-mitigation $2 \times 3 = 6$ MEDIUM → Post-mitigation $2 \times 2 = 4$ LOW
Residual management	Maintain a log of outages and restoration times; report monthly to the PEU.

A2.2 Occupation of the camp by a resident workforce of 98 at peak construction, being 80 workers and 18 management personnel, with up to 105 further non-resident personnel on site by day

Potential impact	Increased demand on water, electricity, health care, waste services and housing within the surrounding community
Risk	Reduced availability or quality of services for residents
Who is affected	Harmony Hall and settlements served by the same infrastructure
Nature, extent, duration	Adverse, Indirect, Cumulative · Local (Harmony Hall and the settlements served by the same infrastructure) · Temporary (duration of construction)
Phase	Construction
Mitigation measures	Camp designed for self-sufficiency in water, power and sanitation so far as practicable; utility consumption and management plan; project health plan providing on-site primary care so that workers do not displace community access to health services; worker transport provided to reduce local pressure.
Significance	Pre-mitigation $4 \times 2 = 8$ MEDIUM → Post-mitigation $3 \times 2 = 6$ MEDIUM
Residual management	Monitor consumption against the baseline and report quarterly; review if the workforce exceeds the assumed peak.

A3.1 Site clearance, earthworks, excavation and vehicle movement on unsealed surfaces

Potential impact	Fugitive dust affecting nearby residences, farmland and the Ministry of Agriculture office
Risk	Nuisance, reduced amenity and respiratory irritation for workers and residents
Who is affected	Nearby residences, farmland and the Ministry of Agriculture office
Nature, extent, duration	Adverse, Direct, Cumulative · Local (site and receptors within the direct AOI) · Temporary (duration of construction, seasonally variable)
Phase	Construction
Mitigation measures	Adherence to EPD parameters for dust; dust suppression management plan including watering of haul routes and stockpiles, covered loads, wheel-wash and speed restrictions; progressive stabilization of cleared areas; works suspended in high wind where suppression cannot be maintained.
Significance	Pre-mitigation $4 \times 3 = 12$ HIGH → Post-mitigation $3 \times 2 = 6$ MEDIUM
Residual management	Visual monitoring daily and PM monitoring at the nearest receptor; complaints logged through the GRM.

A3.2 Construction activity, deliveries and temporary closures

Potential impact	Disruption to daily routines, access, trading and community events
Risk	Loss of amenity, income and access for residents and businesses
Who is affected	Residents, businesses and community events
Nature, extent, duration	Adverse, Direct, Temporary · Local (Harmony Hall and users of the community road) · Temporary (duration of construction)
Phase	Construction

A3.2 Construction activity, deliveries and temporary closures

Mitigation measures	Community engagement and communication plan with a published disruption schedule will use methods that reach women and men; disruptive activities scheduled during off-peak hours; the Contractor to understand the local calendar to map key events and adjust scheduling around religious, school and community events where feasible; disruptions reported through the GRM.
Significance	Pre-mitigation $4 \times 2 = 8$ MEDIUM → Post-mitigation $2 \times 2 = 4$ LOW
Residual management	Advance notice of at least seven days for planned disruption; quarterly community meetings during construction.

A3.3 Construction plant, vehicle movement, generator operation and camp activity

Potential impact	Noise disturbance at the nearest residential receptors, with generator operation expected to continue overnight
Risk	Sleep disturbance, annoyance and reduced amenity for residents
Who is affected	Nearest residential receptors and the Ministry of Agriculture
Nature, extent, duration	Adverse, Direct, Cumulative · Local (Harmony Hall at approximately 280 m; Ministry of Agriculture at approximately 254 m) · Temporary (duration of construction), including night-time periods
Phase	Construction
Mitigation measures	Adherence to EPD parameters; Noise Management Plan including acoustic screening of generators, restrictions on night-time plant operation, selection of lower-noise equipment and maintenance of silencers; noise monitoring plan at the nearest receptors; worker training and PPE under the Workers' Health and Safety Plan. Consult nearby households on acceptable night-time noise windows.
Significance	Pre-mitigation $4 \times 3 = 12$ HIGH → Post-mitigation $3 \times 2 = 6$ MEDIUM
Residual management	Continuous monitoring at Location 3 and complaint-triggered monitoring. Night-time baseline monitoring has not yet been undertaken and is required before the residual rating can be confirmed.
Depends on	<i>Night-time noise baseline not yet measured</i>

A4.1 Presence of a wage-earning workforce and project procurement in the local economy

Potential impact	Localised price escalation for food, goods, services and rental accommodation
Risk	Reduced purchasing power for residents, particularly low-income households
Who is affected	Local households, particularly low-income households
Nature, extent, duration	Adverse, Indirect, Cumulative · Local (Harmony Hall and adjacent communities) · Temporary (duration of construction)
Phase	Construction
Mitigation measures	Local procurement prioritized where quality and safety standards can be met, unit costs are competitive and procurement does not cause significant price escalation for local consumers; inflation monitoring against a pre-construction baseline of prices for key commodities; housing plan to limit competition for local rental stock.
Significance	Pre-mitigation $3 \times 2 = 6$ MEDIUM → Post-mitigation $2 \times 2 = 4$ LOW
Residual management	Report the proportion of goods and services procured locally and price trends for key commodities quarterly. A pre-construction price baseline must be established before indicators can be measured.
Depends on	<i>Pre-construction price baseline not yet established</i>

A4.2 Concentration of employment and procurement during construction, ending at completion

Potential impact	Economic contraction at the end of construction as project spending and employment cease
Risk	Loss of income and employment for locally engaged workers and suppliers
Who is affected	Locally engaged workers and suppliers
Nature, extent, duration	Adverse, Indirect, Short-term · Local (project area of influence) · Short-term (at and following demobilization)
Phase	Demobilization

A4.2 Concentration of employment and procurement during construction, ending at completion

Mitigation measures	Local Skills Development and Inclusion Plan providing transferable training; advance notice of demobilization timelines; supplier diversification encouraged so that local businesses are not dependent on a single contract.
Significance	Pre-mitigation $2 \times 2 = 4$ LOW → Post-mitigation $2 \times 1 = 2$ LOW
Residual management	Track the number of workers completing accredited training and the proportion of suppliers with non-project revenue.

A5.1 Accommodation of a predominantly non-local workforce at the camp

Potential impact	Labour influx effects including pressure on community cohesion, altered social dynamics and worker-community friction
Risk	Community tension, exclusion of vulnerable groups and heightened SH/SEA/GBV risk including against women, girls and youth
Who is affected	Harmony Hall and neighboring settlements
Nature, extent, duration	Adverse, Indirect, Cumulative, Induced · Local, with effects extending to the settlements served by the same road network and social infrastructure · Temporary (duration of construction)
Phase	Construction
Mitigation measures	Worker Influx Management Plan operating together with the Code of Conduct, GRM, Stakeholder Engagement Plan and Labour Management Plan; worker-community interaction protocol; local hiring prioritized and targets set where applicable; community awareness and outreach plan; multilingual communication strategy; monitoring indicators (disaggregated) for community complaints.
Significance	Pre-mitigation $5 \times 3 = 15$ VERY HIGH → Post-mitigation $3 \times 2 = 6$ MEDIUM
Residual management	Monitor grievances by category and origin; review the plan if workforce numbers, nationality mix or camp occupancy change materially. Note that worker numbers and nationality breakdown remain to be confirmed by the Contractor.
Depends on	<i>Workforce numbers and nationality mix to be confirmed by the Contractor</i>

A5.2 Camp occupation adjacent to an operating sewage treatment plant, and worker-community interaction

Potential impact	Communicable disease transmission, vector-borne disease associated with wastewater and standing water, and exposure to biological aerosols and hydrogen sulphide
Risk	Illness among workers and the surrounding community
Who is affected	Workers and the surrounding community
Nature, extent, duration	Adverse, Direct and Indirect, Cumulative · Local (camp, plant environs and Harmony Hall) · Temporary (duration of construction), with potential for longer-term health effects
Phase	Construction
Mitigation measures	Health management plan and Community Health and Safety Plan; specific assessment and control of wastewater exposure pathways covering biological aerosols, hydrogen sulphide, direct and indirect wastewater contact and vector-borne disease; heat stress prevention, hydration and rest-break scheduling; vector control and elimination of standing water; coordination with local health authorities; awareness training for workers.
Significance	Pre-mitigation $4 \times 3 = 12$ HIGH → Post-mitigation $2 \times 3 = 6$ MEDIUM
Residual management	Health surveillance and incident reporting to the PEU; monitoring requirements and control measures to be confirmed against the Community Health Assessment when complete.
Depends on	<i>Community Health Assessment not yet complete</i>

A5.3 Presence of a non-local workforce and visible construction activity in a small residential and agricultural community

Potential impact	Adverse effects on community cohesion, sense of security and public confidence in the project
Risk	Community dissatisfaction, reputational and political exposure, and erosion of the project's social license

A5.3 Presence of a non-local workforce and visible construction activity in a small residential and agricultural community

Who is affected	The community, and public confidence in the project
Nature, extent, duration	Adverse, Indirect, Cumulative · Local, with national visibility given the profile of the project · Temporary (duration of construction), with reputational effects capable of persisting
Phase	Construction
Mitigation measures	Cultural integration training and onboarding for all workers; structured social and cultural engagement with the community; Stakeholder Engagement Plan with gender-sensitive and inclusive methods; accessible GRM with feedback reported back to the community; quarterly community meetings reporting on progress, incidents and grievances.
Significance	Pre-mitigation $4 \times 3 = 12$ HIGH → Post-mitigation $3 \times 2 = 6$ MEDIUM
Residual management	Monitor grievance volume and sentiment; escalate to the PEU where community confidence is affected. This impact is distinguished from Community Health Risks and Labour Influx, which are assessed separately.

A6.1 Presence of a predominantly male non-local workforce in proximity to the community, and unequal power relations in employment

Potential impact	Sexual harassment, sexual exploitation and abuse, and gender-based violence affecting community members and workers, particularly women and girls
Risk	Physical, psychological and sexual harm; risk of harm to minors
Who is affected	Community members and workers, particularly women and girls
Nature, extent, duration	Adverse, Direct and Indirect, Permanent (consequence for survivors) · Local (camp and surrounding communities) · Permanent where harm occurs; risk period coincides with construction
Phase	Construction

A6.1 Presence of a predominantly male non-local workforce in proximity to the community, and unequal power relations in employment

Mitigation measures	Standalone SH/SEA/GBV Prevention and Response Plan with confidential reporting channels, survivor-centered referral, sanctions and disciplinary framework, monitoring indicators and training records; Code of Conduct signed by all workers and displayed in languages commonly spoken on site; mandatory induction training with refreshers for workers, supervisors, subcontractors and security personnel; referral pathway mapping to health, police, shelters, hotlines and legal aid; GRM with a survivor-centered protocol. Community awareness activities
Significance	Pre-mitigation $3 \times 5 = 15$ VERY HIGH → Post-mitigation $2 \times 5 = 10$ HIGH
Residual management	Serious cases reported immediately to the PEU under agreed protocol; anonymized aggregate reporting monthly; HIRA reviewed where the GRM reveals a pattern. Residual significance remains High because the consequence of any single incident is severe irrespective of frequency.

A6.2 Shared accommodation, supervision relationships and site working conditions

Potential impact	Physical, psychological or sexual harassment of workers by other workers, supervisors or security personnel
Risk	Psychological and physical harm to workers; hostile working environment
Who is affected	Workers with heightened risk for women workers
Nature, extent, duration	Adverse, Direct, Temporary · On-site (camp and works areas) · Temporary (duration of employment), with potential lasting psychological effect
Phase	Construction
Mitigation measures	Written anti-harassment policy meeting the requirements of the Sexual Harassment (Prevention) Act and the Employment (Prevention of Discrimination) Act; Code of Conduct and GRM covering all worker categories including subcontractors, security personnel and service providers; mandatory training at induction with periodic refreshers and attendance records; psychosocial hazards included in the hazard identification and risk assessment.
Significance	Pre-mitigation $3 \times 4 = 12$ HIGH → Post-mitigation $2 \times 3 = 6$ MEDIUM

A6.2 Shared accommodation, supervision relationships and site working conditions

Residual management	Monitored through the GRM with survivor-centered handling where the complaint concerns SH/SEA/GBV. Assessed separately from the SH/SEA/GBV row, which addresses community-facing risk, and from Unfair Treatment, which addresses discrimination.
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A7.1 Recruitment, supervision and management of the workforce

Potential impact	Unfair treatment and discrimination on grounds including sex, gender identity, sexual orientation, race, ethnicity, religion, age, disability, HIV status, pregnancy or marital status
Risk	Harm to workers, verbal abuse, exclusion and potential escalation to physical violence
Who is affected	Workers
Nature, extent, duration	Adverse, Direct, Temporary · On-site and local · Temporary (duration of employment)
Phase	Construction
Mitigation measures	Non-discrimination and equal opportunity policy consistent with Barbadian law; Code of Conduct with a clear disciplinary procedure; training for supervisors and workers on respectful behaviour and diversity; accessible and confidential GRM with protection from retaliation; requirements flowed down into all subcontractor contracts.
Significance	Pre-mitigation $3 \times 3 = 9$ MEDIUM → Post-mitigation $2 \times 2 = 4$ LOW
Residual management	Grievances disaggregated and reviewed monthly; disciplinary outcomes recorded and reported to the PEU.

A7.2 Recruitment of workers, including through subcontractors and local labor suppliers

Potential impact	Engagement of persons below the legal working age, including out-of-school youth
Risk	Harm to minors and breach of national law and IDB requirements

A7.2 Recruitment of workers, including through subcontractors and local labor suppliers

Who is affected	Young persons, boys and girls, below the legal working age
Nature, extent, duration	Adverse, Direct, Permanent (consequence for the child) · Local (project area of influence) · Permanent where harm occurs
Phase	Construction
Mitigation measures	Strict age-verification at recruitment against official identity documents, with a Register of Young Persons maintained; explicit contractual obligations on all contractors and subcontractors to comply with national law and international standards; periodic audit of recruitment records by the PEU; defined sanctions for breach, including termination; training for hiring managers.
Significance	Pre-mitigation 2 × 4 = 8 MEDIUM → Post-mitigation 1 × 4 = 4 LOW
Residual management	Recruitment records retained and available for audit by the PEU; any suspected case reported immediately and referred to the competent authority.

A7.3 Advertising, shortlisting and selection of workers

Potential impact	Discriminatory recruitment practices excluding women, persons with disabilities or other groups
Risk	Unequal access to project employment opportunities
Who is affected	Job applicants, particularly women and PWDs
Nature, extent, duration	Adverse, Direct, Temporary · Local (project area of influence) · Temporary (recruitment periods)
Phase	Construction
Mitigation measures	Written job descriptions and a documented selection process with non-discriminatory criteria consistent with Barbadian legislation; standardized scoring at shortlisting and interview; recruitment records retained for audit by the PEU; vacancies advertised through local media and accredited technical and vocational institutions; gender-sensitive hiring procedures, encouragement of applications from women and PwDs.

A7.3 Advertising, shortlisting and selection of workers

Significance	Pre-mitigation 3 × 3 = 9 MEDIUM → Post-mitigation 2 × 2 = 4 LOW
Residual management	Report recruitment outcomes disaggregated by sex and role quarterly; investigate any pattern of exclusion.

A7.4 Setting of wages and grading of roles across the workforce

Potential impact	Differential pay between women and men performing work of equal value
Risk	Economic disadvantage to women workers and breach of equal pay principles
Who is affected	Women workers
Nature, extent, duration	Adverse, Direct, Temporary · On-site and local · Temporary (duration of employment)
Phase	Construction
Mitigation measures	Employment policy setting pay by skills, qualifications and competencies against documented grades; remuneration benchmarked against national labor market data and construction sector rates rather than assumption; pay-related grievances handled through the GRM; payroll and HR records available for audit.
Significance	Pre-mitigation 3 × 3 = 9 MEDIUM → Post-mitigation 2 × 2 = 4 LOW
Residual management	Report average wage for women and men in the same job grade (pay equity ratio) and the number of pay-related grievances disaggregated by sex, quarterly.

A8.1 Employment of workers by the Contractor and subcontractors

Potential impact	Breach of workers' rights concerning working hours, overtime, wages, rest days, freedom of association and living conditions
Risk	Exploitation of workers and non-compliance with national labor law and IDB ESPS 2
Who is affected	Workers, including subcontracted workers

A8.1 Employment of workers by the Contractor and subcontractors

Nature, extent, duration	Adverse, Direct, Temporary · On-site (camp and works areas) · Temporary (duration of employment)
Phase	Construction
Mitigation measures	Labour Management Plan setting out provision of PPE and amenities, fair and timely remuneration through accessible means, working hours and overtime limits, adequate rest periods and rest days, information on workers' rights and freedom of association, and decent working and living conditions; written contracts in a language each worker understands; conditions of work posted at the site; monitoring and enforcement to verify compliance throughout the project.
Significance	Pre-mitigation 3 × 3 = 9 MEDIUM → Post-mitigation 2 × 2 = 4 LOW
Residual management	Worker grievances, HR records, payroll and the contractor employment register reviewed monthly by the PEU; unannounced inspections of camp conditions.

A8.2 Employment of a workforce including non-English-speaking workers alongside an English-speaking community

Potential impact	Communication failure affecting worker safety, community engagement and access to the grievance mechanism
Risk	Unsafe working practices, exclusion from information, and inability to raise concerns
Who is affected	Workers and the community
Nature, extent, duration	Adverse, Direct, Temporary · On-site and local · Temporary (duration of construction)
Phase	Construction
Mitigation measures	Multilingual communication strategy as required by the IDB; interpreters engaged in adequate number; safety procedures, the Code of Conduct and GRM materials translated into the languages commonly spoken on site, including a Chinese-language worker declaration; pictorial as well as text-based signage for non-literate and non-English-speaking workers; all training delivered in a language the worker understands.

A8.2 Employment of a workforce including non-English-speaking workers alongside an English-speaking community

Significance	Pre-mitigation $4 \times 2 = 8$ MEDIUM → Post-mitigation $2 \times 2 = 4$ LOW
Residual management	Confirm translation coverage against the actual workforce language profile once nationality data is provided by the Contractor.
Depends on	<i>Workforce language profile not yet provided</i>

B1.1 Recruitment for camp construction and for operation of the reclamation facility

Opportunity	Creation of employment and transferable skills for residents of the project area of influence
Outcome	Increased household income and local skills base
Who is affected	Residents of the project area of influence
Nature, extent, duration	Beneficial, Direct · Local and national · Temporary during construction; long-term for operational roles
Phase	Construction and operation
Enhancement measures	Hiring plan prioritizing local recruitment with transparent practices; Local Skills Development and Inclusion Plan identifying training opportunities for women, youth, persons with disabilities and other vulnerable groups; accredited training where feasible.
Significance	Pre-mitigation $5 \times 3 = 15$ BENEFICIAL → Post-mitigation $5 \times 4 = 20$ BENEFICIAL
Residual management	Report jobs created disaggregated by sex, skill level and contract type, distinguishing temporary construction roles from longer-term operational roles.

B1.2 Engagement with farmers, the Chamber of Commerce and other defined stakeholder groups during operation

Opportunity	Beneficial supply, offtake or service agreements with identified stakeholder groups
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B1.2 Engagement with farmers, the Chamber of Commerce and other defined stakeholder groups during operation

Outcome	Shared economic benefit from the reclamation facility
Who is affected	Farmers including women farmers and women-owned businesses, the Chamber of Commerce and other defined stakeholder groups
Nature, extent, duration	Beneficial, Indirect · Local and national · Long-term (operation phase)
Phase	Operation
Enhancement measures	Stakeholder Engagement Plan defining which groups are engaged and on what terms; benefit-sharing commitments recorded and reported. The groups described as key populations and the nature of the agreements require definition and confirmation with the BWA and the PEU.
Significance	Pre-mitigation 3 × 3 = 9 BENEFICIAL → Post-mitigation 3 × 3 = 9 BENEFICIAL
Residual management	Record agreements concluded and the groups party to them; report annually.
Depends on	<i>Stakeholder groups and terms of agreement not yet defined</i>

B2.1 Operation of the South Coast Water Reclamation and Reuse Facility

Opportunity	Increased availability of reclaimed water for irrigation in designated agricultural zones
Outcome	Improved water security for agriculture and reduced abstraction of potable water
Who is affected	Women, men and young agricultural users in the designated zones
Nature, extent, duration	Beneficial, Direct · Regional (designated agricultural zones served by the facility) · Long-term (operation phase)
Phase	Operation

B2.1 Operation of the South Coast Water Reclamation and Reuse Facility

Enhancement measures	Equitable and sustainable allocation of reclaimed water to identified agricultural users; ongoing coordination with the BWA and the Ministry of Agriculture and Food and Nutritional Security.
Significance	Pre-mitigation $4 \times 4 = 16$ BENEFICIAL → Post-mitigation $4 \times 4 = 16$ BENEFICIAL
Residual management	Report volumes allocated and users served annually. The service area is limited to defined agricultural zones and is described as regional rather than national.

B2.2 Supply of reclaimed water to agricultural users

Opportunity	Potential reduction in irrigation cost for farmers
Outcome	Improved farm viability, contingent on future pricing decisions
Who is affected	Women, men and young farmers, including smallholder and tenant farmers
Nature, extent, duration	Beneficial, Indirect · Regional (designated agricultural zones). Long-term (operation phase), contingent
Phase	Operation
Enhancement measures	Coordination with the BWA on allocation and pricing. This benefit is contingent on future allocation and pricing decisions that the BWA has not yet confirmed and is presented as a potential rather than a confirmed outcome.
Significance	Pre-mitigation $2 \times 3 = 6$ BENEFICIAL → Post-mitigation $2 \times 3 = 6$ BENEFICIAL
Residual management	Not to be reported as a project benefit until pricing policy is confirmed by the BWA.
Depends on	<i>Contingent on BWA pricing policy</i>

B2.3 Improved reliability of irrigation water during dry periods

Opportunity	Contribution to national food security through more reliable local production
Outcome	Reduced dependence on imported food

B2.3 Improved reliability of irrigation water during dry periods

Who is affected	National food security; women and men along agricultural value chains and consumers
Nature, extent, duration	Beneficial, Indirect, Cumulative · National · Long-term (operation phase), contingent
Phase	Operation
Enhancement measures	Support through equitable allocation of reclaimed water to identified agricultural users and coordination with the Ministry of Agriculture and Food and Nutritional Security. Framed as a potential benefit contingent on future allocation and pricing decisions.
Significance	Pre-mitigation 3 × 3 = 9 BENEFICIAL → Post-mitigation 3 × 3 = 9 BENEFICIAL
Residual management	Monitor volumes allocated to agriculture; the food security contribution cannot be attributed to the project without a firm government plan linking reclaimed water to food security.
Depends on	<i>Contingent on allocation policy</i>

B2.4 More reliable local food production supported by reclaimed water

Opportunity	Greater availability of locally grown produce and more stable food costs over time
Outcome	Improved access to affordable fresh produce for households, businesses and the tourism sector
Who is affected	Households including female-headed households, businesses and the tourism sector
Nature, extent, duration	Beneficial, Indirect, Cumulative · National · Long-term (operation phase), contingent
Phase	Operation
Enhancement measures	As above. Presented as a potential benefit dependent on allocation, pricing and market response, and not as a confirmed outcome.

B2.4 More reliable local food production supported by reclaimed water

Significance	Pre-mitigation 2 × 3 = 6 BENEFICIAL → Post-mitigation 2 × 3 = 6 BENEFICIAL
Residual management	Not to be reported as a confirmed benefit; revisit once allocation and pricing are settled.
Depends on	<i>Contingent on allocation and pricing</i>

B3.1 Diversion of wastewater from the existing outfall and improved treatment performance

Opportunity	Improved environmental health and support to the ecosystem services of the Graeme Hall Swamp and the coastal zone
Outcome	Reduced pollutant loading on sensitive receiving environments
Who is affected	Graeme Hall Swamp and the coastal zone
Nature, extent, duration	Beneficial, Direct and Indirect · Local and national · Long-term (operation phase)
Phase	Operation
Enhancement measures	Management oversight by the PEU on behalf of the Government; performance monitored against the priority ecosystem services identified in the Description of the Environment chapter.
Significance	Pre-mitigation 4 × 3 = 12 BENEFICIAL → Post-mitigation 4 × 3 = 12 BENEFICIAL
Residual management	Monitor effluent quality and receiving water quality against the pre-project baseline, which records the existing plant in a state of operational failure.

B3.2 Infiltration of treated water and reduced abstraction pressure

Opportunity	Recharge of underground reservoirs and improved resilience of supply during drought
Outcome	Improved water security for agriculture, households and industry

B3.2 Infiltration of treated water and reduced abstraction pressure

Who is affected	National water users
Nature, extent, duration	Beneficial, Direct · National · Long-term (operation phase)
Phase	Operation
Enhancement measures	Management oversight by the PEU on behalf of the Government; recharge performance monitored against the groundwater baseline once established.
Significance	Pre-mitigation $4 \times 4 = 16$ BENEFICIAL → Post-mitigation $4 \times 4 = 16$ BENEFICIAL
Residual management	A groundwater baseline has not yet been established and is required before recharge benefits can be evidenced.
Depends on	<i>Groundwater baseline not yet established</i>

B3.3 Financing of the project through the debt-for-climate conversion

Opportunity	Release of fiscal space for investment in water security, climate resilience and critical infrastructure without increasing national debt
Outcome	Strengthened national water and food security and demonstration value for other small island developing states
Who is affected	The national budget and public investment
Nature, extent, duration	Beneficial, Indirect · National, with regional and sectoral demonstration effect · Long-term
Phase	Operation
Enhancement measures	Management oversight by the PEU on behalf of the Government. Reported on the basis of the published IDB, EIB, GCF and Government of Barbados sources rather than by inference.
Significance	Pre-mitigation $4 \times 3 = 12$ BENEFICIAL → Post-mitigation $4 \times 3 = 12$ BENEFICIAL
Residual management	Report savings applied to the project and the resulting investment. The demonstration effect is described as regional and sectoral rather than global.

7.6.5. Part D: What the assessment still depends on

Table 104: Outstanding data dependencies

Row	What is missing	Effect on the assessment	Who holds it
A5.1	Workforce size and nationality mix	The labor influx rating, the language plan and the community awareness programme all assume a workforce profile that has not been confirmed.	China Railway Shanghai Engineering Group
A4.1	Pre-construction price baseline for key commodities	No baseline means the price escalation indicator cannot be measured and the Low residual rating cannot be tested.	Barbados Statistical Service / PEU
A5.2	Community Health Assessment	Monitoring requirements and control measures for wastewater exposure pathways are provisional until the assessment reports.	Community Health Focal Point / PEU
A3.3	Night-time ambient noise baseline	Generator operation is expected to run overnight. Without a night-time baseline the Medium residual rating is not evidenced.	Environmental Protection Department / Contractor
A8.2	Workforce language profile	Translation and interpretation coverage cannot be sized until the languages spoken on site are known.	China Railway Shanghai Engineering Group
B1.2	Definition of stakeholder groups, and of the terms on which engagement with each group is agreed, covering the method of contact, the frequency of engagement and the point of contact	The benefit is asserted without identifying who receives it or on what terms.	Barbados Water Authority / PEU

Row	What is missing	Effect on the assessment	Who holds it
B2.2	BWA allocation and pricing policy for reclaimed water	Reduced irrigation cost is contingent and should not be reported as a project benefit until pricing is set.	Barbados Water Authority
B2.3	Government plan linking reclaimed water to food security	The food security contribution cannot be attributed to the project without it.	Ministry of Agriculture and Food and Nutritional Security
B2.4	Allocation, pricing and market response	Availability and price stability of local produce follow from decisions not yet taken.	Barbados Water Authority / Ministry of Agriculture
B3.2	Groundwater baseline	Recharge benefits cannot be evidenced against an unestablished baseline.	Barbados Water Authority

7.7. Gender Analysis of the Project

The baseline above describes gender relations in Barbados. This section applies that baseline to the project: who the project actually employs, how the project's impacts fall differently on women and men, what the project commits to in response, and what remains unknown. It is the analytical counterpart to the Gender Monitoring Matrix that follows.

7.7.1. Composition of the project workforce

The workforce is set out in the Labour Management Plan of 7 August 2026. Of 252 planned posts, 22 are held by women, a share of 8.7 per cent. The distribution is uneven between the three workforce categories.

Table 105: Project workforce by category and sex

Category	Total	Male	Female	Female share
Project management	19	17	2	10.5%
Chinese skilled workers	80	80	0	0%
Local subcontractor personnel	153	133	20	13.1%
Total	252	230	22	8.7%

Two features of this distribution matter for the assessment. The first is that women are almost entirely absent from the directly employed construction workforce: not one of the 80 Chinese skilled and semi-skilled workers is a woman, and two of the 19 management posts are held by women. Every woman on the project bar two is engaged through a local subcontractor. The second is that the female share of the workforce, at 8.7 per cent, sits far below women's share of the Barbadian labor force, and far below the female labor force participation rate, which stands at 58.1 per cent against 67.0 per cent for men. The project is therefore not merely reflecting national labor market patterns; it is concentrating employment in a way that excludes women more sharply than the national market does.

The workforce is not present at that level throughout. The deployment plan runs from the first quarter of 2026 to the second quarter of 2029 and passes through four phases. Mobilisation, in the first half of 2026, is small and overwhelmingly local, at about seventy-nine per cent Barbadian on a person-quarter basis. Ramp-up, from the third quarter of 2026 to the second quarter of 2027, roughly halves that proportion. Peak construction runs from the third quarter of 2027 to the fourth quarter of 2028, when local content falls to about forty-seven per cent. Demobilization, in the first half of 2029, is the least local of all at about twenty-four per cent, because the remaining work is Chinese-staffed commissioning and plant handover.

On-site numbers follow the same curve. The site holds 22 people in the first quarter of 2026, rises past 150 by the fourth quarter, and reaches its maximum of 203 in the third quarter of 2028, being 98 Chinese nationals and 105 Barbadian personnel. The Chinese complement reaches 98 in the third quarter of 2027 and stays at that level for five quarters. That figure is the same 98 as the camp's resident population, which confirms that the camp is sized for the Chinese national complement and that Barbadian personnel are not accommodated on site.

Two consequences follow for this assessment. The first is that the peak daytime population of 203 and the resident population of 98 are not alternative estimates of the same thing: they are simultaneous and both correct, and they diverge most sharply in the third quarter of 2028. That is the design case for the sanitary and welfare systems. The second is that local employment, which the assessment records as the principal beneficial impact, is at its highest early and declines through the project, so the benefit and the peak disturbance do not coincide.

A distinction in the local content figure should also be recorded. The plan reports 154 personnel as local, giving 61.1 per cent local content, but the strictly Barbadian proportion is 58.3 per cent because the environmental consulting team includes Guyanese nationals. The difference is small but it matters where local content is a contractual or reporting commitment, and the two figures should not be used interchangeably.

The gender baseline of 12 August 2026 records a further statement bearing directly on this analysis: that the Contractor will ensure that recruitment and outreach targets the local population, encouraging women and other vulnerable groups of people to apply. That statement sits alongside a Labour Management Plan showing twenty-two women among two hundred and fifty-two posts, so women are not absent from the planned workforce, but the two together indicate that the female share arises from the professional and administrative functions rather than from any intention to recruit women into the trades. The commitments set out later in this chapter are framed accordingly, and the position should be confirmed with the Contractor in writing before the Environmental and Social Management Plan is finalized, since a stated intention not to hire women engages the Employment (Prevention of Discrimination) Act 2020 and IDB Environmental and Social Performance Standard 9.

7.7.2. Occupational segregation within the project

Disaggregating by role shows where women are and are not employed. Women hold posts in ten of the twenty-four roles identified, and those posts are concentrated in professional, technical and service functions rather than in construction work.

Table 106: Roles employing women, by female share

Role	Total posts	Women	Female share
Legal services	1	1	100%
Financial services	1	1	100%
ESIA/ESMP specialists	7	5	71.4%
Customs clearance officers	3	1	33.3%
Water quality testing, laboratory technicians	7	2	28.6%
Material testing, laboratory technicians	8	2	25.0%
Landscaping works	20	5	25.0%
Material supply, ready-mix concrete and masonry	22	2	9.1%
Temporary water supply, engineers and technicians	11	1	9.1%
Project management personnel	18	1	5.6%

The role table sums to twenty-one women, against twenty-two in Table 106, because one post is classified differently between the Labour Management Plan role table and the summary in the same workbook. The discrepancy is recorded at Table 107 and is to be reconciled with the Contractor.

Table 107: Roles employing no women

Role	Posts
Chinese skilled trades: reinforcement, carpentry, concrete	35
Chinese semi-skilled: general workers and site assistants	15
Chinese skilled: electrical, mechanical and instrumentation	15
Material supply: aggregate and construction equipment	15
Road works	15
Chinese skilled trades: finishing	10
Material supply: building materials and hardware	10
Fire protection works	10
Truck drivers	8
Geotechnical engineers and drilling	6

Role	Posts
Temporary power supply, engineers and technicians	6
Chinese skilled: drivers	5
Survey engineers and surveyors	3
HSE Officer	1
Total	154

One hundred and fifty-four posts, being 61.1 per cent of the entire workforce, are the skilled and semi-skilled construction trades, plant operation, haulage, survey and materials supply.

This finding has a direct consequence for the assessment. Job creation is recorded as a beneficial impact in the Social Impact Assessment Matrix, and the benefit is real, but on the present composition it accrues to men in roughly eleven cases out of twelve. Any statement that the project creates employment opportunity for the community should be qualified accordingly, and the commitments below are directed at changing the distribution rather than restating the benefit.

7.7.3. Gender-differentiated impact pathways

Each of the impacts assessed in the Social Impact Assessment Matrix carries a gender dimension. The table records how the impact falls differently on women and men, and the instrument through which the difference is managed.

Table 108: Gender dimension of assessed impacts

Impact	How it differs by gender	Managed under
Labour influx and community interaction	A workforce that is 91.7 per cent male, housed adjacent to a residential community, is the principal driver of sexual harassment, exploitation and gender-based violence risk. Women and girls in the community bear that risk; women workers, LGBTIQ+ workers, men and boys may also be exposed to harassment and violence from other workers or community members workers do not	SH/SEA/GBV Prevention and Response Plan; Code of Conduct; Stakeholder Engagement Plan and GRM

Impact	How it differs by gender	Managed under
Traffic and pedestrian safety	Women are more likely to travel on foot along the community road, accompanying children to school and carrying goods, and are therefore more exposed to heavy vehicle movement than car-borne road users. Girls, women with disabilities and older women may be particularly at risk as more vulnerable pedestrians	Traffic Management Plan; restricted movement windows
Job creation	The benefit accrues to men in eleven of twelve posts. Women's access is limited by occupational segregation, by recruitment routes that do not reach them, and by unpaid care responsibilities that constrain availability. Women with disabilities and young women face additional barriers to entry into construction and technical roles	Labour Management Plan; the commitments below
Inflationary pressure on food, fuel and rents	Price pressure falls hardest on the lowest-income households, which in Barbados are disproportionately headed by women.	Local procurement; price and rental baseline
Pressure on health services	Women are the principal users of primary and reproductive health services and the principal carers when household members fall ill, so service strain transfers to them twice over. Girls and women with disabilities may face particular barriers when services are overburdened	Community Health Assessment and Programme
Water supply pressure	Where supply is interrupted, the burden of securing and carrying water falls disproportionately on women and girls within the household.	Camp self-sufficiency; consumption monitoring
Noise and disruption to daily activity	Disturbance during the day falls on those at home, who are more often women, older persons and young children. Can particularly affect caregivers, infants, pregnant women, PWDs and older persons' physical and mental health.	Working hour restrictions; Noise Management Plan
Worker accommodation and welfare	Twenty-two women are accommodated or work within a camp of 252. Sanitation, security and privacy provisions determine whether that is safe.	Workers' Health and Safety Plan; welfare provisions; GRM

Impact	How it differs by gender	Managed under
Grievance and reporting	Women are less likely to use a public complaint route, and more likely to use a confidential one. A single undifferentiated channel will under-record women's complaints.	Grievance Redress Mechanism; confidential SH/SEA/GBV channel; SH/SEA/GBV Prevention and Response Plan

7.7.4. Sexual harassment, exploitation and gender-based violence

The Labor Influx Risk Screening assesses this risk at likelihood 3 and consequence 5 before mitigation, and at likelihood 2 and consequence 5 after mitigation, retaining a High residual rating. The consequence score does not fall because harm to a survivor cannot be undone; only the probability of occurrence can be reduced. It is the highest-rated community risk the project carries, and it remains High for the life of the works.

The screening identifies seven drivers: a large and predominantly male workforce; the presence of 98 non-local workers; worker movement and interaction within the surrounding communities; economic power imbalances between workers and residents; the exposure of women, girls, children, older persons, persons with disabilities and lower-income households; under-reporting caused by language difference, fear of retaliation, stigma and limited awareness of reporting routes; and the concentration of risk during peak deployment of 203 workers between the third quarter of 2027 and the fourth quarter of 2028.

Twelve minimum controls follow from the screening and are implemented through the Environmental and Social Management Plan. They cover Code of Conduct signature as a condition of site access, mandatory induction with quarterly refreshers, written material in English and Standard Chinese with spoken interpretation, a worker-community interaction protocol, confidential and anonymous reporting held separately from the general grievance log, a verified survivor referral directory, community awareness before mobilization and six-monthly thereafter, supervisor accountability, a restricted-access case register, disciplinary sanctions, monthly and quarterly monitoring, and the prohibition on any sexual activity with a person under 18.

Obligations of this kind reach the workforce only if they reach the subcontractors. Transport, catering, waste collection and construction support will be delivered by subcontracted firms, and the Inception Report identifies the cascade of obligations to those firms as an open gap: the requirements of the Labour Management Plan and the Workers' Code of Conduct are not yet written into subcontract terms. For this assessment the position is that every control expressed as binding on the Contractor is binding on its subcontractors, that adherence is to be documented in the subcontract, and that

compliance is to be audited rather than assumed. Without that cascade the controls in this document apply to a minority of the people who will be on site.

The Labor Management Plan for the wider project supplies the instruments through which these obligations are evidenced rather than merely stated. It carries thirteen implementation templates, among them the worker induction checklist, the Code of Conduct acknowledgement form, the labor influx risk monitoring checklist, the worker grievance intake form, the confidential referral log for sexual exploitation and harassment cases, the accommodation inspection checklist, the subcontractor labor compliance checklist, the training attendance register and the incident and corrective action tracker. The camp's monitoring obligations under this assessment should be discharged using those templates so that a single evidence trail serves the camp, the treatment plant and the reclamation facility, and so that the subcontractor compliance checklist becomes the mechanism by which the cascade described above is audited.

Language is the other condition of enforceability. The Code of Conduct requires worker-facing documents in the native language of the worker, and eighty of the ninety-eight resident workers are Chinese nationals. The Chinese-language worker declaration had not been provided at the time of the July 2026 document review, which means the instrument that carries the signature has not been available in the language of the majority of those signing it. Induction, refresher training, the grievance posters and the confidential reporting routes are subject to the same requirement. A signature on a document a worker cannot read is not informed consent and would not withstand scrutiny in a disciplinary process or a Bank review.

The national context makes these controls necessary rather than precautionary. The National Intimate Partner Violence survey, commissioned by Jabez House, funded by the European Union and conducted by DB Research Services across 515 respondents, found that 62 per cent of women in Barbados have experienced at least one form of intimate partner violence, with emotional abuse most prevalent at 37 per cent, social isolation at 25 per cent and physical violence at 22 per cent, and 46 per cent of respondents reporting more than one category of abuse. Officials and advocates consider that figure an underestimate given the level of non-disclosure. The regional comparator from population-based surveys by UN Women, the Inter-American Development Bank and the Pan American Health Organization is approximately 30 per cent of ever-partnered women in the Caribbean reporting physical or sexual intimate partner violence in their lifetime. The two figures are not in conflict: the national survey covers all women and counts any form of intimate partner violence including emotional abuse and social isolation, whereas the regional figure covers ever-partnered women only and counts physical or sexual violence. Both are cited here because the assessment should not rest on the lower of the two. Barbados scores between 0.73 and 0.75 on the World Economic Forum Global

Gender Gap Index. The Employment Sexual Harassment (Prevention) Act, 2017 requires employers to maintain zero-tolerance harassment policies, formal grievance procedures and civil liability measures, and the Domestic Violence (Protection Orders) Act as amended in 2016 broadens police intervention powers and the availability of protective orders.

7.7.5. Access to the grievance mechanism

The Grievance Redress Mechanism carries a separate confidential pathway for sexual exploitation and abuse, sexual harassment, gender-based violence and child protection. Cases on that pathway are investigated by an independent, gender-sensitive team outside normal management lines, logged in a restricted-access register recording minimal facts and never identifying details, and handled on survivor-centered principles under which the survivor decides whether an investigation proceeds. Protective measures include temporary relocation of the survivor or suspension of the alleged perpetrator pending investigation, and complainants and witnesses are protected against retaliation. General grievances are acknowledged within two working days and simple cases resolved within seven. Reporting routes include an anonymous drop box within the camp, secure email, a hotline and in-person reporting, with multilingual signage at the camp and work sites.

The existence of that pathway is assessed separately from its effectiveness. Social monitoring under the Social and Gender Methodology examines whether workers and community members are aware of the Grievance Redress Mechanism, whether they know how and where to submit a complaint and what happens after one is received, and whether physical, communication, language, literacy or other barriers prevent them from using it. It examines which reporting channels different groups prefer, and it examines fear of retaliation, particularly where a complaint concerns a supervisor, employer or contractor. It examines whether stakeholders understand how their information is protected, and whether access and use differ between women and men, between local and non-local workers, and for persons with disabilities.

A low number of grievances is treated as an open question and not as evidence that risk is absent. Limited reporting may equally reflect low awareness, absence of trust, fear of retaliation, concern about confidentiality, or difficulty reaching a reporting channel. Grievance data are therefore read alongside stakeholder consultation, worker feedback and observation before any conclusion is drawn about the level of risk. Monitoring of this pathway relies on non-identifying information only. Individual survivor information is not incorporated into social monitoring reports, and where a disclosure is made during routine social engagement, social personnel do not investigate or test the allegation but refer the matter immediately into the confidential survivor-centered procedure described above.

That pathway now has named destinations. The SH/SEA/GBV Prevention and Response Plan of 10 August 2026 sets out a referral directory for Barbados covering health, police protection, psychosocial support, shelter and legal aid, reproduced at Table 102. The plan is built on zero tolerance, a survivor-centered approach in which the survivor determines the course of reporting and investigation, multiple confidential reporting channels including hotline, email, drop box and in person, and a guarantee of non-retaliation for anyone reporting in good faith. Ultimate responsibility for implementation rests with the Project Manager and confidential reporting and investigation are managed by the HR Representative. A confidential grievance register is reviewed monthly and reported quarterly to the Project Execution Unit and the Barbados Water Authority.

Table 109 gives the referral directory.

Table 109: Survivor referral directory, from the SH/SEA/GBV Prevention and Response Plan

Service	Organization	Hours	Services provided
Health	Queen Elizabeth Hospital, Emergency Department	24 hours	Emergency medical care, post-rape treatment, forensic examination
Police protection	Royal Barbados Police Force, Family Conflict Intervention Unit	24 hours	Crisis response, protection orders, relocation assistance
Psychosocial support	SAVE Barbados	24 hours	Confidential counselling, advocacy, accompaniment
Psychosocial support	BPW Crisis Centre	Monday to Friday, 8am to 5pm	Individual and group therapy, children's counselling
Shelter and safe housing	BPW Shelter for Abused Women	24 hours	Temporary housing, skills training, transitional support
Legal aid	Legal Aid Clinic Barbados	Monday to Friday, 9am to 4pm	Legal advice, protection orders, court representation
Legal aid	SAVE Barbados legal team	By appointment	Legal advocacy, support with police reporting

Two points of operating discipline follow. Referral is on the survivor's consent and at the survivor's direction, not on the project's judgement, and the camp's own procedures must not require a survivor to report internally before reaching an external service. Transport to a shelter or to the hospital is to be arranged by the project where the survivor asks for it, which means a vehicle and a driver have to be available outside working hours.

7.7.6. Commitments

The following commitments respond to the analysis above. They are carried in the Labor Management Plan and the Environmental and Social Management Plan and are monitored through the Gender Monitoring Matrix.

Table 110: Gender commitments and the indicator against which each is monitored

Commitment	Indicator
Advertise all locally recruited posts through routes that reach women, including the Bureau of Gender Affairs, community organizations and the Constituency Council, and record where each applicant heard of the post	Applications received by sex, by recruitment route
Set no requirement in a job specification that is not necessary for the work, and review specifications for terms that deter women from applying	Specifications reviewed; terms removed
Report recruitment outcomes by sex at each stage, from application through shortlist to appointment, so that where women are lost from the process is visible	Appointment rate by sex at each stage
Offer training and apprenticeship places in the construction trades to women, with a stated target, given that no woman presently holds one of the 154 posts in those trades	Training places offered and taken up, by sex
Pay equal wages for work of equal value, and audit wage rates by sex annually	Wage audit completed; variance by sex
Provide sanitation segregated by sex, adequate in number, lockable from inside, with cleaning schedules accounting for menstrual hygiene and safe disposal	Inspection findings; complaints received
Provide accommodation, rest and social space that is safe and private for women, with secure lighting on access routes and a visitor policy	Inspection findings; security incidents
Provide lactation facilities and family provisions where required, and accessible facilities where persons with disabilities are employed	Facilities provided against need identified
Deliver induction and refresher training on the Code of Conduct and on SH/SEA/GBV to every worker, in a language they understand, and record attendance disaggregated by sex	Training completion by sex and worker category

Commitment	Indicator
Consult women separately within community engagement, so that their concerns are recorded rather than aggregated	Consultations held; participants by sex
Report grievances by sex of complainant and by category, and report confidential SH/SEA/GBV cases separately in aggregate	Grievances by sex and category; cases and referrals

7.7.7. What is not yet known

Three gaps limit this analysis and are recorded so that they are closed rather than carried forward silently.

Table 111: Gender data gaps

Gap	Why it matters	Action
Sex-disaggregated profile of the Area of Influence — CLOSED	Household headship, tenure, livelihoods and income by sex determine who bears the inflationary and service-pressure impacts, and no baseline exists against which to measure them	Closed by the Community Health Assessment revision 3.0, which profiles 677 households by tenure and the area population by age band and sex. Livelihood and income data by sex remain outstanding.
No data on the sex composition of workers resident in the camp as against those commuting	Determines off-duty exposure and the adequacy of the welfare provisions, which are sized on assumption at present	Confirm accommodation and rotation pattern by worker category and sex
Spoken language varieties within the Chinese workforce are unverified	Determines whether Mandarin, Cantonese or another variety is required for induction, reporting channels and referral information, and language is one of the seven identified drivers of under-reporting	Workforce language verification before mobilization
The workforce gender split is stated inconsistently in the source documents	The Labour Management Plan role table sums to 231 men and 21 women; the summary in the same workbook and the Labour Influx Risk Screening both state 230 and 22. One post is classified differently between them	Reconcile with the Contractor and restate consistently wherever workforce figures appear

7.7.8. Gender monitoring matrix

Table 112 sets out the gender monitoring matrix, covering recruitment and labor force participation, inclusion, community health and training.

Table 112: Gender Monitoring Matrix

Recruitment and labor force	Gender Inclusion	Community Health	Trainings
Age of workers	Number of women hired	Awareness of the grievance redress system	Employee onboarding brief
Recruitment forecast	Segregated bathroom facilities	Social Engagement with businesses	Training on sexual assault and sexual harassment
Recruitment Procedure	Number of men hired	Grievance redress log	Training on gender mainstreaming awareness
Total number of persons hired	Roles women employed in (Technical, Non-Technical)	Social Benefits to the community	Awareness of the grievance redress system
Young Person's Register (If Applicable)	Conduct of Gender Based Violence and Sexual Exploitation and Harassment Training	Local Procurement Activities	Grievance redress log
Number of locals hired	Incident reports	*****136	Implementation of HIV/ STI awareness and education programs
Worker's Contracts signed	Grievance redress log	*****	*****

136 ***** included for completeness to indicate that no information is missing from the table.

Recruitment and labor force	Gender Inclusion	Community Health	Trainings
Worker's awareness of Code of Conduct	Security measures in place at project site	*****	*****
Code of Conduct understood, and signed by workers	Social activities for workers	*****	*****
Awareness of grievance redress system	Worker time off schedule	*****	*****
Number of Foreigners hired	Work schedule	*****	*****
Provision of PPE ³¹	*****	*****	*****

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1. Monitoring programme

Monitoring establishes whether the controls above are working. Each parameter has a method, a frequency, a responsible role and a threshold that triggers corrective action. A measure without a threshold cannot be enforced, so a trigger is stated for every parameter (see Table 113).

Table 113: Environmental and social monitoring programme

Parameter	Method	Frequency	Responsible	Trigger for corrective action
Noise at sensitive receptors	Sound level meter at the boundary nearest the receptor	Monthly and on complaint	HSE Officer	Exceedance of 55 dBA by day or 45 dBA at night, being the IFC EHS Guideline values adopted in the absence of a national standard
Noise within the camp	Observation and complaint log	Daily	HSE Officer	Any noise-producing activity within quiet hours, 22:00 to 06:00
Dust and air quality	Visual observation at the boundary; instrumental monitoring at defined construction stages	Daily visual; staged instrumental	HSE Officer	Any visible dust migration beyond the site boundary
Effluent quality	Laboratory analysis of treated sewage before discharge	Monthly and after any system intervention	HSE Officer	Exceedance of EPD and BWA discharge criteria
Sedimentation tank condition	Inspection for sludge accumulation and structural integrity	Weekly	Site Engineer	Sludge at design capacity, or any sign of structural failure or seepage
Standing water and vectors	Inspection of outdoor areas, drainage and waste areas	Daily	HSE Officer	Any standing water persisting beyond 24 hours
Erosion and sediment control	Inspection of silt fences, sediment traps and stabilized surfaces	Weekly and after heavy rainfall	Site Engineer	Any breach, bypass or sediment discharge beyond the boundary
Clearance boundary	Boundary walk against the delineated clearing limit	Weekly during clearance	Site Supervisor	Any encroachment beyond the approved footprint

Parameter	Method	Frequency	Responsible	Trigger for corrective action
Waste arisings and disposal	Waste log and manifest reconciliation	Weekly and on every removal	HSE Officer	Any removal without a completed manifest; any disposal to an unapproved site
Hazardous waste storage	Inspection of containment, labelling and housekeeping	Daily	HSE Officer	Any leak, unlabeled container, incompatible storage, or containment below 110 per cent of the largest container
Traffic compliance	Observation at the community road; vehicle register	Daily during movement windows	Traffic Wardens	Any movement outside the permitted window; any speed above 15 km/h on the community road
Community complaints	Grievance log by category, receptor group, sex (disaggregated where feasible) of complainant and response time	Continuous; reviewed monthly	Community Liaison Officer with Social Personnel and HSE Officer	Any complaint unresolved beyond the response time in the GRM; thresholds such as increased complaints from women or girls on a specific issue, behavior of workers etc
Social and gender incidents	Confidential reporting through the Grievance Redress Mechanism and Code of Conduct channels	Continuous; reviewed monthly; Coordination with support services and the PEU	Social and Gender focal point, HSE Officer, HR Representative	Any report of sexual harassment, exploitation or gender-based violence involving workers or community members
Worker accommodation	Unannounced inspection of dormitories, washrooms, kitchens and rest areas, GRM posted and emergency contacts in dormitories and washrooms	Weekly	HSE Officer, Camp Manager	Any failure of sex segregation, lockable access, lighting, cleanliness or occupancy standard, any harassment SH/SEA/GBV incident reported linked to accommodation facilities or routes to them
Heat stress	Ambient temperature and humidity; observation of work-rest cycles	Daily during hot periods	Site Supervisor; HSE Officer	Conditions requiring the 45:15 work-rest rotation not being applied

Daily inspection findings are recorded by the HSE Officer. Weekly inspection results, the complaint log and the waste log go to the Operations Manager. A monthly report covering monitoring results, incidents, grievances, trends, corrective actions and management-of-change issues is submitted to the

Project Manager and the Project Execution Unit. Any incident with the potential to affect the community, and any exceedance of a trigger above, is reported without waiting for the monthly cycle.

8.2. Noise management

The following table (Table 114) presents a list of equipment planned for use at the site during construction, and their estimated maximum noise emission levels at a distance of 50 ft (15 m) (values taken from US Department of Transport's Construction Noise Handbook, 2017, and Southern California Edison, MESA 500kV Substation Project Environmental Assessment, 2015).

Table 114: Estimated Noise Emission Output from Construction Equipment

Equipment	Noise Levels at 50 ft (dBA)	
	US Department of Transportation, 2017	Southern California Edison, 2015
Truck Crane (25 tons)	85	81
Excavator (Model 365)	85	81
Road Roller (18 tons)	85	81
Concrete Pump Truck (43 m)	82	82
Concrete Mixing Truck (600 L)	85	80
Forklift (3.5 tons)	-	80
Generator (5.5 Kw)	81	82

The health impacts associated with noise vary according to the levels of noise exposure; and include noise-induced hearing impairment, interference with speech communication, sleep disturbances, and psychophysiological, mental health, and performance effects (WHO, 1999).

Table 115 identifies some noise-induced health impacts and the conditions under which they occur.

Table 115: Noise-Induced Health Impacts

Health Impacts	Conditions Causing Health Impacts
Hearing Impairment	Occurs as a result of sound in the frequency range of 2000-6000Hz (largest effect at 4000 Hz). Occurs at frequencies as low as 2000 Hz with prolonged exposure of 8 hours or more; Hearing impairment is not expected to occur at 75dB or lower, even for prolonged exposure; and during leisure time and environmental noise at 70dB or below for 24 hours; effects are seen at impulse noise exceeding 140dB
Speech Intelligibility	Impacted by noise with sound pressure levels of 35dB or higher. This is because normal speech is at 50dB and to achieve full sentence intelligibility in listeners with normal hearing, the signal to noise ratio (i.e., the difference between the speech level and the sound level of interfering noise) should not exceed 15dB.

Health Impacts	Conditions Causing Health Impacts
Sleep Disturbance	Primary effects of sleep disturbance include difficulty falling asleep, awakenings and alterations of sleep stages and depth, increased blood pressure, heart rate; changes in respiration, cardiac arrhythmia and increased body movements. Continuous background sound level of 30dB and individual noise events exceeding 45dB should be avoided to achieve a good night's sleep.
Disruption of Physiological Function	Susceptible members of the population (such as workers exposed to noise and persons living near airports, industry and noisy streets) are at risk of developing permanent effects such as hypertension and ischemic heart disease as a result of exposure to high sound levels. While the magnitude and effects are affected by individual characteristics, lifestyle behaviors and environmental conditions, workers exposed to industrial noise for 5-30 years are at risk of developing hypertension; long term exposure to air and road traffic exceeding 65-70dB over 24 hours have been associated with cardiovascular effects such as ischemic heart disease and hypertension
Annoyance	The level of annoyance associated with exposure to noise varies in populations according to characteristics of noise (e.g. the source), and non-acoustical social, psychological and economic factors. Nevertheless, it has been determined that noise above 80dB, may increase aggressive behaviour. However, it is noted that at 55 dB and 50dB, few people are highly and moderately annoyed during the day respectively. The nighttime level to reduce the likelihood of annoyance, should be 5-10dB lower than during the day.

8.2.1. Noise monitoring plan

Table 116 sets out the noise management and monitoring measures to be applied through construction and operation.

Table 116: Noise Management and Monitoring Plan

Noise Management			
Objective (s): 1. To avoid, minimize and control the impacts of noise on receptors in the project area, throughout the project's lifecycle 2. To ensure construction activities are undertaken in accordance with best practice controls.			
Management Strategy: Noise to be managed primarily through administrative and equipment controls during the construction and operation of the Workers' Campsite			
		Responsibility	Frequency/Timeline
Controls	Restrict noise-producing activities during construction to daytime period (i.e. during working hours -08:00 h-18:00 h) so that noise levels at sensitive receptors do not exceed 55dBA	Site Supervisor (CRSEG)	Daily

Noise Management			
	Provide hearing protection for workers, to ensure exposure to noise does not exceed the 85dBA threshold, over an 8-hour period.	HSE Officer (CRSEG)	Daily
	Implement administrative controls such as rotating workers in instances where activities producing noise in excess of 85dBA, extend over an 8-hour period	Site Supervisor (CRSEG)	Daily
	Conduct tool-box talks on noise reduction practices	HSE Officer (CRSEG)	Weekly
	Maintain all equipment in good working order in accordance with the Manufacturer's specifications.	Site Engineer (CRSEG)	Monthly
	Install noise dampening mechanisms such as mufflers and silencers on generator and heavy machinery. Place generator in suitable, noise-dampening enclosure	Site Engineer (CRSEG)	Prior to use
	Implement a system of pre-start checks to ensure equipment performance as required.	Site Supervisor (CRSEG)	Daily
	Avoid unnecessary idling of vehicles and heavy-duty equipment. These should be turned off when not in use	Site Engineer and HSE Officer	Daily
	Maintain a safe distance between workers' sleeping area and core construction activities. Install sound proofing measures as necessary	Site Engineer (CRSEG)	During Construction
	Conduct noise monitoring to ensure noise levels are within acceptable limits	HSE Officer (CRSEG)	Monthly
	Inform relevant stakeholders about planned construction activities and sensitize them about the project's grievance redress mechanism (GRM) Implementation of GRM	Stakeholder Engagement/Community Liaison Officer (CRSEG) Stakeholder Engagement/Community Liaison Officer (CRSEG)	Prior to commencement of construction activities As needed

Noise Management			
Performance Indicators	- Noise levels at the sensitive receptors do not exceed 55 dB(A) - Occupational noise exposure for workers remains below 85 dB(A) over an 8-hour time-weighted average. 100% of workers in high-noise areas provided with and using hearing protection. 100% completion of scheduled noise monitoring activities and monitoring report completed within one week of monitoring. 100% of machinery maintained on schedule and in accordance with manufacturer's specifications. - All noise-related grievances are acknowledged within 24 hours and addressed within 7 days. - At least four noise-awareness toolbox talks conducted per month during construction. - Corrective actions implemented within 48 hours of any exceedance.	HSE Officer (CRSEG)	Monthly
Monitoring	- Daily inspection of Workers' Campsite - Conduct of noise monitoring monthly at baseline monitoring locations, workers' accommodation area, generator and equipment use zones using calibrated sound level meter	HSE Officer (CRSEG)	Daily inspection & Monthly monitoring of noise levels
Reporting	Complaints will be channeled to the Project Manager and will be documented in the environmental and social performance reports	HSE Officer (CRSEG) Project Manager (CRSEG)	As needed
Corrective Actions	- Investigate source of noise exceedances and implement corrective measures prior to re-commencing work - Reschedule of noise-generating activities to reduce noise annoyance. - Re-train workers on noise control practices where necessary - Re-measure noise levels post-correction to verify compliance - Document corrective measures and update Environmental Management and Monitoring Plan	Site Engineer (CRSEG)/HSE Officer (CRSEG)	Monthly

8.3. Emergency response plan

Grass fire is a site-specific hazard that the emergency arrangements must address. The land around the camp and the construction laydown area carries dry grass and scrub for much of the year, the site adjoins a wetland with a substantial reed and cane fringe, and the camp introduces ignition sources that were not previously present: cooking, smoking, hot works, vehicle exhausts and electrical installations. A fire starting in the laydown area or in the surrounding vegetation would spread quickly, would threaten the accommodation blocks, and would put smoke over both the residential area to the north and the wetland.

The controls are a vegetation management regime that keeps a cleared margin around the accommodation and storage areas, a prohibition on open burning of any kind, designated smoking areas away from vegetation and fuel storage, hot works under permit with a fire watch, extinguishers and hose points at the laydown area as well as within the camp, and an evacuation route that does not run through the vegetated margin. Fire risk rises sharply in the dry season and the regime should be tightened accordingly. The Barbados Fire Service should be notified of the camp's location, access and water points before occupation.

8.3.1. Introduction

This Emergency Response Plan (ERP) demonstrates the company's commitment to protecting life, property, and the environment, while reinforcing a workplace culture in which safety is a core priority. Without appropriate emergency preparedness, organizations may face serious disruption, property damage, and risks to the health and safety of personnel.

China Railway Shanghai Engineering Group recognizes that a range of hazards may affect its operations and compromise the safety of employees and other persons at the workers' camp. This plan has therefore been developed to establish a structured and effective response to foreseeable emergencies

8.3.2. Scope

This Emergency Response Plan has been prepared for the China Railway Shanghai Engineering Group Workers' Camp at the new South Coast Water Treatment Plant in Barbados. It addresses potential emergencies, including operational emergencies and natural hazards, that may affect camp activities. The plan sets out the actions to be taken to control, respond to, and recover from such events. This plan is specific to the Workers' Camp and is not a substitute for the corporate Health and Safety Manual and Plan prepared by CRSEG for all of its operations and activities. That manual is annexed to this ESIA/ESMP and applies in full to camp personnel; where the two documents address the same

matter, this camp-specific plan governs conditions within the camp and the corporate manual governs all other CRSEG activities. The Workers' Health and Safety Plan set out later in this document should be read in the same way.

8.3.3. Authority

- **Project Manager:** Has overall authority for implementation of this plan and is responsible for ensuring that adequate resources are made available for its effective execution.
- **Operations Manager:** Is responsible for implementing the plan at the camp site, coordinating with management and the HSE team, and identifying personnel to serve as wardens.
- **HSE Officer:** Monitors, reviews, and updates the plan as required. The HSE Officer also supports emergency coordination and works with management to notify the relevant authorities when necessary.
- **Wardens:** Are responsible for assisting personnel during emergencies, directing evacuation where required, and helping to ensure that all persons reach the designated muster point safely.

The emergency response layout of the campsite is shown at Figure 74.

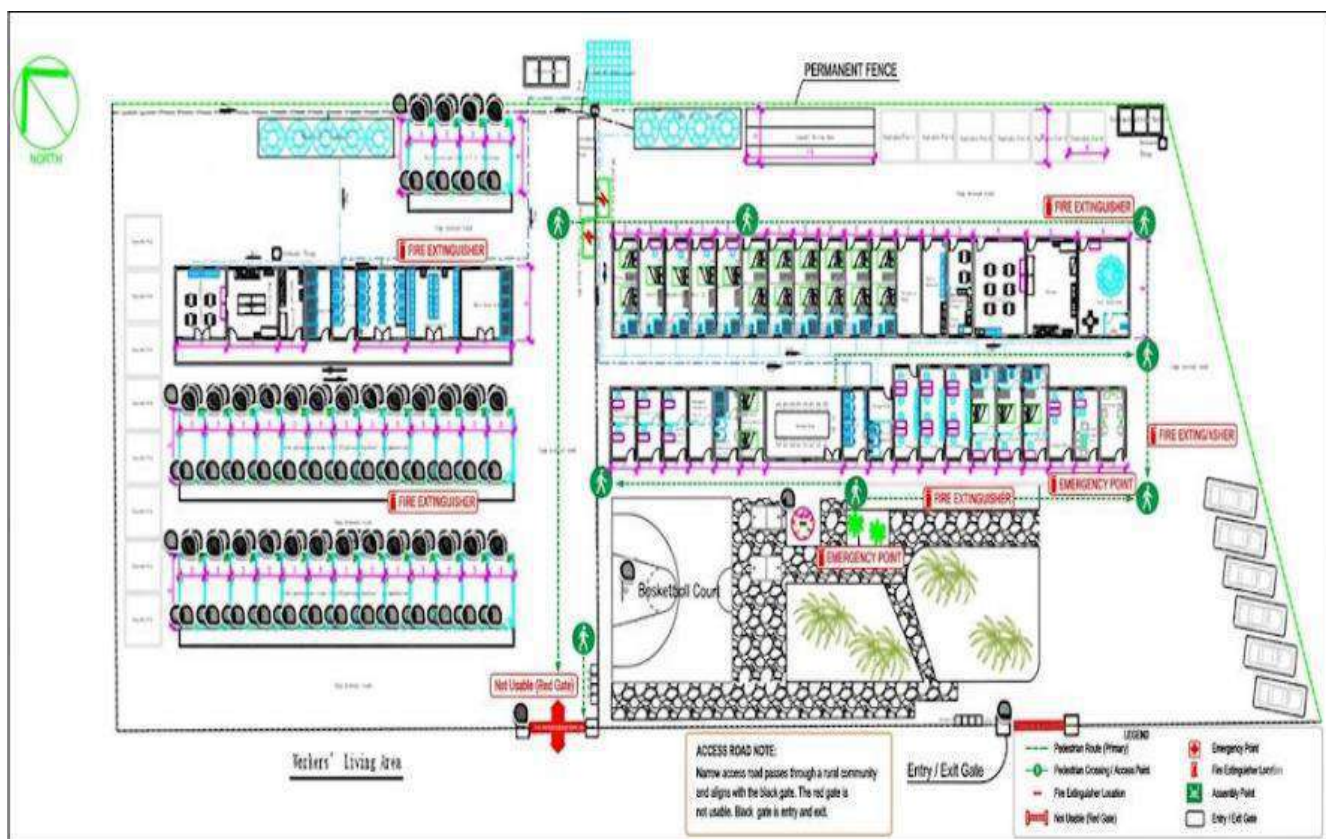


Figure 74: ERM Layout of Campsite

Emergency contacts for the camp are listed in Table 117.

Table 117: Emergency Contacts

Contact	Number
Project Manager	246-850-3666
HSE Manager	Wu Dequan (HSE Officer) — direct contact number to be confirmed by CRSEG before mobilization
Construction Manager	246-825-0987
Barbados Department of Emergency Management	246-438-7575
Police	211
Fire	311
Ambulance	511
South Coast Sewage Treatment Plant Control Room	246-434-4220

8.3.4. Class of Emergencies

For this ERP, emergencies are divided into two classes:

Class 1 Emergencies: These are emergencies arising directly from camp operations. Examples include:

- Fire
- Medical emergencies, including struck-by injuries
- Oil and chemical spills
- Wastewater system or biohazard breaches

Class 2 Emergencies: These are emergencies outside the direct control of the company, but which may affect the workers' camp. Examples include:

- Hurricanes and tropical storms
- Coastal flooding and storm surge
- Seismic activity and volcanic ashfall
- Excessive heat

8.3.5. Preparation for Emergencies

To prepare for the emergencies identified in this document, the company will implement the following measures:

- Conduct emergency drills at least twice each year.
- Ensure that employees receive appropriate training in first aid, fire safety, and spill response.
- Maintain Safety Data Sheets (SDS) for all hazardous materials stored on site.
- Display the emergency contact list prominently on the notice board.
- Ensure that first aid kits, eyewash stations, and emergency showers are available, maintained, and in working condition.
- Establish and maintain a positive working relationship with the nearby existing facility and relevant emergency services.
- Designate a vehicle for use during emergencies where transportation is required.

8.3.6. Emergency response equipment

The Camp will have the following equipment that will be used for any Emergency Response:

The emergency response vehicles and equipment to be held on site are listed in Table 68.

Table 118: Emergency Response Equipment

Vehicle/Equipment Type	Quantity	Identification Number
Fire Extinguishers	TBD when the facility is set up	TBD when the facility is set up
First Aid Kits	TBD when the facility is set up	TBD when the facility is set up
Passenger Car / Pick Up	TBD when the facility is set up	TBD when the facility is set up
Fire Hose	TBD when the facility is set up	TBD when the facility is set up
Excess Water	TBD when the facility is set up	TBD when the facility is set up
Disposable Personal Protective Equipment (PPE)	TBD when the facility is set up	TBD when the facility is set up
Respirators	TBD when the facility is set up	TBD when the facility is set up
Dust Masks	TBD when the facility is set up	TBD when the facility is set up
Water Pumps	TBD when the facility is set up	TBD when the facility is set up
Spill kits	TBD when the facility is set up	TBD when the facility is set up

8.3.7. Procedures for Class 1 Emergencies

8.3.7.1. Fires

If a fire is detected, the alarm must be raised immediately, and the Fire Service must be contacted without delay.

- Once the alarm has been activated, all work must stop, and all personnel must proceed to the nearest muster point.
- Where it is safe to do so, isolate electrical power at the main board.
- Designated fire wardens must sweep the area, where safe, to confirm that no one remains in the danger zone.
- If the fire is small and the responder has been trained, the fire warden may attempt to extinguish it using the appropriate firefighting equipment. Dry chemical or CO2 extinguishers must be used for electrical or grease fires.
- At the muster point, the designated person must conduct a headcount of all personnel.
- No one may leave the muster point or re-enter the area until authorized to do so.

8.3.7.2. Spills

Oil & Chemical Spill

8.3.7.2.1. Small spill

- The spill is less than 25 gallons and remains within the site boundary.
- The clean-up can be carried out without creating a safety or health hazard.
- The discharge can be readily contained.

8.3.7.2.2. Suitable spill response equipment is available for immediate use. Large spills

- The spill exceeds 25 gallons and/or extends beyond the site boundary.
- There is potential for the spill to enter nearby waterways or drainage systems.
- The discharge cannot be readily contained using available on-site resources.
- Response requires specialized training and equipment.
- The incident poses a risk to human health or the environment.
- A person has been injured or exposed.

Table 119: Small spill procedure

Procedure for small spills	Who to contact
• If persons are working in the affected area, stop work and evacuate them from the spill zone. • Cordons off the area to prevent unauthorized access. • Where safe to do so, stop the source of the spill and use the spill kit to prevent the material from reaching drains or other sensitive areas. • Notify the relevant personnel as soon as possible. • Follow the instructions provided in the applicable SDS for safe handling and clean-up. • Clean up the spill and place all waste generated in sealed containers or plastic bags that are properly labelled. Consult the relevant authority regarding disposal requirements where necessary. • Complete the incident report form within 24 hours of the incident.	• Immediate Supervisor • Project / Operations Manager HSE • Officer
Procedure for large spills	Who to contact

Procedure for small spills	Who to contact
• Stop work in the affected area, evacuate personnel, and confirm whether anyone has been injured or exposed. • Cordon off the area to prevent unauthorized access. • Call the appropriate emergency responders, including the Fire Service, emergency medical personnel, and the Police, where required. Notify the Immediate Supervisor and other relevant personnel without delay. Notify the relevant environmental authority of the incident, where applicable. Where it is safe to do so, take immediate action to control and	• Immediate Supervisor • Project / Operations Manager HSE Officer • Relevant environmental authority • Emergency services, as required
contain the spill. When responders arrive, provide key information including the location of the spill, the time it was observed, the type of material released, any injuries or damage, nearby chemicals, and any other relevant site conditions. • All waste generated from the clean-up must be placed in sealed, properly labelled containers or bags and disposed of in accordance with applicable requirements. • Complete the incident report form within 24 hours. If required, submit copies to the relevant authority. Where an injury has occurred, ensure all mandatory notifications and follow-up investigations are completed.	

8.3.7.3. Wastewater system and biohazard breach

A rupture or overflow of the independent three-stage sedimentation tanks presents an immediate public health and environmental hazard and must be treated as a priority emergency.

- Immediately isolate inflow by closing the relevant isolation and bypass valves on the affected sedimentation system to prevent further sewage accumulation from the dormitory bathrooms.
- Establish a containment and exclusion zone by erecting temporary barriers around the affected area. Restrict access to authorized personnel wearing appropriate biohazard PPE, including rubber boots, waterproof coveralls, nitrile gloves, and face shields.

- Deploy suitable pumping equipment to transfer the spilt effluent to an approved collection or disposal system, in accordance with site and regulatory requirements.
- Disinfect the contaminated soil and hard surfaces using an appropriate chlorine or bleach solution to reduce biological risk and control harmful gases.

8.3.7.4. Medical emergency

If a person is injured on site, the severity of the injury must be assessed immediately so that an appropriate response can be initiated.

- For minor injuries, treatment may be provided by a trained first aider on site.
- For serious injuries, the first aider must provide immediate assistance within the limits of their training and stabilize the injured person until emergency medical services arrive.
- If stabilization is not possible, continue to monitor the injured person and provide clear information to paramedics on arrival.
- Where necessary, contact the nearest health facility or ambulance service without delay.

8.3.8. Class 2 Emergencies

8.3.8.1. Hurricanes & tropical storms

Pre-Impact phase (48–72 hours before landfall)

- **Secure prefabricated structures:** Inspect and tighten all structural tie-downs, anchors, and roof components of the prefabricated office and accommodation units.
- **Remove loose objects:** Relocate loose materials from outdoor areas, including work zones and recreation spaces, into secure buildings to prevent them from becoming wind-borne hazards.
- **Clear drainage systems:** Inspect and clear rainwater catch pits and sedimentation tanks to maximize drainage capacity before the storm.

During the Event

- **Shelter in place or evacuate:** Prefabricated camp structures are generally not suitable shelters for major hurricanes. Where a severe hurricane is forecast, the Project Manager must arrange full camp evacuation to a designated approved shelter before storm-force winds begin.

8.3.8.2. Coastal flooding & storm surge

Although Barbados is above sea level, the workers' campsite is located at the bottom of a slope, so severe flooding or storm surge may still affect site drainage and access routes. If flooding does occur, the following actions should be taken:

- **Isolate wastewater systems:** In a severe surge event, close the relevant isolation valves to reduce the risk of backflow into camp sanitation systems.
- **Move to higher ground:** If floodwater enters the site, all personnel must move immediately to the safest available higher ground or evacuate by the safest accessible route, if instructed to do so.

8.3.8.3. Volcanic ash

If a warning is issued for volcanic ashfall affecting the area, the following actions must be taken:

- **Protect ventilation systems:** Shut down air-conditioning and ventilation systems to prevent ash from entering indoor spaces and damaging equipment.
- **Protect drainage and water infrastructure:** Cover exposed collection points where practicable to reduce ash contamination.
- **Monitor roof loading:** If ash accumulates, remove it carefully using trained personnel and appropriate PPE. Do not use water where this may increase roof loading.

8.3.8.4. Extreme heat stress

Periods of extreme heat can lead to serious heat-related illness. Heat stroke is a life-threatening medical emergency and requires immediate medical attention.

The following precautions must be observed during periods of prolonged heat exposure:

- Employees should wear loose, lightweight, light-colored clothing and use a buddy system so that workers check on one another regularly for signs of heat stress. Potable water stations must be maintained and refilled as required.
- Where possible, avoid working in direct sunlight and wear suitable sun protection, especially during the hottest part of the day.
- Ensure that employees remain properly hydrated by drinking water regularly.
- If heat exhaustion is suspected, move the person to a shaded or cool area immediately.
- Lay the person down, elevate the feet slightly, and loosen or remove heavy clothing where appropriate.
- Cool the person using water, air movement, wet cloths, or ice packs applied to major cooling points where available.
- If the person becomes confused, faints, develops a high temperature, or shows signs of worsening condition, seek medical assistance immediately.

8.3.8.5. Earthquakes

If an earthquake occurs while you are inside a building, remain indoors and take immediate protective action.

- Find a safe place under a sturdy desk or table and protect your head and neck.
- Remain in position until the shaking has stopped.
- Do not run outside or go downstairs during the shaking, as falling debris may present a greater hazard.
- After the shaking stops, check for injuries, unstable objects, and other hazards before moving.
- When it is safe to do so, proceed to the designated muster point and await further instructions.
- If you are outside when the earthquake occurs, remain outside and move away from buildings, trees, and overhead lines.
- Move to an open area, crouch down, and protect your head until the shaking stops.
- Open spaces such as the basketball court may be used as temporary safe areas, if appropriate.
- After the shaking has stopped, proceed to the nearest muster point if it is safe to do so.
- No person may re-enter any prefabricated dormitory or office until the structure has been inspected and declared safe by a competent person.

8.3.9. Muster points

- The **Primary Assembly Point** is the **Basketball Court** area. It provides a wide, open clearing away from prefabricated roof lines and overhead utility drops.
- **Secondary Assembly Point** is open, a crushed-stone levelling area on the perimeter boundary if the basketball court is compromised.

8.3.10. Post emergency response

Following any emergency, a formal investigation shall be conducted to determine the immediate and underlying causes of any incident. The investigation process must be fully documented by the company to maintain accountability and support continuous improvement.

All findings arising from the investigation shall be reviewed by the Health, Safety, and Environment (HSE) team together with management. The Emergency Response Plan shall then be updated as necessary to reflect lessons learned and any required corrective actions.

Key findings from the investigation shall be communicated to employees to strengthen awareness and prevent recurrence. A summary may also be posted on the HSE notice board to promote transparency, learning, and a culture of continual improvement.

8.4. Traffic management plan

The primary objective of this Traffic Management Plan (TMP) is to ensure the safe, orderly, and efficient movement of heavy trucks, delivery vehicles, and construction equipment to and from the facility, especially considering the narrow community road that must be used to access the site.

The plan regulates all vehicular and pedestrian traffic to, from, and within the worker's camp facility, including transit through the adjacent community road.

8.4.1. Scope

This plan outlines the traffic management procedures for movement within the facility during the construction and use of the workers' camp area. It provides information on potential hazards and offers guidance for vehicles and pedestrians navigating the facility. Please note that this plan addresses only traffic management for the workers' camp and does not cover movement within the existing facility or the new facility area.

8.4.2. Authorization

- **Project Manager:** has the overall accountability for Traffic management Plan compliance; approval of any deviations.
- **Operations Manager** has the responsibility for Day-to-day implementation and enforcement of the Traffic Management Plan; scheduling vehicle movements; incident reporting; and maintaining the vehicle register.
- **HSE Manager** has the responsibility to audit Traffic Management Plan compliance; community complaint management; monthly review meetings, and incident investigations
- **Traffic Wardens:** Control of vehicle entry and exit through community roads; emergency clearance; pedestrian protection; two-way radio communication.
- **Drivers/ Operators:** Compliance with all TMP rules; adherence to speed limits and scheduled windows; reporting of hazards or incidents.

8.4.2.1. Procedure

8.4.2.1.1. Vehicle management

- All vehicles associated with the project will select the shortest, most fuel-efficient routes that avoid sensitive environmental areas, heavily populated neighborhoods, and areas with strict load or height restrictions.
- The site will be designed to reduce unloading time, minimize double handling and reduce idle times for cranes and forklifts.
- Signs will be placed along the community roadway to inform the community of the type of vehicles that will be travelling in the community.
- Traffic wardens shall be stationed at both ends of the community road during peak movement windows (shift changes, deliveries, equipment movements).
- Two-way radio communication shall be maintained between the marshals at each end of the community road to coordinate vehicle passage.
- All trucks must maintain a speed of 15km/h when moving within the community.
- Trucks will, as reasonably possible, not block the passage of any vehicle travelling in the opposite direction.
- A maximum of two trucks at a time will travel in a convoy within the community roads. They must maintain 50 meters between them.
- If the contractor is required to move an abnormal load, the contractor will implement specialized protocols for managing abnormal loads, such as using appropriate specialized trailers (e.g., trough trailers) to prevent damage.
- All construction vehicles shall be fitted with tarpaulins overloads of fine materials (sand, gravel, soil) before entering the community road.
- Maximize truck load capacity to reduce the total number of trips and eliminate "empty miles".
- When necessary, wheels should be washed, and a wash facility should be installed at the site exit to prevent mud and dust from being tracked onto the community road.
- To reduce and eliminate vehicle idling, the contractor will enforce a strict "no idling" policy for vehicles and machinery waiting to unload to minimize local air pollution.

- To ensure fuel efficiency, only use modern, fuel-efficient trucks (e.g., those meeting strict emission standards) and consider using cleaner alternatives such as biofuels, hybrid or electric transport if possible.
- All transport vehicles associated with the project and onsite machinery must be well-maintained to prevent oil leaks and reduce emissions.
- Once available, vehicles associated with the project will be equipped with Emission Control Technologies (e.g., Selective Catalytic Reduction - SCR).
- Once at the entrance of the new facility, vehicles will traverse the site along the southeastern boundary of the property until they reach the designated area for the workers' camp.
- The site access roads will be all-weather to prevent excessive mud from tracking onto public roads, which can impact local air quality and water systems.
- The contractor will spray water on site access roads during dry conditions to prevent dust dispersion.
- All vehicles associated with the project will be allowed access. Any vehicle not associated with the project will not be allowed to traverse the camp but will be designated to a designated parking area.

Vehicle access and the restrictions applying to each type are set out in Table 120.

Table 120: Vehicle Access and Restrictions

Vehicle Type	Access Permitted	Restrictions
Heavy delivery trucks	Yes	Scheduled windows only; max 2 per convoy
Construction equipment (excavators, cranes, etc.)	Yes	Low-loader escort required; advance notice 48 hrs
Light project vehicles/cars	Yes	No restriction during operating hours
Buses/worker transport	Yes	Designated drop-off/pick-up zone only
Fuel tankers/hazmat	Yes	Escort required; only during daylight hours
Unauthorized private vehicles	No	Restricted to designated visitor parking

- To properly manage all vehicles on site, all trucks and equipment arriving must be prescheduled within the time outlined in the table below:

Permitted movements by time window are given in Table 121.

Table 121: Traffic Movement Preschedule

Window	Time	Permitted Activities
Morning Delivery	06:00 – 07:00	Materials and supply deliveries only
Mid-Morning Equipment	09:30 – 11:30	Construction equipment movements
Afternoon Delivery	13:00 – 15:00	Materials and supply deliveries only
Evening Equipment Return	16:30 – 18:00	Construction equipment demobilization
Restricted Period	07:00 – 09:30 & 11:30 – 13:00	No heavy vehicles on the community road
Night (No Movement)	18:00 – 06:00	No vehicle movements unless an emergency

8.4.2.1.2. Pedestrian management

- The road to the project site runs through a community; all vehicles associated with this project must be cognizant of this.
- Heavy vehicles and construction equipment shall not travel the community road between 07:00–08:00 and 14:30–16:30 to coincide with school travel hours.
- The company will assist in painting pedestrian crossings within the community, if possible. Additionally, safety information signs will be placed throughout the area to warn residents of ongoing activities.
- A maximum speed limit of 15 km/h will be enforced on community roads for all project vehicles without exception.
- All project drivers will be informed of the details outlined in the Traffic Management Plan.
- Clearly marked pedestrian walkways must be established within the camp boundary, providing safe routes from the dormitory areas to the canteen, washrooms, and office areas.
- Vehicles will follow a one-way loop on the site, where feasible, to reduce the potential for reversing conflicts in pedestrian zones.
- The female dormitory area (Dormitory-1, located in the Management Personnel Camp) will be designated as a vehicle-restricted zone, allowing access only to authorized vehicles.
- Spotters will be assigned to assist drivers when reversing in areas with pedestrian activity.

8.4.2.1.3. Parking on site

- All project vehicles must be parked in the project compound and follow the zones outlined in the table below

Designated parking zones and the vehicle types permitted in each are given in Table 122.

Table 122: Parking Locations on-site

Zone	Location	Vehicle Types
Zone A – Heavy Vehicle Laydown	Near site entrance/equipment charging area	Heavy trucks, construction equipment, low-loaders
Zone B – Staff Vehicles	Management camp vicinity	Light vehicles, management staff cars
Zone C – Worker Transport	Workers' camp – designated drop-off zone	Buses, minivans, worker transport
Zone D – Visitor Parking	Site gate/reception-area	Visitor and employer representative vehicles
Zone E – Equipment Storage	Equipment Storage & Server Room area	Maintenance vehicles, charging equipment

8.4.2.1.4. Pedestrian and community protection

Vehicle movements create risk for community members on foot, and that risk is not evenly distributed. Children travelling to and from school, women walking at the beginning and end of the day, older persons and persons with disabilities are the road users least able to avoid a heavy vehicle on a narrow road. The controls below are directed at them specifically and respond to the review comments on community safety and gender integration.

Table 123: Pedestrian and community protection measures

Measure	Detail
School-hour restriction	Heavy vehicles and construction equipment do not transit the community road between 07:00 and 08:00 or between 14:30 and 16:30. The afternoon window begins at 14:30 because primary and secondary schools in Christ Church close between 14:30 and 15:00. The times must be verified against the actual opening and closing hours of St Lawrence Primary School and St Luke's Academy before the schedule is fixed.
Driver briefing	All drivers, including those employed by subcontractors and by delivery and logistics providers, are briefed before first entry on the community context, the movement windows, the speed limits and the standard of conduct expected towards residents. The briefing is repeated on any change. Including zero-tolerance for harassment, cat-calling or any form of sexualized behavior toward community members, heightened vulnerability of women, girls, older persons and PWDs. Sign and training on the Code of Conduct
Warden instruction	Traffic wardens are briefed to protect pedestrians with particular attention to school children, women, older persons and persons with disabilities, and to clear the community road immediately on the approach of an emergency vehicle.

Measure	Detail
Signage	Pedestrian crossings within the community will be painted where practicable and warning signage placed along the route. Signage is pictorial as well as textual, so that it is intelligible to non-literate readers and to workers who do not read English. Temporary road signs are erected and maintained to notify road users of works, lane closures and diversions. GRM contact information included on signage.
Flaggers	Flaggers are trained and equipped with personal protective equipment, high-visibility clothing and two-way communication devices, and are stationed at critical bends, access points and the main gate whenever required. Respectful engagement with all road users, non-discrimination and zero-tolerance for SH/SEA/GBV.
Maintained access	Access to residences, businesses and emergency vehicles is maintained at all times, except for short closures notified in advance. In consultation with affected residents and businesses with attention to households with vulnerable persons.
Community information sessions	Sessions on traffic safety are held before construction begins and repeated at intervals, targeted at women, children, older persons and persons with disabilities as well as the general community, and delivered through the Stakeholder Engagement Plan. Separate sessions will be held with women and vulnerable groups where feasible.
Conduct reporting	Unsafe driving and inappropriate driver behaviour towards community members are reportable through the Grievance Redress Mechanism and are treated as conduct matters under the Code of Conduct, not only as traffic matters.
Gender-sensitive complaint handling	Complaints and incidents relating to driver behaviour, including any allegation of sexual harassment, exploitation or gender-based violence involving community members or workers, and any concern raised by women, are logged with the receptor group recorded, investigated by the Social and Gender focal point with the HSE Officer, and reported monthly, where appropriate referred to social support services as defined in the GRM and SH/SEA/GBV Prevention and Response Plan..
Approval	The Traffic Control Plan prepared by the Contractor is submitted to the Project Execution Unit and the Barbados Water Authority for approval, and complies with national road safety standards and temporary traffic control guidance.

- No vehicle shall park in a manner that obstructs internal camp pedestrian walkways, canteen access, or emergency assembly areas.
- Heavy vehicles awaiting unloading shall be directed to Zone A and must not queue on the community road.
- Overnight parking of heavy vehicles or construction equipment on the community road is strictly prohibited.
- Vehicles not listed on the project vehicle register shall not be admitted to the site without prior authorization from the Site Manager.

- The Equipment Charging Area (as indicated on the camp layout plan) shall be designated for non-motor vehicles and construction tool charging — this area shall not be used for general parking.

8.4.2.1.5. Emergency vehicle access

The following measures shall ensure emergency services can reach the site without delay:

- The community road shall never be blocked by parked project vehicles, construction equipment, or stored materials at any time.
- All traffic wardens shall be briefed to immediately clear the community road upon the approach of an emergency vehicle (fire, ambulance, police).
- Emergency access lanes within the camp shall be kept clear at all times — minimum width 4.0 m to accommodate fire appliances.

8.4.2.1.6. Reporting of incidents & plan review

- When an incident occurs, it must be reported immediately to the Project Manager or HSE Manager.
- All incidents must be reported as per the Incident reporting procedure.
- The plan must be reviewed annually or when there is an incident.
- All revisions to the TMP shall be reissued and re-briefed to all relevant personnel.
- A copy of the current TMP revision shall be maintained at the site gate and with the HSE Manager at all times.

This Plan should include the following for vehicle management:

Transport and Logistics Optimization:

- Load Optimization: Maximize truck load capacity to reduce the total number of trips and eliminate "empty miles".
- Route Planning: Select the shortest, most fuel-efficient routes that avoid sensitive environmental areas, heavily populated neighborhoods, and areas with strict load or height restrictions.
- Fuel Efficiency: Use modern, fuel-efficient trucks (e.g., those meeting strict emission standards) and consider using cleaner alternatives as biofuels, hybrid or electric transport if possible.

- **Abnormal Load Logistics:** If it is a heavy move of vehicles, implement specialized protocols for managing abnormal loads, such as using appropriate specialized trailers (e.g., trough trailers) to prevent damage.

Operational Emission Control:

- **Idling Reduction:** Enforce a strict "no idling" policy for vehicles and machinery waiting to unload to minimize local air pollution.
- **Maintenance:** Ensure all transport vehicles and onsite machinery are well-maintained to prevent oil leaks and reduce emissions.
- **Emission Control Technologies:** Use vehicles equipped with modern exhaust gas treatment technologies (e.g., Selective Catalytic Reduction - SCR).

Site Preparation and Management

- **Site Layout Planning:** Design the site to reduced efficient unloading, minimizing double handling and reducing idle times for cranes and forklifts.
- **Traffic Management:** Plan site access roads for all-weather conditions to prevent excessive mud from tracking onto public roads, which can impact local air quality and water systems.
- **Dust Control:** Implement water spraying on site access roads, especially during dry

conditions, to prevent dust dispersion.

The traffic movement site layout is shown at Figure 75.

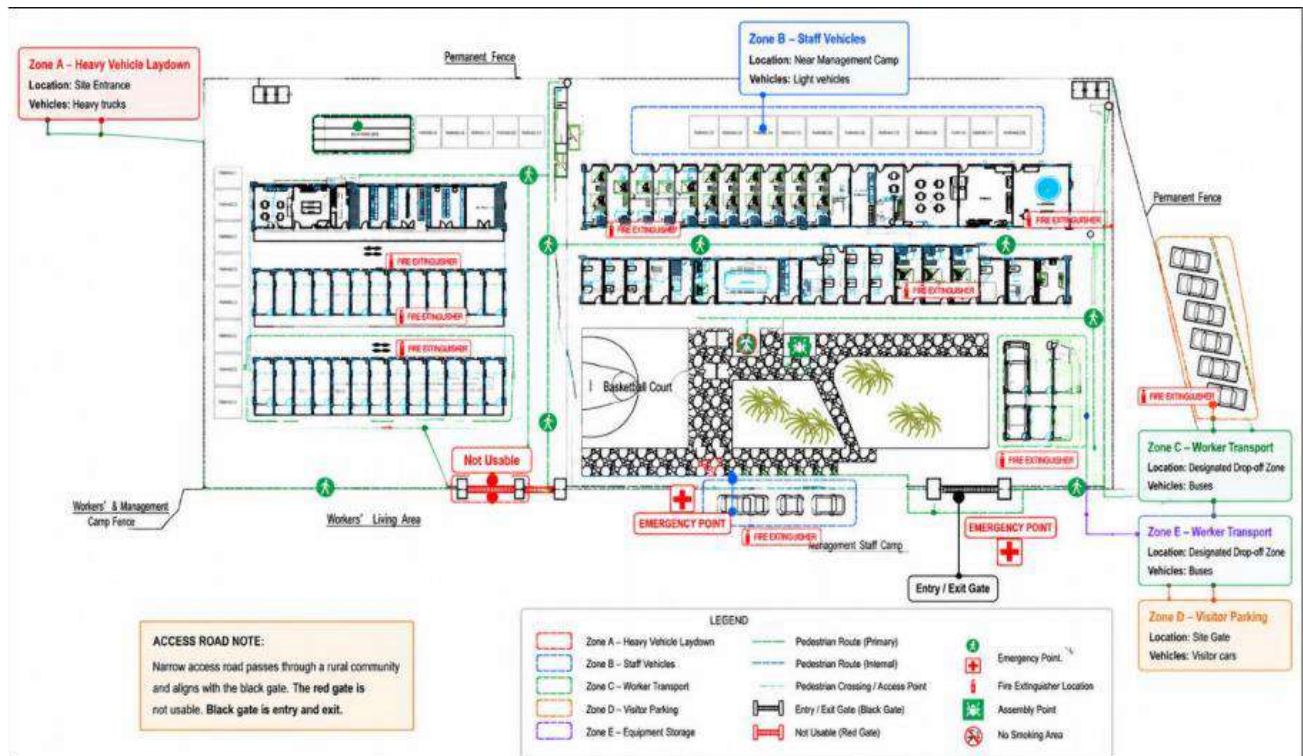


Figure 75: Traffic Movement Site Layout

8.5. Incident management plan

The primary goal of this plan is to ensure that all accidents, near misses, occupational illnesses (such as severe heat exhaustion), and environmental releases (including fuel spills and wastewater overflows) within the Workers' and Management Camp are systematically reported, thoroughly analyzed, and legally resolved to prevent future occurrences. This procedure applies to all residents, subcontractors, management personnel, and visiting logistics drivers.

8.5.1. Scope

This document informs all individuals involved in the project about how to report an incident. It provides guidance to the HSE and Management team on investigating and resolving incidents.

8.5.2. Incident classification

- **Near Miss (NM):** An event that had the potential to cause injury, damage, or loss but was avoided due to circumstances. Near misses are also referred to as 'close calls' or 'near hits.'
- **First Aid (FA):** An injury that requires just one first aid treatment and a follow-up visit typically involves only minor injuries. Examples include minor scratches, burns, and cuts, which usually

do not require extensive medical care. In these cases, the person can often return to their normal activities right away.

- **Medical Treatment Case (MTC):** An injury or disease that requires treatment from a physician or medical personnel under the standing orders of a physician.
- **Restricted Workday Case (RWDC):** A work-related injury is defined as any injury that is not fatal and does not result in a lost workday but leaves a person unable to fully perform their regular job duties on any day following the occupational injury. These types of incidents typically allow the employee to continue working, either by performing part-time duties in their regular position or by working full-time but not carrying out all of their usual responsibilities.
- **Lost workday case (LWDC):** An occupational injury or illness, excluding fatal injuries, occurs when an individual is unable to work on any day following the incident. This includes rest days, weekends, leave days, public holidays, and days after the end of employment.
- **Fatality:** An incident that results in the death of an employee.

8.5.2.1. Incident classification matrix

- **Tier 1: Minor / Near-Miss:** Property damage under \$1,000, minor first-aid cases, or near-miss traffic deviations on the central driveway or community road.
- **Tier 2: Medium / Recordable:** Medical treatment cases (restricted work, heat exhaustion requiring clinical rest), localized environmental spills under 50 liters contained inside the levelling yard, or minor localized kitchen fires.
- **Tier 3: Major / Critical:** Lost Time Injuries (LTI), structural collapse of prefabricated units, severe heat stroke emergencies requiring hospitalization, fuel/oil chemical spills escaping into community drainage, or sewage breaches from the sedimentation tanks.

8.5.2.2. Procedure

8.5.2.2.1. Incident reporting

- When an incident occurs, it must be reported immediately (verbally) to the relevant supervisor.
- The Incident Reporting Form must be completed within two hours of the incident.
- If an incident results in a spill that extends beyond the facility's boundaries or causes a death, the relevant authorities must be informed without delay.

- Once the form is completed, it should be submitted to the HSE Manager for review.

8.5.2.2.2. Incident investigation

- Upon receiving the completed Incident Reporting Form, the HSE Manager will initiate an investigation.
- This investigation will commence immediately, and a report should be completed within 7 days for incidents classified as Tier 2 and Tier 3.

8.5.2.2.3. Incident closure

- Once all aspects of the incident have been completed, the close-out form should be filled out.
- This serves as a unit of the system to ensure all corrective actions are completed according to the requirements of the investigation.
- It allows the team to document all the information related to the incident on one form, making it easier to identify the lessons learned from the incident.

8.5.2.2.4. Post incident

- Once an incident investigation is complete, any relevant procedures that need updating must be addressed.
- Lessons learned from the incident should be discussed with all employees.
- A summary of the incident and the lessons learned must be posted on the HSE notice board.

8.5.3. Incident investigation form

To be completed by the Lead Investigator (HSE manager) within 7 days for Tier 2 and Tier 3 incidents.

8.5.3.1. Investigation administration

- **Incident Reference Number:**
- **Date Investigation Commenced:**
- **Investigation Team Members:**

2. Comprehensive Fact-Finding & Chronology

(Attach witness statements, photographic evidence, and maintenance logs for equipment/sedimentation systems/charging boards as applicable).

3. Root Cause Analysis (The 5-Whys Methodology)

- **Problem Statement (The Incident Event):**
- **Why? (1):**
- **Why? (2):**
- **Why? (3):**
- **Why? (4):**
- **Why? (5 - Root Cause):**

4. Corrective and Preventive Actions (CAPA) Plan

Actions must target the underlying root cause to ensure long-term mitigation.

Table 124: Corrective and Preventive Actions Plan

#	Action Item Description	Responsible Person	Target Date	Resources Required
1	<i>e.g., Relocate charging racks, service sewage valves, and add signs</i>			
2				
3				

Lead Investigator Signature: _ Date: Project Manager Review: _ Date:

8.5.4. Incident reporting form

To be filled out by the discovering person or area warden and submitted to the Camp HSE Officer within 2 hours of the event.

Incidents are recorded on the form reproduced at Table 125.

Table 125: Incident Reporting Form

1. GENERAL INFORMATION	
Date of Incident:	Time of Incident: _ AM/PM
Exact Location within Camp:	
• Workers' Living Dormitories • Management Offices / Housing	• Central Vehicle Driveway

1. GENERAL INFORMATION	
• Construction Tool Charging Area	• Waste / Sedimentation Tanks • External Community Access Corridor
Name of Reporting Person:	Job Title / Company:
2. INCIDENT TYPE CLASSIFICATION (Check all that apply)	
• Injury / Illness (First Aid) • Property / Structural Damage • Vehicle Collision	
• Severe Heat Stress / Exhaustion • Fire / Smoke Outbreak • Chemical / Fuel Spill	
• Wastewater / Sewage Spill • Near-Miss Event • Natural Disaster Damage	
3. INITIAL DESCRIPTION OF THE EVENT	
<i>Provide a summary of what happened, equipment involved, and immediate consequences:</i>	
4. IMMEDIATE ACTIONS TAKEN	
<i>Detail first aid applied, spill kits deployed, power isolations, or emergency services called:</i>	
Reporting Person Signature	Date/Time

8.6. Integrated solid waste management plan

8.6.1. Introduction

This Waste Management Plan establishes the minimum requirements for the segregation, storage, collection, transport, and disposal of wastes generated at the Workers' Camp. The plan is intended to protect human health, prevent nuisance conditions, avoid contamination of soil, groundwater, water (fresh, brackish and marine), and air, and ensure that wastes are managed in accordance with applicable Barbados requirements and approved disposal practices.

8.6.2. Scope

This plan applies to all workers' camp operations, including accommodation areas, kitchens and dining areas, offices, workshops, laydown areas, housekeeping activities, maintenance tasks, and any temporary storage areas within the workers' camp. It applies to all personnel, including employees, contractors, subcontractors, visitors, and waste service providers involved in handling all waste generated by camp activities.

8.6.3. Roles and Responsibilities

- **Project Manager:** Responsible for ensuring that adequate resources, personnel, and support are available for the effective implementation of this plan.
- **Operations Manager:** Responsible for coordinating with the HSE Representative to ensure that waste management procedures are implemented consistently across camp operations.
- **HSE Representative:** Responsible for maintaining waste management documentation, conducting inspections, providing guidance, and verifying that required resources and controls are in place.
- **Employees and Contractors:** Responsible for complying with the requirements of this plan, using designated waste containers correctly, reporting spills or waste-related issues, and maintaining good housekeeping practices.

8.6.4. Definitions

The following definitions are based on the Health Services (Collection and Disposal of Refuse) Regulations, 1975.

- **Refuse:** all solid waste derived from garbage, rubbish, swill, trade refuse and other waste matter;
- **Rubbish:** house sweepings, wood, leaves, trimmings from shrubs, sawdust, paper, cardboard, grass, rags, old shoes, tires and all other combustible material;
- **Swill:** particular garbage, which is wholly, or nearly so, edible as a food having food value for animals, or foul accumulation from animal, vegetable or other matter wasted, from clubs, hospitals, hotels, restaurants and public eating places;
- **Waste matter:** material composed of soil, earth, stones, wasted concrete blocks, glassware, ashes, metals and other non-combustible material which is, has been or is to be, discarded.

For this plan, waste generated at the workers' camp shall be grouped into the following operational categories

- **General/Municipal solid waste:** Combined residential and commercial waste material generated in any municipal area.
- **Recyclable waste:** Waste that can be collected, processed, and transformed into new materials, including paper, cardboard, plastic bottles, glass, and scrap metal.
- **Organic waste:** Biodegradable waste such as food scraps, vegetable matter, and other compostable material generated from kitchen and dining activities.
- **Bulky waste:** Furniture, old appliances, discarded automobiles and auto parts, rubber, or such matter as may accumulate as a result of building construction, renovations or repairs.
- **Construction and Demolition waste (C&D):** Waste generated from construction, maintenance, renovation, or repair activities, including packaging, timber offcuts, concrete fragments, and other non-hazardous construction debris.
- **Special-care or hazardous waste:** Waste requiring special handling due to its potential health, safety, or environmental risks, including grease, sewage sludge, offal, chemicals, used oil, batteries, fluorescent lamps, contaminated absorbents, and other regulated materials.

8.6.5. Procedure

8.6.5.1. Expected types of waste & segregation

The principal waste categories expected at the workers' camp include general waste, organic waste, construction waste, recyclable waste, bulky waste, and hazardous waste. Waste shall be segregated at source to minimize cross-contamination, support reuse and recycling, and reduce the volume requiring final disposal. Segregation practices shall be aligned with applicable Barbados requirements and the approved arrangements for the project.

- **General waste** shall be placed in covered, leak-resistant bins fitted with liners.
- **Recyclable materials** shall be separated into clearly labelled containers for paper/cardboard, plastics, glass, and metals where collection or delivery options are available.
- **Organic waste** shall be kept in closed containers and removed frequently to control odors, flies, and vermin. Discarded meat shall be stored securely, including refrigeration or freezing where required, until the day of disposal. Suitable organic material may be retained for use as fertilizer in vegetable plots, provided it does not create odors, attract pests, or present a health risk.
- **Bulky waste** shall be stored in a designated area pending approved collection or disposal.

- **Hazardous waste** shall be stored separately from general waste in secure, labelled containers that are compatible with the waste type and protected from rain, spills, and unauthorized access. Different types of hazardous waste shall not be mixed unless specifically approved by a competent specialist. Safety Data Sheets shall be available for hazardous materials that become waste.
- Secondary containment for hazardous waste shall have sufficient capacity to contain at least 110% of the volume of the largest container stored within it. Hazardous waste storage areas shall be inspected daily, and any defects, leaks, or housekeeping issues shall be corrected promptly.

This plan prioritizes waste minimization and the four Rs: Reduce, Reuse, Recycle, and Recover energy before disposal. Waste reduction, reuse, and recycling shall be the primary focus because energy recovery is not currently being pursued. All bins and storage areas shall be clearly labelled, maintained in a sanitary condition, and located away from drainage paths, watercourses, and sensitive receptors. Open dumping and open burning of waste are prohibited.

The following color coding shall be used to identify waste streams:

- Recyclable waste: Blue for dry recyclables.
- General Waste – Black
- Food and organic waste: Green.
- Paper/cardboard - Yellow
- Hazardous waste- Red

8.6.5.2. Waste collection, transportation & disposal

Waste shall be collected on a scheduled basis, at least weekly or more frequently where required, to prevent overflow, nuisance conditions, and health risks. Housekeeping personnel or assigned camp staff shall inspect waste receptacles daily and transfer waste to the central storage areas as needed. Central storage areas shall be kept clean, accessible to collection vehicles, and managed to prevent litter, runoff, and pest infestations. Four central storage areas shall be used to stage waste before off-site transport. Two areas located at the facility entrances will store recyclable materials, general waste, and organic waste that can be reused by the facility.

A designated hazardous waste storage area will be located on the north-western side of the facility, and a separate bulky waste storage area shall be located on the northern side. The image below illustrates the expected waste storage arrangement at the campsite. Any changes to the storage

arrangement shall be reflected in an updated site layout image and communicated to relevant personnel.

Before waste is removed from the facility, the waste log shall be completed. A waste manifest shall also be completed before waste is transported from the facility to any disposal, treatment, or recycling facility.

General camp waste shall be transported only to approved municipal solid waste disposal facilities or collected by an authorized service provider. Recyclable materials shall be sent to approved recycling facilities where available. Commercial or industrial wastes that are not routinely accepted at local disposal sites shall not be transported for disposal until acceptance requirements and any necessary approvals have been confirmed. Hazardous waste shall be managed by suitably authorized contractors or in accordance with written guidance from the Environmental Protection Department.

Used oil, chemicals, batteries, lamps, electronic waste, and contaminated materials shall be stored in appropriate containers and secondary containment where required. These wastes shall be removed off-site through a controlled handover process. Spill kits shall be available in hazardous waste storage locations, and any spill shall be contained, cleaned up, and reported immediately in accordance with site emergency procedures.

Waste collection frequency will be increased during periods of peak occupancy, high food preparation activity, or special maintenance works.

Waste segregation and storage areas are shown at Figure 76.

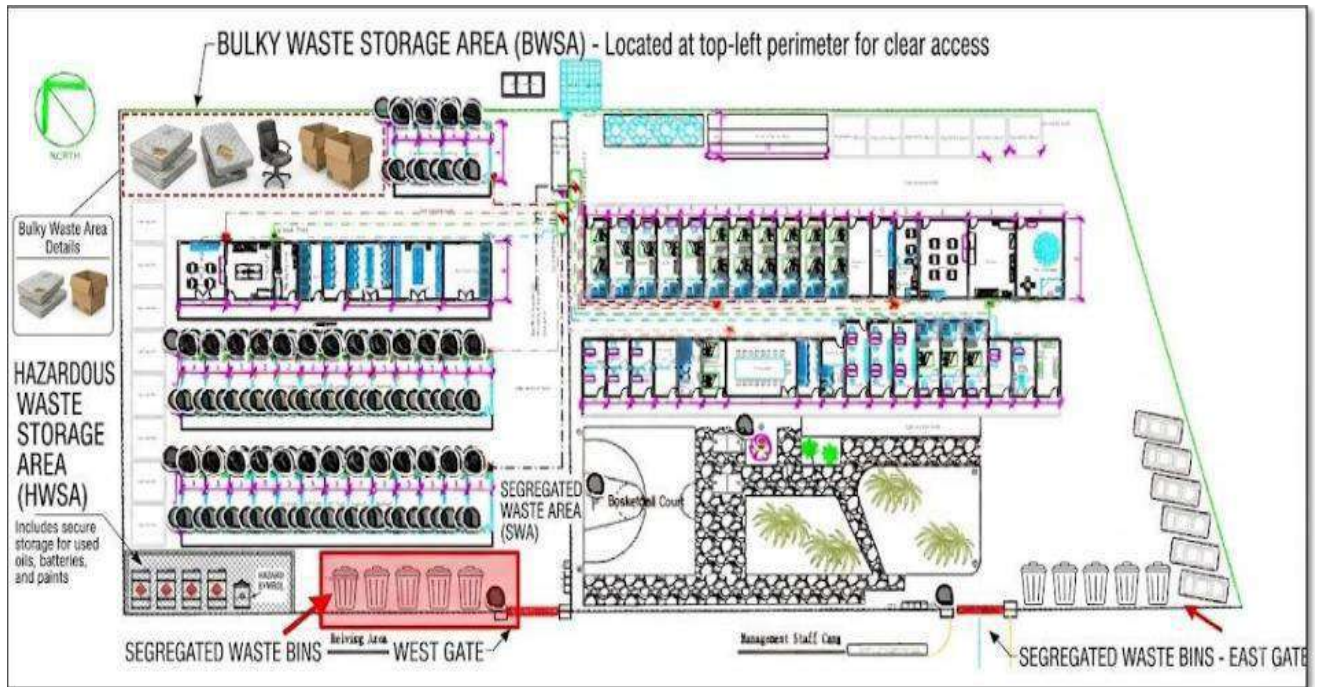


Figure 76: Waste Segregation and Storage Areas

8.6.5.3. Documentation

Records shall be maintained to demonstrate proper waste handling and disposal. Documentation shall be retained by site management and made available for internal review or inspection as required. At a minimum, records shall include waste inspections, estimated quantities or container counts, dates of collection, transporter details, disposal or recycling destination, incident reports, and copies of manifests, receipts, or disposal certificates for special or hazardous wastes.

8.6.5.4. Waste log

A waste log shall be maintained on site to track the type of waste generated, the point of origin, the estimated quantity, the date the waste was removed from the camp, the person or contractor responsible for handling the waste, and any relevant remarks. The log shall be completed at least weekly and updated whenever waste is removed from the facility.

8.6.5.5. Waste manifest

A waste manifest shall accompany all waste that leaves the facility. Manifest information shall include the waste description, quantity, container type, date of shipment, generator details, transporter details, receiving facility, and confirmation of receipt. Manifests shall be valid only when signed by the relevant authorized personnel, and copies shall be retained with the site waste records.

Waste arisings are recorded in the log at Table 126.

Table 126: Waste Log

Date	Source/Area	Waste category	Description	Quantity	Unit	Disposal Method	Handled By	Remarks

Instructions:

- This document should be used every time waste is collected for disposal, storage or recycling.
- The information in this document must match the information on the waste manifest form

8.6.6. Waste manifest form

8.6.6.1. [Typical waste stream for a workers' camp]

Off-site transfers are recorded on the manifest at Table 127.

Table 127: Waste Manifest Form

Manifest Information			
Manifest No.		Date	
Camp / Project Name		Location	
Waste Generator		Contact Person	
Telephone / Email		Reporting Period	
Transporter / Collector		Vehicle No.	
Receiving Facility / Disposal Site		Site Contact	



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www.crshe.com

Manifest Information			
Waste Stream		Classification	Hazardous / Non-hazardous
Description of Waste			
Quantity		Unit	kg / L / bags / drums / bins
Container Type		No. of Containers	
Storage Area at Camp		Date Removed	
Special Handling Instructions			
Generator Representative Name		Signature / Date	
Transporter Representative Name		Signature / Date	
Receiving Facility Representative Name		Signature / Date	

8.7. Health, Safety and Environment Management Plan

Purpose of Preparation

To standardize Health, Safety and Environment (HSE) management throughout the entire construction and operation of the new wastewater treatment plant in Barbados; to fully implement HSE control responsibilities for the project; to effectively identify, mitigate and manage risks across all stages of the project, including civil engineering works, equipment installation, pipework laying, tank and structure construction, and temporary electrical works; and to prevent accidents such as personal injury or fatality, damage to equipment, fire or explosion, water pollution and occupational health hazards; to strictly comply with local environmental protection, occupational safety and labor regulations in Barbados, as well as international engineering HSE standards; to safeguard the health and safety of all project personnel; to protect the surrounding ecological environment, marine areas and living environment; to achieve the HSE management objectives of zero fatalities, zero serious injuries, zero environmental pollution and zero occupational diseases; and to ensure the efficient, compliant and smooth delivery of the project, this Management Plan has been drawn up.

Basis for Preparation

- Local laws and regulations of Barbados: Health Services (Nuisances) Regulations (1969), Health Services (Refuse Collection and Disposal) Regulations (1975), Road Traffic Act, National Oil Spill Contingency Plan, Occupational Health and Safety Act 2005.
- Contract for the Barbados Climate Resilience South Coast Water Reclamation and Re-use Facilities.
- China Railway Shanghai Engineering Group construction site safety management procedures, emergency management system regulations, and relevant environmental management systems and standards.

Scope of Application

This plan applies to the entire life cycle of this construction project, covering all phases from preliminary project preparation, the SCWRRF and SCSTP upgrade and refurbishment, workers' camps, on-site construction, testing and commissioning, completion and acceptance, operation, through to the withdrawal of personnel. This plan applies to the full lifecycle of this construction project, covering the pre-construction preparation, on-site construction, testing and commissioning, completion acceptance, operation and maintenance support, and personnel withdrawal stages. The scope of management covers Chinese management personnel, seconded construction workers, locally hired employees, subcontractor teams, equipment operation and maintenance personnel, site visitors, and all third-party personnel entering the construction area; it covers all construction work processes,

mechanical equipment, temporary facilities, office and living areas, material storage areas, and commuting transportation.

8.7.1. Management Principles

Adhere to the core principles of safety first, prevention-oriented, comprehensive governance, local compliance, full staff accountability, and full-process management. Implement the accountability system of "whoever manages production must manage safety, whoever manages operation must manage safety." Establish a three-tier safety management system comprising the project management office, construction teams, and subcontractors. Give due consideration to local environmental risks in Barbados, strengthen proactive risk identification, dynamic in-process management, and rapid emergency response, and achieve standardized, localized, routine, and refined safety management.

Management Objectives

- Health Objectives: No group occupational diseases, no construction-related occupational health injuries, no infectious disease transmission; 100% coverage of full-staff health examinations; 100% rectification rate for occupational health hazards.
- Safety Objectives: Eliminate fatalities and serious injuries; eliminate fire, explosion, collapse, electrocution, and confined space suffocation/poisoning accidents; control the minor injury rate to the lowest industry standard; 100% hazard closure and rectification rate.
- Environmental Objectives: Ensure the compliant disposal of construction wastewater, dust, noise and solid waste; prevent any incidents of water, soil or air pollution; protect surrounding wetlands and coastal marine areas; conservation of ecological processes and ecosystem services; and achieve a 100 per cent compliance rate with environmental regulations.
- Social and Gender Objectives: Ensure zero tolerance of SH/SEA/GBV and discrimination, equitable access for women and men to safe working and living conditions, implementation of gender responsive measures.
- Management Objectives: Full coverage of HSE training, full implementation of management systems, comprehensive inspections, fully controllable emergency response; successful passage of all HSE audits and inspections by the Employer and local regulatory authorities.

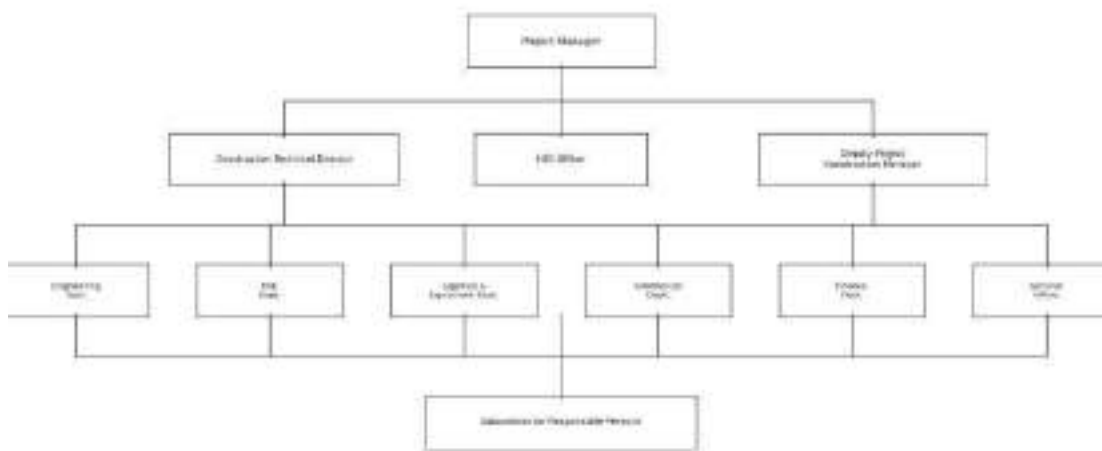
8.7.2. Project HSE Organizational Structure and Job Responsibilities

Organizational Structure

In accordance with the Barbados Occupational Safety and Health Act (CAP 356), workplaces with 75 or more employees are required to establish a Safety and Health Committee. The number of workers on the sewage treatment plant construction project exceeds 75 at peak times; therefore, a committee

must be established in accordance with the law. Furthermore, in line with common industry practice, the Safety Committee is typically chaired by the Project Manager and comprises the heads of each department and the representatives of subcontractors, supported by HSE management personnel (members of the Health, Safety and Environment Department and HSE specialists) to implement the HSE accountability framework.

The Project HSE and Work Safety Management Committee, chaired by the Project Manager, is responsible for coordinating health and safety management for all project personnel; a dedicated HSE management department is established, staffed with a sufficient number of full-time safety management personnel, and safety officers are deployed in accordance with the scale of construction. A four-tier management network is established, comprising the Project Manager as the overall supervisor, HSE specialists providing oversight, the Health, Safety and Environment Department responsible for implementation, subcontractors providing support, and the participation of all personnel, covering all construction areas and operational phases of the project. Subcontractors must appoint a safety officer and be integrated into the project's unified safety management system.



Core Job Responsibilities

Project Manager (First Person Responsible for HSE)

Bears full responsibility for the overall management of project health and safety. Reviews and approves the HSE Management Plan, specialized safety plans, and emergency response plans. Coordinates compliance with local requirements and resolves major safety risks, resource allocation, and government-enterprise interface issues for overseas projects. Organizes safety special meetings, hazard rectification, and emergency drills, and bears overall responsibility for production safety and occupational health of the project.

HSE Officer

Responsible for the day-to-day implementation of project HSE management. Leads risk identification, assessment, and control. Supervises on-site PPE wearing, operational compliance, equipment safety, and environmental management. Conducts daily HSE inspections and hazard investigations. Leads preliminary accident investigations and follows up on rectification measures. Reports HSE work progress to the Project Manager and the company. This role is to be filled by one person, appointed by the main contractor from a local safety and environmental consultancy team.

HSE Department

Responsible for the on-the-ground implementation of this plan. Conducts daily safety inspections, risk identification, and hazard investigation and rectification. Organizes full-staff safety training, technical briefings, and pre-shift safety activities. Manages construction site protective facilities, labor protection equipment, and mechanical equipment safety. Establishes HSE management records, reports safety data, hazards, and accident situations. Supervises subcontractors and local employees in safe operations and implements local safety regulation rectification requirements. Enforcement of the zero tolerance policy on SH/SEA/GBV and discrimination and oversight of social and gender aspects of the project. The department's staffing comprises members of the main contractor's project Health, Safety and Environment Department and safety officers from subcontractors, with a minimum of two permanent staff members. Key positions include the Head of the Health, Safety and Environment Department, social and gender personnel and the subcontractor safety officers.

Subcontractor Managers

Implement daily pre-shift safety briefings and work risk notifications, and manage the on-site behavior of their work teams. Investigate immediate safety hazards in their work areas and stop instances of illegal command, illegal operations, and violations of labor discipline. Organize work team members to properly wear labor protection equipment and bear primary responsibility for safety accidents and health issues in their subcontracted areas. Cooperate with the project management office to complete rectification and emergency response work. Strictly construct in accordance with specialized plans and immediately report on-site sudden safety issues and abnormal health conditions.

All Operating Personnel

Strictly comply with project safety and health management systems and local operating standards. Participate in safety education training and emergency drills. Properly wear labor protection equipment and eliminate the "three violations" (illegal command, illegal operation, violation of labor discipline). Proactively identify job-related risks, promptly report hazards and abnormalities, and consciously comply with occupational health protection requirements.

8.7.3. Communication Channels between All Parties

(1) Internal Communication Channels

Table 128: HSE Communication Channels

Channel Type	Specific Method	Frequency	Target Audience
Monthly Safety Briefing	Joint meeting of all specialist departments to coordinate safe construction arrangements and discuss risks associated with overlapping operations	Once a month	Project Manager, heads of all departments, and project supervisors from each subcontractor
Pre-shift Briefing	A brief safety briefing held 5–10 minutes before the start of work each day, conducted by the foreman and inspected and recorded by the safety officer	Daily, before work commences	All team members
HSE Specialized Regular Meetings	Internal weekly HSE team meeting to summarize inspection findings and track the progress of hazard rectification	Once a week	All HSE department staff
On-site safety inspections	HSE staff conduct daily on-site inspections; any potential hazards identified are immediately reported to the person responsible for rectification	At least two comprehensive inspections per day	HSE staff/team leaders

(2) External Communication Channels

The Department of Emergency Management (DEM) of Barbados operates a real-time disaster warning system on its website; construction safety information may be disseminated via this platform as appropriate.

Table 129: External Communication Channel

Communication Recipients	Key communication channels	Communication Content
Client (BWA)	Formal report emails, monthly HSE reports, immediate telephone notification of incidents (followed by a written report within 24 hours)	HSE performance, incident reports, corrective action plans, implementation status of the C-ESMP
Inter-American Development Bank (IDB)	Formal correspondence, quarterly compliance reports, ESIA/ESMP implementation reports	Compliance with environmental and social protection policies, notification of significant incidents, status of grievance handling
Ministry of Labour, Barbados	Submission of written reports as required by law (notification 7 days prior to commencement of works; immediate reporting of incidents involving absences exceeding 3 days)	Notification of commencement of works, accident reports (including fatal and serious injury accidents, which must be reported by telephone within one hour), compliance information
Ministry of the Environment, Barbados	Submission of environmental compliance reports and water quality monitoring reports in accordance with approval conditions	Wastewater discharge monitoring, hazardous waste disposal records, implementation of wetland protection measures
Ministry of Emergency Management, Barbados	Coordination of hurricane/heavy rain warnings, liaison on emergency response	Receipt of disaster warnings, emergency coordination, and cooperation with personnel evacuation
Community/Public	Complaints helpline, complaint registration points, regular visits by community liaison officers (in accordance with the ESIA public consultation commitments and IDB	Notification of construction impacts, handling of complaints and feedback on

	information disclosure	their resolution, information on public enquiries
	requirements)	

(3) Emergency Communication Channels

The project team must establish a 24-hour emergency communications network, covering the Project Manager, HSE Manager, Security Manager, camp medical center, the client's emergency contact, the A&E department of the nearest hospital, and the Barbados Fire Service/Police Service. All contact lists must be displayed in prominent locations within office areas, construction sites and camps, and updated promptly as personnel changes occur.

8.7.4. HSE Management System Development

In combination with Chinese work safety standards, Barbados laws and regulations, and Employer's HSE requirements, a standardized management system adapted to local construction scenarios shall be established to ensure that management has rules to follow, evidence to check, and full-process traceability. The core systems are as follows:

1. Work safety responsibility system and performance management system, defining HSE accountability standards and reward and penalty mechanisms for all positions.

This system aims to break down the project's HSE objectives to every individual role through a 'responsibility cascade mechanism'. The core of this system is to define the specific HSE performance standards for project management personnel. The assessment component requires the establishment of a 'monthly HSE performance appraisal system', linking assessment results directly to remuneration and commendations. This creates a closed-loop accountability system where 'the burden of safety is shared by all, and everyone has targets to meet', whilst complying with the general requirements of Barbados' Work Safety and Health Act regarding the employer's duty to ensure a safe and healthy workplace.

2. Construction site risk identification, tiered management and control, and hazard investigation and rectification management system.

This system requires the implementation of a "dual prevention mechanism", combining risk identification with hazard investigation. Firstly, a "dynamic risk register" should be established, with systematic hazard identification (HAZID) carried out during the project planning and construction phases, and a job safety analysis (JSA) prepared for each high-risk operation. Secondly, the "risk matrix method" must be adopted to classify the identified risks and implement differentiated control measures. Hidden hazard inspections should be carried out through a three-tier inspection system

comprising ‘daily, weekly and monthly inspections’. A register must be maintained for all identified hazards, which are to be managed according to a closed-loop process of ‘identification – registration – rectification – acceptance – closure’. The results of risk classification should directly guide the focus and frequency of hidden hazard inspections.

3. Permit management systems for special operations including work at heights, hot work, temporary electrical operations, lifting operations, and confined space operations.

This system serves as the core safeguard against major casualty accidents. A “work permit system” must be implemented for work at height, hot work, temporary electrical work, lifting operations and work in confined spaces. Procedurally, the application should be submitted by the person in charge of the operation; following an on-site inspection by the safety officer to confirm that safety measures are in place, the permit shall be issued by the project manager or their authorized representative. The permit must clearly specify the scope of work, timeframe, risk points, safety protection measures and emergency arrangements. Particular attention must be paid to the principle that ‘no work may be carried out without a permit’; any unauthorized work shall be regarded as a serious breach. Permit management requirements must align with the regulatory priorities of the Barbados Ministry of Labour regarding high-risk construction projects.

4. Mechanical equipment, temporary electrical work, and construction tools safety management system.

These regulations are designed to ensure that all construction equipment remains in a safe condition at all times. Key requirements include: equipment must pass acceptance inspection prior to entry onto site, and operators must have completed approved training before being permitted to operate it. Temporary electrical systems must comply with the principle of ‘three-level power distribution and two-level earth leakage protection’, and must be fitted with earthing protection. The HSE Manager shall carry out daily inspections of equipment to ensure there are no fluid leaks and that safety devices are in working order. Barbadian legislation explicitly requires employers to ensure the safety of equipment and to prevent harm to employees and the public.

5. Occupational health protection, health examination management, and occupational disease prevention and control management system.

This system focuses on full-cycle occupational health surveillance. Firstly, a system of pre-employment, periodic (annual) and post-employment medical examinations must be established. Secondly, occupational health hazards within the project—such as dust, noise, high temperatures, and toxic or harmful gases—must be identified, and engineering control measures, such as ventilation and noise reduction, must be implemented. Furthermore, employees exposed to such hazards must be

provided with, and the use of, approved personal protective equipment must be supervised. At the same time, consideration must be given to the risk of local mosquito-borne diseases (such as dengue fever and Zika virus).

6. On-site civilized construction and environmental hygiene management system.

This system must coordinate construction activities with the community and the environment. Within the construction area, 'rigid hoardings' and 'safety warning signs' must be installed, and pollution control measures—such as water sprinkling to suppress dust and noise reduction—must be implemented to minimize the impact on surrounding communities. Site environmental management should also include the centralized treatment of construction and domestic wastewater, as well as measures to prevent leaks of oils and chemicals. Furthermore, a 'community complaints and feedback mechanism' should be established to promptly address neighborhood disputes arising from construction noise, dust and mosquito breeding, thereby demonstrating a commitment to community health and safety.

7. Safety access and education and training management system for cross-border personnel, local employees, and subcontractors.

This system serves as a 'gatekeeper' mechanism to ensure that all site personnel possess basic safety literacy. Firstly, all personnel (including cross-border staff, local staff and subcontractors) must complete 'three-level safety training', the content of which must cover project-specific risks (such as high temperatures, insect control and hurricane response). Secondly, personnel engaged in high-risk operations must undergo specialized skills training and assessment. The system should clearly stipulate the principle of 'no training, no work' and establish 'training records'. Ensure that all personnel are capable of identifying workplace hazards.

8. Emergency management, accident reporting, and response management system.

This system must establish a comprehensive mechanism covering the entire process from on-site response to official reporting. On the one hand, specific emergency response plans should be drawn up for incidents such as fires, collapses, chemical leaks, heatstroke and natural disasters such as hurricanes, and regular drills should be organized. On the other hand, the accident reporting procedures, as well as the methods and reporting requirements for accident investigations, must be clearly defined to ensure corrective actions are implemented and prevent similar incidents from recurring.

9. Camp living and public health and safety management system.

10. HSE records management and inspection and performance management system.

These regulations form the foundation for safeguarding workers' physical and mental well-being and ensuring community harmony. Campsite planning must be approved by the relevant authorities in Barbados to ensure the provision of adequate and safe drinking water, hygienic bathing facilities, and effective waste and sewage treatment. With regard to public health and safety, strict standards for food procurement, processing and storage must be established to prevent foodborne illnesses; standing water must be cleared and insecticides sprayed regularly to control the spread of mosquito-borne diseases such as dengue fever.

11. HSE record-keeping, inspection and assessment management system.

This system forms the basis for ensuring the traceability and verifiability of the HSE management system. It requires the establishment of a comprehensive HSE record-keeping system for the project, covering all key documents such as training records, inspection reports, meeting minutes, incident reports, equipment maintenance logs and licenses. Record-keeping management must clearly define the classification, coding, version control, filing and retention periods for documents. Furthermore, this system must document the results of regular internal inspections and external audits, which serve as the basis for management reviews and performance assessments, thereby driving the continuous improvement and enhanced effectiveness of the HSE management system.

8.7.5. Construction Site Safety Risk Identification and Control

Scope of Risk Identification

Given the special nature of overseas construction in Barbados, a comprehensive identification shall be carried out of occupational health risks, construction safety risks, and environmental protection risks, covering the entire construction process. Focus shall be placed on unique risks including high-risk operations, overseas extreme weather, local infectious diseases, public security hazards, and cross-border operational compliance.

Control of Key High-Risk Operations

The principle of prior approval before special operations shall be strictly enforced, work permit systems implemented, and operational risks dynamically updated.

- **Work at Heights:** Compliant protective scaffolding, protective railings, and safety nets shall be erected. Workers shall wear safety harnesses throughout, and exclusion zones shall be established below. Overhead throwing of materials, unauthorized operations, and non-compliant climbing shall be prohibited. Work at heights shall be prohibited in winds of Beaufort Force 6 or above, heavy rain, and dense fog.
- **Hot Work:** Flammable and explosive materials in the work area shall be cleared, sufficient fire-fighting equipment and fire monitors provided, hot work permits obtained, fire-catching measures

implemented for hot work at height, and post-work inspection carried out to confirm no fire hazards.

- Temporary Electrical Operations: Three-level distribution and two-level protection shall be strictly enforced, cables laid in a compliant manner, private connections strictly prohibited, distribution boxes locked and weatherproofed, and dedicated electricians responsible for wiring, maintenance, and inspections, eliminating unauthorized live operations.
- Lifting Operations: Lifting equipment shall be regularly tested and calibrated, rigging and slings verified as compliant and intact, lifting exclusion zones established, and dedicated signalers and monitors appointed. Overloading, oblique pulling, and forced dragging shall be prohibited. Lifting operations shall be suspended in adverse weather.
- Confined Space Operations: Ventilate first, then test, then operate. Continuous gas monitoring and dedicated supervision throughout. Emergency rescue equipment shall be provided. Strict management of operational time limits and blind rescue attempts shall be prohibited.
- Flooding Risks: Construct adequate drainage systems as required to mitigate flood risks in the construction area; schedule major earthworks during the dry season to avoid soil erosion during periods of heavy rainfall; suspend excavation work during rainfall and implement measures to prevent landslides; and regularly clear drainage ditches to ensure they remain unobstructed. In terms of emergency coordination, weather forecasts must be monitored in real time; following a heavy rain warning, excavation of foundation pits and utility trenches must be suspended immediately, and preparations for activating pumping equipment and evacuating personnel must be initiated.

8.7.6. Comprehensive Environmental Risk Management by Country

- Climate Risks: For local extreme weather including high temperatures, heavy rain and etc. specialized management plans shall be developed. Outdoor high-risk operations shall be suspended during extreme weather, and equipment protection, heatstroke protection for personnel, and camp wind and rain protection measures implemented.
- Public Health Risks: Local infectious and endemic disease risks shall be surveyed in advance. Camp disinfection and pest control, drinking water safety, and food hygiene management shall be enforced. Epidemic prevention supplies shall be stockpiled, consumption of unsafe food prohibited, and personnel exhibiting symptoms such as fever and fatigue immediately isolated and referred for medical treatment.
- Local Security Risks: Liaison with local security departments and partner organizations shall be maintained. Closed management of construction sites and living areas shall be implemented, with security personnel on guard. Unauthorized entry of unrelated personnel and external vehicles

shall be prohibited. Personnel external movement reporting procedures shall be standardized to avoid security disputes and foreign-related safety risks.

8.7.7. Mechanism for Identifying and Rectifying Hidden Hazards

The project's hazard identification and rectification mechanism operates through three core components: a five-tier inspection system, tiered control measures, and closed-loop management.

The five-tier inspection mechanism covers the entire project lifecycle at varying frequencies and levels. Each work team conducts a daily pre-shift self-inspection of safety safeguards at the work area, the wearing of PPE and the condition of tools; HSE managers carry out daily comprehensive patrols of high-risk work sites, correcting any breaches immediately upon discovery; the project department organizes weekly specialized inspections, focusing on one high-risk theme each week (such as work at height, temporary electrical installations, lifting operations, etc.); the project manager leads a comprehensive monthly inspection of the entire site, covering compliance with regulations and the completeness of records across construction, living and office areas; and before public holidays and the start of the hurricane season, a thorough, grid-style inspection is carried out, focusing on drainage systems, the reinforcement of temporary facilities and the stockpiling of emergency supplies.

Hidden hazards are categorized into two levels of severity: major hazards (which may result in death, serious injury or significant environmental pollution) require immediate suspension of work for rectification; general hazards must be rectified within three days.

The closed-loop rectification mechanism is implemented in five steps: 'Identification → Registration → Rectification → Re-inspection → Closure'. Upon discovery of a hazard during an inspection, photographs are taken for record-keeping and the details are entered into the register, clearly specifying the person responsible for rectification, the measures to be taken and the deadline. Once rectification is complete, the HSE supervisor must carry out a re-inspection and acceptance within 24 hours; the item may only be closed and archived upon passing the inspection. Major hazards must be assessed on-site by the project manager, who must draw up a specialized plan and supervise the rectification process throughout; a work resumption order is issued only upon successful acceptance. As Barbados is situated in a hurricane corridor, during heavy rain warnings, drainage systems must be cleared in advance, slope supports reinforced and the stability of excavation pits checked. Before resuming work after rainfall, a comprehensive inspection of the electrical systems and site safety must be carried out before operations can resume.

8.7.8. Occupational Health Management

Personnel Health Access Management

All Chinese seconded personnel shall complete comprehensive medical examinations before departure to identify conditions such as cardiopulmonary diseases, infectious diseases, and chronic diseases that are unsuitable for overseas construction. Only those who pass their medical examination may commence work. Local employees shall undergo health screening before employment to prevent persons with occupational contraindications from undertaking relevant work. A comprehensive health file for all staff shall be established, with dynamic updating of medical records, health status, and treatment records.

a. Standards for Classification of Medical Examinations

All personnel must complete a pre-employment occupational health and safety examination before entering the camp, construction or operational areas. The examination shall screen for conditions unsuitable for tropical construction work, such as cardiovascular and respiratory diseases, infectious diseases, chronic conditions and heat stress tolerance. Local employees must undergo a health screening at a locally recognized institution prior to commencing employment; they may only undertake the relevant work after confirmation that they have no occupational contraindications.

b. Compliance with Statutory Requirements for Medical Examinations

All medical examination costs shall be borne by the employer and must not be passed on to employees in any form. Medical examination records shall be retained by the employer, who must establish health files for all staff and dynamically update medical examination records, health status and medical treatment information.

c. Regular Medical Examinations and Special Protection

Employees must undergo an occupational health review at least once a year. Furthermore, the provisions of Article 73 of CAP 356 must be strictly adhered to; the employment of women and young people in lead manufacturing and related processes is strictly prohibited. For roles involving occupational health hazards such as dust, noise, high temperatures and confined spaces, the intervals between medical examinations must be appropriately shortened in accordance with the level of exposure. All medical examination findings must be communicated to the employee in writing, and those with occupational contraindications must be reassigned to suitable roles without delay.

d. Occupational Health Protection during Construction and Operations

For occupational hazard factors including dust, noise, high temperatures, toxic and harmful gases, and strong light radiation, specialized protective measures shall be implemented. Ventilation, dust removal, and noise reduction equipment shall be installed in work areas. Sufficient labor protection equipment including safety helmets, non-slip safety footwear, protective masks, dust respirators, noise-reducing earplugs, protective gloves, and protective clothing shall be provided for workers. Full

compliance in wearing and regular replacement shall be supervised, and unprotected operations strictly prohibited.

e. Head Protection

Safety helmets must comply with the ANSI Z89.1 standard and must be worn at all times when working in areas where there is a risk of being struck by falling objects, collisions or electric shock. The service life of a safety helmet is generally 24–36 months, subject to adjustment based on the degree of wear and tear during use; helmets must be replaced immediately in the event of a severe impact or the appearance of cracks.

f. Foot Protection

Non-slip safety footwear must comply with the ASTM F2413 standard and be equipped with impact-resistant, puncture-resistant and slip-resistant features; it is mandatory for all on-site personnel. Footwear must be replaced immediately if the soles are severely worn, the toe cap is deformed or the anti-slip tread is worn smooth; the typical service life is 12–24 months.

g. Respiratory Protection

Dust masks and respirators shall be selected according to dust concentration; respiratory protective equipment must be provided to staff where an assessment confirms the presence of a hazard. Work involving silica dust, cement dust, welding fumes and similar hazards requires the wearing of N95 or higher-grade dust masks; in confined spaces or areas containing toxic or harmful gases, gas masks fitted with filter cartridges must be worn. Disposable masks must be replaced every 4 hours or immediately if they become damp; filter cartridges must be replaced regularly in accordance with the operating environment and the manufacturer's instructions.

h. Hearing Protection

Noise-reducing earplugs or earmuffs must be used in areas where noise levels exceed the permissible limits; the project's ESMP explicitly requires that operators of high-noise equipment be provided with noise-reducing earmuffs. Earplugs are consumables and must be replaced as soon as they become soiled or lose their elasticity; earmuffs are generally replaced every 6–12 months but must be replaced immediately if the padding is damaged.

i. Hand Protection

Protective gloves must be selected according to the nature of the work (cut-resistant, acid and alkali-resistant, insulated, etc.), and must be worn when handling chemicals. Gloves must be replaced immediately if they are torn, severely worn or have come into contact with corrosive substances.

j. Personal Protective Equipment

Protective clothing (including high-visibility vests) must be worn in all work areas to ensure personnel are visible. It must be replaced if it is damaged, severely soiled or if the reflective strips are no longer effective.

k. Eye and Face Protection

Safety goggles or face shields must be worn when carrying out work involving dust, intense light radiation (such as welding arcs) or chemical splashes. Lenses must be replaced immediately if they become scratched to the extent that they impair vision, or if the face shield becomes deformed.

All PPE must be fully provided and paid for by the contractor, who must establish a record of issue and collection, as well as a system for regular inspection and replacement, and ensure that all personnel wear it correctly; working without protective equipment is strictly prohibited.

8.7.8.1. Daily Health Management

- **Construction camps shall be managed to standardized requirements to ensure dormitory ventilation, lighting, and sanitary cleanliness. Regular disinfection and pest control shall be carried out to eliminate mosquito breeding and pathogen transmission.**

Regarding standardization requirements for camp facilities, the camp shall be constructed in accordance with the plan approved by the Government of Barbados, providing workers with temporary sanitary facilities that meet the required standards, whilst maintaining good hygiene and carrying out necessary repairs.

With regard to standardized regular disinfection and pest control: the site environment shall be sprayed with insecticide once a month; drainage channels shall be kept clear and free of standing water to prevent the breeding of mosquitoes; during peak mosquito seasons (April–June and September–November each year), mosquito control and disinfection shall be carried out at least once a month; Cockroach control agents shall be applied monthly in canteens and dormitories, whilst rodenticides (such as bromadiolone and bromadiolone) shall be deployed in accordance with the ‘three-saturation’ principle; rodent carcasses shall be collected and disposed of centrally 5–7 days after application; all chemicals used must be public health pesticides authorized for use in Barbados.

With regard to standardized daily maintenance, domestic waste must be sorted and collected in leak-proof containers and removed regularly; kitchen waste water must be treated in grease traps before being discharged into the camp’s sewage system. All living areas must be kept free of pests such as rats, lice, bedbugs, cockroaches and flies, both indoors and outdoors.

- **2. Food safety in the canteen shall be strictly managed, with food procured in compliance with regulations, stored by category, raw and cooked foods processed separately, utensils regularly disinfected, and group incidents of food poisoning and gastrointestinal illness prevented.**

All our food ingredients are sourced locally, with perishable items such as red meat, white meat and fish purchased from supermarkets such as Chapside Market or Cost U Less. During procurement, insulated boxes are used to ensure low-temperature transport; upon arrival at the project site, the goods are immediately stored in designated sections of the refrigerators for chilled or frozen storage, thereby fully ensuring a closed-loop cold chain for fresh produce and meeting food safety management requirements.

- **Construction shifts shall be arranged reasonably, with strict control of fatigue and overtime work. Staggered construction schedules and heatstroke prevention and cooling measures shall be implemented during hot weather, with heatstroke medicines and drinking water provided.**

(1) Regarding shift arrangements, the project draws on international experience from similar construction projects in tropical regions and implements a ‘work early and late, rest in the middle’ staggered working pattern, concentrating core construction tasks during the early morning and evening when temperatures are relatively moderate. The period from 12:00 to 15:00 is designated as a high-temperature work suspension period, during which workers are required to extend their lunch break and delay the resumption of afternoon work.

(2) Regarding shift duration and working hour standards, the project complies with the provisions of Barbados’ Employment Rights Act, with a daily working day of 8 hours. Outdoor work must be suspended when temperatures reach 38°C or above to prevent excessive working hours and fatigue.

(3) With regard to dynamic adjustments based on weather conditions, the project department monitors high-temperature warnings issued by the Barbados Meteorological Service on a daily basis. When temperatures exceed 35°C, work in direct sunlight is strictly controlled; when temperatures exceed 38°C, outdoor work is suspended, and heatstroke prevention medication and drinking water are provided.

- **Regular occupational health awareness education shall be conducted to disseminate knowledge of occupational disease prevention, infectious disease prevention, and emergency first aid, enhancing all-staff self-protection capacity.**

(1) Content of the training programme

The educational content must cover three main areas: prevention and control of occupational diseases (identification of hazards and protective measures relating to dust, noise, high temperatures, toxic and harmful gases, and intense light radiation); prevention of infectious diseases (control of

mosquito-borne diseases such as dengue fever and Zika, food and water safety, and malaria prevention and control); and emergency first aid knowledge (cardiopulmonary resuscitation, handling of trauma patients, and first aid for heatstroke).

(2) Trainers and Venue

Instructors must be qualified professionals: the sections on occupational disease prevention and control and infectious diseases shall be delivered by the project HSE manager or a certified occupational health and safety specialist engaged for this purpose; first-aid skills shall be taught through practical guidance by the project department's doctor. Venue: Theoretical training shall take place in the project department's conference room; practical training shall be conducted in an open, safe area on the construction site; on-site briefings for work teams shall be held directly at the work area.

(3) Format and Grouping Method

A three-tiered, tiered training approach shall be adopted, with groups organized by job category:

Table 130: Three tiered training approach

Level	Target Audience	Format	Grouping Method
Lectures for all staff	All site personnel (including cross-border staff, local staff and subcontractors)	Classroom instruction + video-based learning + case studies	Classes organized by camp or work area, with no more than 50 participants per class
Specialized Intensive Courses	Personnel engaged in high-risk operations such as work at height, confined spaces and hot work; personnel exposed to high noise levels and dust	Practical exercises + on-site demonstrations + written assessment	Grouped by trade or type of work, with 10–15 people per group
On-site briefing for work teams	All team members	5–10-minute pre-shift briefing	Organized by work team, to be conducted daily by the team leader or safety officer

(4) Frequency schedule

Specific frequency: Complete induction safety training for all staff (including three-tier safety education) prior to commencing work; conduct at least one specialized training session per quarter

(rotating through the three major areas by topic); conduct one annual refresher course on first-aid skills and a joint inspection; hold a 5-minute on-site briefing before each shift.

(5) Records and Assessment

Attendance records, training materials, assessment results and video footage must be retained for all training sessions; training records shall be incorporated into the HSE ledger management system. Personnel in high-risk roles must pass both written and practical assessments before being permitted to take up their posts; those who fail the assessment must undergo retraining. Assessment results shall be recorded in individual training files and reviewed periodically.

8.7.8.2. Health Monitoring and Medical Support

Construction camps shall stock sufficient first-aid medicines, epidemic prevention supplies and emergency medical equipment, and shall establish a temporary on-site medical room staffed by medical personnel; A partnership has been established with the local accredited Queen Elizabeth Hospital (contact number: +1 (246) 536-4500) to create a green channel for emergency medical care; in the event of an emergency, the project department will arrange transport to the hospital using its own vehicles; regular health re-examinations shall be organized for all staff, with a focus on monitoring those engaged in high-risk work over the long term; should any occupational health abnormalities be detected, the individual shall be immediately reassigned, treated and subject to follow-up monitoring.

Overall Emergency Response Flowchart

The response process is carried out in five steps: 'Detection → Assessment → Response → Evacuation → Reporting':

Table 131: Emergency Response Flowchart

Step	On-site Personnel	On-site Manager/HSE Manager	Camp Medical Centre	External organizations
1. Detection and Alert	Identify the injured person → Assess the injury → Call for help immediately → Report to the HSE Manager	Receive the report → Assess whether to activate the emergency response plan	Stand by and prepare first-aid supplies	—
2. First Aid at the Scene	If qualified in first aid, assist with rescue efforts	Arrive at the scene to take charge; organize the evacuation of onlookers	Dispatch medical staff with a first-aid kit to the scene; perform CPR, stop	—

Step	On-site Personnel	On-site Manager/HSE Manager	Camp Medical Centre	External organizations
			bleeding and apply dressings	
3. Injury Assessment and Triage	Assist with first aid	Confirm the severity of injuries (minor/serious/critical)	Assess vital signs and determine whether hospital admission is required	—
4. Transport Arrangements	Assist with transport	Contact the designated hospital; arrange a vehicle or ambulance	Accompany the patient in the vehicle and provide continuous monitoring enroute	Admission of the patient to the hospital's A&E department
5. Information Sharing	—	Notify family members/emergency contacts; report to the client and the Ministry of Labour	Explain the nature of the injury and the course of treatment to the attending doctor upon handover	Admit the injured person; provide feedback on the diagnosis
6. Follow-up	—	Monitor the progress of treatment; arrange for staff to cover the injured person's duties	Follow up on the injured person's recovery	Issue medical certificates detailing the nature of injuries

Note: Injury classification criteria — Minor injuries (can be treated with first aid at the scene; no hospitalization required), serious injuries (require hospital treatment but are not life-threatening), critical injuries (life-threatening; require emergency resuscitation). Upon discovering an injured person, personnel at the scene should provide assistance whilst ensuring their own safety and avoiding secondary injuries.

8.7.8.3. Matrix of Responsibilities

Table 132: Matrix of Responsibilities

Role	Emergency Response Responsibilities	Day-to-day preparation responsibilities
Project Manager	Declare the activation of the emergency response plan; coordinate internal and external resources; report major	Approve the emergency management budget; sign off on emergency drill plans

Role	Emergency Response Responsibilities	Day-to-day preparation responsibilities
	incidents to the client and the client's representative	
HSE Manager	On-site command; liaising with the fire service, police and hospitals; confirming the identity and condition of injured persons	Organize emergency drills; manage medical supplies stockpiles; update the emergency contact list
Camp Medical Staff	Administer first aid on site; assess and triage injuries; accompany patients during transport	Manage first-aid medicines and equipment; carry out regular re-examinations; conduct health monitoring
Team Leader	Organize the evacuation and headcount of their team; report incidents immediately	Attend emergency response training; communicate emergency evacuation routes and assembly points to the team
Security Staff	Maintain order at the scene; direct traffic; guide ambulances at the camp entrance	Assist in setting up signage for evacuation routes; ensure emergency access routes remain clear

8.7.8.4. Management of Evacuation Routes and Assembly Points

- (1) Evacuation route signage: The camp must display a bilingual (Chinese and English) site plan in a prominent location, with escape routes marked by red arrows; these routes must be kept clear.
- (2) Designation of Assembly Points: One safety assembly point shall be established at the campsite, equipped with a headcount register, a public address system and a first-aid kit.
- (3) Evacuation Instructions: A 'Stop Work Alarm' must be broadcast via the public address system; all personnel must cease work, switch off equipment and proceed to the assembly point via the nearest route for a headcount.

8.7.8.5. Procedure for Tracking Injured Persons

Phase	Responsible Party	Specific Actions
On-site Response	Camp medical staff/HSE Manager	Record the injured person's name, employee number, job title, time of injury, location of injury, preliminary assessment and on-site treatment measures
Transfer and handover	Escort personnel	Submit the 'Injury Handover Form' to the attending doctor;

Phase	Responsible Party	Specific Actions
		record time of admission and preliminary diagnosis
During hospitalization	HSE Manager (or their designated representative)	Liaise with the hospital daily to monitor the patient's condition; inform the project manager of any changes in the patient's condition; arrange language assistance (e.g. Chinese expatriate staff);
Discharge and Rehabilitation	HSE Manager + General Affairs Office	Obtain discharge certificates and rehabilitation recommendations; arrange for sick leave or redeployment; record the employee's health status during rehabilitation
Return-to-work assessment	Camp Medical Staff	Conduct pre-return-to-work health checks; confirm suitability for the original role; if unsuitable, propose a job reassignment

Post-Hospitalization Procedures

Admission arrangements: The camp must enter into a medical cooperation agreement in advance with a nearby accredited hospital. As the project's area of influence is adjacent to the south coast, the nearest large public hospital is Queen Elizabeth Hospital, which has a total of 554 beds and provides comprehensive services including A&E, surgery and intensive care; it may serve as the preferred referral hospital. The emergency center also provides on-site first aid and transport services.

Costs: All medical expenses for personnel injured whilst on duty shall be borne by the employer (covered by work injury insurance or the project budget), in accordance with the basic requirements of the Barbados Occupational Safety and Health Act.

Accompaniment: When an injured person is taken to hospital, they must be accompanied by a person familiar with the circumstances of the accident, who will provide the attending doctor with background information on the injury and assist with completing medical documentation.

Notification: The employer must be notified within one hour of admission, and family members or emergency contacts must be informed promptly.

Emergency Supplies: In accordance with the project's ESIA/ESMP requirements, the construction site must be equipped with adequate first-aid supplies, including equipment required for resuscitating

unconscious casualties and stretchers, with the management of emergency supplies supervised by a qualified occupational health and safety officer.

8.7.8.6. Procedures for Handling Fatal Incidents

The Barbados Health Services Act, Cap. 44, and its 2025 amendments provide the legal framework for the disposal of human remains. The project must comply with the following procedures:

Table 133: Fatal Incident Procedure

No.	Step	Specific Action	Responsible Party
1	Securing the Scene	Immediately halt all work in the area; secure the scene and do not move any equipment or the body without authorization; await the arrival of the police and professional emergency medical personnel	HSE Manager/Security
2	Confirmation of Death	Death must be confirmed by a registered doctor or a coroner; personnel at the scene are not authorized to determine death	Medical staff/hospital
3	Immediate Reporting	The project manager must notify the client (BWA) and the client's bank (IDB) immediately (within one hour) following the incident, and report it to the Chief Labour Officer at the Ministry of Labour	Project Manager
4	Police involvement	The Royal Barbados Police Force will conduct an investigation, and the body will be handed over to the coroner for a post-mortem examination to determine the cause of death (as required by Barbadian law)	Police/Forensic Services
5	Notification of next of kin	Immediate family members must be notified in person or by telephone by a designated representative, ensuring that the information is conveyed accurately, sensitively and respectfully; notification must not be given via text message or email	Project Manager/Human Resources
6	Arrangements for the Deceased's Remains	In accordance with the family's wishes and Barbadian law, a registered funeral director shall be commissioned to collect and preserve the remains; where cross-border transport is involved, the Ministry of Health's entry regulations must be observed	Family/Funeral Directorate

No.	Step	Specific Action	Responsible Party
7	Post-mortem Arrangements	Assistance with procedures such as obtaining a death certificate, processing insurance claims and terminating employment contracts; provision of mental health counselling services where necessary	General Affairs Office / HSE Manager
8	Recording and Archiving	Compile and archive a complete record of the incident, the investigation report and corrective measures for use in accident investigations and continuous improvement	HSE Manager

8.7.8.7. Coordination of Healthcare Resources

Barbados' public health system is centered on the Queen Elizabeth Hospital (554 beds), which provides comprehensive services including A&E, surgery, intensive care, cardiothoracic surgery and neurosurgery, and is the island's largest referral hospital. In addition, there are eight polyclinics across the island providing primary healthcare services. The project must enter into an emergency medical cooperation agreement with this hospital, clearly defining a priority admission pathway for injured persons upon arrival.

List of Medical Supplies

All medical supplies must be managed by designated medical personnel at the camp. A stock ledger must be maintained, expiry dates checked regularly and supplies replenished in a timely manner to ensure that emergency supplies are available at all times. At the same time, health records must be established for all personnel (including medical examination records, health status and medical history) to facilitate the monitoring and management of injured or ill personnel.

List of Medical Supplies

Table 134: Medical Supplies

No.	Category	Name of Medication/Equipment	Specification	Manufacturer	Quantity
I. Hemostasis, Disinfection and Dressing for Traumatic Injuries					
1	First-aid treatment	75% medical alcohol	100 milliliters (75% ± 5%)	Hubei Aibang Biotechnology Co., Ltd.	10

No.	Category	Name of Medication/Equipment	Specification	Manufacturer	Quantity
2	First-aid treatment	Povidone-iodine antiseptic solution	100 milliliters	Hunan Kefu Medical Equipment Co., Ltd.	10
3	First-aid treatment	Hydrogen peroxide	3 per cent × 100 milliliters	Jiangxi Caoshanhu Disinfectant Products Co., Ltd.	10
4	First-aid treatment	Saline solution	500 milliliters: 4.5 grams	Sichuan Kelun Pharmaceutical Co., Ltd.	10
5	First-aid treatment	Medical plasters (standard/waterproof)	25 plasters (waterproof, elastic)	Hai's Hainuo Health Technology Co., Ltd.	10
6	First-aid treatment	Sterile gauze, medical cotton wool	7 × 7 cm × 8 layers × 5 pieces	Nanchang Chaoyang Medical and Healthcare Supplies Co., Ltd.	20
7	First-aid treatment	Sterile gauze, medical cotton wool	50g	Xuchang Zhende Medical Dressings Co., Ltd.	10
8	First-aid treatment	Elastic bandages, self-adhesive bandages, triangular bandages	8 cm × 6 m × 2 rolls	Nanchang Chaoyang Medical and Healthcare Supplies Co., Ltd.	10
9	First-aid treatment	Elastic bandages, self-adhesive bandages, triangular bandages	Non-woven self-adhesive, 5 cm × 450 cm	Kefu Medical Technology Co., Ltd.	5
10	First-aid treatment	Moist Burn Ointment	10 g × 3 tubes	Shantou Meibao Pharmaceutical Co., Ltd.	3
II. Products for Traumatic Injuries and Muscle Pain Relief					
11	Pain Relief for Traumatic Injuries	Yunnan Baiyao Aerosol (Red + White Bottles)	85 g + 60 g	Yunnan Baiyao Group Co., Ltd.	5

No.	Category	Name of Medication/Equipment	Specification	Manufacturer	Quantity
12	Pain Relief for Traumatic Injuries	Safflower Oil, Joint-Relief Oil	25 milliliters	Aomei Pharmaceutical (Traditional Chinese Medicine) Co., Ltd.	5
13	Pain Relief for Traumatic Injuries	Safflower Oil, Joint-Relief Oil	35 milliliters	Ax Mark Authentic Safflower Oil	5
14	Pain Relief for Traumatic Injuries	Anti-swelling and Pain-Relieving Tincture	60 milliliters	Guangxi Zhuang Autonomous Region Huahong Pharmaceutical Group Co., Ltd.	5
III. Specialized Heatstroke Prevention and Cooling Products (Summer Essentials)					
15	Heatstroke Prevention and Cooling	Huoxiang Zhengqi Lotion/Capsules	10 ml × 10 vials	Tai Ji Group Chongqing Fuling Pharmaceutical Factory Co., Ltd.	100
16	Heatstroke Prevention and Cooling	Wind Oil, Cooling Oil	6 milliliters	Guangdong Taienkang Pharmaceutical Factory Co., Ltd. (formerly Shantou)	10
17	Heatstroke Prevention and Cooling	Wind Oil, Cooling Oil	15 g	Jiangsu Huasheng Pharmaceutical Co., Ltd.	10
IV. Cold and Fever, Respiratory Anti-inflammatory Products					
18	Cold and fever relief	Ibuprofen Tablets	0.3 g × 14 tablets	Huizhou Daya Pharmaceutical Co., Ltd.	10
19	Cold and fever relief	Paracetamol Tablets	0.65 g × 18 tablets	Shanghai Johnson & Johnson Pharmaceutical Co., Ltd.	10

No.	Category	Name of Medication/Equipment	Specification	Manufacturer	Quantity
20	Cold and fever relief	Compound Paracetamol and Phenylephrine Capsules, Cold Relief Granules	20 capsules	Hainan Huluhawa Pharmaceutical Group Co., Ltd.	10
21	Cold and fever relief	Compound Paracetamol and Phenylephrine Capsules, Cold Relief Granules	10 g × 9 sachets	China Resources Sanjiu Pharmaceutical Co., Ltd. (China Resources Sanjiu)	10
V. Gastrointestinal and Digestive Health, Anti-diarrhea and Stomach-Nourishing Products					
22	Gastrointestinal Medicines	Montmorillonite Powder	3 g × 12 sachets	Jilin Yizheng Pharmaceutical Group Co., Ltd.	10
23	Gastrointestinal Medicines	Norfloxacin Capsules	0.1 g × 48 capsules	Lepu Hengjiuyuan Pharmaceutical Co., Ltd.	10
24	Gastrointestinal Medicines	Omeprazole	20 mg × 21 tablets × 1 bottle	Bengbu Fengyuan Tushan Pharmaceutical Co., Ltd.	10
VI. Skin, anti-allergy and insect bite remedies					
25	Topical Medicines	Erythromycin ointment	18 g	Tangshan Hongxing Pharmaceutical Co., Ltd.	10
26	Topical Medicines	Dermatitis-Ping Ointment	30 g: 22.5 mg	Guangdong China Resources	10
27	Topical Medicines	Zinc oxide lotion	100 millilitres	Jiangsu Huasheng Pharmaceutical Co., Ltd.	10
28	Topical Medicines	Loratadine Tablets	10 mg × 12 tablets	Jiangsu Yabang Epsom Pharmaceutical Co., Ltd.	10
VII. Emergency cardiovascular and cerebrovascular reserve category					

No.	Category	Name of Medication/Equipment	Specification	Manufacturer	Quantity
29	Emergency reserve	Glyceryl trinitrate	0.5 mg × 100 tablets	Shijiazhuang Huaxin Pharmaceutical Co., Ltd.	2
30	Emergency reserve	Aspirin enteric-coated tablets	100 mg × 24 tablets/strip × 5 strips/box	Jiangsu Wangao Pharmaceutical Co., Ltd.	2
31	Emergency reserve	Glucose	10 g × 12 sachets	Chongqing Heping Pharmaceutical Co., Ltd.	5
VIII. Medical Devices and First Aid Equipment					
32	Medical devices	Electronic/Mercury Thermometers	WG-1108 (Mercury-free internal reference axillary type)	Jiangsu Chenyu Medical Equipment Co., Ltd.	1
33	Medical devices	Electronic/Mercury Thermometers	KF-HW-009 Grey Non-Voice Model	Kefu Medical Technology Co., Ltd.	1
34	Medical devices	Blood pressure monitors, stethoscopes	YE610E	Jiangsu Yuyue Medical Equipment Co., Ltd.	2
35	Medical devices	Stretcher	YHTJ01	Yihui	2
36	Medical devices	Blood pressure monitors, stethoscopes	Dual-purpose	Jiangsu Yuyue Medical Equipment Co., Ltd.	1
37	Medical devices	Hair clippers	units	Feike Borui	1
38	Medical devices	Semi-automatic external defibrillator (AED)	units	Jiuxin brand	1
IX. Disinfection, Sterilization and Protective Equipment					
39	Disinfection and Protection	84 Disinfectant, Disinfectant Effervescent Tablets	500 g	Jiangxi Caoshanhu Disinfectant Products Co., Ltd.	10
40	Disinfection and Protection	Hand Sanitizer Gel	500 ml, 75%	Wuhan Xuehuan Medical	5

No.	Category	Name of Medication/Equipment	Specification	Manufacturer	Quantity
				Disinfection Products Co., Ltd.	
41	Disinfection and Protection	Disinfectant and Protective Equipment	Flat-style ear-loop masks, 17.5 × 9.5 cm, 10 pieces per individual pack	Hunan Kangwo	10
42	Disinfection and Protection	Disinfectant and Protective Equipment	Powder-free/textured – 7.5M size – 2 pieces	Kefu Medical Technology Co., Ltd.	15
X. STI Testing, Contraception and Prevention					
43	Contraception and Prevention		Ultra-thin and smooth, pack of 12	Tianjin Zhongsheng Latex Co., Ltd.	3
44	Contraception and Prevention		1.5 mg * 1 box	Wuhan Jiulong Renfu Pharmaceutical Co., Ltd.	3
45	Test Kit		1 kit*1 box	Hangzhou Botuo Biotechnology Co., Ltd.	5

8.7.9. Construction Site Safety Management

8.7.9.1. General Safety Management Procedures

Closed access management shall be implemented at the construction site. All personnel must pass training and assessment, complete registration, and wear identification badges before entering. Strict registration and approval procedures shall be enforced for external personnel and vehicles. The high-risk work permit system shall be strictly enforced. Confined space, hot work, work at heights, lifting, temporary electrical, and deep excavation operations must be approved in advance, and construction without permits is strictly prohibited. Anti-"three violations" inspections shall be routinely conducted. Daily pre-shift safety briefings, risk notifications, and sign-off confirmation procedures shall be implemented. All operations shall be fully controllable and traceable.

Daily pre-shift safety briefings must be organized and conducted by the team leader, assisted by the safety officer and supported by the project department's technical and management staff, to ensure that the briefing content aligns with the day's actual construction activities. The briefing must cover:

the hazards associated with the day's tasks and their control measures; requirements for the wearing of personal protective equipment; emergency procedures and evacuation routes; and the day's weather conditions and potential impacts (during typhoon or heavy rain warnings, the thresholds for work suspension must be emphasized). The briefing must be documented in a standardized written record, signed and confirmed individually by the person conducting the briefing and all attendees (all personnel on duty), specifying the time of the briefing, the scope of work, the number of personnel present and key safety requirements; anyone who has not attended the briefing or failed to sign the confirmation form is strictly prohibited from commencing work that day.

Daily Pre-shift Safety and Technical Briefing Record Form for

Construction Sites

Project Name: _____	Weather Conditions: _____
Construction Crew: _____	Team Leader/Briefing Officer: _____

Number of Workers: Expected: ____ / Present: ____ / Absent: ____ (Reason: _____)		Date: ____ year ____ month ____ day		
Category	Details	Execution Confirmation		
I. Check on personnel status	1. All personnel are in good spirits; there are no instances of alcohol consumption, illness or excessive fatigue	☐ Yes ☐ No (____ people have been adjusted)		
	2. All personnel are wearing personal protective equipment (safety helmets, safety harnesses, gloves, etc.) correctly	☐ Yes ☐ No (____ people have been rectified)		
II. Today's Construction Work				
III. Notification	☐ Fall from height	☐ Struck by falling objects	☐ Electric shock	☐ Mechanical injury

of Hazard Sources	☐ Collapse/landslide	☐ Lifting-related injuries	☐ Fire/scalding	☐ Poisoning/Asphyxiation
	Other risks:			
IV. Targeted Prevention and Control Measures	1. Working at height: Fasten safety harnesses correctly (high-point attachment, low-point use); throwing tools up or down is strictly prohibited		☐ Briefing completed	
	2. Temporary electrical installations: Non-electricians are strictly prohibited from connecting wiring; cables must be routed overhead or buried for protection		☐ Briefing completed	
	3. Hot work: Obtain a hot work permit; clear flammable materials from the surrounding area; provide fire extinguishers		☐ Briefing completed	
	4. Concurrent Work: Establish a cordoned-off area, appoint a dedicated supervisor, and ensure no one stands below		☐ Briefing completed	
	5. Other measures: ***		☐ Briefing completed	
V. Emergency Reminders	Emergency evacuation routes: ***** Emergency telephone number: *****		☐ Information provided	
Signatures of attendees:				

8.7.9.2. Specialized Safety Management for High-Risk Operations

Confined Space Operations (Tanks, Pipelines, Enclosed Excavations)

Strictly adhere to the mandatory principle of ‘test first, ventilate next, then commence work, with a designated person supervising throughout’. Prior to work commencing, use professional detection

equipment to test the concentrations of oxygen, hydrogen sulphide, methane, CO₂, CO and NH₃; entry is permitted only once all readings meet the required standards. Mechanical ventilation must be maintained throughout the entire operation, and the supervisor must remain on duty at all times; leaving the post is strictly prohibited. Workers must wear emergency protective equipment such as self-contained breathing apparatus and safety ropes; warning and caution signs must be erected in the work area; and upon completion of the work, personnel and tools must be accounted for one by one to eliminate any residual safety hazards.

Deep Excavation Operations

Excavation work must be carried out strictly in accordance with the specialized plan, proceeding layer by layer; over-excavation and undercutting are strictly prohibited. Guardrails must be installed around the perimeter of the excavation, and measures must be taken to ensure proper drainage and flood prevention on the slopes, whilst ensuring that safety passages and emergency exits remain unobstructed. Work must be suspended immediately and rectified should any hazards such as cracking, slippage or waterlogging occur; employees are granted the right to refuse dangerous work in accordance with Clause 104 of CAP 356. Formwork, shoring and scaffolding for tanks and structures must be approved by the engineer before use; risks of concrete pour collapse and falling objects from height must be strictly controlled. High-risk civil engineering work in excavation pits and in the open air is prohibited during rainy weather.

Work at Heights and Edge Operations

When working at heights of 2 meters or above, workers must wear a safety harness and a full set of protective equipment; fall protection systems must comply with statutory standards. Work platforms and scaffolding must be inspected and approved by an engineer before being put into use. Protective measures (such as guardrails and covers) must be installed at all edges, openings and access points; throwing objects from height and unauthorized crossing of protective barriers are strictly prohibited. Tools and materials must be stored in designated locations to prevent accidents involving being struck by falling objects or falls from height. A fall prevention plan must be drawn up for work at height to ensure safe access routes.

Hot Work

Hot work operations must be carried out under a specific hot-work permit. Prior to commencing work, all flammable and explosive materials within the operational radius must be cleared; combustible substances must be removed and it must be verified that there is no accumulation of combustible gases. Sufficient fire-fighting equipment, such as fire extinguishers, must be provided. After the hot work has been completed, a person must remain on site to monitor the area for at least 30 minutes;

the site may only be vacated once it has been confirmed that there are no smoldering embers or fire hazards. Unauthorized hot work is strictly prohibited in enclosed spaces and areas where flammable gases are concentrated. Hot work permits must be reviewed daily; permits must be revoked immediately if the working environment changes or if incompatible operations are taking place.

Temporary Electrical Operations

The "three-level distribution, two-level protection" standard shall be strictly enforced. Cables shall be laid in an orderly manner, and unauthorized connections strictly prohibited. All electrical equipment shall be reliably earthed and zeroed, with residual current devices that are sensitive and reliable. Trained dedicated electricians shall be responsible for electrical management, conducting daily inspections of cables and equipment, and promptly rectifying aged, damaged, and leaking hazards. Electrical protection in humid work areas shall be strengthened to strictly prevent electric shock accidents.

Lifting and Mechanical Operations

Special equipment must undergo on-site acceptance and be registered before use; operators must undergo training before commencing work, and the operation of faulty equipment is strictly prohibited. A safety perimeter must be established for lifting operations, with a designated person in charge of unified command; the safe working load of lifting slings must be calculated, and unauthorized personnel are strictly prohibited from entering the operational radius. Mechanical operations must be carried out in strict accordance with regulations; no personnel are permitted within the operational radius to prevent accidents such as mechanical collisions, falling loads during lifting, and strikes by falling objects.

Work Process Safety Management

The construction processes for this project primarily involve earthworks, scaffolding erection, formwork erection and dismantling, steel reinforcement tying, concrete pouring and equipment installation. In accordance with Sections 6 and 7 of the Barbados Occupational Safety and Health Act (Cap. 356), employers/occupiers are obliged to ensure the health, safety and welfare of all employees and persons who may be affected by work activities, and to provide safe equipment, work systems and adequate training and supervision. An appropriate and thorough risk assessment must be completed for each work process prior to commencement, and measures must be taken to eliminate or reduce risks. Safety management personnel must implement safety management in accordance with the requirements of this Act and the relevant regulations.

Earthwork Excavation

1. Preliminary Investigation and Planning: Prior to construction, the location of underground utilities and structures must be ascertained. In accordance with Section 7 of the Barbados Occupational Safety and Health Act (Cap. 356), the occupier must ensure that every part of their workplace is of safe construction, made of sound materials and properly maintained.
2. Load Management: The stacking of heavy objects within 1 meter of the perimeter of the excavation pit is strictly prohibited to prevent the risk of collapse caused by overloading (in accordance with Section 7 regarding the prohibition of overloading that creates a hazard).
3. Safe Access: Workers operating within the excavation pit must have safe means of access and egress. In accordance with Section 8 of the Barbados Workplace Safety and Health Act (Cap. 356), safe means of access and egress must be provided for all workplaces, and such access must be maintained in a safe condition.
4. Drainage and Protection: During construction in the rainy season, drainage ditches and retaining walls must be installed around the excavation pit to prevent rainwater from entering and causing slope instability.

Formwork Operations

1. A specialized construction plan must be prepared for formwork operations. Formwork installation must be carried out in accordance with design requirements, and the support system must be firm and reliable.
2. Formwork removal must be carried out after concrete strength has reached design requirements, following the principle of "last installed, first removed."
3. Exclusion zones shall be established during formwork removal, and unrelated personnel strictly prohibited from entering.

Reinforcement Work

1. Reinforcement processing machinery must be securely installed, with all safety guards in place and in good working order. In accordance with Section 7 of the Barbados Workplace Safety and Health Act (Cap. 356), hazardous parts of machinery must be enclosed, covered, fenced off or otherwise effectively protected to prevent hazards;
2. When cutting or bending reinforcing bars, direct contact with the bars by hand is strictly prohibited. Workers must use safety equipment appropriately in accordance with Section 9 of the Barbados Workplace Safety and Health Act (Cap. 356) and exercise due care for their own safety and that of others;

3. When handling steel bars, be mindful of the surrounding environment and overhead power lines to prevent collisions and electric shock;

4. When tying steel bars at height, a working platform must be erected; it is strictly prohibited to stand on formwork or supports whilst working.

Concrete Works

1. When pumping concrete, pipe connections must be secure to prevent pipe bursts that could cause injury.

2. When pouring concrete, a designated person must supervise the formwork and shoring system to promptly identify safety hazards such as deformation.

3. When using vibrators, operators must wear insulated footwear and insulated gloves. In accordance with the 'Personal Protective Equipment Regulations' (2022), the contractor shall provide workers with suitable PPE and ensure it is used correctly.

Equipment Installation

1. A specific construction plan must be drawn up and a risk assessment completed prior to the installation of equipment.

2. During equipment installation, it is strictly prohibited to touch rotating parts by hand; rotating parts of machinery must be effectively guarded in accordance with the requirements of Section 7 of the Barbados 'Workplace Safety and Health Act' (Cap. 356).

3. During equipment commissioning, procedures must be strictly adhered to in accordance with operating instructions; a designated person must be assigned to supervise the process, and the commissioning area must be cordoned off and clearly signposted to prevent unauthorized persons from being exposed to danger.

8.7.10. Fire Prevention and Security Management

Fire-fighting equipment must be provided in full accordance with standards at the construction site, accommodation areas and materials stores; it must be regularly calibrated and updated to ensure it remains in good working order. Fire escape routes must remain clear at all times; blocking or occupying them is strictly prohibited. Flammable and explosive materials, fuels and chemicals must be stored in separate designated areas, managed by designated personnel and issued in strictly controlled quantities. A 24-hour security duty system must be implemented, as detailed in the 'Security Management Plan'; the entry and exit of personnel and vehicles must be regulated, and measures must be taken to prevent theft of materials and equipment, thereby ensuring stable order at the construction site.

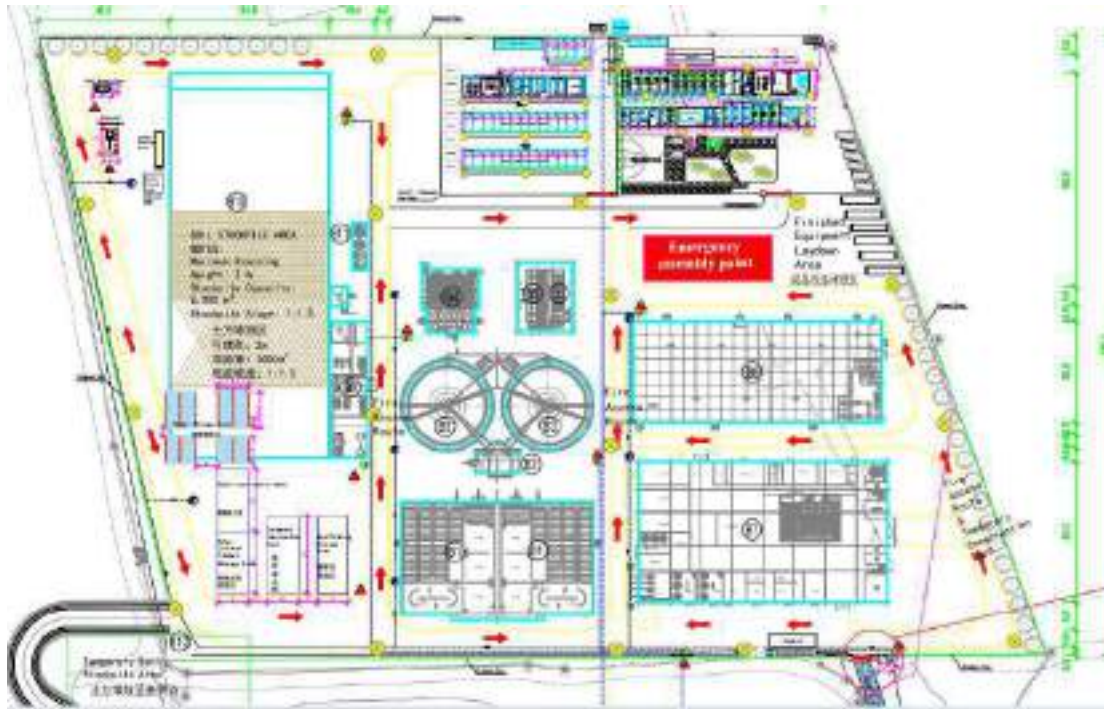


Figure 77: Evacuation Routes and Emergency Assembly Points

8.7.11. Environmental Protection Management

In accordance with the ecological protection requirements for the waters off Barbados, strictly implement environmental protection controls throughout the entire construction and operation process, prevent all types of pollution incidents, and protect the local ecological environment in compliance with regulations. Detailed implementation measures are set out in the 'Safety, Health and Environment Management Manual'.

Prevention and Control of Water Pollution

1. Construction Wastewater Management: Standing water in excavation pits, construction wash water and slurry shall be collected centrally in settling ponds; after sedimentation, it shall be conveyed via pipework to the existing sewage treatment plant for treatment. The direct discharge of untreated wastewater into surrounding waters, watercourses or soil is strictly prohibited during construction.
2. Material Management: Storage areas for building materials such as cement, sand, gravel, paints and chemicals must be equipped with measures to prevent rainwater ingress and material runoff. In particular, storage areas for chemicals and oils must be fitted with containment berms to prevent the spread of spills. During construction, it is strictly prohibited for oils or slurry to leak into water bodies.

3. Management and Protection of Wetlands and Coastal Zones: The dumping of construction waste, domestic waste and construction debris into surrounding waters is strictly prohibited, as is any unauthorized offshore activity that damages the marine ecosystem. Waste generated during the construction and operational phases must be collected and stored in covered storage facilities at designated on-site locations, to be collected regularly (at least twice weekly) and transported to the Mangrove Landfill at the Sustainable Barbados Recycling Centre.

Prevention and Control of Air and Noise Pollution

1. Dust Control: During construction and operation, earthworks, material stockpiles and transport vehicles must be fully covered with dust-control netting (green, 6-needle); the construction site must be regularly watered to suppress dust; transport vehicles must have their wheels washed before leaving the site to prevent mud from being carried onto roads and the spread of dust.

2. Noise Control: During construction and operation, construction sequences shall be planned appropriately to avoid high-noise operations during residents' rest periods; noise-reduction measures shall be implemented for high-noise equipment (1. Monitor ambient background noise levels near equipment closely and keep them within permissible limits. 2. Where necessary, fit enclosures to equipment or erect movable acoustic barriers to minimize the impact of noise.) At the same time, night-time construction should be avoided as far as possible (should night-time construction be required, the client's consent must be obtained) to minimize the impact of construction noise on surrounding residential areas.

8.7.11.1. Integrated Solid Waste Management Plan

Solid waste generated during construction is categorized into three types

(1) Primary Waste Definitions

Barbadian law formally categorizes waste into three primary definitions:

1. Refuse: General, non-liquid waste material.
2. Rubbish: Combustible and non-combustible items (paper, garden waste, tires, etc.).
3. Swill: Organic food waste/rubbish.

(2) Main Waste Categories

1. Municipal Solid Waste (MSW): Typical household and commercial rubbish, including organic waste.
2. Recyclable Waste: Separated materials such as glass, plastic (PET/HDPE), metal and oil.
3. Organic/Green Waste: Biodegradable garden and food waste, managed largely through composting.

4. Construction & Demolition (C&D) Waste: Bulky, non-hazardous rubble, timber and concrete.

Methods for the Management of Solid Waste Generated During Construction

1. Contractors shall comply with the provisions regarding on-site waste disposal set out in the Health Services (Refuse Collection and Disposal) Regulations (1975) and shall monitor waste in accordance with the Integrated Solid Waste Management Plan. A permit from the Environmental Protection Agency is required for the disposal of special waste at Health Services Authority facilities.
2. The first two types of waste should be collected and stored in covered storage facilities at designated on-site locations, so that they can be collected regularly (at least once a week) and transported to the Mangrove Landfill at the Sustainable Barbados Recycling Centre;
3. Metal waste may be disposed of at the Bagatelle scrap metal facility.
4. Separate waste containers used for holding hazardous liquids so that they can be collected, stabilized and pre-treated prior to disposal.
5. Under no circumstances is the disposal of solid waste in wetlands or unauthorized dumping sites permitted.



Figure 78: Waste Collection Route Map

Hazardous Waste Management

(1) Regulatory and International Convention Framework

1. Key legislation: This includes the Health Services (Nuisances) Regulations, 1969, and the Health Services (Disposal of Offensive Matter) Regulations, 1969, as well as the Pesticides Control Act, amongst others.

2. International Conventions: Barbados is a Party to the Basel Convention, which governs the transboundary movement and disposal of hazardous waste. As Barbados lacks domestic disposal capacity for hazardous waste, all such waste must be exported for treatment in accordance with this Convention.

(2) Hazardous Waste Management

1. Definition and Classification of Hazardous Waste: According to the EPD's definition, hazardous substances are those possessing properties such as toxicity, reactivity, corrosiveness, flammability, radioactivity, infectivity or carcinogenicity. Hazardous waste at construction sites may include: waste paint, solvents, waste oil, asbestos-containing materials, waste batteries, fluorescent tubes and chemical containers.

2. Application for Hazardous Waste Disposal: As there is no local disposal capacity, contractors must submit a written application to the Director of the EPD, specifying the types and quantities of hazardous waste requiring disposal and providing a Safety Data Sheet (SDS). The EPD will then provide disposal recommendations and assist in arranging export.

3. Export Procedures: The transboundary movement notification documents stipulated by the Basel Convention must be completed, and prior approval must be obtained from both the importing country and any transit countries.

4. Temporary Storage Requirements: Prior to removal from the site, hazardous waste must be: stored in approved containers and labelled in accordance with an accredited classification system. Incompatible wastes must be strictly segregated. A containment bund must be installed, with the container capacity set at 110 per cent of the total volume of the stored material, and the date of filling must be recorded.

(3) Pollution Control and Prevention

1. Leakage and seepage prevention: All hazardous waste storage areas must be fitted with containment bunds.

2. Signage and Management: Storage areas must be clearly signposted to indicate the risks associated with the waste. All waste movements in and out must be recorded, including volume, weight and type.

3. Prohibition of Incineration and Illegal Dumping: The on-site incineration of solid waste is strictly prohibited, as is the disposal of waste at unauthorized dumping sites.

(4) Emergency Response Plan

1. Approval and Drills of Emergency Plans: A written Emergency Response Plan (ERP) must be drawn up on site. The content of the Emergency Response Plan is detailed in the 'Spill Emergency Response Plan (2nd Edition)', and this plan must be practiced at least once every six months.
2. Emergency Supplies: The site must be equipped with spill containment and clean-up equipment (e.g. oil absorbent mats, sand), spill containment vessels and personal protective equipment (PPE).
3. Incident Reporting: Any spill incident must be cleaned up immediately and reported to the supervising engineer and the client as soon as possible.

(5) Division of Responsibilities

Please refer to the 'Integrated Solid Waste Management Plan' section of the project's ESIA and ESMP.

(6) Training and Capacity Building

1. Training Requirements: Personnel at waste management facilities must undergo at least 10 hours of training annually on hazardous waste-related knowledge.
2. Training Content: This must cover the correct use of spill containment measures, the correct donning of PPE, the identification and safe packaging of hazardous waste, and Standard Operating Procedures (SOPs), amongst other topics.

(7) Monitoring and Reporting

1. Record-keeping system: A designated person on site must be responsible for record-keeping to collect data on waste, including type, volume, weight and characteristics, and to establish material tracking and updated stock records.
2. Monitoring Frequency: Given that waste is typically collected once a week on site, monitoring of waste management should also be carried out weekly to ensure that all measures are being implemented.
3. Regular Reporting: Matters relating to waste management must be reported regularly to the supervising authority.

(8) Improvement Mechanism

Standard Operating Procedures (SOPs): The site must draw up written Standard Operating Procedures (SOPs). The SOPs should include: organizational structure and responsibilities, types of waste received and their hazards, and waste handling operating procedures. For further details, please refer to the 'Integrated Solid Waste Management Plan' section of the project's ESIA and ESMP.

8.7.11.2. Ecological Protection

Strict protection must be afforded to vegetation, wetlands and coastal marine ecosystems in the vicinity of the project; the arbitrary felling of vegetation and the destruction of topography and landforms are strictly prohibited. Upon completion of construction, the site must be cleared and greening restored in a timely manner, and ecological restoration work within the plant premises must be carried out to meet the local ecological and environmental acceptance requirements of Barbados. Detailed implementation actions are set out in Chapter 11, 'Environmental Protection Management', of the 'Health, Safety and Environment Management Manual' and in the 'Environmental and Construction Mitigation Measures Strategy'.

Pre-construction: Baseline Surveys and Preventive Planning

Prior to the commencement of works, a thorough assessment of the site's ecological baseline must be carried out, and a detailed conservation plan must be drawn up.

1. Conduct an ecological baseline survey: Carry out professional surveys and record vegetation types, wetland areas and coastal marine ecosystems within the project's area of influence. This data will serve as the core basis for subsequent monitoring and acceptance inspections.
2. Delineate strict protection boundaries: Based on the survey results, clearly mark on the construction drawings the trees requiring protection, wetland boundaries and sensitive nearshore waters. Install physical fencing or warning signs to prevent construction personnel and machinery from entering these areas by mistake.
3. Develop a 'transplantation and avoidance' plan: Where it is unavoidable that certain vegetation will be affected, a transplantation plan must be drawn up in advance, and suitable reception sites selected.

During Construction: Proactive Control and Real-time Monitoring

The key objective during construction is to minimize ecological impact, particularly by controlling soil erosion and the discharge of pollutants into the sea.

1. Strict protection of vegetation and topography: In addition to protecting retained vegetation with fencing, topsoil within the construction area must be stripped and stored separately for subsequent landscaping. The arbitrary felling or burial of vegetation is strictly prohibited, and the disposal and stockpiling of waste must avoid ecologically sensitive areas.
2. Control of soil erosion and dust: Temporary barriers and drainage ditches shall be installed in earthwork areas to prevent rainwater runoff from carrying sediment into the sea or wetlands.

3. Waste and chemical management: All construction and domestic waste must be collected and transported to designated locations, such as the Mangrove Landfill at the Sustainable Barbados Recycling Centre (SBRC). Containers holding hazardous liquid waste must be stored separately, and measures must be taken to prevent any chemical leaks that could contaminate soil and water bodies, thereby avoiding damage to the wetland ecosystem.

Post-construction: Site Clearance and Ecological Restoration

Upon completion of construction, site restoration must commence immediately, and proactive ecological restoration measures must be implemented to mitigate the temporary impacts caused by the works.

1. Comprehensive clearance of the construction site: Dismantle all temporary facilities, remove hardened and contaminated soil, and transport away all construction waste.

2. Topographical restoration and vegetation rehabilitation: Backfilling and levelling shall be carried out in accordance with the original topography, and native plant species shall be used for vegetation restoration. Experience in Barbados has shown that planting species with well-developed root systems, such as vetiver grass, can effectively stabilize the soil and prevent soil erosion.

8.7.11.3. Hazardous Chemical Management

1. Strict full-process management of site acceptance inspection, storage management, withdrawal registration, standardized use, and waste disposal shall be implemented.

2. All items entering the site must be accompanied by MSDS Safety Data Sheets and safety warning labels.

3. Strict separate storage by category: flammable, explosive, corrosive, toxic, and oxidizing substances shall be stored separately; incompatible chemicals must not be stored together.

4. Safety warning signs and fire and explosion prevention notices shall be posted in storage areas, with designated no-fire zones.

5. Hazardous chemical management records shall be established, with complete records of intake, withdrawal, consumption, return, and disposal.

6. Items shall be stored by hazardous waste classification and entrusted to qualified units for unified collection and disposal.

7. On-site response plans for spills, fires, and poisoning shall be developed, and emergency drills regularly organized. Upon occurrence of a spill, explosion, or personnel poisoning, operations shall be

immediately suspended, personnel evacuated, emergency response initiated, and the incident reported.

8.7.12. HSE Training and Briefing Management

Pre-Employment Full-Staff Training

All personnel entering the site must undergo three-tier HSE safety education and training to ensure that all staff understand and are familiar with local regulations, project policies, job-specific risks and emergency measures; they may only commence work after passing the post-training assessment. The Barbados Ministry of Labor emphasizes that safety should not be treated as an ‘afterthought’, but must be integrated into the entire management process from the project planning stage. Training records must retain complete attendance records, examination papers, summary tables of results and video footage; personnel who fail to meet the required standards are strictly prohibited from entering the site to work.

Table 135: Training Schedule – Three-Level Pre-Employment Training for All Staff

Training Levels	Training Content	Training Duration	Target Audience	Training Frequency	Responsible Department/Person	Is an assessment required?
Project level	Barbados Local HSE Regulations (Project HSE Management System, Overall Project Risks and Control Measures, Emergency Response Procedures and Evacuation Routes, Environmental Protection Requirements, Gender-Based Violence)	4 hours	All site personnel	Conducted centrally prior to each intake of personnel	Health, Safety and Environment Department / Project Manager	Yes

Training Levels	Training Content	Training Duration	Target Audience	Training Frequency	Responsible Department/Person	Is an assessment required?
At work-team level	Risk identification in work areas, safe operating procedures, correct use of personal protective equipment (PPE), basic first aid, and accident case studies for safety awareness	4 hours	Construction teams divided into groups	Conducted in groups prior to each batch entering the site	Team Leader / Health and Safety Department	Yes
Workstation-level	Specific operational risks and preventive measures for this post, operational procedures, key points for safe equipment operation, and division of responsibilities and duties for emergency response	2 hours	Grouped by specific role	To be carried out immediately upon assignment to a post	Team Leader	Yes

8.7.12.1. Specialized Training

Specialized HSE training shall be conducted for high-risk operations personnel and special operations personnel, covering confined space operations, hot work, lifting operations, temporary electrical works, emergency rescue, and occupational health protection. Special operations personnel must be trained before commencing work, with valid and compliant credentials, and regular refresher training shall be conducted.

Table 136: Training Schedule - Specialized Training

Training Category	Training Content	Training Duration	Target Audience	Training Frequency	Responsible Department	Is an assessment required?
Confined Space Work	Identification and classification of confined spaces, gas detection and ventilation requirements, emergency rescue procedures	2 hours	Operators and supervisors involved in confined space work	Before first assignment; once a year	Health and Safety Department	Yes
Hot work	Tiered management of hot work operations, clearance of combustible materials from the site, use of fire-fighting equipment, and duties of supervisors	2 hours	Welders, cutters and hot work supervisors	Before first assignment; once a year	Health and Safety Department	Yes
Lifting operations	Safety operating procedures for lifting machinery; inspection and selection of lifting gear; cordoning off and marking of the lifting area	2 hours	Crane operators, riggers, signalmen and lifting supervisors	Before first assignment; once a year	Health and Safety Department	Yes
Temporary Electrical Installations	Requirements for distribution boards and cable routing; earth leakage protection, earthing and neutral bonding; prevention of electrical fires and emergency response	2 hours	Electricians, electrical operators and on-site management staff	Before first assignment; once a year	Health and Safety Department	Yes
Work at height	Use of safety harnesses and fall arresters; erection of scaffolding and working platforms; protection of edges and openings; regulatory requirements for working at height in Barbados https://barbadostoday.bb/2026/05/11/work-at-height-rules-to-be-fast-tracked-amid-safety-concerns/amp/	2 hours	Personnel engaged in work at height and scaffolding erectors	Before first assignment; once a year	Health and Safety Department	Yes



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Training Category	Training Content	Training Duration	Target Audience	Training Frequency	Responsible Department	Is an assessment required?
Emergency Response and Occupational Health	First aid skills (CPR, hemostasis and bandaging), identification and protection against occupational hazards (dust, noise, chemicals), use and maintenance of PPE	2 hours	All team leaders, HSE representatives and first-aiders	Before first assignment; once a year	On-site doctor and Health, Safety and Environment Department	Yes

Daily Briefings and Awareness Education

Daily pre-shift safety briefings shall be consistently maintained. HSE warning education and accident case studies shall be routinely conducted. Safety slogans, warning signs, and HSE notice boards shall be displayed at construction sites to foster an environment where all staff attach importance to HSE. Monthly HSE special training sessions shall be regularly organized to update management requirements and enhance all-staff safety and environmental awareness.

The construction site must display prominent safety slogans and warning signs at entrances and in high-risk areas as required. The content of monthly thematic training sessions should be dynamically adjusted in line with the project's construction progress; for example, topics on slip prevention and electric shock protection should be added during the rainy season, whilst lifting safety topics should be included during peak periods for steel structure hoisting. All training records (attendance sheets, training materials, video footage) must be archived and retained as supporting documentation for HSE compliance audits.

8.7.13. Hazard Investigation, Inspection, and Performance Management

Hazard Investigation Mechanism

A four-tier hazard investigation mechanism of "daily inspections + specialized inspections + monthly comprehensive inspections + seasonal inspections" shall be established to achieve comprehensive, no-dead-zone hazard management.

1. Daily inspections: Dedicated HSE personnel shall conduct comprehensive daily site inspections, immediately identifying and rectifying minor hazards. Major hazards shall be immediately suspended, reported, and controlled.
2. Specialized inspections: Monthly specialized investigations shall be conducted for high-risk operations, temporary electrical works, fire prevention, environmental protection, and mechanical equipment.
3. Monthly comprehensive inspections: Led by the Project Manager with full staff participation, comprehensively investigating on-site HSE hazards and compiling inspection records.
4. Seasonal inspections: Targeted at the island's high-temperature, heavy rain, and typhoon conditions, seasonal safety and environmental specialized inspections shall be conducted to implement flood prevention, typhoon prevention, and heatstroke prevention measures.

Table 137: Hazard Identification and Rectification Schedule

Inspection Level	Frequency	Lead Person	Participants	Main Scope
Routine inspections	Daily	HSE Manager	On-duty HSE staff	Comprehensive inspection of the construction site to identify and resolve issues immediately
Specialized Inspections	Monthly (rotating by discipline)	HSE Manager	Specialist technicians and team leaders	High-risk operations, temporary electrical installations, fire safety, environmental protection, machinery and equipment
Monthly comprehensive inspection	Once a month	Project Manager	Full participation (heads of all disciplines, team leaders, HSE team)	Comprehensive on-site HSE hazard identification, with a record kept
Seasonal inspections	Before the change of season or extreme weather	HSE Manager	Emergency Response Team, Heads of each discipline	Specialized inspections for flood prevention, typhoon preparedness and heatwave mitigation

Hazard Closure Management

All identified hazards shall be subject to closed-loop management of "registration, issuance of rectification notices, time-limited rectification, re-inspection, and sign-off," with clearly designated responsible persons, rectification deadlines, and rectification measures. Minor hazards shall be rectified on the same day, general hazards within 3 days, and major hazards immediately suspended for rectification. Resumption of work without sign-off is prohibited. Hazard records shall be maintained, with regular statistical analysis to prevent recurrence of the same type of hazard.

Safety and Quality Inspection and Rectification Record Reference No.: *****

Project Name	South Coast Water Reclamation and Re-use Facilities
Item Project Overview Overview	The Barbados South Coast Wastewater Reclamation and Re-use Facilities project is situated adjacent to the existing Graham Hall Wetlands in the City of Christ Church, Barbados, to the east of the H7 motorway. Project scope: construction of a new wastewater treatment plant with a secondary treatment capacity of 0.90 ten thousand tons per day during the dry season and 2.40 ten thousand tons per day during the wet season, and a tertiary treatment capacity of 1.80 ten thousand tons per day. The

Project Name	South Coast Water Reclamation and Re-use Facilities
	Advanced Water Treatment (AWT) process produces 0.51 ten thousand tons per day of reverse osmosis permeate; The main scope of works includes: all civil engineering and equipment installation; demolition of existing buildings and structures on the construction site; civil engineering, fit-out, procurement, installation and commissioning of equipment for permanent plant buildings and structures; as well as other ancillary works such as roads, landscaping and slope stabilization.
Inspection Unit	China Railway Group Barbados Sewage Treatment Plant Project Management Department
Rectification Status Summary	The project department's rectification verifier carried out the verification on schedule; the identified issues have been fully rectified. The specific details are as follows:
Rectification Rectification Status Status Details Details Record Record	Issue 1: *****; Remedial Action: *****. Issue 2: *****; Remedial action taken: *****. The above safety hazards were rectified at **:** on ** * * * *, and have been verified and closed out by the project's Health, Safety and Environment Department.
Person responsible	Signature: Year Month Day
Head of Department and Verifier	Signature: Year Month Day

Note: This form is produced in triplicate, with one copy each for the rectifying unit, the re-inspection unit and the inspecting unit; the verified copy is retained.

8.7.14. HSE Performance Rewards and Penalties

A project HSE performance assessment system shall be established, incorporating HSE accountability into assessments of work teams, individuals, and subcontractors. Teams and individuals who strictly implement HSE systems with no hazards and no violations shall be commended and rewarded. Personnel who violate regulations, fail to adequately rectify hazards, or violate environmental protection and safety regulations shall be penalized; those with serious violations shall be expelled from the site and held accountable.

Content of Performance Assessment

The project's HSE performance assessment is conducted across two dimensions: the process of fulfilling duties and outcome indicators, covering both individuals and subcontractors. Barbados' Safety and Health at Work Act (SHAW Act) sets out the fundamental obligations of employers and employees under common law: employers must provide a safe workplace, safe work systems, safe tools, safe colleagues and adequate supervision and training; employees must not endanger themselves or others, must use safety equipment and must cooperate with inspections by plant safety officers. The assessment criteria are closely linked to these statutory duties.

Table 138: Assessment Criteria

Assessment Targets	Assessment Dimensions	Specific Content	Assessment Cycle
Individual	Wearing of PPE	Rate of correct wearing of personal protective equipment (PPE), such as safety helmets, safety harnesses and safety footwear	Daily/Weekly
	Operating Procedures	Whether work is carried out in accordance with the safety operating procedures for the role, and whether any breaches of regulations have occurred	Daily

Assessment Targets	Assessment Dimensions	Specific Content	Assessment Cycle
	Training participation	Participation rates in three-tier training, attendance rates at monthly specialized training sessions, assessment results	Quarterly
	Hidden hazard reports	Quantity and quality of potential hazards proactively identified and reported	Monthly
Subcontractors	HSE System	Whether an HSE management structure has been established and whether dedicated HSE personnel have been appointed	On-site assessment quarterly +
	Implementation of Policies	Compliance with HSE clauses stipulated in the contract; speed and effectiveness of responses to rectification instructions	Monthly
	Accident/breach rates	Incident and non-compliance rates within the subcontracted scope	Quarterly/Annual

Incentive Measures

Subcontractors who strictly implement HSE systems and have no hidden hazards or breaches of regulations shall be commended and rewarded. The Barbados Ministry of Labour emphasizes that employers should ‘proactively implement’ workplace health and safety requirements, rather than merely to avoid penalties. Specific incentive measures include:

Subcontractors ranked first in the annual HSE assessment will be awarded extra marks in the tender evaluation or given priority for contract award in the following year's tender process.

Subcontractors with excellent HSE performance may receive an 'Excellent' rating in their contract performance evaluation, thereby enhancing their reputation within the industry.

Specific Penalty Measures

Penalties shall be imposed on personnel for unauthorized operations, failure to adequately rectify potential hazards, and breaches of environmental protection and safety regulations.

Table 139: Penalty Measures

Level of Breach	Typical Circumstances	Penalty Measures	Legal Basis
Minor Breaches	Failure to wear PPE correctly, absence from pre-shift briefings, failure to clear the work area in a timely manner	Written warning	Provisions regarding employees' obligations under the General Act
Serious Breaches	Unlicensed hot work or temporary electrical installations; unauthorized removal of safety barriers; failure to rectify identified hazards within the specified timeframe	Work suspension pending completion of specialized HSE training (unpaid; work may only resume upon passing the training assessment); joint deduction of the team's monthly safety performance points	General Duty Provisions under the Barbados SHAW Act
Serious Breaches	Issuing unlawful instructions, forcing workers to undertake hazardous operations, refusing to rectify major	Immediate removal from the site; inclusion on the project blacklist; accountability and disciplinary action by project management	Barbados SHAW Act – Employer Liability Provisions; Common Law

Level of Breach	Typical Circumstances	Penalty Measures	Legal Basis
	safety hazards, or causing a minor accident		Employer Safety Obligations
Particularly Serious Breaches	Concealment or misreporting of accidents; breaching ecological protection red lines; causing a major work safety accident or environmental pollution incident	Immediate removal from the site and inclusion on the industry blacklist; termination of contract/dismissal; referral to the judicial authorities (where a breach of the law has occurred); demotion or dismissal of the manager responsible for project management	Penal provisions under Chapter 347 of the Barbados Factories Act; provisions on employers' criminal liability under the SHAW Act

Procedure for the Enforcement of Penalties:

1. Determination of non-compliance: Non-compliance identified during site inspections or specialized checks shall be documented by the HSE Officer through photography, recording and evidence collection.
2. Notification procedure: Within 24 hours of the violation being confirmed, a written 'Notice of Penalty for Breach' shall be issued to the party concerned and their respective work team or subcontractor, specifying the facts of the breach, the basis for the penalty and the penalty measures.
3. Appeal Procedure: The party concerned may lodge a written appeal with the Project HSE Committee within three working days of receiving the notice.
4. Enforcement and Archiving: The penalty decision shall be enforced following review by the HSE Committee; all penalty records shall be incorporated into the HSE files of the individual, work team or subcontractor.

8.7.15. Emergency Management

Emergency Organizational System

A Project Emergency Rescue Leading Group shall be established with clearly designated roles for the Commander-in-Chief, On-Site Rescue Team, Medical and First Aid Team, Logistics Support Team, Communications Team, and Environmental Response Team, with clearly defined responsibilities. Liaison with local hospitals, fire departments, and environmental emergency agencies shall be maintained, establishing a coordinated emergency response mechanism.

Table 140: Emergency Leading Group Contact Directory

Position	Name	Phone
Project Manager	Wu Rongsen	+1(246)8503666
Construction Technical Director	Wang Peng	+1(246)2568666
Procurement Manager	Li Jianlong	+1(246)8513999
Mechanical Engineer	Ren Mingzhou	+1(246)8511096
Administration Officer	Wu Pengbo	+1(246)8518686
HSE Officer	Wu Dequan	+1(246)2568666
Interpreter	Yan Lisa	+1(246)8260392
Project Coordinator, PEU,BWA	Mr. Ian Constantine	+1(305)5376796
Project Engineer, PEU, BWA	Mr. David Drakes	+1(868)7389280

Table 141: Emergency Agency Contact Numbers

Agency	Phone
Queen Elizabeth Hospital	+1(246)536-4500
Police	211
Fire	311
Medical Services	511
Hastings Police Station	+1(246)430-7614

8.7.15.1. Specialized Emergency Response Plans

In line with the project's risk profile, comprehensive specialized emergency response plans shall be developed covering: fall from height accidents, excavation collapse accidents, electric shock accidents, confined space poisoning and asphyxiation accidents, fire and explosion accidents, mechanical injury accidents, sudden water pollution incidents, heatstroke, and heavy rain natural disasters. Each plan

shall define emergency response procedures, rescue measures, reporting procedures, and post-incident requirements.

Emergency Supplies and Equipment

Emergency supplies shall be allocated at fixed locations at construction sites and living areas, including first aid kits, stretchers, emergency medicines, air breathing apparatus, ventilation equipment, fire extinguishers, fire hoses, emergency lighting, flood prevention supplies, and warning and exclusion equipment. Dedicated personnel shall regularly inspect, update, and replenish emergency supplies to ensure they are functional in an emergency.

Table 142: List of Medical and First-Aid Supplies

No.	Category	Name of Medication/Equipment	Specifications	Manufacturer	Quantity
I. Hemostasis, Disinfection and Dressing for Traumatic Injuries					
1	First-aid treatment	75% medical alcohol	100 millilitres (75% ± 5%)	Hubei Aibang Biotechnology Co., Ltd.	10
2	First-aid treatment	Povidone-iodine antiseptic solution	100 millilitres	Hunan Kefu Medical Equipment Co., Ltd.	10
3	First-aid treatment	Hydrogen peroxide	3 per cent × 100 millilitres	Jiangxi Caoshanhu Disinfectant Products Co., Ltd.	10
4	First-aid treatment	Saline solution	500 millilitres: 4.5 grams	Sichuan Kelun Pharmaceutical Co., Ltd.	10
5	First-aid treatment	Medical plasters (standard/waterproof)	25 plasters (waterproof, elastic)	Hai's Hainuo Health Technology Co., Ltd.	10
6	First-aid treatment	Sterile gauze, medical-grade non-woven cotton	7 × 7 cm × 8 layers × 5 pieces	Nanchang Chaoyang Medical and Healthcare Supplies Co., Ltd.	20
7	First-aid treatment	Sterile gauze, medical-grade non-woven cotton	50g	Xuchang Zhende Medical	10

No.	Category	Name of Medication/Equipment	Specifications	Manufacturer	Quantity
				Dressings Co., Ltd.	
8	First-aid treatment	Elastic bandages, self-adhesive bandages, triangular bandages	8 cm × 6 m × 2 rolls	Nanchang Chaoyang Medical and Healthcare Supplies Co., Ltd.	10
9	First-aid treatment	Elastic bandages, self-adhesive bandages, triangular bandages	Non-woven self-adhesive, 5 cm × 450 cm	Kefu Medical Technology Co., Ltd.	5
10	First-aid treatment	Moist Burn Ointment	10 g × 3 tubes	Shantou Meibao Pharmaceutical Co., Ltd.	3
II. Products for Traumatic Injuries and Muscle Pain Relief					
11	Trauma and Pain Relief	Yunnan Baiyao Aerosol (Red + White Bottles)	85 g + 60 g	Yunnan Baiyao Group Co., Ltd.	5
12	Trauma and Pain Relief	Safflower Oil, Joint-Relief Oil	25 millilitres	Aomei Pharmaceutical (Traditional Chinese Medicine) Co., Ltd.	5
13	Trauma and Pain Relief	Safflower Oil, Joint-Relief Oil	35 millilitres	Ax Mark Authentic Safflower Oil	5
14	Trauma and Pain Relief	Anti-swelling and Pain-Relieving Tincture	60 millilitres	Guangxi Zhuang Autonomous Region Huahong Pharmaceutical Group Co., Ltd.	5
III. Specialized Heatstroke Prevention and Cooling Products (Summer Essentials)					
15	Heatstroke Prevention and Cooling	Huoxiang Zhengqi Lotion/Capsules	10 ml × 10 vials	Tai Ji Group Chongqing Fuling Pharmaceutical Factory Co., Ltd.	100

No.	Category	Name of Medication/Equipment	Specifications	Manufacturer	Quantity
16	Heatstroke Prevention and Cooling	Wind Oil, Cooling Oil	6 ml	Guangdong Taienkang Pharmaceutical Factory Co., Ltd. (formerly Shantou)	10
17	Heatstroke Prevention and Cooling	Wind Oil, Cooling Oil	15 g	Jiangsu Huasheng Pharmaceutical Co., Ltd.	10
IV. Cold and fever remedies, and anti-inflammatory products for the respiratory tract					
18	Cold and fever relief	Ibuprofen Tablets	0.3 g × 14 tablets	Huizhou Daya Pharmaceutical Co., Ltd.	10
19	Cold and fever relief	Paracetamol Tablets	0.65 g × 18 tablets	Shanghai Johnson & Johnson Pharmaceutical Co., Ltd.	10
20	Cold and fever relief	Compound Paracetamol and Phenylephrine Capsules, Cold Relief Granules	20 capsules	Hainan Huluhawa Pharmaceutical Group Co., Ltd.	10
21	Cold and fever relief	Compound Paracetamol and Phenylephrine Capsules, Cold Relief Granules	10 g × 9 sachets	China Resources Sanjiu Pharmaceutical Co., Ltd. (China Resources Sanjiu)	10
V. Gastrointestinal and Digestive Health, Anti-diarrhea and Stomach-Nourishing Products					
22	Gastrointestinal Medicines	Montmorillonite Powder	3 g × 12 sachets	Jilin Yizheng Pharmaceutical Group Co., Ltd.	10
23	Gastrointestinal Medicines	Norfloxacin Capsules	0.1 g × 48 capsules	Lepu Hengjiuyuan Pharmaceutical Co., Ltd.	10
24	Gastrointestinal Medicines	Omeprazole	20 mg × 21 tablets × 1 bottle	Bengbu Fengyuan Tushan	10

No.	Category	Name of Medication/Equipment	Specifications	Manufacturer	Quantity
				Pharmaceutical Co., Ltd.	
VI. Skin, anti-allergy and insect bite remedies					
25	Topical Medicines	Erythromycin ointment	18 g	Tangshan Hongxing Pharmaceutical Co., Ltd.	10
26	Topical Medicines	Dermatitis-Ping Ointment	30 g: 22.5 mg	Guangdong China Resources	10
27	Topical Medicines	Zinc oxide lotion	100 millilitres	Jiangsu Huasheng Pharmaceutical Co., Ltd.	10
28	Topical Medicines	Loratadine Tablets	10 mg × 12 tablets	Jiangsu Yabang Epson Pharmaceutical Co., Ltd.	10
VII. Emergency cardiovascular and cerebrovascular reserve category					
29	Emergency reserve	Glyceryl trinitrate	0.5 mg × 100 tablets	Shijiazhuang Huaxin Pharmaceutical Co., Ltd.	2
30	Emergency reserve	Aspirin enteric-coated tablets	100 mg × 24 tablets/strip × 5 strips/box	Jiangsu Wangao Pharmaceutical Co., Ltd.	2
31	Emergency reserve	Glucose	10 g × 12 sachets	Chongqing Heping Pharmaceutical Co., Ltd.	5
VIII. Medical Devices and First Aid Equipment					
32	Medical devices	Electronic/Mercury Thermometers	WG-1108 (Mercury-free, internal reference standard, axillary type)	Jiangsu Chenyu Medical Devices Co., Ltd.	1
33	Medical devices	Electronic/Mercury Thermometers	KF-HW-009 Grey Non-Voice Model	Kefu Medical Technology Co., Ltd.	1

No.	Category	Name of Medication/Equipment	Specifications	Manufacturer	Quantity
34	Medical devices	Blood pressure monitors, stethoscopes	YE610E	Jiangsu Yuyue Medical Equipment Co., Ltd.	1
35	Medical devices	Stretcher	YHTJ01	Yihui	2
36	Medical devices	Blood pressure monitors, stethoscopes	Dual-purpose	Jiangsu Yuyue Medical Equipment Co., Ltd.	1
37	Medical devices	Hair clippers	Taiwan	Feike Borui	1
38	Medical devices	Semi-automatic external defibrillator (AED)	Taiwan	Jiuxin brand	1
IX. Disinfection, Sterilization and Protective Equipment					
39	Disinfection and Protection	84 Disinfectant, Disinfectant Effervescent Tablets	500 g	Jiangxi Caoshanhu Disinfectant Products Co., Ltd.	10
40	Disinfection and Protection	Hand Sanitizer Gel	500 ml, 75%	Wuhan Xuehuan Medical Disinfection Products Co., Ltd.	5
41	Disinfection and Protection	Disinfectant and Protective Equipment	Flat-style ear-loop masks, 17.5 × 9.5 cm, 10 pieces per individual pack	Hunan Kangwo	10
42	Disinfection and Protection	Disinfectant and Protective Equipment	Powder-free/textured – 7.5M size – 2 pieces	Kefu Medical Technology Co., Ltd.	15
X. STI Testing, Contraception and Prevention					
43	Contraception and Prevention	Natural Latex Condoms	Ultra-thin and smooth, pack of 12	Tianjin Zhongsheng Latex Co., Ltd.	3
44	Contraception and Prevention	Levonorgestrel tablets	1.5 mg * 1 box	Wuhan Jiulong Renfu Pharmaceutical Co., Ltd.	3

No.	Category	Name of Medication/Equipment	Specifications	Manufacturer	Quantity
45	Test kits	Kefu HIV, Syphilis, Hepatitis B and Hepatitis C Test Kits	1 sample * 1 box	Hangzhou Botuo Biotechnology Co., Ltd.	5

Table 143: List of Emergency Rescue Equipment and Tools

No.	Category	Equipment/Tool Name	Quantity
1	Communications and Early Warning	Walkie-talkies	10
2	Communications and Early Warning	Public address loudspeakers	2
3	Lighting and Evacuation	Emergency lighting	10
4	Lighting and Evacuation	Torches	10
5	Lighting and Evacuation	Evacuation signs	20
6	Lighting and Evacuation	Escape masks (smoke-proof)	10
7	Fire Extinguishing	Dry powder fire extinguishers	50
8	Fire Extinguishing	Fire buckets	10
9	Fire Extinguishing	Fire axe	3
10	Fire Extinguishing	Shovels	5
11	Demolition and Shoring	Crowbars	2
12	Demolition and Shoring	Saws	2
13	Demolition and Shoring	Steel pipes	10
14	Flood Prevention and Drainage	Water Pumps	2 units
15	Flood Prevention and Drainage	Woven sacks	100
16	Flood Prevention and Drainage	Water hoses (for use with water pumps)	50 meters
17	Flood Prevention and Drainage	Wellington boots	20 pairs
18	Flood Prevention and Drainage	Raincoats	20 sets
19	Emergency power supply	Generator	1 unit
20	Vehicles	Emergency vehicles	2 units
21	Chemical protection equipment	Disposable protective suits	3 sets
22	Chemical protection equipment	Chemical-resistant gloves	6 pairs

8.7.15.2. Emergency Drills and Response

Small-scale emergency drills shall be conducted quarterly, and comprehensive emergency drills annually, focusing on confined space rescue, firefighting, electric shock first aid, and water pollution response scenarios. After each drill, timely review and summary shall be conducted to optimize emergency plans and response procedures. When a sudden accident or incident occurs, the corresponding plan shall be immediately activated to rapidly carry out rescue, loss mitigation, reporting, and post-incident work, preventing escalation of the accident, and strictly complying with local accident reporting procedures. For specific drill plans, please refer to Chapter 12, 'Emergency Response Management', of the *Health and Safety Management Manual* and Chapter 12, 'Environmental Emergency Response', of the *Environmental and Construction Mitigation Strategies*.

8.7.16. Protection of Female Workers

Core Management Principles

1. Equal Treatment and Compliance Principle: Local anti-discrimination regulations shall be strictly enforced to ensure female employees enjoy equal rights in recruitment, employment, remuneration, promotion, training, and leave, eliminating any gender-differentiated treatment.
2. Safety First Principle: Given the high-risk nature of construction sites and the special island environment, targeted strengthening of personal safety, operational safety, and nighttime safety management for female workers shall be implemented.
3. Health-Specific Principle: Adapted to the physiological characteristics of women, special protections shall be implemented for menstruation, pregnancy, maternity, and lactation periods, avoiding hazards of high-risk job operations.
4. Zero Tolerance Principle: Zero tolerance shall be applied to workplace sexual harassment, verbal insults, infringement of rights, and non-compliant employment practices. Any discovered violation shall be seriously investigated and subjected to closed-loop resolution.

8.7.16.1. Dedicated On-Site Safety Protection for Female Workers

Job Classification Management and Prohibited Operations

In light of the high-risk nature of wastewater treatment plant construction and the physiological characteristics of women, a tiered job management and prohibited operations system shall be implemented to strictly avoid high-risk operation injuries:

1. Absolutely Prohibited Positions: Female employees are strictly prohibited from engaging in deep excavation, confined space enclosed operations, overhead suspended operations, heavy machinery

lifting, high-intensity earthwork, direct contact with toxic and harmful gases, and nighttime high-risk construction, and other heavy manual or high-risk positions.

2. Restricted Positions: For positions such as welding, temporary electrical operations, noise and dust exposure, and wastewater contact, female workers' operating hours shall be strictly controlled, with job rotation and rest systems implemented to prevent prolonged continuous operations.

3. Suitable Positions: Priority shall be given to assigning lighter, safer, and lower-risk positions such as on-site documentation, quality inspection, safety inspections, logistics management, equipment auxiliary commissioning, and on-site coordination.

Daily Operational Safety Protection

Dedicated, properly fitting, and compliant labor protection equipment shall be provided for female employees, including properly fitting safety helmets, dust masks, protective gloves, protective clothing, and non-slip footwear, eliminating protection failures caused by use of oversized standard-issue protective equipment. During operations, HSE personnel shall focus their inspections on female work positions, promptly correcting non-compliant operations, investigating job safety hazards, and ensuring full safety and controllability throughout operations.

Nighttime and Off-Site Safety Management

Nighttime operations for female employees shall be strictly controlled. As a general principle, female employees shall not be assigned to nighttime shifts, nighttime overtime work, or sole nighttime guard duties. Where operationally necessary, they must work in pairs and be supervised by management personnel throughout, with full lighting and camera coverage in the work area. Arranging female employees to go out alone to make purchases, undertake solo field assignments, or conduct sole nighttime inspections is strictly prohibited, eliminating safety risks of working alone and commuting alone.

8.7.16.2. Anti-Sexual Harassment and Civilized Employment Management

Zero Tolerance Management Standards

The project implements a zero-tolerance policy for workplace sexual harassment and gender bullying. All personnel (including management, operational workers, subcontractor personnel, and external visitors) are strictly prohibited from engaging in any infringement of female employees' rights, including verbal teasing, physical harassment, malicious ridicule, gender bullying, covert photography, stalking, and information harassment. Spreading vulgar information and behavior that insults the dignity and personality of women are strictly prohibited.

Prevention and Supervision Mechanisms

Full camera coverage shall be installed in public areas of construction sites, living areas, and office areas to eliminate private blind spots. Personnel conduct shall be regulated, and civilized construction and employment education routinely conducted. Anonymous complaint channels and female liaison officers shall be established. Complaint methods shall be publicly disclosed, and female rights protection requests handled with full confidentiality, eliminating complaint leaks and retaliatory behavior. All complaints shall be registered, investigated by dedicated personnel, resolved within prescribed time limits, and subjected to closed-loop rectification.

Violation Handling Mechanisms

Upon confirmed instances of harassment, discrimination, or bullying of female employees, work shall be immediately suspended for investigation. Depending on the severity of the violation, measures including public criticism, financial penalties, and expulsion from the site shall be applied. In cases of serious violations that contravene local regulations, the matter shall be referred to Barbados' Labor Department and judicial authorities for handling, with all evidence retained throughout and accountability pursued in accordance with the law.

Dedicated Living Area Safety Management**Accommodation Privacy and Safety Protection**

Male and female workers shall be accommodated in separate areas. Female dormitories shall be independently enclosed, with dedicated access control, anti-theft facilities, and lighting equipment installed. Persons of opposite sex randomly entering female living areas and dormitories are strictly prohibited. Female dormitories shall have dedicated management personnel on duty, with regular inspections of accommodation safety hazards to ensure accommodation privacy, personal safety, and property security. Unauthorized dormitory changing and accommodation of external visitors are strictly prohibited, and personnel flow in living areas shall be standardized.

Dedicated Living Facilities

Independent female-only washing areas, toilets, and shower areas shall be provided, ensuring cleanliness, privacy, safety, and ventilation. Regular cleaning and disinfection shall be carried out to prevent dirty and unsanitary conditions and mosquito breeding. Living areas shall be equipped with emergency hygiene supplies, common medicines, and drinking water to comprehensively meet female employees' daily living needs. Strict 24-hour security patrols of living areas shall be enforced, with a focus on strengthening nighttime living area security management.

Civilized Living Management

All employees' conduct shall be regulated, and gender discriminatory remarks, vulgar jokes, and malicious ridicule in living areas and work areas are strictly prohibited. An environment of respect for women, equality, friendliness, civilization, and harmony shall be fostered in the station, and all uncivilized, infringing, and bullying behaviors eliminated.

8.7.17. Training, Education, and Grievance Management

Specialized Training and Education

All incoming personnel must participate in specialized training on female rights protection, covering Barbados female employment regulations, anti-discrimination ordinances, workplace conduct standards, sexual harassment prevention, female operational safety guidelines, "three-period" protection policies, and rights protection channels. Bilingual education shall be used for Chinese and foreign employees to ensure that all staff understand, are aware of, and comply with the requirements. Post-training assessments shall be filed, and personnel who fail shall not be permitted to commence work. Regular warning education shall be conducted using case studies to reinforce all-staff compliance awareness.

Routine Awareness Education

Female rights protection, anti-harassment, and civilized employment promotional slogans and notice boards shall be posted at construction sites and living areas to routinely disseminate protection knowledge and compliance requirements. Female protection briefings shall be incorporated into weekly pre-shift meetings to eliminate discrimination, harassment, and non-compliant employment practices, and continuously foster an equal, safe, and civilized construction environment.

Closed-Loop Grievance and Rights Protection Mechanism

A rights protection mechanism of "grievance collection – registration and investigation – rapid resolution – feedback and follow-up – archiving and closure" shall be established. Female employees may at any time report work difficulties, rights infringements, safety hazards, and harassment issues through dedicated liaison officers, anonymous channels, and the project management office. The project shall respond within 24 hours of receiving a grievance and complete investigation and resolution within 15 days. All matters shall be handled with full confidentiality and impartiality, and delays, cover-ups, and retaliatory behavior are strictly prohibited, ensuring that every grievance is followed up and every matter receives a response.

Subcontractor HSE Management

Before subcontractors enter the site, HSE qualification reviews shall be conducted to verify safety qualifications, past HSE performance, and personnel certification status. HSE special agreements shall

be signed, clearly defining subcontractor HSE responsibilities. All subcontractor personnel shall be incorporated into the project's unified HSE management, with unified training, briefings, inspections, and assessments. Subcontractors with HSE violations or inadequate performance shall be required to rectify within a specified period; those with serious violations shall have cooperation terminated. All subcontractor personnel must complete a pre-employment medical examination and the CRSEG occupational safety and health course.

Access Management (Pre-Entry Controls)

1. Qualification review for access: All subcontractors must submit business licenses, work safety qualifications, HSE management systems, past construction performance, and safety reputation certificates before entering the site. Subcontractors with incomplete qualifications, poor reputation, or multiple violations are strictly prohibited from entering the site. Comprehensive accident insurance must be taken out.
2. Personnel qualification review: Subcontractor special operations personnel and machinery operators must receive training before commencing work. Valid personnel certification documents must be submitted to SCWRP-PEU.
3. Equipment and material inspection submission: Subcontractor machinery, equipment, tools, and protective equipment entering the site must be submitted for inspection. Only equipment that is qualified, with complete protection and in good condition, may be put into use. Unqualified equipment is strictly prohibited from entering the site for operations. Specifications and manuals for large machinery and equipment must be submitted.
4. Contract HSE terms and conditions: Subcontract agreements shall clearly define HSE responsibilities, safety terms, penalty standards, and accident accountability mechanisms, implementing the management principle of "whoever subcontracts is responsible, whoever constructs is responsible."

On-Site Orientation and Briefing Management

1. Three-tier safety training: All subcontractor personnel must complete project-, team- and post-level safety training; they may only commence work after passing the assessment. Training records must be archived and retained; personnel who have not undergone training are prohibited from carrying out work.
2. Specialized Safety Briefings: Specialized HSE technical briefings shall be conducted for high-risk operations such as work at height, lifting and hoisting, hot work, temporary electrical installations, excavation pits, machinery operation, temporary water supply operations and risks of submersion, clearly outlining risk points, prevention and control measures, and operational prohibitions.

3. Localised Training in Barbados: The SCWRP project in Barbados must provide subcontractors with specialized training on local environmental regulations, safety standards, marine conservation, hurricane and heavy rain preparedness, and the management of water, soil and oil contamination to ensure compliance during construction.

4. Routine pre-shift briefings: Subcontractor work teams shall hold pre-shift meetings daily to communicate the day's operational risks, protective requirements, and emergency precautions, achieving daily risk elimination and pre-emptive hazard awareness.

On-Site HSE Management

1. Work Permit Management: For high-risk subcontractor operations, the permit system must be strictly enforced for hot work, work at height, lifting and hoisting, confined spaces, temporary electrical work, and operations involving a risk of submersion. Any work carried out without a valid permit shall be suspended immediately for rectification, and those responsible shall be held strictly accountable.

2. Personnel Behaviour Control: Strictly control unsafe behaviors by subcontractor personnel, such as operating in breach of regulations, failing to wear personal protective equipment, reckless construction practices, working under the influence of alcohol, and unauthorized use of electricity; work must be halted immediately upon detection of any violations for rectification. The table below sets out the minimum red-line standards for the safe behaviour of subcontractor personnel on the project site. All subcontractors must sign to confirm their compliance with these standards before entering the site. Any breach of the behavioral control regulations will result in immediate suspension of work, fines or even expulsion from the site; any resulting delays to the construction schedule and losses shall be borne by the subcontractor.

Table 144: Safety, Health and Environmental Management Measures for Subcontractors

No.	Behaviour Control Category	Specific Examples of Non-compliance	Penalty Measures
1	Personal Protective Equipment (PPE)	Entering the site without wearing a safety helmet or fastening the chin strap; working at height without wearing a safety harness (or using a safety harness that is attached too low for the height of the work); failing to wear a high-visibility vest; failing to	Work shall be suspended immediately; the offending personnel shall be removed from the site and issued with a warning. Should the same subcontractor commit three such breaches, all their work

No.	Behaviour Control Category	Specific Examples of Non-compliance	Penalty Measures
		wear specialized goggles or a face shield during welding or cutting operations.	on the project shall be suspended and all staff shall undergo refresher safety training.
2	Operational Breaches	Operating heavy machinery (such as excavators or tower cranes) without authorization; carrying out specialized operations such as electric welding or electrical work without a valid license; maintaining equipment without following the 'Lockout/Tagout' (LOTO) procedure; using hands instead of tools (e.g. using fingers to test whether gears are turning) or throwing tools or materials.	Work shall be halted immediately, and a comprehensive investigation and rectification shall be carried out for the work team involved.
3	Working Under the Influence of Alcohol and Electrical Safety Breaches	Consumption of alcohol or evidence of alcohol influence during working hours or on the premises; unauthorized wiring by non-certified electricians, the use of damaged cables, or failure to install residual current devices (RCDs).	Work must cease immediately; the personnel involved must be dismissed immediately and permanently barred from re-entering the project site.
4	Careless Construction and Environmental Protection	Damage or dust caused by rough handling of materials during loading and unloading; haphazard excavation resulting in damage to underground utility lines (water, electricity, fiber-optic cables); indiscriminate dumping of waste or discharge of sewage on site.	Work shall be suspended immediately; the parties concerned shall be ordered to restore the site to its original condition and bear all restoration costs.

No.	Behaviour Control Category	Specific Examples of Non-compliance	Penalty Measures
5	Discipline and Civilized Construction Practices	Fighting, brawling, theft or willful damage to equipment on the construction site; smoking in non-designated smoking areas (particularly in flammable or explosive zones); unauthorized removal, misappropriation or obstruction of safety barriers (such as guardrails and warning signs).	Work shall be suspended immediately; the individuals involved shall be dismissed, and, depending on the severity of the offence, the matter shall be referred to the local police for handling (particularly in cases of theft).

3. Civilized construction management: Subcontractor work areas shall be cleaned upon task completion. Material storage shall be standardized, passageways kept clear, and drainage maintained. Dust, noise, wastewater, and oil pollution shall be strictly controlled, and environmental protection requirements implemented.

4. Machinery and electrical management: Subcontractor machinery shall be operated by designated persons on dedicated equipment, with regular maintenance. Temporary electrical works shall strictly follow three-level distribution and two-level protection, eliminating unauthorized connections, defective operation, and overloaded operations.

5. Dedicated on-site supervision: During high-risk operations, the subcontractor's safety officer must conduct patrols and supervision to prevent unsupervised work or workers leaving their posts. Reports on supervision, monitoring and post-operation activities must be submitted.

8.7.18. Hazard Investigation and Rectification Management

1. Daily self-inspection: Subcontractor units shall conduct daily on-site self-inspections, investigating safety, environmental, equipment, and fire prevention hazards, and self-rectifying and self-closing issues.

2. Joint project inspections: The project management office shall conduct daily and weekly specialized HSE inspections of subcontractors, establishing records of violations and hazards, with clearly designated responsible persons and rectification deadlines. Inspection records and reports must be retained.

3. Closed-loop hazard management: All hazards shall be subject to closed-loop management of "discovery – rectification – re-inspection – sign-off." Those who refuse to rectify or fail to adequately rectify shall be immediately suspended, interviewed, and penalized.

4. Key risk management: Key management shall be applied to subcontractor high-risk operations, temporary facilities, fuel and chemical storage, wastewater discharge, and near-coastal construction, strictly preventing safety and environmental incidents. Inspection records and reports must be retained.

Emergency and Incident Management

1. Inclusion in the project emergency response system: All subcontractor personnel are to be included in the project's emergency response plan and are required to participate in standardized emergency training and drills, ensuring they are fully familiar with the procedures for dealing with fires, heatstroke, collapses, machinery-related injuries, extreme weather and routine meteorological events.

2. Incident reporting and handling: Any near-miss, minor injury, serious injury, or environmental incident involving subcontractors must be immediately reported to the project management office. Concealment, false reporting, and delayed reporting are strictly prohibited. If self-resolution is ineffective, the project emergency rescue system shall be immediately activated. Detailed emergency response procedures are set out in Chapter 11, 'Emergency Management', of this Health, Safety and Environmental Management Plan.

3. Incident accountability and rectification: Safety and environmental incidents caused by subcontractors shall be the full responsibility of the subcontractor. Rectification, review, and education shall be implemented to prevent recurrence of the same type of issue. records of all training sessions must be kept on file.

Environmental and Occupational Health Management

1. Occupational Health Protection: Subcontractors shall ensure that all workers wear the full complement of personal protective equipment (PPE) against dust, noise and cuts, as required by their job roles, and shall conduct regular occupational health examinations to eliminate the risk of occupational diseases. Subcontractors must adhere to the main contractor's operational guidelines.

2. Implementation of Pollution Prevention and Control: During subcontracted works, strict control measures must be implemented for dust, noise, waste water, oil contamination and construction waste. Arbitrary discharge is prohibited, as is the pollution of wetlands, coastal marine areas and waters, and any actions that alter the biodiversity of ecosystems. Subcontractors must adhere to the main contractor's policy.

3. Proper Disposal of Waste: Construction waste, domestic waste, waste oil and oil-contaminated waste must be sorted, collected, stored at designated locations and disposed of centrally; unauthorized dumping is strictly prohibited. Subcontractors must adhere to the main contractor's policy.

Performance Evaluation and Reward/Disciplinary Management

1. Monthly HSE assessment: The project management office shall conduct monthly comprehensive HSE assessments of subcontractors, covering safety, environmental protection, civilized construction, hazard rectification, and violations. Assessment results shall be linked to project payments.

2. Reward mechanism: Outstanding subcontractors with standardized HSE management, no violations, no hazards, and no accidents shall be publicly commended and rewarded.

3. Penalties and expulsion: Subcontractors with repeated violations, refusal to rectify hazards, management disorder, or accidents shall be subject to work suspension, fines, interviews, and time-limited rectification. In serious cases, they shall be directly expelled from the site and blacklisted. For details regarding the specific monthly assessment, reward mechanism, and penalty and dismissal measures, please refer to Chapter 10, '10.3 HSE Assessment, Rewards and Penalties', of this plan.

Site Withdrawal Management

1. Completion HSE acceptance: Before subcontractors withdraw upon project completion, a specialized HSE acceptance inspection shall be conducted to investigate residual hazards, equipment, waste, and pollution issues. Withdrawal may only proceed after all issues have been rectified to a satisfactory standard.

2. Safety and Occupational Health (Safety) Compliance Standards

(1) Elimination of Safety Hazards

Edge and Opening Protection: All pits, manhole openings and exposed edges left by construction work have been restored or fitted with permanent safety protection measures (such as guardrails and cover plates) to ensure there is no risk of personnel falling.

Dismantling of Scaffolding and Temporary Facilities: All temporary scaffolding and work platforms have been safely dismantled and cleared from the site in accordance with prescribed procedures; no structural components or loose materials remain.

Residual Risks from Work at Height: There are no unsecured loose materials, tools or other items that could fall and cause injury.

(2) Safety Status of Special Equipment and Machinery

Clearance of Equipment: All construction machinery, vehicles and lifting equipment have been removed from the site, or, where handed over, have been confirmed to be safely shut down, de-energized and locked out and tagged (LOTO).

Isolation of Hazardous Energy Sources: Temporary electrical circuits, gas cylinders, hydraulic lines and similar items have been disconnected, depressurized and safely removed; no live or pressurized equipment remains on site.

3. Environment and Hygiene (Environment) Compliance Standards

(1) Rubbish and Waste Clearance

Clearance of Construction Debris: There are no piles of construction debris on site, such as cement bags, rebar offcuts, timber battens or scrap pipework. All waste has been deposited at the site's designated waste collection points.

Compliant Disposal of Hazardous Waste: Where hazardous waste is involved, such as asbestos, lead-based paint, waste oil or chemical containers, it must be disposed of in accordance with regulations by a contractor certified by the Environmental Protection Department (EPD), and valid transfer notes or disposal certificates must be provided.

(2) Site Restoration and Pollution Remediation

Ground Restoration: Any damage to hardened surfaces, excavation pits or trenches caused by construction works has been backfilled and levelled, restoring the site to a state that harmonizes with the surrounding environment, with no risk of subsidence or water accumulation.

Contamination Removal: There are no visible oil stains, chemical residues or discolored soil within the construction area. Where contamination is present, the contaminated soil must be cleared or remediated.

Water Accumulation and Mosquito Breeding: All depressions or pits where water may accumulate have been levelled to eliminate conditions conducive to mosquito breeding.

Dust and Particulate Matter Control: There is no significant accumulation of dust on roads, equipment surfaces or inside buildings; sweeping or wet cleaning has been carried out.

(3) Public Utilities and the Surrounding Environment

Protection of underground utilities and facilities: Cables, water pipes, telecommunications fiber-optic cables and other utilities that were temporarily relocated or exposed during construction have been restored to their original condition or permanently repaired in accordance with regulations; there are no exposed or damaged sections.

Mitigation of Impact on Surrounding Roads and Communities: Damage to surrounding roads and pavements caused by construction has been repaired; temporary traffic facilities and hoardings have been removed, and public access has been restored.

4. Closed-loop documentation archiving: Complete documentation including subcontractor safety education, briefings, inspections, rectifications, emergency response, and assessments shall be organized, completely archived, forming a full-process HSE management closed loop.

8.7.19. Incident Reporting and Investigation

Incident Management Plan

The primary objective of this plan is to ensure that all accidents, near misses, occupational diseases (such as severe heatstroke), and environmental spill incidents (including fuel spills and wastewater overflows) occurring in workers' and management personnel's camps are systematically reported, thoroughly analyzed, and properly handled in accordance with the law, to prevent similar incidents from recurring. This procedure applies to all camp residents, subcontractors, management personnel, and visiting logistics drivers.

Scope

This document informs all project-related personnel on how to report incidents and provides guidance for health and safety enforcement departments and management teams on investigating and handling incidents.

Incident Classification

1. Near Miss (NM): An event that could have caused injury, damage, or loss but was avoided due to specific circumstances. Near misses are also referred to as "close calls" or "near accidents."
2. First Aid (FA): An injury requiring only one first aid treatment followed by a follow-up visit, typically involving minor injuries. Examples include minor abrasions, burns, and cuts that generally do not require complex medical care. In such cases, the individual can usually resume normal activities immediately.
3. Medical Treatment Case (MTC): An injury or illness requiring treatment by a doctor or medical personnel in accordance with a doctor's standard medical instructions.
4. Restricted Work Day Case (RWDC): A work-related injury that is non-fatal, does not result in absence from work, but causes the employee to be unable to fully perform all routine work duties on any day following the occupational injury. Such cases generally allow the employee to continue working, such as working part-time in their original position, or working full-time but unable to undertake all daily responsibilities.

5. Lost Work Day Case (LWDC): An occupational injury or occupational disease that prevents an individual from working on any day after the accident, excluding fatal injuries. This includes rest days, weekends, leave days, public holidays, and days after separation from employment.

6. Fatality: Resulting in the death of an employee.

Incident Classification Matrix

1. Level 1: Minor incidents/near-misses: Property damage of less than US\$1,000; minor first-aid incidents; or traffic deviations resulting in near-collisions on the central carriageway or local roads.

2. Level 2: Moderate/Reportable: Medical treatment (restricted work, clinical rest due to heatstroke); localised environmental spills contained within a levelled area and not exceeding 50 liters; or small localised kitchen fires.

3. Level 3: Major/Serious Incidents: Lost-time injuries (LTI), collapse of prefabricated structural units, severe heatstroke emergencies requiring hospitalization, fuel/oil or chemical leaks entering the community drainage system, or sewage leaks from sedimentation tanks.

Table 145: Incident Severity Classification Matrix

Level	Category Name	Personal Injury	Property Damage	Environmental Incident	Road traffic accidents	Fire/Explosion
1	Minor incidents/emergencies	Minor injuries requiring first aid (e.g. minor grazes, cuts, sprains, not requiring hospital treatment) ; no loss of	Less than US\$1,000	/	Near-misses on the Central Lane or community roads (no actual collision or only minor	/

Level	Category Name	Personal Injury	Property Damage	Environmental Incident	Road traffic accidents	Fire/Explosion
		working hours			scrapes)	
2	Moderate/reportable incidents	Requiring medical treatment (e.g. stitches, immobilization) and resulting in work restrictions (reassignment or recuperation); clinical rest required due to heatstroke (medically prescribed rest); documented	US\$1,000 – 10,000	A localised spill occurring on a level surface, which has been effectively contained and where the volume of the spill does not exceed 50 liters	/	A small localised fire in a kitchen area (which did not spread and was extinguished on the spot)

Level	Category Name	Personal Injury	Property Damage	Environmental Incident	Road traffic accidents	Fire/Explosion
		reportable incidents				
3	Major/Serious Incidents	Loss-time injury (LTI) resulting in work stoppage; emergency treatment for severe heatstroke requiring hospitalization; serious injury (e.g. fracture, amputation)	Exceeding US\$10,000	Spills of fuel, oil or chemicals into the local drainage system; sewage leaks from sedimentation tanks causing environmental pollution	/	Collapse of a prefabricated unit structure; fire spreading to storage areas or equipment

Additional notes: Priority determination: Classification follows the ‘higher-over-lower’ principle. Where an incident triggers the criteria for a higher level in any dimension, it shall be treated at the highest level. For example: if property damage is less than \$1,000 but heatstroke has resulted in hospitalization, the incident shall be treated as Level 3.

Incident Reporting at

1. In the event of an incident, a verbal report must be made immediately to the relevant supervisor. The incident report form must be completed within two hours of the incident occurring.
2. If an incident results in a spill extending beyond the facility boundaries or causes a fatality, the relevant regulatory authorities must be notified immediately.

3. Once completed, the form must be submitted to the HSE Manager for review.

Incident Report Form

To be completed by the person who discovered the incident or the area manager, and submitted to the camp HSE Manager within two hours of the incident occurring.

Table 146: Incident Report Form

1. Basic Information	
Date of incident:	Time of incident: _____ AM/PM
Exact location within the camp:	
☐ Workers' accommodation office/residence ☐ Management	☐ Central vehicle access route
☐ Construction equipment charging area	☐ Wastewater/settling tank ☐ External community access corridor
Name of Reporter:	Position/Company:
2. Incident Type Classification (multiple selections permitted)	
☐ Injury/Illness (First Aid) ☐ Property/Structural Damage ☐ Vehicle Collision	
☐ Severe heat stress/heatstroke ☐ Fire/smoke outbreak ☐ Chemical/fuel spill	
☐ Sewage/Wastewater Leakage ☐ Near Miss ☐ Damage Caused by Natural Disasters	
3. Preliminary description of the incident	
Briefly describe the sequence of events, the equipment involved and the emergency measures taken	
Consequences:	
4. Emergency Measures Taken	
Provide a detailed account of the emergency response measures implemented, the spill response kits deployed, power cut-offs and isolation measures, or the emergency services contacted, namely:	



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Signature of the presenter	Date/Time
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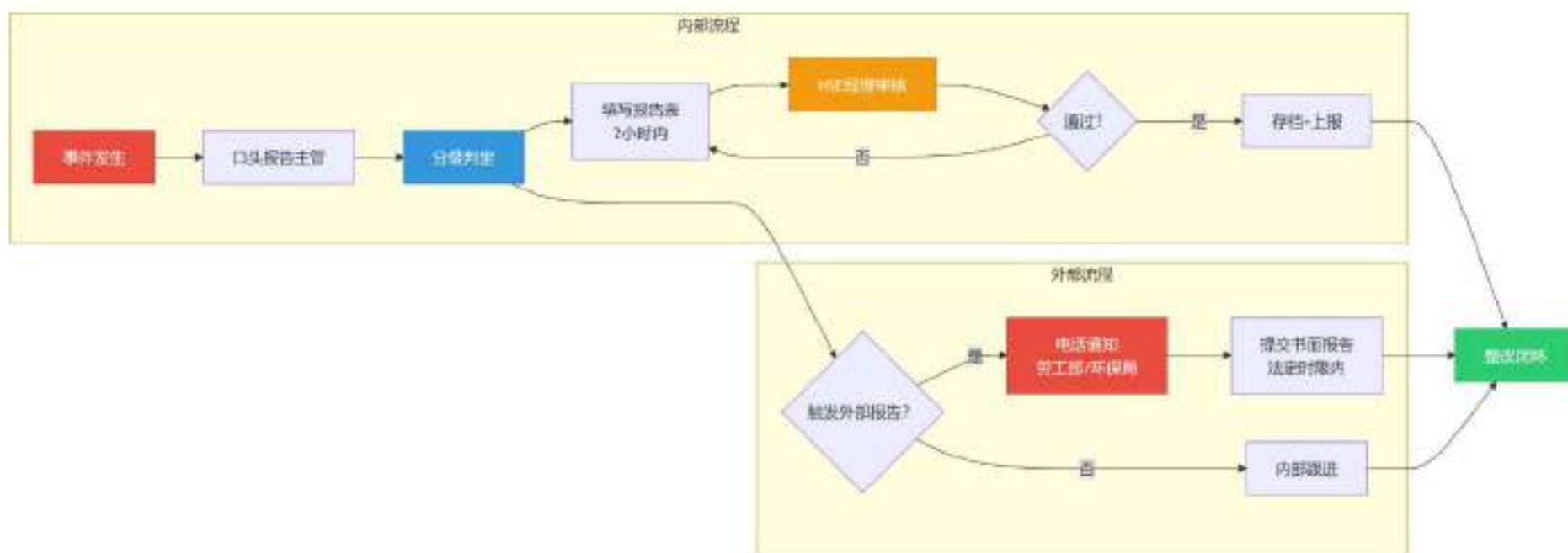


Figure 79: Accident Report Flowchart

Investigation of ‘ ‘ Incidents

1. Upon receipt of a fully completed incident report form, the HSE Manager will initiate an investigation.
2. This investigation shall commence immediately; for incidents classified as Level 2 and Level 3, the report shall be completed within 7 days.

Incident Investigation Form

To be completed by the lead investigator (HSE Manager) within 7 days of a Level 2 or Level 3 incident occurring.

1. Investigation Management

- Incident Reference Number: _____
- Investigation Commencement Date: _____
- Investigation Team Members: _____

2. Comprehensive Fact-Finding and Timeline Analysis

(Including witness statements, photographic evidence and maintenance records for equipment/settling tanks)

System/charging panel (if applicable).

3. Root Cause Analysis (Five-Question Method)

- Statement of the problem (the incident itself): _____
- Cause? (Level 1): _____
- Cause? (Level 2): _____
- Cause? (Level 3): _____
- Cause? (Level 4): _____
- Cause? (Level 5 – Root Cause): _____

4. Corrective and Preventative Action (CAPA) Plan

Corrective actions must address the root cause to ensure long-term and effective prevention and control.

#	Description of corrective action	Person responsible	Target Completion Date	Required Documentation
1	For example: rearranging charging racks, carrying out maintenance on sewage treatment facilities and valves, and installing additional signage			
2				



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3				
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Signature of the person in charge of the investigation: _____ Date: _____

Project Manager's Approval: _____ Date: _____

Closure of an ' ' Incident

1. Once all aspects of the incident have been resolved, the closure form should be completed.
2. This serves as a component of the system to ensure that all corrective actions are completed in accordance with the investigation requirements.
3. It enables the team to record all information relating to the incident on a single form, thereby making it easier to identify the lessons learnt from the incident.

Incident Closure Form

Reference No.: HSE-CL-_____

Date of Closure: ____ Year ____ Month ____ Day

I. Basic Information

Project Name	
Incident Report Number	HSE-IR-_____
Incident Investigation Number	HSE-INV-_____
Date of Incident	____ year ____ month ____ day
Incident Severity	☐ Level 1 (Minor) ☐ Level 2 (Moderate) ☐ Level 3 (Serious)
Incident Type	☐ Personal injury ☐ Property damage ☐ Environmental spill ☐ ☐ Fire/explosion ☐ Structural collapse ☐ Road traffic accident ☐ Other: _____

II. Incident Summary

Course of Events	
Direct Consequences	Personal injury: _____ Property damage: \$_____ Volume of environmental spill: _____
Root Cause	

III. Status of Rectification Measures

IV.

No.	Corrective Action	Person Responsible	Planned Completion Date	Actual Completion Date	Status
1					☐ Completed ☐ Not completed
2					☐ Completed ☐ Not completed

Outstanding Issues and Follow-up

No.	Outstanding Issues	Planned Completion Date	Person responsible for follow-up	Status
1				☐ In progress ☐ To be initiated
2				☐ In progress ☐ To be initiated

If there are no outstanding issues, enter 'None'.

V. Summary of Costs

VI.

Cost Category	Amount (US dollars)
Property damage	\$
Environmental Clean-up/Remediation	\$
Medical/Compensation	\$
Loss of business	\$
Fines/Penalties	\$
Total	\$

Lessons learnt (optional)

VII. Signatures and Approval

Role	Recommendation for Case Closure	Signature	Date
Investigator	☐ Recommend closure ☐ Defer		
HSE Manager	☐ Agree to close the case ☐ Postpone		
Subcontractor's Representative	☐ Confirm completion ☐ Object		
Project Manager	☐ Approve closure ☐ Return		

VIII. List of Documents to be Filed

Important Notes

1.	Document	Status
	Incident Report Form (HSE-IR)	☐ Archived
	Incident Investigation Form (HSE-INV)	☐ Archived
	On-site photographs/videos/sketches	☐ Archived
	Rectification Acceptance Record	☐ Archived
	External report acknowledgement (if applicable)	☐ Archived

Conditions for case closure: All rectification measures have been accepted as satisfactory; responsibility for following up on outstanding issues has been assigned; external government reports on Level 3 incidents have been submitted to the Barbados Ministry of Labour/Environmental Protection Agency in accordance with regulations.

2. Extension of the closure deadline: Should an extension be required, written approval must be obtained from the project manager, specifying the anticipated closure date and the reason for the extension.

3. Record retention: Closure records must be retained for at least five years for compliance audits by the Ministry of Labour.

4. Coordination with handover acceptance: Where the incident involves subcontractor liability, the 'rectification completed' status on the closure form will serve as one of the prerequisite review items for the subcontractor's HSE-specific handover acceptance—subcontractors with unresolved incidents shall not be permitted to complete handover procedures.



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Following an ‘ ‘ incident

1. Once the incident investigation is complete, any relevant procedures requiring updating must be addressed.
2. The lessons learnt from this incident should be discussed with all staff.
3. A brief summary of the incident and the lessons learnt must be posted on the HSE noticeboard.

8.7.20. HSE Records and Documentation Management

Records Management

A comprehensive project HSE record-keeping system shall be established, comprising: personnel health records (contents: pre-employment medical examination reports, medical examinations following changes in job role, and records of work-related injury treatment; update frequency: records to be created upon commencement of employment and updated within 24 hours of any health incident); training and assessment records (contents: three-tier safety education, safety technical briefings, daily pre-shift meeting minutes, records of specialized training and re-education for safety violations; Update frequency: filed within 24 hours of the completion of each training session or briefing); Hazard Identification and Rectification Records (Contents: routine inspection records, special inspection records, hazard rectification notices, rectification acceptance forms, and special reports on major hazards; Update frequency: filed within 24 hours of rectification acceptance); Work Permit Records (Contents: hot work permits, confined space work permits, lifting operation permits, etc.; Update frequency: issued prior to work commencement; filed upon completion of the operation), Equipment Maintenance and Servicing Register (Contents: Equipment acceptance records upon arrival, routine inspection records, periodic maintenance records, equipment fault/repair records, equipment scrapping records; Update frequency: Within 24 hours of each inspection or maintenance activity), Emergency Drill Register (Contents: Annual emergency drill plan, drill procedures, attendance sheets, photographs/videos of the drill process, drill evaluation reports, drill summaries and improvement measures; Update frequency: Completed and archived within 48 hours of each drill), Environmental Monitoring Log (Contents: Dust monitoring records, noise monitoring records, waste collection and removal records (including hazardous waste transfer forms), oil/chemical spill records; Update frequency: Monitoring carried out according to scheduled frequency; incidents exceeding limits reported immediately), Incident Record Register (Contents: Incident Report Form (HSE-IR), Incident Investigation Form (HSE-INV), Incident Closure Form (HSE-CL), incident statistics and analysis reports, external report records (acknowledgement slips from the Ministry of Labour/Environmental Protection Bureau); Update frequency: within 24 hours of completion of relevant forms), PPE issue ledger (contents: PPE issue register, periodic replacement records; update frequency: updated in real time after each issue/replacement), etc., to ensure full traceability and verifiability throughout the process.

Information Reporting and Communication

A routine HSE meeting mechanism shall be established, with weekly HSE regular meetings and monthly special meetings to summarize management status, rectify issues, and plan the next phase of work. HSE monthly reports, quarterly reports, and various specialized materials shall be submitted to the Employer,



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general contractor, and local regulatory authorities on schedule. All-staff HSE information feedback channels shall be kept open, encouraging hazard reporting and issue feedback.

Supplementary Provisions

1. This plan takes effect from the date of project commencement and covers the full construction period of the project until engineering completion acceptance and site clearance are completed.
2. This plan may be revised and improved in a timely manner in accordance with project construction progress, changes in on-site risks, updates to local regulations, and Employer requirement adjustments. After revision, all personnel shall implement the updated plan.
3. This plan is to be interpreted and implemented by the project's dedicated HSE management department.

8.8. Community Health Plan

Objectives

The Plan prevents Project-attributable deterioration in the health status of communities within the Area of Influence. It reduces the likelihood of the three priority residual risks to as low as reasonably practicable and maintains response capability proportionate to their consequence. It establishes measurable health indicators with defined responsibilities, frequencies and corrective action triggers. It ensures that affected communities, including vulnerable groups, can access health information and raise health concerns safely and effectively. It completes the baseline verification actions at Section 5.7 within defined timeframes. It demonstrates compliance with Environmental and Social Performance Standard 4 and related standards, Barbadian law and Project contractual obligations.

Principles

Controls are designed to prevent exposure ahead of treating consequence. Control intensity is calibrated to assessed risk, with priority residual risks receiving priority supervision. Health information and sensitive grievances are handled with confidentiality, consent and non-retaliation, applying survivor-centered principles. The differentiated needs of women, children, older persons, persons with disabilities and lower-income households are addressed explicitly. Monitoring results, grievances and incidents drive revision of controls. Measures are written for direct use by supervisors and subcontractors, with a named responsible role attached to every action.

8.8.1. Governance, Roles and Responsibilities

Delivery of the Plan depends on accountability being assigned to identified roles within the Contractor's organisation. This section allocates community health responsibilities across Contractor personnel, the Employer and the regulatory agencies, and Table 147 records that allocation.

Two features warrant note. Accountability for the Plan as a whole, rests with the Project Manager, who holds the authority to stop work on health grounds. Day-to-day delivery is divided between the Health, Safety and Environment Representative for monitoring and incident response, the Camp Manager for camp-mediated pathways, and the Community Liaison Officer for the community interface, with a designated Community Health Focal Point coordinating across them and holding the relationship with the Ministry of Health.

Table 147: Community health roles and responsibilities.

Role	Community health responsibilities
Project Manager	Ultimate accountability for Programme implementation and resourcing; reporting of serious health incidents to the Project Execution Unit; authority to stop work on health grounds
Health, Safety and Environment Representative	Day-to-day implementation; delivery of the monitoring programme; incident investigation; interface with the Environmental Protection

Role	Community health responsibilities
	Department and the Ministry of Health; maintenance of the health monitoring record
Community Health Focal Point	Named officer with specific responsibility for community health and safety; ¹³⁷ coordination of vector control, health outreach, baseline verification and health service liaison
Community Liaison Officer	Community-facing communication; receipt of community concerns; delivery of outreach; coordination where grievances involve community members
Human Resources Representative	Worker health screening records; camp morbidity recording; confidential handling of sexual exploitation and abuse, sexual harassment and gender-based violence cases
Site Supervisors and Foremen	Daily implementation of traffic, particulate, waste and conduct controls; immediate reporting of community-affecting incidents
Camp Manager	Camp sanitation, catering hygiene, vector control within the camp, occupancy density, isolation arrangements
Subcontractors	Bound by the same requirements through contract, reporting through the Contractor
Project Execution Unit and Barbados Water Authority	Oversight, review of reports, verification, approval of corrective action plans
Inter-American Development Bank	Supervision against Environmental and Social Performance Standard requirements
Ministry of Health and Wellness	Vector control coordination; communicable disease notification and outbreak response; health service capacity
Environmental Protection Department	Environmental quality standards and incident notification

¹³⁷ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063)*, Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

The Community Health Focal Point is designated and introduced to the Project Execution Unit before mobilization, with qualifications submitted for confirmation. The Project Execution Unit has recorded that personnel identified with health, safety and environment responsibility are to be introduced to the Unit,¹³⁸ and this Programme applies that requirement to the Community Health Focal Point.

8.8.2. Plan Components

This section sets out the twelve management components through which the impacts assessed in Part A are controlled. Each component corresponds to a pathway at Section 3.1 and specifies the measures to be applied, the frequency of application, the responsible role, and where relevant the escalation or work stoppage trigger.

Components are calibrated to assessed risk. The three components addressing priority residual risks, being road safety at Section 11.6, sexual exploitation and abuse together with sexual harassment and gender-based violence at Section 11.8, and emergency preparedness at Section 11.10, carry the most prescriptive measures, the shortest response times and dedicated escalation triggers. Components addressing pathways with Low residual significance are proportionately lighter.

Each component is delivered through, and reported against, the indicators at Section 14.1.

Vector Surveillance and Control

Table 148: Vector surveillance and control measures

Measure	Frequency	Responsible
Inspection of the site, camp and 50 meter perimeter for standing water, containers, tires, tarpaulins and blocked drainage	Weekly, and within 24 hours following rainfall exceeding the established trigger	Camp Manager
Elimination of identified breeding sites	Within 24 hours of identification	Site Supervisor
Maintenance of covered waste receptacles and removal of accumulated waste	Continuous, with collection per the Waste Management Plan	Camp Manager

¹³⁸ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

Measure	Frequency	Responsible
Verification that camp wastewater systems are sealed and functioning	Weekly	Camp Manager
Verification that canal and drainage flow is unobstructed by works, stockpiles or sediment, preserving larvivorous fish movement	Weekly	Health, Safety and Environment Representative
Protection of the Ministry of Health fish breeding station through exclusion zone, runoff and sediment control, maintained staff access, and no works affecting its water supply without prior agreement	Continuous, verified monthly	Health, Safety and Environment Representative
Larval and adult vector index survey	Monthly	Qualified vector control provider
Coordination with the Ministry of Health vector control unit, including confirmation of the fogging and canal-clearing schedule and advance notice to workers and community before fogging	Quarterly	Community Health Focal Point
Community larval source reduction outreach addressing household container management	Twice during construction and before each wet season	Community Liaison Officer
Drainage maintenance on and adjacent to the access route	Monthly and following storms	Site Supervisor
Use of insect repellents containing DEET, picaridin, or lemon eucalyptus oil on exposed skin	Continuous	Camp Manager and workers

Measure	Frequency	Responsible
Wear long-sleeved shirts and long pants, especially during peak mosquito activity	Continuous	Camp Manager and workers
Installation of insect screens on windows and doors	Before camp occupation, then inspected monthly	Camp Manager, verified by Health, Safety and Environment Representative
Elimination of stagnant water Repellent use, protective clothing and window screening are occupational measures applied to the workforce inside the campsite. They reduce the campsite's function as a vector amplification point adjacent to the community, consistent with the occupational to community pathway described at Section 1.2. Provision of repellent, clothing and screening rests with the Camp Manager; correct use rests with individual workers and is verified through camp inspection.	Weekly	Site Supervisor/Camp Manager

Escalation applies where the vector index exceeds the established baseline in any month, or where three or more mosquito-related community complaints are received in a month. Escalation triggers joint review with the Ministry of Health and an intensified control response within seven days.

Particulate and Air Quality Management at Community Receptors

Table 149: Particulate and air quality management measures

Measure	Frequency	Responsible
Water suppression of dust, exposed soil, unpaved areas, haul routes and site entrance	As required to prevent visible dust migration, at the established minimum rate in dry conditions	Site Supervisor
Covering of stockpiles, transport containers, and securing of vehicle loads before departure	Every movement	Site Supervisor

Measure	Frequency	Responsible
Wheel-wash or equivalent at site exit, with sweeping of tracked material	Daily	Site Supervisor
Continuous monitoring of particulate matter at 10 and 2.5 micrometers at the nearest residential receptor and at the school-facing haul route, at the same referenced locations throughout	Continuous, logged	Health, Safety and Environment Representative
Visual boundary dust inspection	Daily	Health, Safety and Environment Representative
Advance notification to households with registered sensitive occupants before high-dust activities	Minimum 48 hours	Community Liaison Officer

Visible dust migration beyond the site boundary toward a residential or school receptor requires immediate suspension of the causal activity until suppression is effective.

Monitoring maintains the geographic points logged during the baseline sampling exercise, consistent with the commitment that all geographical points collected during air quality sampling be maintained throughout the construction and operational phases.¹³⁹

Odor, Hydrogen Sulphide and Bioaerosol Control

Table 150: Odor, hydrogen sulphide and bioaerosol control measures

Measure	Frequency	Responsible
Continuous hydrogen sulphide monitoring with alarm at the camp boundary and the nearest community receptor	Continuous	Health, Safety and Environment Representative
Odor management procedure for bypass operations, sludge handling and tank openings	Every operation	Treatment plant interface supervisor

¹³⁹ Brinsjen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labour force data at p. 294; schools identified at pp. 292 and 335.

Measure	Frequency	Responsible
Scheduling of high-odor operations with reference to wind direction toward receptors	Per operation	Health, Safety and Environment Representative
Advance community notification of planned high odor works	Minimum 48 hours	Community Liaison Officer
Verification that camp intake, dining and recreation areas lie outside the modelled plume envelope	At camp commissioning and on any process change	Health, Safety and Environment Representative
Bioaerosol control through enclosure, spray suppression and restriction of aerosol-generating activity in adverse wind conditions	Continuous	Site Supervisor

Exceedance of the hydrogen sulphide alarm threshold requires immediate cessation of the causal activity, evacuation of affected areas under the Emergency Response Plan, and notification to the Project Execution Unit within four hours.

Noise, Vibration and Light Management

Table 151: Noise, vibration and light management measures

Measure	Frequency	Responsible
Restriction of high-noise activity, loading operations and other disruptive tasks to approved daytime working hours	Continuous	Site Supervisor
Generator and plant attenuation, with siting for maximum separation from dwellings	At mobilization and on relocation	Health, Safety and Environment Representative
Pre-construction condition survey of dwellings within the established distance of vibration-generating works	Once, before works	Independent surveyor
Noise monitoring at the nearest residential boundary, and at the school boundary during teaching hours, measured against the	Monthly and on complaint	Health, Safety and Environment Representative

Measure	Frequency	Responsible
World Health Organization Community Noise Guideline values adopted under the National Noise Policy ¹⁴⁰ and the construction noise limits identified in the Health and Safety Manual ¹⁴¹		
External lighting directed downward and inward with shielding to minimize glare and spill	Continuous	Camp Manager
Night work notification to affected households	Minimum 72 hours before each occurrence	Community Liaison Officer

Complaints relating to noise, vibration or lighting are logged, investigated within 48 hours and closed with documented action. Investigation includes enquiry into how the disturbance affects the complainant's sense of safety and wellbeing, and mitigation is adapted accordingly.¹⁴²

Water, Sanitation and Wastewater Exposure Control

Table 152: Water, sanitation and wastewater exposure control measures

Measure	Frequency	Responsible
Verification of potable water quality at source and at point of use in the camp	Before occupation, then monthly	Health, Safety and Environment Representative
Monitoring at the camp wastewater discharge point	Monthly	Health, Safety and Environment Representative

¹⁴⁰ Environmental Protection Department, Government of Barbados, *National Noise Policy*, together with Environmental Protection Department guidance on Noise Pollution Control, recording that Barbados has no dedicated noise legislation, that Cabinet acceded to the Barbados Noise Policy adopting the World Health Organization Community Noise Guidelines as reference standards, and that noise is otherwise addressed through the nuisance provisions of the Health Services Act, the Marine Pollution Control Act and the Road Traffic Regulations.

¹⁴¹ Construction noise limits specified in the manual include: i) Normal hours (Mon–Fri 07:00–18:00, Sat 07:00–12:00): $L(A)_{eq}(8h) = 85 \text{ dB(A)}$, max 115 dB(A); ii) Restricted hours (Mon–Fri 18:00–22:00, Sat 12:00–22:00, Sun/holidays 10:00–18:00): $L(A)_{eq}(4h) = 65 \text{ dB(A)}$, max 80 dB(A); and iii) All other times: $L(A)_{eq}(4h) \leq 50 \text{ dB(A)}$, max 55 dB(A)

¹⁴² BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.

Measure	Frequency	Responsible
Groundwater monitoring at established baseline points	Quarterly	Health, Safety and Environment Representative
Inspection and maintenance of the camp wastewater treatment system	Weekly	Camp Manager
Spill prevention inspection of fuel and chemical storage with containment verification	Weekly	Site Supervisor
Verification that night soil is not used in the vegetable garden	Monthly	Camp Manager
Handwashing facilities and hygiene provision maintained at all welfare points	Continuous	Camp Manager
Confirmation of emergency bypass status, sluice gate functionality and the sewage spill protocol with the Barbados Water Authority	Before construction adjacent to the operating plant, then annually	Community Health Focal Point

Any wastewater or chemical release carrying potential for community exposure requires notification to the Project Execution Unit, the Environmental Protection Department and the Ministry of Health within four hours, and direct notification to potentially affected households within twelve hours.

Sample handling follows documented procedure covering container type, preservation, transport temperature and chain of custody, addressing the requirements identified in review of the water sampling methodology.¹⁴³

Road Safety and School Zone Programme

This component addresses a priority residual risk.

The Traffic Management Plan establishes requirements for transport and logistics optimization, operational emission control, and site preparation and management. Several of those measures act directly on the

¹⁴³ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

community health pathways assessed in this document. They are set out below so that the two instruments remain aligned and so that delivery can be verified against the indicators at Section 14.1.

Measures reducing exposure frequency. Load optimization, which maximizes truck load capacity to reduce the total number of trips and eliminate empty running, reduces the number of heavy vehicle movements on the shared access road and therefore reduces the exposure frequency that drives the road traffic injury rating at CH-06. Route planning that selects the shortest routes and avoids sensitive environmental areas and heavily populated neighborhoods moves movements away from residential receptors and away from the two schools identified at Section 4.3.

Measures reducing emissions at the receptor. Use of modern fuel-efficient vehicles meeting current emission standards, together with cleaner alternatives where available, reduces roadside particulate and nitrogen dioxide concentrations at the residential and school receptors monitored under Section 11.2. A strict prohibition on idling for vehicles and machinery waiting to unload removes a concentrated source of exhaust at fixed points where people gather. Maintenance of transport vehicles and site machinery prevents oil leaks and reduces emissions, and connects to the vehicle inspection point raised at CH-06. Vehicles equipped with modern exhaust gas treatment, including selective catalytic reduction, reduce the same pollutants at source.

Measures reducing dust and road contamination. Planning site access roads for all-weather conditions prevents mud tracking onto public roads, which otherwise degrades local air quality, creates a skid hazard for other road users, and washes into the drainage network feeding Graeme Hall Swamp. Water spraying on site access roads during dry conditions prevents dust dispersion toward the receptors assessed at CH-02. Site layout planning that minimizes double handling and reduces idle time for cranes and forklifts lowers both noise and emissions at the boundary.

Measures addressing abnormal loads. Where heavy or oversized moves are required, specialized protocols and appropriate trailers prevent damage to the road surface and to adjacent property. Road sub-base degradation is assessed at CH-06 as a community impact in its own right, since it transfers a maintenance burden to residents and creates a hazard for pedestrians and cyclists using the same route.

Delivery of these measures is verified through the vehicle movement log, the weekly compliance audit at Section 11.6, and indicators KPI-10 to KPI-12. Where a measure in the Traffic Management Plan is revised, the corresponding entry in this Assessment is reviewed at the next issue.

Table 153: Road safety and school zone measures

Measure	Frequency	Responsible
Prohibition of heavy vehicle community transit between 07:00 and 08:00 and between 15:00 and 16:30, except where specifically authorized for an emergency	Continuous	Site Supervisor and Traffic Warden

Measure	Frequency	Responsible
Speed limit of 15 kilometers per hour on the community access route and 10 kilometers per hour at the camp entrance and internal gate areas	Continuous	Traffic Warden
Trained traffic wardens positioned at critical bends, access points and the main gate	During all vehicle movement periods	Site Supervisor
Off-site vehicle staging at a designated holding area, with no queuing on public roads serving the community	Continuous	Logistics coordinator
Driver induction covering route restrictions, school zones, speed limits and community conduct	Before first movement, with refresher every six months	Health, Safety and Environment Representative
Vehicle movement log recording time-stamped route compliance	Every movement	Logistics coordinator
Access road inspection with prompt removal of mud, debris and spillage attributable to project traffic	Daily	Site Supervisor
Engagement with St. Luke's Academy and St Lawrence Composite School on movement schedules and pedestrian safety	Before mobilization, then each term	Community Liaison Officer
Compliance audit of transit windows and speeds	Weekly	Health, Safety and Environment Representative

Any pedestrian near-miss, or any breach of a school-hour transit restriction, triggers immediate suspension of the responsible driver, investigation within 24 hours, and report to the Project Execution Unit.

Communicable Disease Prevention

Table 154: Communicable disease prevention measures

Measure	Frequency	Responsible
Pre-mobilisation health assessment applied consistently with Barbadian law, non-discrimination obligations and the Data Protection Act 2019	Before mobilization	Human Resources Representative
Verification of camp occupancy density and ventilation against the adopted standard	At commissioning, then monthly	Camp Manager
Isolation facility available with defined procedure for suspected communicable disease	Continuous availability	Camp Manager
Recording of camp illness presentations as a leading indicator	Daily recording, monthly reporting	Camp Manager
Worker health education covering respiratory hygiene, sexually transmitted infection prevention and vector protection, delivered in Chinese and English	Induction, with quarterly refresher	Health, Safety and Environment Representative
Food handler certification and periodic health check	Before engagement, then every six months	Camp Manager
Outbreak notification to the Ministry of Health	Within 24 hours of suspicion	Community Health Focal Point
Confidential access arrangements for sexual and reproductive health services	Continuous	Human Resources Representative

Three or more epidemiologically linked cases of the same illness within the camp within seven days constitutes a suspected outbreak and triggers notification, isolation and Ministry of Health engagement.

Sexual Exploitation and Abuse, Sexual Harassment and Gender-Based Violence: Community Interface

This component addresses a priority residual risk. Full arrangements are established in the Sexual Exploitation and Abuse, Sexual Harassment and Gender-Based Violence Prevention and Response Plan, and this Programme delivers the community-facing elements.

Table 155: Sexual exploitation and abuse, sexual harassment and gender-based violence community interface measures

Measure	Frequency	Responsible
Community awareness sessions covering prohibited worker conduct and available reporting channels	Before mobilization, then every six months	Community Liaison Officer
Confidential and anonymous reporting channels accessible to community members as well as workers, including multilingual hotline, anonymous drop boxes and secure email	Continuous	Human Resources Representative and Community Liaison Officer
Survivor referral directory covering medical, psychosocial, legal, police and child protection services	Established before mobilization, verified quarterly	Community Health Focal Point
Separate confidential case register held apart from the general grievance log, with restricted access	Continuous	Human Resources Representative
Non-retaliation protection communicated to workers and community	Induction and community sessions	Human Resources Representative and Community Liaison Officer
Worker induction and refresher on the Code of Conduct, using scenarios of acceptable and unacceptable behavior with community members and covering use of the grievance mechanism including anonymous and confidential reporting	Induction, with quarterly refresher	Health, Safety and Environment Representative

Measure	Frequency	Responsible
Reporting of case numbers and resolution times without identifying detail	Quarterly to the Project Execution Unit	Human Resources Representative

Acknowledgment of a report is confirmed within two working days. Investigation is conducted by an independent gender-sensitive team operating outside normal management lines. Survivors are notified of outcomes and retain a right of appeal.

Food Safety and Zoonoses

Table 156: Food safety and zoonoses measures

Measure	Frequency	Responsible
Kitchen and food storage hygiene inspection	Weekly	Camp Manager
Cold chain temperature verification and logging	Daily	Catering supervisor
Sealed food waste storage with daily removal	Daily	Camp Manager
Integrated rodent control with bait station monitoring at the camp perimeter	Monthly	Pest control provider
Produce washing protocol for the vegetable garden, with night soil prohibited	Continuous	Camp Manager
Camp gastrointestinal illness rate monitoring	Daily recording, monthly review	Camp Manager

Emergency Preparedness and Community Interface

This component addresses a priority residual risk and is delivered together with the Camp Emergency Response Plan.

Table 157: Emergency preparedness and community interface measures

Measure	Frequency	Responsible
Camp Emergency Response Plan defining emergency procedures,	Established before occupation, reviewed annually	Health, Safety and Environment Representative

Measure	Frequency	Responsible
roles and responsibilities, communication protocols, evacuation routes, emergency contacts, training requirements and reporting procedures, and addressing fire in accommodation facilities, severe weather including hurricanes and flooding, wastewater or sewage releases, fuel and hazardous material spills, medical emergencies and disease outbreaks, and security incidents		
Determination of elevation above sea level and the highest point, with establishment and mapping of evacuation routes	Before occupation	Health, Safety and Environment Representative
Evacuation drills with recorded participation	Quarterly	Camp Manager
Emergency contacts table completed, verified and displayed	Verified quarterly	Health, Safety and Environment Representative
Mutual notification arrangements with fire service, ambulance service and police	Established before mobilization, confirmed annually	Community Health Focal Point
Community notification protocol for incidents carrying off-site consequence	Within one hour of occurrence	Community Liaison Officer
Prohibition of smoking in dormitory rooms, cooking restrictions and prohibition of garbage burning	Continuous	Camp Manager
Emergency Response Form completed for every incident	Every incident	Health, Safety and Environment Representative

Health Service Coordination

Table 158: Health service coordination measures

Measure	Frequency	Responsible
On-site first aid and primary care provision sufficient for routine worker health needs	Continuous	Camp Manager
Private medical arrangements for non-emergency worker care	Continuous	Human Resources Representative
Coordination with the receiving polyclinic and the Queen Elizabeth Hospital	Before mobilization, then quarterly	Community Health Focal Point
Recording of worker presentations to public health facilities	Monthly	Human Resources Representative
Review of whether Project demand is displacing community access	Quarterly	Community Health Focal Point
Emergency medical supplies available and accessible, with escalation to hospital where on-site supplies are inadequate	Continuous	Camp Manager

Where a community member is exposed to hazardous material, immediate medical attention is arranged.¹⁴⁴

Health Promotion and Community Outreach

Table 159: Health promotion and community outreach measures

Measure	Frequency	Responsible
Community health information sessions covering vector control, construction safety, reporting channels and works schedules	Before mobilization, then every six months	Community Liaison Officer
School engagement on road safety	Before mobilization, then each term	Community Liaison Officer

¹⁴⁴ Environmental Solutions Ltd., *Barbados Climate Resilient South Coast Water Reclamation Plant (BA-L1063), Updated Environmental and Social Impact Assessment and Environmental and Social Management Plan*, revised 16 April 2024. Community Health and Safety Management at section 9.7; community health concerns recorded in consultation at p. 221; vector-borne disease context at p. 97.

Measure	Frequency	Responsible
Health information materials in plain English, accessible to older residents and persons with disabilities	Distributed at each session	Community Liaison Officer
Regular communication of ongoing works and possible risks, including vector-borne risks, through radio, signage and direct notification	Monthly	Community Liaison Officer
Publication of works schedules enabling businesses and households to plan	Monthly	Community Liaison Officer
Controlled vendor engagement arrangements with transparent communication of access restrictions	Established before mobilization, reviewed quarterly	Community Liaison Officer
Wellbeing enquiry incorporated into engagement and complaint investigation	Continuous	Community Liaison Officer

8.8.3. Communication, Consultation and Grievance Interface

Community access to information and to a functioning complaint channel is a control measure in its own right and is required under Environmental and Social Performance Standard 10. This section establishes how health-related concerns enter the Project Grievance Redress Mechanism, how they are categorized, investigated and closed, and how consultation on health matters is conducted.

Three provisions carry particular weight. Health grievances alleging illness or injury are escalated immediately and investigated as incidents. Sensitive complaints concerning sexual exploitation and abuse, sexual harassment, gender-based violence and child protection follow a separate confidential channel and are excluded from the general log. Channels must be usable by persons who cannot read, cannot travel, or have concerns about identification, with anonymous submission available and operational.

Proactive community health and safety communication is essential and includes advance notification of disruptive/high-risk activities and communication following significant incidents. The Project will maintain an ongoing programme of community health and safety communication to ensure that communities receive timely, accurate and accessible information regarding Project activities that may affect health, safety,

mobility, access to services, or community wellbeing. Table 160 shows triggers/events, primary stakeholders, communication actions and responsibilities.

Table 160: Community Health and Safety Communication Triggers and Responsibilities

Trigger/Event	Primary Stakeholders	Communication Requirement	Responsible Person	Indicative Timeframe	Escalation Requirement
Planned road closure, traffic diversion or major traffic management change	Residents, businesses, schools, healthcare facilities, emergency services	Advance notification describing location, duration, alternative routes and safety precautions	Social Personnel with Contractor Site Representative	Minimum 48–72 hours before implementation, where practicable	Escalate to Project Execution Unit if disruption exceeds planned duration or affects emergency access
Planned high-risk or disruptive activity	Nearby residents, businesses, vulnerable groups	Advance notification of activity, duration, anticipated impacts and mitigation measures	Community Health Focal Point and HSE Representative	Prior to commencement of activity	Escalate significant concerns through Project Execution Unit
Odor or H ₂ S event affecting the community	Nearby residents, businesses, schools, healthcare facilities	Immediate notification where there is potential community exposure, including precautionary measures and contact details	HSE Representative	As soon as practicable following confirmation of the event	Immediate notification to Project Execution Unit; emergency response procedures activated where required
Wastewater overflow, uncontrolled discharge or sewage-related incident	Residents, businesses, schools, healthcare facilities, regulatory agencies	Notification of affected areas, health precautions, restrictions and response actions	HSE Representative and Community Health Focal Point	As soon as practicable after incident identification	Immediate escalation to Project Execution Unit and relevant authorities
Community health-related monitoring exceedance	Potentially affected communities and facilities	Communication of exceedance, implications, corrective actions	HSE Representative	Within 24 hours of confirmation where a	Escalation to Project Execution Unit and

Trigger/Event	Primary Stakeholders	Communication Requirement	Responsible Person	Indicative Timeframe	Escalation Requirement
		and follow-up monitoring		community health impact may occur	management review
Community emergency requiring protective action	All affected stakeholders	Emergency communication including protective instructions and emergency contact information	Incident Controller/Project Manager	Immediate	Managed through emergency response and incident management procedures
Significant incident causing injury, illness, evacuation, loss of service or widespread public concern	Affected communities, authorities and other stakeholders as appropriate	Initial factual notification followed by updates as information becomes available	Project Manager supported by Community Health Focal Point	Initial communication as soon as practicable; subsequent updates as required	Escalation to Project Execution Unit and regulatory authorities in accordance with reporting requirements
Receipt of multiple similar community complaints indicating an emerging health or safety issue	Affected community members	Communication of findings, corrective actions and opportunities for feedback	Social Personnel and Community Health Focal Point	Following preliminary investigation	Escalation to Grievance Redress Committee and Project Execution Unit where systemic issues are identified

Information shall be communicated through channels appropriate to local circumstances, which may include community meetings, notices, flyers, local media, social media platforms, direct stakeholder contact, and communication through community representatives. Materials shall be presented in language and formats accessible to vulnerable and disadvantaged groups. Communication activities will target affected stakeholder groups using methods appropriate to their needs and circumstances. Key stakeholder groups include:

- Residents located adjacent to works areas, haul routes and treatment facilities.
- Businesses and commercial operators that may be affected by access restrictions, traffic changes or service interruptions.
- Schools, childcare facilities and educational institutions located within the area of influence of Project activities.

- Healthcare facilities, pharmacies and emergency service providers.
- Community organisations and local authorities.
- Vulnerable groups, including women, girls, boys, men, youth, older persons, PWDs, migrants, informal workers, and female-headed households.

Communication methods may include public meetings, community briefings, door-to-door notification, information leaflets, posted notices, website and social media updates, local radio announcements, stakeholder liaison meetings, direct telephone contact and electronic messaging services. Selection of methods shall be based on the affected population, urgency of the information and accessibility requirements.

Information communicated to stakeholders shall be clear, accurate and understandable and shall, where relevant, describe:

- The nature and duration of the activity or issue.
- Potential health and safety risks.
- Expected disruptions or restrictions.
- Measures implemented to reduce risks and impacts.
- Actions required by community members, where applicable.
- Contact details for obtaining information or lodging complaints.

The Community Health Focal Point, supported by the Social Personnel and the Health, Safety and Environment Representative, shall be responsible for coordinating community health and safety communications. For incidents, emergencies or monitoring exceedances, communication shall be coordinated with the Project Execution Unit and relevant regulatory authorities as required.

Where a significant community health and safety incident occurs, or where an incident gives rise to substantial public concern, the Project shall provide timely communication to affected communities and relevant stakeholders. Communications should describe the nature of the event, known and potential consequences, immediate protective measures, actions taken by the Project to manage risks, and available channels for obtaining further information. Follow-up communications should be provided as new information becomes available and when corrective or preventive actions have been implemented.

8.8.3.1. Health-Related Grievances

Community health grievances enter through the Project Grievance Redress Mechanism. The following requirements apply in addition to standard handling.

Health-related grievances are categorized using the categories established in the Grievance Redress Mechanism, Table 161, which already provides the category set, the primary focal point and the escalation

pathway for each.¹⁴⁵ This Programme adds no separate category scheme. The correspondence between the health pathways assessed at Section 6 and the existing categories is as follows.

Table 161: Correspondence between health pathways and Grievance Redress Mechanism categories.

Health pathway	Grievance Redress Mechanism category	Primary focal point
CH-01 Vector-borne disease	Occupational Health; Environmental Impacts	HR and HSE; HSE Representative
CH-02 Particulates and respiratory health	Environmental Impacts	HSE Representative
CH-03 Odor, hydrogen sulphide, bioaerosols	Occupational Health; Environmental Impacts	HR and HSE; HSE Representative
CH-04 Noise, vibration, sleep disruption	Worker Influx and Community; Environmental Impacts	Community Liaison Officer; HSE Representative
CH-05 Water, sanitation, gastrointestinal illness	Emergency and Safety; Environmental Impacts	HSE Representative
CH-06 Road traffic injury	Traffic and Mobility	Social Personnel
CH-07 Communicable disease and labor influx	Occupational Health; Worker Influx and Community	HR and HSE; Community Liaison Officer
CH-08 Sexual exploitation and abuse, sexual harassment, gender-based violence	SEA/SH/GBV	HR Representative, survivor-centered team
CH-09 Food safety and zoonoses	Occupational Health; Labor and Welfare	HR and HSE; HR Representative
CH-10 Emergency, disaster and climate events	Emergency and Safety	HSE Representative
CH-11 Health service capacity displacement	Labor and Welfare	HR Representative
CH-12 Wellbeing and livelihood loss	Worker Influx and Community; General Conduct	Community Liaison Officer; Site Supervisors

¹⁴⁵ China Railway Shanghai Engineering Group Co., Ltd., *Grievance Redress Mechanism*, draft incorporating inputs of 7 August 2026. Grievance redress process for general grievances at section 5, Steps I to VI; grievance categories, focal points and escalation pathways at section 5.1, Table 1; specific procedures for workers and for gender-based violence, sexual exploitation and abuse and sexual harassment grievances at section 6; record keeping and monitoring at section 6.5; communication and awareness at section 6.6.

Sexual exploitation and abuse, sexual harassment and gender-based violence complaints, together with child protection matters, follow the confidential channel and are excluded from the general log.

Timeframes and process follow the Grievance Redress Mechanism without variation.¹⁴⁶ Receipt is acknowledged within two working days, and the grievance is logged by the Social Personnel. Merit is assessed through investigation. Tier 1 resolution by the Social Consultant targets seven working days for simple cases; unresolved cases move to Tier 2 with the Grievance Redress Committee comprising the Project Execution Unit, the Contractor and the Supervising Consultant, which aims to resolve within fourteen days; Tier 3 is the legal system, the court being the final authority under Barbadian legislation. Complainants are notified of their right of appeal, and further escalation may be raised to the Barbados Water Authority or to the Inter-American Development Bank through its grievance protocol form.

This Programme adds one health-specific provision to that process. Any grievance alleging illness or injury attributable to the Project is escalated immediately to the Health, Safety and Environment Representative and the Community Health Focal Point on receipt, investigated as an incident under Section 15.1, and reported to the Project Execution Unit, in place of the standard Tier 1 timeline. Grievances are recorded on the standard Grievance Redress Mechanism form.

Channels are accessible to persons who cannot read, cannot travel, or have concerns about identification, and anonymous submission is available and operational.

8.8.3.2. Consultation

Public consultation on the Environmental and Social Impact Assessment documentation is held before commencement of works, with health content presented in accessible form. Consultation logistics follow the arrangements established for the Project, covering scheduling, venue reservation, written and oral invitations, materials, attendance records, and preparation of a Public Consultation Report annexed to the Environmental and Social Impact Assessment and Management Plan, with suggestions incorporated into the final document and publication on the Barbados Water Authority and Inter-American Development Bank websites.¹⁴⁷

Health findings in this Assessment are validated with affected residents through the consultation scheduled at Section 15, with separate arrangements to hear from women, older persons and persons with disabilities.

Consultation is supplemented by ongoing community engagement during Project implementation. Community health and safety information shall be communicated throughout the works period rather than solely during formal consultation events. Feedback received through routine engagement activities,

¹⁴⁶ China Railway Shanghai Engineering Group Co., Ltd., *Grievance Redress Mechanism*, draft incorporating inputs of 7 August 2026. Grievance redress process for general grievances at section 5, Steps I to VI; grievance categories, focal points and escalation pathways at section 5.1, Table 1; specific procedures for workers and for gender-based violence, sexual exploitation and abuse and sexual harassment grievances at section 6; record keeping and monitoring at section 6.5; communication and awareness at section 6.6.

¹⁴⁷ Fajardo, S., *Environmental Report No. 004, Revision 02: Review of CRSEG ESIA/ESMP for Workers' Campsite Version 2B*, South Coast Water Reclamation Project Environmental Management System, reference SCWRP-EMS-ER-002, issued 10 July 2026, approved 22 July 2026. Omission of noise and ecosystem services from the environmental baseline at item 4, p. 1; naming of Graeme Hall Swamp at item 10, p. 2; water sampling methodology at items 19 to 21, pp. 4 to 5; identification and prioritization of ecosystem services at item 23, p. 6; impact rating methodology and risk level interpretation at items 31 to 34, pp. 8 to 9; waste definitions and categories at item 43, p. 12; consultation logistics at item 49, p. 13; field work representativeness at item 50, p. 14.

community meetings, stakeholder discussions, health-related enquiries and grievances shall be reviewed periodically to identify emerging concerns and opportunities for improvement of community health and safety measures.

Records will be maintained of notifications issued, consultation activities undertaken, issues raised by stakeholders, commitments made by the Project, and actions taken in response. Information generated through monitoring, incident investigations and grievance analysis shall be used to adapt communication approaches and consultation priorities over the life of the Project.

8.8.4. Training and Capacity Building

Training is the mechanism through which the commitments in Section 11 reach the individuals whose conduct determines whether they are met. This section sets out the community health training requirement across six audiences, from the workforce as a whole to community members themselves.

The requirement operates within the Contractor's wider Safety Education and Training Plan, which establishes a three-tier pre-job structure applied to all incoming personnel before site access is granted.¹⁴⁸ Project-level training of four hours covers Barbados health, safety and environment regulations, emergency response procedures and evacuation routes, environmental protection requirements, gender-based violence, and prevention of communicable and occupational diseases. Crew-level training of four hours covers hazard identification, safe operating procedures, correct use of personal protective equipment and basic first aid. Position-level training of two hours covers job-specific risks. Each tier requires a post-training assessment, and personnel who do not pass are prohibited from entering the worksite.¹⁴⁹

Three features of that structure carry community health significance. Gender-based violence and communicable disease prevention are already embedded at project level and reach every person entering the site, which provides the delivery route for the community-facing content at Sections 11.7 and 11.8. Assessment is mandatory and failure excludes a worker from site, so community health obligations are enforceable at induction. Training records comprising attendance registers, assessment papers, score summaries and photographic evidence are retained as compliance documentation, and these satisfy the disaggregated reporting required under the contractual metrics.¹⁵⁰

Daily toolbox talks are maintained without exception and monthly themed sessions are adjusted to reflect works progress, including seasonal topics during the rainy season.¹⁵¹ These provide the vehicle for reinforcing

¹⁴⁸ China Railway Shanghai Engineering Group Co., Ltd., *Safety Education and Training Plan*, 2026. Three-tier pre-job training structure at section I.1, including the Training Plan Table for pre-job three-tier training; specialized training requirements at section I.2; daily toolbox talks and monthly themed sessions at section I.3; site conduct requirements at section II.1.1.

¹⁴⁹ China Railway Shanghai Engineering Group Co., Ltd., *Safety Education and Training Plan*, 2026. Three-tier pre-job training structure at section I.1, including the Training Plan Table for pre-job three-tier training; specialized training requirements at section I.2; daily toolbox talks and monthly themed sessions at section I.3; site conduct requirements at section II.1.1.

¹⁵⁰ China Railway Shanghai Engineering Group Co., Ltd., *Safety Education and Training Plan*, 2026. Three-tier pre-job training structure at section I.1, including the Training Plan Table for pre-job three-tier training; specialized training requirements at section I.2; daily toolbox talks and monthly themed sessions at section I.3; site conduct requirements at section II.1.1.

¹⁵¹ China Railway Shanghai Engineering Group Co., Ltd., *Safety Education and Training Plan*, 2026. Three-tier pre-job training structure at section I.1, including the Training Plan Table for pre-job three-tier training; specialized training requirements at section I.2; daily toolbox talks and monthly themed sessions at section I.3; site conduct requirements at section II.1.1.

vector control during wet-season breeding conditions and traffic discipline during periods of intensive haulage.

The community health training requirement is as follows.

Table 162: Training programme.

Audience	Content	Frequency	Records
All workers	Community health obligations; vector control; waste discipline; traffic controls and school zones; Code of Conduct community provisions; use of the grievance mechanism including anonymous reporting	Induction before site access, with quarterly refresher	Attendance register, disaggregated and reported to the Project Execution Unit
Drivers	Route restrictions, school-hour prohibitions, speed limits, pedestrian awareness, community conduct	Before first movement, refresher every six months	Driver competency record
Supervisors and foremen	Recognition and immediate reporting of community-affecting incidents; complaint handling; supervisory accountability for worker conduct	Before appointment, then annually	Competency record
Catering staff	Food hygiene, cold chain, waste handling, illness reporting	Before engagement, then every six months	Certification record
Health, safety and environment and community liaison personnel	Community health monitoring methods; incident investigation; survivor-centered handling	Before appointment, then annually	Training record

Audience	Content	Frequency	Records
Community members	Vector source reduction; construction safety; reporting channels; conduct expectations of workers	Before mobilization, then every six months	Session record

Training is delivered in languages understood by participants. Written material for the workforce is provided in Standard Chinese and English, spoken delivery is provided in the spoken varieties confirmed under verification action BV-12 with interpretation where required, and community sessions are conducted in accessible plain English.¹⁵² Records specify frequency type, distinguishing induction from refresher, and are available for inspection as stipulated by the Labor Laws of Barbados. Training structure and trainer competency are shared with the Project Execution Unit before each training exercise.¹⁵³ Daily toolbox talks reinforce key risks, lessons from incidents and complaints, and expectations for respectful engagement with community members.¹⁵⁴

14. Monitoring, Indicators and Reporting

Monitoring converts the commitments in Section 11 into evidence. This section establishes twenty-one key performance indicators, set out at Table 163, together with the reporting cycle at Table 164.

Indicators are drawn directly from the Programme components, and each specifies a measurement method, a target, a responsible role and a frequency, addressing the requirement that monitoring identify who, what, where, when and how. Indicators fall into three groups. Compliance indicators measure whether a specified control was applied, such as elimination of breeding sites within 24 hours or the absence of heavy vehicle movements in restricted school-hour windows. Outcome indicators measure the environmental or health result, such as exceedances at community receptors or camp illness rates. Process indicators measure delivery of the supporting programme, including training, drills, grievance closure and completion of baseline verification.

Reporting is structured to feed the contractual environmental, social, health and safety metrics and is disaggregated by gender where the metric permits.

¹⁵² BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labour Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

¹⁵³ BrinsJen Systems Development Specialists, *The Workers' Code of Conduct of China Railway Shanghai Engineering Group*, Version 2.0, July 2026. Alignment with IDB Performance Standards at section 1; child protection and the Labour Laws Chapter 346 definition at section 4.5; health and safety requirements and the Safety and Health at Work Act at section 4.6; compliance with laws at section 5; data protection at section 5.5; training and language requirements at section 8.6; the Community Liaison Officer role at section 3.3.1.

¹⁵⁴ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labour force data at p. 294; schools identified at pp. 292 and 335.



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8.8.5. Key Performance Indicators

Table 163: Community health key performance indicators.

Reference	Indicator	Measurement method	Target	Responsible	Frequency
KPI-01	Vector breeding sites identified and eliminated within 24 hours	Inspection record	100 percent	Camp Manager	Weekly
KPI-02	Vector index relative to established baseline	Larval and adult survey	No increase above baseline	Vector control provider	Monthly
KPI-03	Exceedances of particulate matter guideline values at community receptors	Continuous monitoring log	Zero	Health, Safety and Environment Representative	Monthly
KPI-04	Visible dust migration beyond the site boundary	Daily inspection	Zero events	Health, Safety and Environment Representative	Daily
KPI-05	Hydrogen sulphide alarm exceedances	Continuous monitoring	Zero	Health, Safety and Environment Representative	Monthly



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Reference	Indicator	Measurement method	Target	Responsible	Frequency
KPI-06	Odor complaints received and closed within seven days	Grievance log	Downward trend, 100 percent closed	Community Liaison Officer	Monthly
KPI-07	Noise exceedances at residential and school boundaries against World Health Organization Community Noise Guideline values	Monitoring record	Zero exceedances	Health, Safety and Environment Representative	Monthly
KPI-08	Effluent and receiving water compliance	Laboratory results	100 percent compliant	Health, Safety and Environment Representative	Monthly
KPI-09	Potable water compliance at camp point of use	Laboratory results	100 percent compliant	Health, Safety and Environment Representative	Monthly
KPI-10	Heavy vehicle movements within restricted school-hour windows	Movement log audit	Zero	Health, Safety and Environment Representative	Weekly



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Reference	Indicator	Measurement method	Target	Responsible	Frequency
KPI-11	Speed compliance on the community access route	Audit record	100 percent	Health, Safety and Environment Representative	Weekly
KPI-12	Traffic incidents and pedestrian near-misses involving Project vehicles	Incident register	Zero	Health, Safety and Environment Representative	Immediate and monthly
KPI-13	Camp illness presentations per 100 occupants	Camp health record	Below outbreak threshold	Camp Manager	Monthly
KPI-14	Suspected outbreaks notified to the Ministry of Health within 24 hours	Notification record	100 percent	Community Health Focal Point	Per event
KPI-15	Workers inducted on community health obligations before site access	Training register	100 percent	Health, Safety and Environment Representative	Monthly
KPI-16	Community health grievances closed within target time	Grievance log	90 percent or above	Community Liaison Officer	Monthly



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Reference	Indicator	Measurement method	Target	Responsible	Frequency
KPI-17	Cases received and resolution times under the confidential channel, without identifying detail	Confidential register	Response within protocol	Human Resources Representative	Quarterly
KPI-18	Emergency drills completed against schedule	Drill record	100 percent	Camp Manager	Quarterly
KPI-19	Emergency contacts table complete and verified	Verification record	100 percent	Health, Safety and Environment Representative	Quarterly
KPI-20	Community health outreach and consultation sessions delivered against schedule	Session records	100 percent	Community Liaison Officer	Per schedule
KPI-21	Baseline verification actions completed	Verification register at Section 5.7	100 percent by the scheduled date	Community Health Focal Point	Monthly until complete

8.8.6. Reporting

Table 164: Reporting schedule.

Report	Content	Recipient	Frequency
Daily inspection record	Particulates, waste, standing water, traffic control, road condition	Internal	Daily
Monthly community health report	All indicators; grievance analysis by category; incidents; corrective actions; baseline verification status	Project Execution Unit	Monthly
Quarterly progress report	Community health section integrated with contractual environmental, social, health and safety metrics	Project Execution Unit and Inter-American Development Bank	Quarterly
Incident report	Any incident carrying actual or potential community health consequence	Project Execution Unit within 24 hours, full report within five working days	Per event
Outbreak notification	Suspected communicable disease outbreak	Ministry of Health within 24 hours, Project Execution Unit concurrently	Per event
Annual Programme review	Effectiveness assessment, trend analysis, revision recommendations	Project Execution Unit and Inter-American Development Bank	Annually

Reporting is disaggregated by gender where the metric permits, consistent with contractual reporting requirements.¹⁵⁵

¹⁵⁵ Standard Bidding Document for Design and Build of Civil Works, Barbados Climate Resilient South Coast Water Reclamation Project: Section V Bidding Forms, including Form ESHS, Form CCESHS and Form LSER; Section VI Employer's Requirements, Environmental, Social, Health and Safety Requirements, listing the required management plans and the minimum content for the Contractor ESHS Framework and Code of Conduct; Section VIII Particular Conditions of Contract, Part C, ESHS metrics for progress reports, and Part D, Contractor's Code of Conduct.

8.8.7. Corrective Action and Adaptive Management

While monitoring under Section 14 produces findings only if those findings alter practice, this section provides practical implications and next steps to establish what happens when a control fails, a complaint is received, or an incident occurs.

Section 14 establishes what is measured, by whom and how often. This section establishes what happens next. The indicators, inspections and grievance records described there generate findings continuously through construction, and those findings carry value only where they trigger a defined response. The arrangements below convert a monitoring result, a complaint or an incident into an investigation, a corrective action with a named owner, and a verified closure, and they identify the circumstances in which work stops while that process runs.

It sets out a six-stage corrective action process from detection through to verified closure, the circumstances in which work is suspended pending investigation, and the conditions under which the Programme itself is revised. The work stoppage triggers at Section 15.2 correspond to the escalation points identified in the Programme components and represent the threshold at which continued operation would present ongoing exposure.

Corrective Action Process

Detection occurs through monitoring, inspection, grievance, incident or external notification. Immediate control suspends the causal activity where continued operation presents ongoing exposure. Investigation is completed within 48 hours for health complaints and within 24 hours for incidents involving injury or potential outbreak, addressing immediate causes, underlying causes, and whether work methods, traffic arrangements, camp management, stakeholder communication or emergency preparedness require change.¹⁵⁶ Corrective and preventive actions are documented with a named owner and completion date. Closure is confirmed by the Health, Safety and Environment Representative, with effectiveness verified at the next monitoring cycle. Reporting follows Section 13.2, with serious matters reported to the Project Execution Unit immediately.

Work Stoppage Triggers

Work is suspended pending investigation where visible dust migrates beyond the boundary toward a residential or school receptor; where hydrogen sulphide exceeds the alarm threshold at a monitored location; where a pedestrian near-miss occurs involving a Project vehicle; where a wastewater or chemical release carrying community exposure potential occurs; where a suspected communicable disease outbreak is identified within the camp; or where a heavy vehicle transits the community during a restricted school-hour window.

Adaptive Management

The Programme is revised where monitoring shows a control to be ineffective, where grievance trends indicate an unaddressed pathway, where an incident reveals a gap, where Project scope or schedule changes

¹⁵⁶ BrinsJen Systems Development Specialists, *Workers' Camp Environmental and Social Impact Assessment and Environmental and Social Management Plan*, Version 2B, prepared for China Railway Shanghai Engineering Group Co., Ltd., 2026. Community Health and Safety Plan at pp. 270 to 274; campsite occupancy and layout at p. 37; nearest residential receptor at p. 5; air quality sampling parameters and locations at p. 121; demographic profile at p. 292; language and labor force data at p. 294; schools identified at pp. 292 and 335.



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materially, or where completion of baseline verification alters the assessed significance of an impact. Revisions are recorded in the document control table and notified to the Project Execution Unit.

8.9. Social management plan

The Social Management Plan is a tool that is utilized by development practitioners to control, minimize, and/or mitigate the potential social risks and impacts identified during project scoping analysis.

The SIA identified social impacts. In response, the social management plan has been developed to address the anticipated negative social impacts identified in the SIA. The social management plan sets out the procedures that will be undertaken by the project to circumvent the potential impacts.

Social impacts are anticipated during the construction and operational phases of the project. Construction phase impacts are deemed to be temporary or reversible. Much of the operational phase impacts can be mitigated through awareness of the potential impacts, research on best practices, and prudent implementation and monitoring of mitigation measures in the development of the workers Camp.

8.9.16. Companion documents and related management plans

A number of the measures relied upon in this Social Management Plan are set out in full in companion documents prepared alongside this ESIA/ESMP rather than reproduced here. This is deliberate: duplicating the same commitment in two documents creates version drift and makes it impossible to tell which text governs. The table below records each companion document, who owns it, its status at the date of this submission, what this ESIA/ESMP relies on it for, and where it is cross-referenced. Where a companion document is still in draft, the commitment in this ESIA/ESMP stands and the companion document elaborates it; where the two differ, this ESIA/ESMP governs until the companion document is approved by the Project Execution Unit.

Table 165: Companion documents relied upon by this ESIA/ESMP

Document	Owner	Status at 8 August 2026	What this ESIA/ESMP relies on it for	Where cross-referenced for
Labour Management Plan	Contractor (CRSEG), prepared with SAEDI Consulting	Draft issued 8 August 2026	Workforce profile and composition; recruitment and employment conditions; worker welfare and accommodation standards; occupational health and safety; working hours, wages, rest days and freedom of association; provisions for foreign workers including immigration compliance, accommodation standards, equal protection and translation.	Social Management Plan; Social Impact Assessment Matrix rows for Workers' Rights, Discrimination in hiring, Gender Pay Gap and Unfair Treatment.
Workers' Code of Conduct	Contractor (CRSEG)	Version 2, under revision	Mandatory standards of behaviour for all workers, subcontractors, security personnel and service providers; prohibition of sexual harassment, sexual exploitation and abuse and gender-based	Social Management Plan; SH/SEA/GBV provisions; Community Health and Safety Plan; Worker Influx Management Plan.

Document	Owner	Status at 8 August 2026	What this ESIA/ESMP relies on it for	Where cross-referenced for
			violence; disciplinary framework; induction and periodic refresher training with attendance records; display at prominent worksite locations in languages commonly spoken; signed worker declaration.	
Grievance Redress Mechanism	Contractor (CRSEG), with the Project Execution Unit	Draft issued 7 August 2026	Channels and protocols for workers, community members and other stakeholders; process flow and response timelines; membership of the Grievance Committee; escalation route beyond initial acknowledgement; grievance form and register templates; confidential survivor-centered pathway for SH/SEA/GBV cases; protection from retaliation.	Grievance section of this document; Stakeholder Engagement; Social Management Plan; Traffic Management Plan.
SH/SEA/GBV Prevention and Response Plan	Contractor (CRSEG), with the Project Execution Unit	Draft issued 7 August 2026	The standalone management framework required by IDB Annex 1, comprising confidential reporting channels, survivor-centered referral arrangements, sanctions and disciplinary framework, monitoring and reporting indicators, and training and awareness requirements with records of participation; referral pathway mapping with named services and contact details.	Social Impact Assessment Matrix row for SH/SEA/GBV; Grievance section; Community Health and Safety Plan; Code of Conduct.
Stakeholder Engagement Plan	Contractor (CRSEG)	Inputs issued 7 August 2026	Stakeholder identification and analysis disaggregated into women's groups, youth groups, organizations of persons with disabilities, farmers' associations, non-governmental and civil society organizations and GBV support service providers; gender-sensitive and inclusive engagement methods covering meeting times, safe spaces and accessible venues; engagement calendar by project phase; disclosure and feedback arrangements.	Stakeholder Engagement section; Social Management Plan; Grievance section.
Community Health Assessment and Community Health Programme	Project Execution Unit with SAEDI Consulting	Draft under preparation	Community health baseline for the area of influence; assessment of wastewater exposure pathways and vector-borne disease; capacity of local health services	Community Health and Safety Plan; Social Baseline; Social Impact Assessment Matrix row

Document	Owner	Status at 8 August 2026	What this ESIA/ESMP relies on it for	Where cross-referenced for
			and referral arrangements; health monitoring indicators.	for Community Health Risks.
Critical Habitat Assessment and Biodiversity Action Plan	To be commissioned under the SCSTP and SCWRRF Studies Report	Drafting due 27 September 2026; finalization 15 October 2026	Critical habitat determination for the Graeme Hall interface; verification and refinement of the priority ecosystem services identified in this document; biodiversity mitigation and monitoring commitments.	Biological Environment chapter; Ecosystem Services of the Workers' Campsite Area; Social Impact Assessment Matrix.
Workers' Health and Safety Manual (corporate)	Contractor (CRSEG)	Issued; to be annexed to this ESIA/ESMP	The corporate occupational health and safety framework applying to all CRSEG operations and activities, which applies in full to camp personnel alongside the camp-specific plans in this document.	Workers' Health and Safety Plan; Emergency Response Plan.

The Social Management Matrix later in this chapter names a number of plans that do not appear as separate sections of this document. For the avoidance of doubt, each sits within one of the instruments above or within this ESIA/ESMP, as follows. The Health Plan, Project Health Plan and Health Management Plan are delivered through the Workers' Health and Safety Plan and the Community Health and Safety Plan of this document, with the community-facing elements drawn from the Community Health Assessment. The Communication Plan and Social and Cultural Engagements are delivered through the Stakeholder Engagement Plan. The Project Utility and Consumption Management Plan is delivered through the camp description and the resource efficiency provisions of this ESIA/ESMP. The Hiring Plan and Recruitment Plan are delivered through the Labour Management Plan, as is the Gender Sensitive Construction and Site Plan. The Inflation Management Plan and Housing Plan are delivered through the Worker Influx Management Plan at Appendix 4. The Cultural Integration Training and Onboarding Plan is delivered through the induction and training requirements of the Workers' Code of Conduct. The SGBV Management Plan is the SH/SEA/GBV Prevention and Response Plan listed above. No plan named in the Social Management Matrix is without an owner or a home.

8.9.17. Mitigations of Impacts (Design Phase)

There are no anticipated impacts to the environment during the design phase of the project. As a result, mitigation measures are not defined for this phase of the Project.

The mitigation and monitoring commitments of this Social Management Plan are set out at Table 108. Each row is keyed to the corresponding row of the Social Impact Assessment Matrix at Part A and Part B, so that a commitment can be traced to the impact it answers and to the residual rating it is relied upon to achieve. Commitments are expressed as obligations of the Contractor unless another party is named. Where an

indicator cannot yet be measured because baseline data is outstanding, the row says so and the dependency is carried at Part D.

8.9.18. Social mitigation matrix

Table 106 sets out, for each row of the Social Impact Assessment Matrix, the mitigation commitment relied upon, the indicator against which delivery is verified, the timing and frequency, and the party responsible.

Table 166: Social Management Matrix

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
A1.1	Congestion and delay on the community road and at the junction with the highway	The Contractor shall implement a Traffic Management Plan approved by the PEU and the BWA covering haul routes, peak-hour restrictions, signage, flaggers and temporary diversions. Movement windows shall avoid school travel times. Access for residents, businesses and emergency vehicles shall be maintained at all times except for short pre-notified closures. Should be agreed and periodically reviewed with the CLO and community representatives.	Complaints logged through the GRM; disaggregated; record of quarterly movement-window reviews	Plan approved before mobilization; windows reviewed quarterly and on any change to the delivery schedule	Contractor; PEU; Supervising Consultants; law enforcement (traffic)
A1.2	Vehicular accidents involving workers, community members or pedestrians	All drivers shall be briefed and inducted on speed limits, haul routes, reversing, pedestrian awareness and fatigue management including	Incidents and near-misses reported to the PEU immediately; driver-behaviour complaints in the GRM; disaggregated; disciplinary records	Induction before first site access, refreshed annually; incidents reported immediately	Contractor; PEU; Supervising Consultants; law enforcement (traffic)

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		instruction on zero-tolerance for SH/SEA/GB towards community members consistent with the Code of the Conduct. Trained flaggers in high-visibility PPE shall be stationed at high-risk junctions and near schools, businesses and churches. Movement shall be restricted from 14:30 to protect school children. Vehicles shall be inspected and maintained in safe working order and drivers shall be fit for duty. Random drug and alcohol testing shall apply to employees and subcontractors.	under the Code of Conduct		
A2.1	Interruption to water, electricity or telecommunication s serving nearby households and businesses	The Contractor shall agree a utilities management schedule with each operator before work begins, covering risks, planned outages and restoration procedures. Planned outages shall be notified in advance through the Stakeholder Engagement Plan and sequencing shall minimize disruption to	Log of outages and restoration times; outage-related complaints through the GRM	Schedule agreed before work begins; outage log reported monthly to the PEU	Contractor; PEU; Supervising Consultants; utility operators

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		critical users. Unplanned disruptions shall be reported and addressed through the GRM.			
A2.2	Increased demand on water, electricity, health care, waste services and housing	The camp shall be operated for self-sufficiency in water, power and sanitation so far as practicable, under a utility consumption and management plan. On-site primary care shall be provided under the project health plan so that workers do not displace community access to health services. Worker transport shall be provided to reduce local pressure.	Consumption against the pre-construction baseline; workforce numbers against the assumed peak of 120 residents and 252 on site; GRM complaints	Consumption monitored monthly and reported quarterly; reviewed if the workforce exceeds the assumed peak	Contractor; PEU; Supervising Consultants
A3.1	Fugitive dust affecting nearby residences, farmland and the Ministry of Agriculture office	The Contractor shall adhere to EPD dust parameters and implement a dust suppression management plan covering watering of haul routes and stockpiles, covered loads, wheel-wash and speed restrictions. Cleared areas shall be progressively stabilized. Works shall be suspended in high wind where suppression cannot be maintained. Inform nearby households and	Daily visual inspection record; particulate monitoring at the nearest receptor; dust complaints in the GRM	Daily during earthworks; instrumental monitoring at defined construction stages	Contractor; PEU; Supervising Consultants

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		communities of dust control measures and complaint channels through the GRM.			
A3.2	Disruption to daily routines, access, trading and community events	The Contractor shall publish a disruption schedule under the community engagement and communication plan, schedule disruptive activities in off-peak hours, and adjust scheduling around religious, school and community events where feasible. Disruptions shall be reported through the GRM. Adjusted where feasible to limit impacts on peak times and caregiving routines.	Notice issued against the seven-day requirement; attendance at community meetings; disaggregated; complaints in the GRM disaggregated	At least seven days advance notice of planned disruption; community meetings quarterly	Contractor; PEU; Supervising Consultants
A3.3	Noise disturbance at the nearest residential receptors, including overnight generator operation	The Contractor shall adhere to EPD parameters and implement the Noise Management Plan, including acoustic screening of generators, restrictions on night-time plant operation, selection of lower-noise equipment and maintenance of silencers. Worker exposure shall be controlled under the Workers' Health and Safety Plan.	Measured levels against 55 dBA by day and 45 dBA at night at the nearest receptor; complaints in the GRM. A night-time baseline has not yet been measured and is required before the residual rating can be confirmed.	Continuous at Location 3 and on complaint; night-time baseline before generator operation begins	Contractor; PEU; Supervising Consultants

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
A4.1	Localised price escalation for food, goods, services and rental accommodation	Local procurement shall be prioritized where quality and safety standards can be met, unit costs are competitive and procurement does not cause significant price escalation for local consumers. A housing plan shall limit competition for local rental stock. Inflation shall be monitored against a pre-construction price baseline for key commodities. Consider the potential impact on women-headed and low-income renter households	Proportion of goods and services procured locally; price trend for key commodities against the baseline. The baseline has not yet been established. Price trends.	Baseline before mobilization; procurement and price trends reported quarterly	Contractor; PEU; Supervising Consultants
A4.2	Economic contraction at the end of construction as spending and employment cease	The Contractor shall deliver transferable training under the Local Skills Development and Inclusion Plan, give advance notice of demobilization timelines, and encourage supplier diversification so that local businesses are not dependent on a single contract.	Number of workers completing accredited training; proportion of suppliers with non-project revenue including the share of women-owned suppliers where feasible	Notice of demobilization timelines at least one quarter in advance; training completions reported at demobilization	Contractor; PEU; Supervising Consultants
A5.1	Labour influx effects on community cohesion, social dynamics and	The Contractor shall implement the Worker Influx Management Plan together with the Code of Conduct,	Grievances by category and origin disaggregated; workforce numbers and nationality mix. Numbers and	Plan in force from mobilization; grievances reviewed monthly; plan reviewed on material change to	Contractor; PEU; Supervising Consultants

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
	worker-community friction	the GRM, the Stakeholder Engagement Plan and the Labour Management Plan, including a worker-community interaction protocol, prioritized local hiring with targets where applicable, a community awareness and outreach plan, and a multilingual communication strategy. Recruitment shall take place at recruitment offices rather than at the project site. Use gender-sensitive and inclusive methods including separate or safe spaces for women and girls to express concerns (data disaggregated) and monitoring of participation in meetings	nationality breakdown remain to be confirmed by the Contractor.	the workforce or camp occupancy	
A5.2	Communicable and vector-borne disease, biological aerosols and hydrogen sulphide exposure	The Contractor shall implement the health management plan and the Community Health and Safety Plan, including specific assessment and control of wastewater exposure pathways, heat stress prevention with hydration and	Health surveillance records; incident reports to the PEU; standing-water inspections. Monitoring requirements are provisional until the Community Health Assessment reports.	From mobilization; health surveillance continuous; incidents reported immediately	Contractor; PEU; Supervising Consultants; local health authorities

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		rest-break scheduling, vector control and elimination of standing water, coordination with local health authorities, and worker awareness training.			
A5.3	Adverse effects on community cohesion, sense of security and public confidence in the project	The Contractor shall deliver cultural integration training and onboarding for all workers, structured social and cultural engagement with the community, and a Stakeholder Engagement Plan using gender-sensitive and inclusive methods regularly seek feedback on perceived safety and project acceptance. GRM outcomes shall be reported back to the community.	Grievance volume and sentiment; community meeting records disaggregated	From mobilization; grievances reviewed monthly; community meetings quarterly	Contractor; PEU; Supervising Consultants
A6.1	Sexual harassment, sexual exploitation and abuse, and gender-based violence in the community	The Contractor shall implement the standalone SH/SEA/GBV Prevention and Response Plan, with confidential reporting channels, survivor-centered referral, a sanctions and disciplinary framework, monitoring indicators and training records.	Code of Conduct signatures against headcount; training attendance by worker category disaggregated; confidential case register and referrals, reported in aggregate only	Signature before site access; induction before first shift with quarterly refreshers; serious cases reported to the PEU immediately; aggregate reporting monthly	Contractor; PEU; Supervising Consultants; law enforcement

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		Signature of the Code of Conduct shall be a condition of site access and the Code shall be displayed in the languages commonly spoken on site. Induction training shall be mandatory, with refreshers for workers, supervisors, subcontractors and security personnel. The referral pathway to health, police, shelter, hotline and legal aid services shall be verified and kept current. Include community awareness activities so that women and other vulnerable groups know the Code of Conduct and GRM			
A6.2	Physical, psychological or sexual harassment of workers by other workers, supervisors or security personnel	The Contractor shall maintain a written anti-harassment policy meeting the requirements of the Employment Sexual Harassment (Prevention) Act, 2017 and the Employment (Prevention of Discrimination) Act, 2020, extending to subcontractors, security personnel and service providers. Training shall be mandatory	Training attendance records disaggregated; GRM cases handled under the survivor-centered protocol	Induction before first shift with periodic refreshers; grievances reviewed monthly	Contractor; PEU; Supervising Consultants; law enforcement

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		at induction with periodic refreshers and attendance records. Psychosocial hazards shall be included in the hazard identification and risk assessment. Recognize the heightened risks for women and vulnerable groups and implement the GRM including confidential reporting options and access to social support services			
A7.1	Unfair treatment and discrimination on protected grounds	The Contractor shall apply a non-discrimination and equal opportunity policy consistent with Barbadian law, a Code of Conduct with a clear disciplinary procedure, and training for supervisors and workers on respectful behaviour and diversity. The GRM shall be accessible and confidential with protection from retaliation. These requirements shall be flowed down into every subcontract.	Grievances disaggregated by ground of complaint; disciplinary outcomes recorded and reported, with anonymized analysis of trends	From recruitment; grievances reviewed monthly; outcomes reported to the PEU	Contractor; PEU; Supervising Consultants; law enforcement
A7.2	Engagement of persons below the legal working age,	The Contractor shall verify age at recruitment against	Register of Young Persons; PEU audit of recruitment	At every recruitment; records audited by	Contractor; PEU; Supervising

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
	boys and girls may be at risk	official identity documents and maintain a Register of Young Persons. Compliance with national law and international standards shall be an express contractual obligation of every contractor and subcontractor, with defined sanctions for breach including termination. Hiring managers shall be trained.	records; any suspected case referred to the competent authority	the PEU quarterly; suspected cases reported immediately	Consultants; law enforcement
A7.3	Discriminatory recruitment practices excluding women, persons with disabilities or other groups	The Contractor shall use written job descriptions and a documented selection process with non-discriminatory criteria consistent with Barbadian legislation, standardized scoring at shortlist and interview, and retention of recruitment records for audit. Vacancies shall be advertised through local media, accredited technical and vocational institutions and routes that reach women.	Applications, shortlists and appointments disaggregated by sex and role; any pattern of exclusion investigated and corrective action documented	At every recruitment round; outcomes reported quarterly	Contractor; PEU; Supervising Consultants
A7.4	Differential pay between women and men	Pay shall be set by skills, qualifications and competencies against	Pay equity ratio by job grade; pay-related grievances	Grades set before recruitment; pay equity reported	Contractor; PEU; Supervising Consultants

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
	performing work of equal value	documented grades, and benchmarked against national labor market and construction sector rates rather than assumption. Pay-related grievances shall be handled through the GRM and payroll and HR records shall be available for audit. Implement corrective action with clear timelines if audits identify unjustified differences	disaggregated by sex	quarterly; wage audit annually	
A8.1	Breach of workers' rights on hours, overtime, wages, rest days, freedom of association and living conditions	The Contractor shall implement the Labour Management Plan covering PPE and amenities, fair and timely remuneration through accessible means, working hours and overtime limits, rest periods and rest days, freedom of association, and decent working and living conditions. Every worker shall hold a written contract in a language they understand, and conditions of work shall be posted at the site. Ensure the living and working conditions meet the needs of both women and men	Worker grievances disaggregated; HR, payroll and contractor employment register; unannounced inspections of camp conditions	From engagement; records reviewed monthly by the PEU; inspections unannounced	Contractor; PEU; Supervising Consultants

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
A8.2	Communication failure affecting worker safety, community engagement and access to the GRM	The Contractor shall implement a multilingual communication strategy as required by the IDB, engage interpreters in adequate number, and translate safety procedures, the Code of Conduct and GRM materials into the languages commonly spoken on site, including a Chinese-language worker declaration. Signage shall be pictorial as well as textual and all training shall be delivered in a language the worker understands. Consider nationality, gender and literacy differences and use oral and visual channels to effectively reach workers	Translation coverage against the workforce language profile; proportion of training delivered in language. The language profile has not yet been provided. Proportion of workers who can understand and describe how to access the GRM.	Translation in place before mobilization; coverage confirmed once the language profile is provided	Contractor; PEU; Supervising Consultants
B1.1	Creation of employment and transferable skills for residents of the area of influence	The Contractor shall operate a hiring plan prioritizing local recruitment on transparent terms, and a Local Skills Development and Inclusion Plan identifying training opportunities for women, youth, persons with disabilities and	Jobs created disaggregated by sex, skill level and contract type, distinguishing temporary construction roles from longer-term operational roles. Percentage of women in total workforces and in technical roles	Throughout construction and into operation; reported quarterly	Contractor; PEU; Supervising Consultants

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		other vulnerable groups, with accredited training where feasible.			
B1.2	Beneficial supply, offtake or service agreements with defined stakeholder groups	The BWA and the PEU shall define which groups are engaged including women farmers, women-owned businesses and youth groups and on what terms under the Stakeholder Engagement Plan and shall record and report benefit-sharing commitments.	Agreements concluded and the groups party to them. The groups and terms are not yet defined. Identify women-led or women-owned where feasible	Groups and terms defined before operation; agreements reported annually	BWA; PEU; Contractor; PEU; Supervising Consultants
B2.1	Increased availability of reclaimed water for irrigation in designated agricultural zones	The BWA shall allocate reclaimed water equitably and sustainably to identified agricultural users, in coordination with the Ministry of Agriculture, Food and Nutritional Security. Groups engaged shall include women farmers, women-owned business and agreements designed and accessible to them	Volumes allocated and users served	Operation; reported annually	PEU on behalf of the Government of Barbados; BWA; MAFNS
B2.2	Potential reduction in irrigation cost for farmers	The BWA shall confirm allocation and pricing policy. Until it does, this benefit shall not be reported as an outcome of the project.	BWA pricing decision, which is a precondition to reporting	Not reported as a benefit until pricing policy is confirmed	PEU on behalf of the Government of Barbados; BWA

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
B2.3	Contribution to national food security through more reliable local production	Support shall be given through equitable allocation of reclaimed water to identified agricultural users including women and male farmers, smallholders and tenant farmers and coordination with the Ministry of Agriculture, Food and Nutritional Security.	Volumes allocated to agriculture. The contribution cannot be attributed to the project without a government plan linking reclaimed water to food security. Users disaggregated	Operation; allocation monitored annually	PEU on behalf of the Government of Barbados; MAFNS
B2.4	Greater availability of locally grown produce and more stable food costs	As for B2.3. This is presented as a potential benefit dependent on allocation, pricing and market response, and not as a confirmed outcome. Access to affordable fresh produce for households	Allocation and pricing decisions, which are preconditions to reporting	Revisited once allocation and pricing are settled	PEU on behalf of the Government of Barbados; BWA
B3.1	Improved environmental health and ecosystem services of the Graeme Hall Swamp and coastal zone	The PEU shall exercise management oversight on behalf of the Government and shall monitor performance against the priority ecosystem services identified in the Description of the Environment chapter.	Effluent and receiving water quality against the pre-project baseline, at the three lake stations and the bisecting canal used in 2010 and 2018	Operation; monitored to the frequency set in the monitoring programme	PEU on behalf of the Government of Barbados
B3.2	Recharge of underground reservoirs and improved resilience of supply during drought	The PEU shall exercise management oversight on behalf of the Government and shall monitor recharge	Recharge volumes against the groundwater baseline. The baseline has not yet been established.	Operation; monitored once the baseline exists	PEU on behalf of the Government of Barbados; BWA

Ref	Impact	Mitigation commitment	Indicator and verification	Timing	Responsible
		performance against the groundwater baseline once established.			
B3.3	Release of fiscal space for water security, climate resilience and critical infrastructure	The PEU shall exercise management oversight on behalf of the Government and shall report on the basis of the published IDB, EIB, GCF and Government of Barbados sources rather than by inference.	Savings applied to the project and the resulting investment	Operation; reported annually	PEU on behalf of the Government of Barbados

8.9.19. Gender monitoring plan

Table 167 gives the gender indicators, their data sources, the frequency of measurement and the reporting arrangements for each.

Table 167: Gender Monitoring Matrix

Description	Indicator	Data Source How will it be measured?	Frequency How often will it be measured	Responsibility Who will measure it?	Reporting Frequency and form of reporting
Reports of Gender-Based Violence and Harassment	Number of SH/SEA/GBV Incidents/ allegations reported	Reports of Violence, GRM case register	Daily	Contractor and Supervisory Consultant, Social Personnel	Immediately as the cases arise, Monthly
Gender Segmentation of Workforce	Roles women occupy disaggregated	Reports on the number of women in the workforce, HR and payroll records	Bi-Weekly	Contractor and Supervisory Consultant, Social Personnel	Bi- weekly meeting
Provision of Gender accommodation	State of Gendered Accommodation, occupancy within national standards	Reports on Condition, Inspection of facilities, checklists	Monthly, Weekly	Contractor and Supervisory Consultant	Monthly project report

Description	Indicator	Data Source How will it be measured?	Frequency How often will it be measured	Responsibility Who will measure it?	Reporting Frequency and form of reporting
Provision of gendered washrooms	Number, condition and usability of gendered bathrooms	Availability and sanitary state of bathrooms, inspection checklists, GRM and worker complaints	Bi-weekly	Contractor and Supervisory Consultant	Monthly Progress Report
Number of women enterprises supported	logs of enterprises supported	Log of Purchased, vendor feedback survey	Quarterly	Contractor and Supervisory Consultant	Monthly Progress Report
Gender-Based training provided to workers	Number of trainings conducted, change in knowledge and attitudes as measured by brief pre/post test or periodic surveys	Number of Trainings, registered, attendance, employee behaviour toward each other, Number of incidents reported, procurement logs	Bi-monthly, at each major training cohort	Contractor and Supervisory Consultant	Monthly and Quarterly Progress Report
Gender-based training provided to community members	Number of trainings provided, gender awareness sessions held, disaggregated data on participants	Number of Trainings registered, attendance, employee behaviour toward each other, Number of incidents reported	Quarterly, per session	Contractor and Supervisory Consultant	Quarterly, End of year report
Gender Pay	Complaints management salary bands	Number of Grievances Logged,	Quarterly	Contractor and Supervisory	Yearly Project Report

Description	Indicator	Data Source How will it be measured?	Frequency How often will it be measured	Responsibility Who will measure it?	Reporting Frequency and form of reporting
	recruitment plan, number of pay related grievances, disaggregated	Payroll and HR records, GRM		Consultant	
Women in leadership and management roles	Number of women and men in decision-making roles and supervisory positions	Management Organogram, HR data	Quarterly	Contractor and Supervisory Consultant	Monthly, Quarterly Project, Report
Scheduling of time off for women and males	Record of time off granted to women Records of Work Schedule, number and % of leave days taken by women and men	Time Sheet and leave records, worker feedback/GRM	Weekly	Contractor and Supervisory Consultant	Monthly, Quarterly Project Report

8.10. Stakeholder engagement plan

8.10.16. Overview

Social engagement plans are powerful tools that promote civic engagement and facilitate productive stakeholder and community/local advancement. The foundation of social or stakeholder engagement lies in the principle that “those groups capable of influencing or being influenced by an organization’s objectives” should have the chance to provide feedback and contribute to decisions that impact them (*Jeffery, 2009*).

Based on the principle mentioned above, this Stakeholder Engagement Plan (SEP) has been prepared by China Railway First Group (Joint Venture), as part of the Terms of Reference requirements for the South Coast Water Treatment Plant (referred to as the Project). The SEP outlines the engagement process to be undertaken as part of the design and construction phases of the Workers’ Camp Site. Therefore, this SEP will be updated and modified by the project team as necessary throughout the life cycle of the project. This section summarizes the engagement approach for the Workers’ Camp. The full Stakeholder Engagement Plan for the project, including stakeholder identification and analysis disaggregated by group, gender-sensitive and inclusive engagement methods, the engagement calendar by project phase, and disclosure and feedback arrangements, is issued as a companion document and is cross-referenced in Table 107.

8.10.17. Purpose of the SEP

The overall purpose of the SEP is to ensure that a consistent, comprehensive, and coordinated approach is taken for social engagement and project disclosure throughout the project. It is further intended to demonstrate the commitment of the project principals - the Barbados Water Authority and China Railway First Group (Joint Venture). Whereby, China Railway First Group (Joint Venture), in the capacity of project contractors, is the main implementing party, and the Barbados Water Authority, in the capacity of the Client, will ensure an 'international good practice' approach to engagement. The project team is committed to full compliance with all Barbados laws and regulations, as well as aligning to international standards such as the Inter- American Development Bank Environmental and Social Safeguards. The Stakeholder Engagement Plan operates throughout the life of the project and not only during preparation of this assessment. It supports engagement during construction and operation, provides the route by which stakeholders are informed of monitoring results and of progress against the management commitments in this document, and records stakeholder feedback so that it can be considered in project decisions.

In keeping with good international practice, the SEP aims to ensure that stakeholder engagements are conducted in a timely and relevant manner, providing pertinent and accessible information. In this regard, the SEP seeks to ensure that stakeholders are given sufficient opportunity to express their opinions and concerns and that these concerns receive adequate consideration in project decisions.

The SEP provides the project's approach to stakeholder engagement. It identifies the main categories of stakeholders and how they influence and will be engaged in the SIA process. It also identifies the ways to document engagement undertaken throughout the project's life cycle.

8.10.18. Objective of the SEP

The Project's SEP has four principal objectives for engaging stakeholders during the SIA process. They are as follows:

- 1) **Ensuring Understanding:** This is key to foster an open, inclusive, and transparent process of dialogue/communication and information sharing in a culturally appropriate manner. It will recognize various categories of stakeholders who require specific forms of communication, including women, men, youth, older persons, persons with disabilities, migrant workers and other groups who may be less able to participate, have different information needs and face different barriers to participation. Communication methods, venues and timing will be adapted accordingly, and the arrangements for doing so are set out in the Stakeholder Engagement Plan recorded in Table 107. Information regarding engagements will be disclosed as early and as comprehensively as possible.
- 2) **Involving Stakeholders in the Assessment:** To include and garner stakeholder views in the scoping phase, identification of issues, the assessment of impacts, and management/mitigation measures. Stakeholders will be able to provide their input by detailing local knowledge and information for the social baseline, informing the social impact assessment.
- 3) **Managing Expectations:** It is important to ensure that the Project does not create, nor allow unrealistic expectations to develop amongst the stakeholders regarding potential project benefits. The engagement process will serve as a mechanism for understanding and managing stakeholder and

community expectations by disseminating accurate information in a relatable and understandable manner.

- 4) **Ensuring Compliance:** The process is designed to ensure compliance with local regulatory requirements and good international practices. In addition, it is intended to build good social relationships as a good practice of socially responsible entities.

8.10.19. Scope and Structure of the SEP

The scope is defined as the extent of the area over which any activity operates or is effective, and the range of applications or subjects embraced, which is relevant (*Oxford English Dictionary, 2023*). Therefore, this SEP, which covers the Graeme Hall, within the Project area, gives general guidance on how to involve the stakeholders within this defined project area, in all phases of the project.

8.10.20. Legal Framework Guiding the SEP

The SEP has been prepared to ensure compliance with Barbados legislative requirements, as well as international good practices as defined by the Inter-American Development Bank. This section presents the relevant Barbadian legislation and international standards that will guide the project's stakeholder engagements.

8.10.21. National legislative framework

The key National Legislative Framework relevant to the Project, which guides the SEP process, is the Planning and Development (Environmental Impact Assessment) Regulations, 2021.

The Data Protection Act, 2019-29 applies to stakeholder engagement under this Plan. Personal information collected through attendance registers, grievance records, contact databases and consultation feedback is personal data within the meaning of the Act. It is collected for the specified purpose of project engagement, held securely, used only for that purpose, and disclosed to third parties only where the individual has consented or where disclosure is required by law. Records containing personal information relating to sexual harassment, sexual exploitation and abuse or gender-based violence are held on the separate confidential register described in the Grievance Redress Mechanism and are accessible only to designated officers.

8.10.22. International standards

This social engagement plan (SEP) will be informed by Inter-American Development Bank Environmental and Social Performance Standards, specifically ESPS 10 Stakeholder Engagement and Information Disclosure.

This ESPS recognizes the importance of open and transparent engagement between the Borrower and stakeholders, especially project-affected people, as a key element that can improve the environmental and social sustainability of projects, enhance project acceptance, and contribute significantly to the project'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 (Bank I.-A. D.).

8.10.23. Stakeholder identification and analysis

Stakeholder Identification and analysis is an essential component of effective and meaningful stakeholder engagement activities. The objective of this process is to provide a general overview of all stakeholders and their level of engagement with the project. The Stakeholder Engagement Assessment Matrix is a project management technique to document desired engagements and monitor actual engagement levels of stakeholders. It helps identify potential gaps in the involvement of stakeholders (Project-Management. Info, 2024). Please see the *Stakeholder Assessment Matrix* and *Stakeholder Influence Matrix* below.

8.10.24. Stakeholder assessment matrix

Table 168: Stakeholder Assessment Matrix

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
Government Agencies					
Barbados Water Authority	High	High	Establishing the scope of the project. Ensuring the Project is undertaken following the regulations of Barbados. Ensuring credibility of the information assessed. Ensuring the project keeps its timeline	Terminating the project on behalf of the Government of Barbados	Early and continuous engagement throughout the life cycle of the project, submitting reports in a timely manner, discussions of any changes with the technical teams. bi-weekly, monthly meetings and report
Ministry of Agriculture, Food and Nutritional Security	High	Project Beneficiary	Ensuring the Project serves the Government of Barbados' Needs Aligns with National Agriculture Plans	Connect the project to the agriculture eco system serve a medium to transmit communications	Continuous engagement

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
			Ensure populations (for example Small Farmers are consulted)	Key Help in the organization of meetings with key stakeholder groups	
Ministry of People Empowerment and Elder Affairs	Medium	Secondary stakeholder	Wellbeing of key population within communities within project Area of Influence	Provide secondary information on Gender needs and baseline information to inform social impact and migration of the project	Periodic engagement to appraise the stakeholder about project development for example Consultation and disclosure meetings
Ministry of Youth, Sports and Community Empowerment	Medium	Secondary stakeholder	Wellbeing of key population within communities within project Area of Influence	Provide secondary information on youth needs and baseline information to inform social impact and migration of the project	Periodic engagement to appraise the stakeholder about project development for example Consultation and disclosure meetings
Member of Parliament (Graeme Hall)	High	Community Representative	Ensuring the Project serves the Government of Barbados' Needs Aligns with National goals Ensure Key populations (for example community constituency	Fail to support public consultation process, resulting in community members developing apathy towards the project	Continuous engagement by email, in person sessions (with advance notice of sessions provided) and text message

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
Barbados Power and Light	High	Utility Provider	Ensuring the project is able to keep its timeline protecting its utility infrastructure maintaining its corporate image and trust of consumers	Coordination with contractor to ensure the project can keep its civil works schedule	Periodic communication and coordination meetings
Main Project Parties					
Inter-American Development Bank	High	Funders	Ensure the project complies with Local Legislation and Funders ESPF Ensure the project meets its timeline Ensure the project has the appropriate social and environmental safeguards Monitoring the project performance	Terminating the project on behalf of the Government of Barbados as the project financiers	Early and continuous engagement throughout the life cycle of the project, submitting reports in a timely manner, discussions of any changes with the technical teams. bi-weekly, monthly meetings and report
Project Engineer / Contractor	High	Project Implementation and execution	Ensuring the Project complies with the Projects Terms of Reference ensure the project	Impede project implementation timeline affect community trust and	No action required

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
			complies with Local Legislation and Funders ESPF health and safety of workers and community	confidence in the process and project Managing Community expectations	
Project Affected Persons					
Workers	High	Beneficiaries / Project execution	Employment Working conditions advancing the project	Advancing the execution of the project Ensuring that project is executed according to plans and designs	Continuous Engagement, Project plans and work schedule, policies, compliance trainings for
Residents Graeme Hall	High	Project Beneficiaries	Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects, and not adverse	Helping to define project impacts, social monitoring of Project	Periodic engagement to provide project scheduling and activities awareness sessions on construction safety, traffic and road safety around the site, vector source reduction at household level, and use of the Grievance Redress Mechanism and engagement for project
Residents Rendezvous Gardens	High	Project Beneficiaries	Communicating project impacts transparently,	Helping to define project impacts,	Periodic engagement to provide project

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
			together with the mitigation measures applied to reduce adverse effects, and not adverse	social monitoring of Project	scheduling and activities
Residents Lodge	Amity High	Project Beneficiaries	Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects, and not adverse	Helping to define project impacts, social monitoring of Project	Awareness sessions on construction safety, traffic and road safety around the site, vector source reduction at household level, and use of the Grievance Redress Mechanism and engagement for project
Farmers Hall	Graeme High	Project Beneficiaries	Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects, and not adverse	Helping to define project impacts, social monitoring of Project	Periodic engagement to provide project scheduling and activities
GBV support service providers	High	High	Managing and mitigating GBV/SEAH risks and impacts	Supporting management of GBV/SEAH risks and impacts	Periodic engagement
Barbados Agricultural Society	High	Farmer's representative body	Ensuring inclusion of farmers in engagement activities	Participation in engagement activities to provide perspectives,	Engagement for project

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
			Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects	concerns and needs from the agricultural community	
Barbados Council for the Disabled (BCD)	Medium	PWDs representative body	Ensuring inclusion of PWDs in community engagement activities Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects	Participation in engagement activities to provide perspectives and concerns from the PWD community	Engagement for project
Barbados National Organization of the Disabled (BARNOD)	Medium	PWDs representative body	Ensuring inclusion of PWDs in community engagement activities Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects	Participation in engagement activities to provide perspectives and concerns from the PWD community	Engagement for project
National Organization of Women (NOW)	Medium	Women's Organization	Ensuring inclusion of women in engagement	Participation in engagement activities to provide	Engagement for project

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
			activities Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects	perspectives and concerns	
Barbados Professional Women's Club	Medium	Women's Organization	Ensuring inclusion of women in engagement activities Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects	Participation in engagement activities to provide perspectives and concerns	Engagement for project
Equals Barbados	Medium	LGBTQI+ Organization	Ensuring inclusion of the LGBTQI+ community in engagement activities Communicating project impacts transparently, together with the mitigation measures applied to reduce adverse effects	Participation in engagement activities to provide perspectives and concerns	Engagement for project
Barbados Youth Development Council	Medium	Youth Organization	Ensuring inclusion of youth in engagement	Participation in engagement activities to provide	Engagement for project

Stakeholders	Stakeholder Impact (Level of impact the project has on the stakeholder)	Influence (level of influence the stakeholder has on the project)	What is important to Stakeholder	How can the Stakeholder Contribute Influence the project	Engagement Strategy /
			activities Ensuring project impacts are not adverse	perspectives and concerns	
Caribbean Youth Environment Network (CYEN)	Medium	Youth Organization	Ensuring inclusion of youth in engagement activities Ensuring project impacts are not adverse	Participation in engagement activities to provide perspectives and concerns	Engagement for project

The stakeholder relationship map is shown at Figure 80.

Stakeholder Relationship Network Map

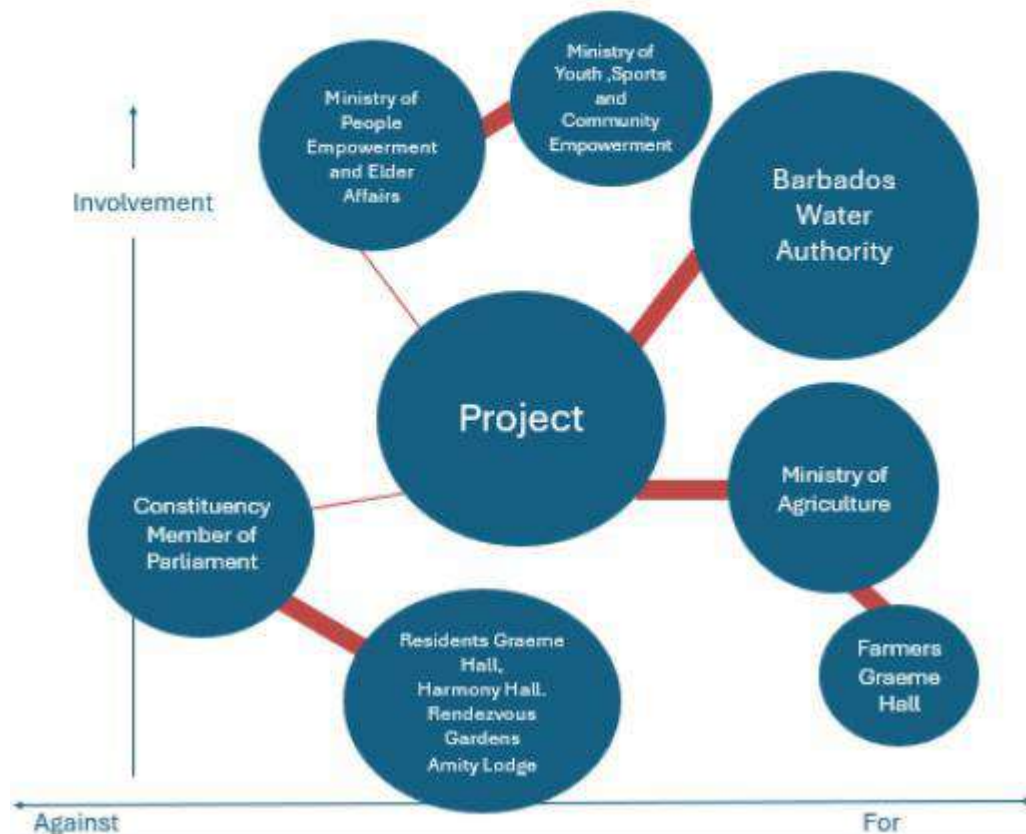


Figure 80: Stakeholder Relationship Map

- Bubble size indicates degrees of influence
- Line thickness indicates the strength of the relationship

8.10.25. Stakeholder engagement methodology and consultations

Stakeholder consultations are a key mechanism used by bureaucratic and legislative decision-makers to actively engage citizens and interest groups in the design, formulation, and evaluation of public policies and legislation. Consultations allow policymakers to gather expertise and policy-relevant information about the feasibility of policy options, to hear stakeholders' preferences regarding policy outcomes, and to evaluate the implementation and socio-economic impact of policy measures. Consultations are a key source of policy input and feedback. They constitute a trademark of better regulation measures and a key component of legitimate, accountable, and responsive democratic government.

To ensure the participation and inclusion of interested stakeholders the project's stakeholder consultation will involve the identification of key stakeholders, and there after the conduct of stakeholder consultation meetings. Social surveys are standardized procedures to gather information from large populations. However, at this stage, the researcher has not been able to meet with any designated women's, Youth or Elderly or PDW groups. This can be incorporated in another round of consultation.

The data collection instrument used during the scoping phase of the project is an interview guide. The nature and use of interview guides is described under Methodology earlier in this Social Assessment and is not repeated here. The interview guide is a structured document, often a list of questions, topics, or prompts used by interviewers to ensure consistency, reduce bias, and cover key information from the research populations. It serves as a flexible script for conversations, allowing for both standardization and open-ended exploration¹⁵⁷.

This method was chosen since the views of community members are not homogeneous, how individuals react to stimuli in a given space is not the same. Some residents may have strong views on a topic while others may not, depending on the level of information available, influence, potential for impact etc. The interview guide provides research participants (community members) to freely express their individual thoughts and concerns, which are not homogeneous, allowing the researcher to listen to the views expressed.

The target population for the South Coast Water Treatment Camp Site Development, comprise residents from four communities, and two government Agencies, and Farmers, who are within the project's **Direct Area of Influence and Indirect Area of Influence** and likely to be impacted by the Project's planned activities. The target population is drawn from the socio-economic catchment of 1 km defined in the Project Area of Influence section.

An interview guide containing pertinent questions was developed (See interview guide in Appendix).

Simultaneously, qualitative data will be collected through a process of secondary research, through in-person interviews with key stakeholder groups and information disclosure meetings with key stakeholders such as the government and advocacy groups. Participants who attend advertised scoping, consultation, and information disclosure meetings will provide input on possible impacts and expectations of the project.

8.10.26. Inclusion criteria

- Persons residing within the socio-economic catchment, being 1 km from the site boundary, as defined in the Project Area of Influence section.
- Persons at home when the team visits
- Attend scheduled virtual/ in-person information consultation and disclosure meetings
- Persons who consent to participate in the survey (scoping exercises)

¹⁵⁷ <https://sk.sagepub.com/ency/edvol/research/chpt/interview-guide>

8.10.27. Exclusion criteria

- Persons younger than 18 years of age.
- Persons not residing in the Project's Area of Influence

The data collection period that informed the preparation of this document began April 15th to April 18th, 2026, and is expected to continue as the project progresses. Data on Consultation will be updated as needed. A list of preliminary questions and concerns posed by the community members during the scoping activity can be seen in the Appendix. The consultation records referred to are provided at Appendix 2, Engagement Population Demographics, and Appendix 3, List of Community Questions and Concerns Expressed During Field Exercise 15 to 19 April 2026. All tables, figures and appendices are introduced in the text at the point of first reference and are numbered consecutively.

8.10.28. Public Consultation Prior to the Start of Works

A public consultation will be held before works commence and will sensitize stakeholders including authorities and community members, including representatives of vulnerable groups, on important project details such as the process, project scope, potential impacts, and stakeholder engagement activities to be conducted. This consultation will be held at a conveniently accessible venue and streamed via a virtual platform to ensure that all stakeholders have a fair opportunity to be engaged and to participate in discussions. Activities at this consultation will include presentations and a session at the end to obtain stakeholder feedback.

8.10.29. Recommendations for Future Consultation

Meeting invitations and consultation methodology. Community residents are invited to town hall-style meetings, which can be accessed via in-person and virtual means, through virtual communication platforms such as email, social media, radio, and WhatsApp circulation. Venues, dates and times must be clearly communicated in invitations. Consultation methodologies for women should consider separate consultations for women where needed, and consultations should be scheduled at times that accommodate women's time poverty due to care burdens. Collaboration with the Bureau of Gender Affairs and local NGOs/CSOs are useful for facilitating outreach with women, women's organizations, and other vulnerable groups. Further consultation logistics planning includes preparation of consultation materials (including agendas and attendance lists) and refreshments for attendees at in-person meetings. Those responsible for video and photographic materials must be hired and consent for such obtained at the beginning of the engagement. Views collected from stakeholders during engagements must be documented to inform the preparation of a Public Consultation Report attached to the ESIA/ESMP document.

There will be information disclosure ahead of visits. The Project prints and distributes information with updated correspondence to share with community residents, discussing the phase the project is in and what members of the community can expect, so that they can be meaningfully engaged ahead of planned visits and consultations. There will also be an appraisal of local social and cultural protocols. Appropriate information will be shared for the consultations ahead of time about social and cultural nuances within the local environment, allowing future consultants to be prepared for the eventualities and to maximize impact and planning. Post-consultation processing will also take place. Stakeholder views documented from consultations

must be processed and included in the Public Consultation Report attached to the ESIA/ESMP document, with suggestions incorporated into the final ESIA/ESMP document and final publication on the BWA and IDB websites.

The Stakeholder Assessment Matrix at Table 110 sets out the engagement strategy and frequency for each stakeholder group and should be read with these recommendations.

8.10.30. Consultation approach

A two-step approach to social engagement will be implemented, designed both to inform stakeholders and to curate their concerns and expectations. The implementation approach will include the following:

- Engagement to inform key stakeholders and authorities to disclose important project details pertaining to the process, project scope, potential impacts, curate their concerns and expectations, and stakeholder engagement.
- Engagement with project-affected stakeholders to disclose project scope, impacts, grievance mechanisms, curate their concerns and expectations, and discuss any potential for resettlement.

8.10.31. Data analysis

During the consultation phase of the project, the data collected will be analyzed using thematic analysis. The qualitative data will be analyzed thematically using an inductive approach. The data will be presented textually.

8.10.32. Consultation During the Design Phase of the Project

The first scoping activities of the project were conducted from 15 to 18 April 2026. The activity was a house-to-house, one-on-one meeting with residents in the impacted communities. The activity aimed to:

- Appraise stakeholders about the project phase,
- Scope concerns of stakeholders relating to the project,
- Allow stakeholders to ask questions
- Managing stakeholders' expectations of the project and
- Provide information on the projects' next steps

8.10.33. Consultant's general overview of scoping activity

Many community residents were not prepared to have the discussion about the project, since it had been a long time since they had information about the project discussed in the public sphere, or had received an update on the project. However, residents who did participate in the engagement openly shared their concerns about the project generally and about the development of the Workers' Camp in particular. Some residents had many questions about water scarcity, water prices, jobs, sanitary practices of workers, dust, and odor emanating from the facility. (Please see attached Data sheet showing demographics of research participants in the Appendix)

8.10.34. Sampling technique

Convenience sampling was used, that is, residents who were available and agreed to speak with the researcher were interviewed during the activity. In this context, a sample is a group that is drawn from an entire population. The reason a sample is drawn is that the project cannot reasonably reach all of the people affected by the project.

8.10.35. Limitations of the Scoping Activity

Availability of residents during the activity: Visits were scheduled for 4:30 pm to accommodate working residents. This proved a challenge. Many residents were still not at home at the time. As darkness fell, residents receded to their homes, making it difficult to engage. Some were also scared when approached in the darkness of the night.

Lack of information in the public sphere about the project: The lack of information in the public sphere meant that the interviewer was required to share extensive information, which minimized the time to engage with a planned quota of 10 households per day per area.

Lack of knowledge about local Protocols of arranging meetings with government officials: The lack of critical information on scheduling formal meetings with government agencies resulted in a lost opportunity to conduct in-person meetings with government officials while physically in the country during the scoping mission *The applicable protocol has since been established. Meetings with government agencies are arranged through the Project Execution Unit, which makes the approach on behalf of the project and confirms the attendance and level of representation. That route is recorded in the Stakeholder Engagement Plan so that the difficulty encountered during the April 2026 exercise does not recur.*

8.10.36. Recommendations

- **Meeting invitations / Consultation methodologies:**

Community residents are invited to town hall-style meetings, which can be accessed via in person attendance, noting that the Barbados Water Authority have advised that the September 2026 town hall is to be held in person only.

- **Information disclosure ahead of visits to prepare residents:**

The Project prints and distributes information update correspondence to share with community residents, discussing the phase the project is in and what members of the community can expect, so that they can be meaningfully engaged ahead of planned visits and consultations.

- **Appraisal of local social and cultural nuances/ protocols:**

Appropriate information will be shared with the consultations ahead of time about social and cultural nuances within the local environment, allowing future consultants to be prepared for the eventualities and to maximize impact and planning

- **Additional Notes:** Please see also the *Stakeholder Engagement Matrix* for additional details of the communication strategy, which includes meeting frequency and the like, intended to be utilized during the execution of the project.

8.11. Labour Management Plan

8.11.16. Introduction

The Labour Management Plan (LMP) is a cornerstone of China Railway Shanghai Engineering Group's (CRSEG) commitment to responsible project delivery for the South Coast Water Reclamation Project (SCWRP) and the South Coast Sewage Treatment Plant (SCSTP). It is designed not only as a compliance instrument but as a practical, contractor-facing guide that ensures labor practices are fair, safe, and consistent with both national legislation and international standards. By embedding the principles of equity, non-discrimination, and respect for human dignity with particular attention to gender equality and the inclusion of migrant workers, younger and older workers and PWDs, the LMP provides a framework through which CRSEG can manage its workforce in a manner that protects workers, communities, and the integrity of the project.

The plan is firmly anchored in Barbados' legal framework, including the Employment Rights Act (2012), which guarantees fair treatment and contractual protections for employees, including protections against unjust dismissal and discriminatory treatment on the basis of sex, age, race, disability, nationality or other characteristics; the Health and Safety at Work Act (Cap. 356), which establishes the right of workers to refuse unsafe work without reprisal; and the Health Services Act (Cap. 44), which governs public health protections. These laws provide the baseline obligations for CRSEG and its subcontractors, ensuring that labor practices meet the expectations of the Barbados Water Authority (BWA) and the Government of Barbados.

Equally important, the LMP demonstrates compliance with the Inter-American Development Bank (IDB)'s Environmental and Social Performance Standards (ESPS). ESPS 2 on Labour and Working Conditions requires fair treatment, safe working environments, and accessible grievance mechanisms. ESPS 4 on Community Health, Safety and Security emphasizes the need to protect surrounding communities from risks associated with construction and worker influx. ESPS 9 on Gender Equality mandates proactive measures to prevent discrimination and gender-based violence, promote equal opportunities for women and men in recruitment, training, advancement and pay, and address gender-differentiated risks in the workplace and worker-community interface, while ESPS 10 on Stakeholder Engagement requires inclusive, transparent, and culturally appropriate engagement with affected parties. Together, these standards require that the LMP make social and gender impacts visible, monitor them with disaggregated data and adapt controls where women, men or vulnerable groups are affected differently, and elevate the LMP beyond national compliance, aligning it with international best practice.

The LMP is closely tied to CRSEG's Workers' Code of Conduct, which sets mandatory behavioral standards for all employees, subcontractors, and representatives. The Code of Conduct prohibits child labor, forced labor, discrimination, harassment, and sexual exploitation or abuse. Discrimination and harassment include behaviour based on sex, age, gender, disability, nationality, race, ethnicity, religion, sexual orientation or other

characteristics. It also establishes expectations for courtesy, respect, and professionalism in worker interactions with colleagues and community members. By integrating the Code of Conduct into the LMP, CRSEG ensures that behavioral standards are enforced alongside labor protections, creating a holistic system of accountability and communicated in languages workers understand and supported by the GRM for all worker groups.

The LMP is not a stand-alone document. It functions as an integrating plan that is triggered by related ES plans and, in turn, supports them through workforce controls, training, grievance management, monitoring, and corrective actions including social and gender-responsive measures across OHSE, community health and safety, labor influx and SH/SEA/GBV risk management, (see Figure 81).

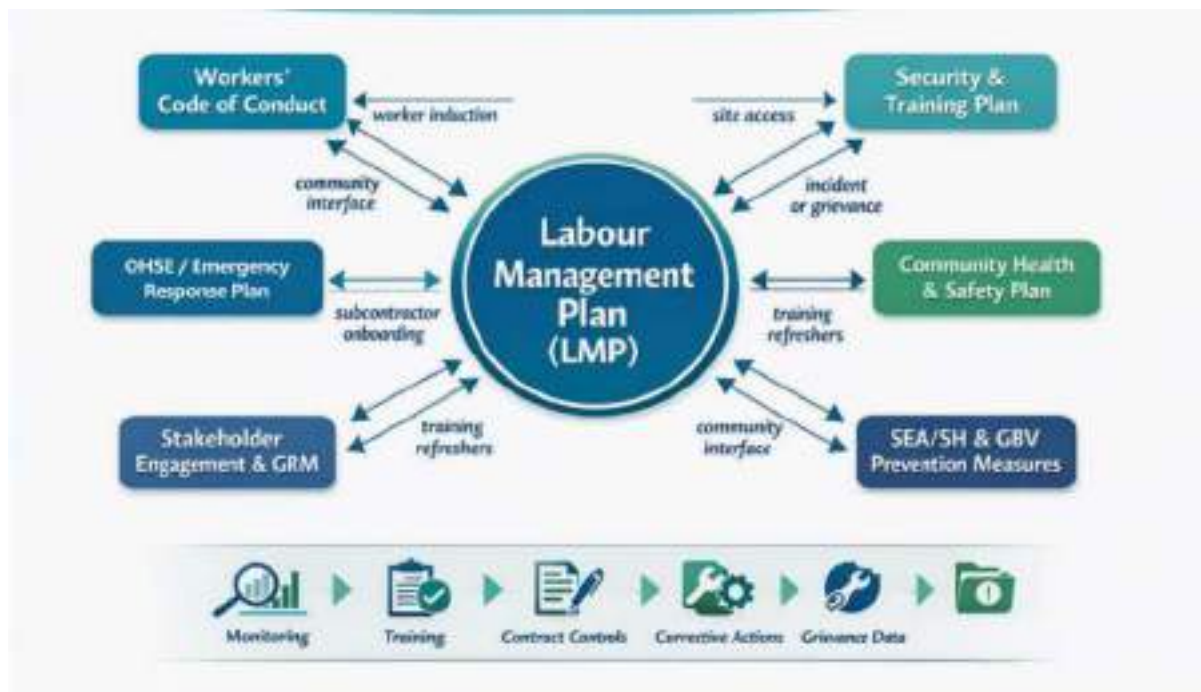


Figure 81: LMP integration with related environmental and social plans. This image is AI generated and is meant to be illustrative and to facilitate communication and understanding of the interdependencies among plans, particularly for workers and supervisors.

This plan also recognizes the unique challenges posed by the anticipated influx of workers during peak construction. With hundreds of local and foreign workers expected, the project must address risks such as strain on housing and services, exposure to communicable diseases, and potential social tensions which many affect women and girls, older persons, PWDs, informal vendors and low-income households differently. The LMP therefore emphasizes careful workforce planning, equitable recruitment, and proactive engagement with local communities to mitigate these risks. It commits to collecting disaggregated data on age, sex, disability, and nationality to monitor inclusion and impacts, ensuring that vulnerable groups are not excluded or disproportionately affected. The project will engage with workers through mandatory Code of Conduct adherence, multilingual training (including OHS and SEA/SH prevention), accessible grievance mechanisms with non-retaliation protections, and regular communication on safety and welfare. For stakeholders and communities, engagement will primarily be managed by a Community Liaison Officer who will facilitate dialogue, conduct regular meetings, raise awareness on public health and SEA/SH prevention, and ensure

access to the project's grievance redress mechanism for community concerns. Monitoring and feedback from both groups will be integral to adapting and improving labor management practices.

Worker welfare is a central theme of the LMP. The plan sets standards for safe, clean, and dignified accommodation, gender-segregated sanitary facilities, privacy and security measures for women's facilities, rest areas and dormitories, and reasonable accommodations for persons with disabilities. It requires access to medical care, recreational spaces, and communication facilities, with regular inspections to ensure compliance. These measures are designed to create a living environment that promotes dignity, safety, and productivity, consistent with both Barbados law and IDB ESPS 2.

Occupational health, safety and environment are treated as a cornerstone of the plan. The LMP mandates the implementation of the Workers' Health and Safety Plan, supported by daily toolbox talks, scheduled safety drills, and specialized training for high-risk tasks. Personal protective equipment is compulsory, and emergency preparedness is reinforced through the integration of the Emergency Response Plan and Incident Management Plan. Workers are explicitly granted the right to refuse unsafe work without fear of reprisal, routine audits, accident reporting, and corrective action tracking ensure that safety standards are consistently upheld.

Finally, the LMP establishes mechanisms for worker grievance redress and sexual exploitation and abuse (SEA)/ sexual harassment (SH)/gender-based violence prevention covering SEA/SH/GBV risks affecting both workers and community members with particular attention to women and girls and other vulnerable groups. Workers are provided with accessible and confidential channels to raise concerns, with clear timelines for acknowledgement, resolution, and escalation. Special procedures are in place for SEA/SH/GBV -related grievances, ensuring survivor-centered handling with confidentiality, non-retaliation, and referral to appropriate support services. Workers often face significant barriers to reporting grievances, particularly for Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), and Gender-Based Violence (GBV), including language differences, fear of retaliation, lack of accessible channels, and heightened vulnerability for groups like women and persons with disabilities. To overcome these, the project implements confidential, survivor-centered reporting pathways that allow for anonymous or restricted disclosure of sensitive information for SEA/SH/GBV cases. Grievance data is collected and disaggregated by sex, age, nationality, disability, and vulnerability status, while individual case details for SEA/SH/GBV remain non-identifying to protect privacy. This meticulous collection and continuous analysis are crucial for the Environmental and Social Management Plan (ESMP) as they enable the identification of differential impacts and under-reporting, inform targeted prevention and survivor-centered response measures, ensure accountability through corrective actions, and drive continuous improvement, ultimately managing the confirmed high residual SEA/SH/GBV risks and ensuring compliance with social standards. As such, mandatory training, community awareness sessions, and zero-tolerance enforcement ensure that sexual harassment, exploitation, and abuse are prevented and addressed.

These grievance procedures are fully integrated into the project's grievance redress mechanism (GRM). The GRM provides workers, subcontractors, and community members with clear entry points (hotline, email, in-person, and anonymous channels) ensuring accessibility to women and men, youth, older persons, PWDs, and other vulnerable groups, defined timelines for acknowledgement and resolution, and escalation pathways

when issues remain unresolved. SEA/SH-related grievances are channeled through a specialized confidential pathway within the GRM, ensuring survivor-centered handling, restricted information access, and referral to medical, psychological, and legal support services.

Figure 82 below illustrates the grievance flow: workers raise concerns through accessible channels → grievances are logged and acknowledged within two working days (urgent or important cases are acknowledged within 24 hours and aimed to be resolved in 2 days) → simple cases are resolved at site level within seven days → unresolved or sensitive cases escalate to the Grievance Redress Committee → SEA/SH cases follow the confidential survivor-centered pathway → if still unresolved, grievances may be referred to external oversight bodies such as the IDB's Independent Consultation and Investigation Mechanism (ICIM).



Figure 82: Worker grievance flow for standard grievances

Workforce Profile

The workforce for the SCWRRF and the SCSTP will be composed of a diverse mix of Chinese nationals employed directly by CRSEG, Barbadian nationals engaged through direct hire, and local subcontractors providing specialized services with a predominantly male workforce and a smaller proportion of women workers. This composition reflects both the international nature of the contractor and the project's commitment to engaging local labor markets (see Figure 3). The presence of foreign and local workers side by side requires careful planning to ensure cohesion, respect, and equitable treatment across cultural and national lines and to prevent discrimination, harassment or exclusion based on sex, age, nationality, disability or other characteristics.

Chinese nationals will primarily occupy a mix of technical and supervisory roles, bringing specialized expertise in engineering, construction management, and water treatment technologies and unskilled labor roles. Their participation is critical to the transfer of technical knowledge and the successful delivery of complex infrastructure works (see more on this in the last section of the LMP). Barbadian nationals, meanwhile, will be

engaged across skilled trades, unskilled labor, and camp support functions. Their involvement ensures that the project contributes directly to local employment, builds capacity within Barbados, and strengthens community ownership of the project outcomes with special effort to provide fair and equal opportunities for women and other workers to access skilled roles and training.

Local subcontractors will play a vital role in delivering specific services such as transport, catering, waste management, and construction support. Their inclusion not only diversifies the workforce but also stimulates the local economy by creating business opportunities for Barbadian enterprises including women-owned and small businesses and services that often employ women workers e.g. catering and cleaning. The LMP requires that subcontractors adhere to the same standards of labor management, occupational health, safety and environment, and behavioral expectations set out in the Workers' Code of Conduct, including non-discrimination, gender equality measures, SH/SEA/GBV prevention, access to the GRM for all workers, subcontractors, security personnel etc. This ensures consistency across the workforce and prevents gaps in compliance with monitoring and audits checking conditions and protections for all workers including women and other vulnerable groups.



Figure 83: Integrated workforce model. This image is AI generated and is meant to be illustrative and to facilitate communication and understanding of workforce composition, complementarities, and distinct roles.

The demographic composition of the workforce is expected to be diverse, including women, youth, persons with disabilities, and migrant workers. Vulnerable groups are defined as populations who may be disproportionately affected by project impacts or excluded from project benefits, including women, elderly persons, low-income households, and socially marginalized groups such as PWDs, migrants, informal workers, and female-headed households. The LMP commits to ensuring that all workers are equitably included in recruitment, training, and welfare provisions, with their rights safeguarded throughout the project lifecycle. Employment opportunities will be open to all qualified individuals, without restrictions based on pregnancy, age, or disability. Role assignments will be guided by an assessment of each worker's ability to safely and effectively perform the required tasks, consistent with Barbados labor law and the Disabilities Bill. This

approach promotes equal opportunity while ensuring that work responsibilities are matched appropriately to protect health and safety.

Inclusivity and non-discrimination are central principles of the workforce profile. Recruitment will be conducted transparently and merit-based, with equal opportunity provisions ensuring that no worker is discriminated against based on gender, ethnicity, disability, sexual orientation, or other protected characteristics, and that women, youth, PWDs are actively encouraged and supported to apply for skilled and supervisory roles. Recruitment processes will ensure that no worker is excluded based on pregnancy, age, or disability and that all workers have fair access to training, overtime, promotion and other employment benefits. Assignment to specific roles will be determined by fitness to safely perform the required tasks, consistent with Barbados labor law and the new Disabilities Bill. Reasonable accommodation will be provided where necessary, ensuring equal opportunity while protecting workers from being burdened with tasks that could pose undue risk. CRSEG will provide reasonable accommodations for workers with disabilities, ensure gender-segregated sanitary facilities, and promote equal access to training and advancement opportunities for Chinese and Barbadian workers, subcontractors and security personnel. These measures align with Barbados' Employment Rights Act and IDB ESPS 2, which require fair treatment and equal opportunity for all workers.

The integration of Chinese and Barbadian workers within the same camp and worksites requires proactive measures to foster mutual respect, address power imbalances between supervisors and junior staff and ensure gender-sensitive and cultural-sensitive conduct. Induction training will include modules on intercultural communication, respect for diversity, gender equality, prevention of discrimination and harassment, including SH/SEA/GBV and community interaction protocols. Supervisors will be trained to monitor interpersonal dynamics and intervene promptly in cases of discrimination, harassment, or conflict with particular attention to protecting women workers, younger workers, migrant workers and PWDs from bullying, exclusion or abuse of authority. Daily toolbox talks and regular refresher sessions will reinforce these principles, ensuring that inclusivity is not only a policy but a lived practice and that women and other under-represented workers are encouraged and feel safe to raise concerns.

Finally, workforce planning will include disaggregated data collection on age, sex, disability, nationality, and vulnerability status. This data will be used to monitor inclusion, identify potential disparities, and inform adaptive management measures including recruitment, task assignment, training access, overtime, promotion, disciplinary action, OHS incidents and grievance patterns. By tracking workforce composition and experiences, CRSEG can ensure that the project delivers equitable benefits, prevents exclusion, and responds effectively to emerging risks with periodic consultations of workers including women and vulnerable groups to validate findings and improve measures/responses. This approach demonstrates compliance with IDB ESPS 9 on Gender Equality and ESPS 10 on Stakeholder Engagement, while also meeting the expectations of the Barbados Water Authority for inclusive and socially responsible project delivery.

The workforce planning process is grounded in the projected labor influx baseline of 252 workers, comprising 98 Chinese nationals and 154 Barbadian/local personnel, with peak deployment of 203 workers in Q3 2028. The workforce is predominantly male (230 men and 22 women, or 8.73%), which underscores the need for gender-sensitive welfare, accommodation, and grievance access and specific measures to prevent

SH/SEA/GBV, support and address the well-being of women and men working in a high-risk, male dominated environment.

Disaggregated data will therefore be collected and monitored across age, sex, disability, nationality, and vulnerability status, enabling CRSEG to track inclusion and identify disparities in recruitment, training, welfare, and grievance outcomes and to compare conditions and outcomes between different worker groups. This dataset will also distinguish between camp-resident workers (those housed in project-managed accommodation subject to 24-hour labor standards) and commuting workers who return home daily. The distinction is critical for monitoring welfare, supervision, and community interface risks, as camp-based workers experience continuous oversight and welfare obligations, while commuting workers interact more frequently with surrounding communities and may present SH/SEA/GBV risk profiles, particularly where the workforce is predominantly male and non-local.

Integrating this disaggregated data into workforce planning ensures that labor standards are applied consistently across both residential and non-residential worker groups, in line with Barbados labor law and IDB ESPS 2, 9, and 10. This approach strengthens adaptive management and supports equitable, socially responsible project delivery, allowing CRSEG to identify and address any emerging gender or vulnerability-related gaps.

Workforce Baseline for Labour Influx Screening

The labor influx screening baseline is based on a planned total workforce of 252 persons, comprising 98 Chinese nationals and 154 personnel reported as Barbadian/local. Peak deployment is expected to reach 203 persons in Q3 2028, within the broader peak construction period from Q3 2027 to Q4 2028. The workforce is predominantly male, with 230 men and 22 women, meaning women represent approximately 8.73 percent of the planned workforce. Chinese skilled workers comprise 80 workers, all recorded as male, while local subcontractor personnel comprise 153 persons, including 133 men and 20 women. These figures provide the operating baseline for recruitment planning, accommodation, OHS, SEA/SH prevention, GRM readiness, worker-community interaction controls, and monitoring. Monitoring data is systematically disaggregated by sex, age group, nationality, job category, disability status, and vulnerability status to detect disparities and ensure equitable treatment across the project's workforce. This granular approach allows for the identification of potential under-representation, pay gaps, or higher grievance rates among specific groups, such as women, younger workers, older workers, persons with disabilities, and migrant workers. By analyzing this data, the project can address any differential impacts or barriers, recognizing that risks and needs, particularly for occupational health and safety (OHS), may vary (e.g., appropriate PPE sizing, task allocation, reproductive health considerations). The disaggregated information is crucial for informing adaptive management measures in areas such as recruitment, task assignment, training access, promotion, disciplinary actions, OHS incidents, and grievance patterns. Furthermore, for high-priority risks like Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) and Gender-Based Violence (GBV), monitoring includes sex and age-disaggregated data on non-identifying case information and complaints, along with indicators of under-reporting, to ensure survivor-centered responses and identify patterns. This comprehensive data collection also enables comparisons of conditions and outcomes between different worker groups, like camp-resident versus commuting personnel, thereby ensuring consistent application of labor standards and effective

management of community interface risks. Ultimately, this detailed monitoring framework underpins compliance with labor standards and fosters accountability and continuous improvement throughout the project lifecycle.

The workforce baseline is summarized in Table 169 and illustrated in Figure 84.

Table 169: Workforce baseline for labor influx screening

Screening Factor	Baseline Finding	LMP Relevance
Total planned workforce	252 persons (98 workers living in the campsite)	Requires project-wide conduct management, supervision, GRM access, and welfare planning.
Nationality composition	98 Chinese nationals and 154 Barbadian/local personnel	Requires intercultural coordination, language access, fostering mutual respect and cohesion, monitoring, addressing power imbalances and careful worker-community interface management.
Peak deployment	203 persons in Q3 2028	Enhanced supervision is required during peak labor presence.
Gender composition	230 male workers and 22 female workers; women represent 8.73 percent	Requires gender-sensitive welfare, sanitation, safe accommodation, privacy, reporting, SEA/SH/GBV prevention, equal opportunities and non-retaliation controls, confidential reporting and survivor-centered pathways.
Chinese skilled workers	80 workers, all recorded as male	Requires language-appropriate induction, Code of Conduct training and gender awareness and gender risk management (SH/SEA/GBV risks) training, supervision, and worker-community interaction rules.
Local subcontractor personnel	153 persons, including 133 men and 20 women	Requires subcontractor cascade of LMP, CoC, GRM, OHS, welfare, and SEA/SH/GBV obligations.

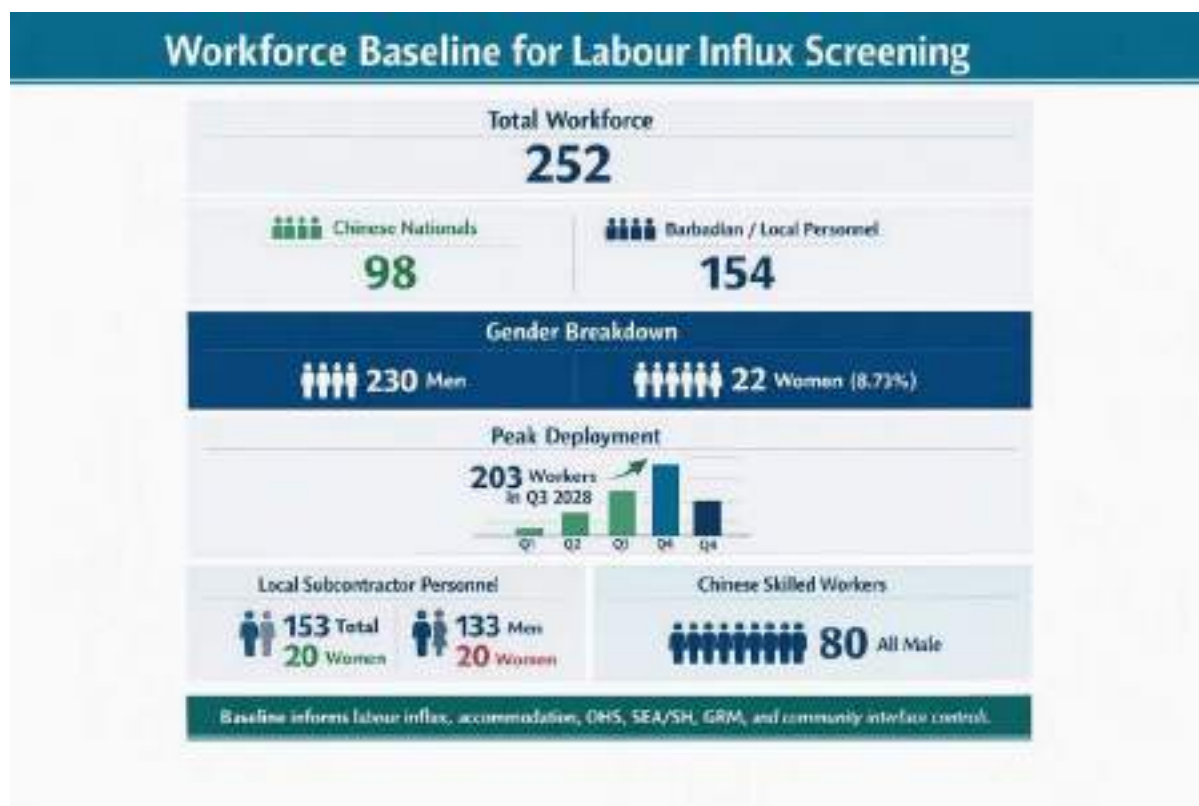


Figure 84: Workforce baseline for labor influx screening. This image is AI generated and summarizes the workforce

Recruitment and Employment Conditions

Recruitment for the SCWRRF and SCSTP will be conducted in a transparent, merit-based, and accessible manner. CRSEG is committed to ensuring that all employment opportunities are advertised and filled in ways that promote fairness and inclusivity with targeted efforts to reach women, youth, PWDs, who are often under-represented in construction workforces. This means that recruitment processes will be free from bias and discrimination on the basis of sex, age, disability, nationality, pregnancy, ethnicity, religion, sexual orientation and other protected characteristics and will actively encourage participation from both Barbadian nationals and foreign workers, including Chinese nationals engaged by CRSEG as well as women, PWDs, younger and older workers and other vulnerable groups who may face barriers to entry. By adopting transparent procedures, the project will demonstrate compliance with Barbados' Employment Rights Act (2012) and IDB ESPS 2, which require fair treatment and equal opportunity for all workers.

Workforce Planning and Recruitment Strategy

The workforce will consist of a diverse mix of international specialists, local skilled trades, subcontractor personnel, and administrative staff. At the core of the team will be Chinese expatriate specialists employed by CRSEG, including senior engineers, project managers, and technical experts in water reclamation and treatment infrastructure. These individuals bring highly specialized skills and will provide technical leadership throughout the project lifecycle. Alongside them, Barbadian skilled workers will play a central role in plant

operations, electrical and mechanical installation, welding, masonry, plumbing, carpentry, and heavy equipment operation. Local subcontractor personnel will provide essential support services such as general labor, driving, security, catering, cleaning, and camp management. The workforce will also include management and administrative staff HR officers, health and safety representatives, camp managers, and community liaison officers drawn from both local and expatriate sources. Specialist consultants in environmental safeguards, gender equality, and occupational health will be engaged regionally and internationally to ensure compliance with IDB standards. Importantly, the recruitment strategy emphasizes inclusion of vulnerable groups, with targeted opportunities for women, persons with disabilities, and younger or older workers in support functions.

Workforce numbers will vary across project phases, ramping up during peak construction and stabilizing during operations. During the design phase (2026–2027), the workforce will remain relatively small, with approximately 30 to 40 professionals focused on engineering, planning, and safeguards. Numbers will increase during early works (2027–2028) to around 80 to 100 workers, as site preparation, camp setup, and utility installation begin. The peak construction phase in Q3 2028 will see the largest deployment, with approximately 203 workers engaged in heavy civil works and mechanical and electrical installation. At this stage, the workforce will be predominantly male, with 230 men and 22 women, highlighting the importance of gender-sensitive measures. As construction winds down, the commissioning phase in 2029 will require 60 to 80 workers, primarily technical specialists and plant operators responsible for testing, training, and handover. Once the facility enters operation in late 2029, the workforce will stabilize at 40 to 50 long-term staff, mainly local plant operators, maintenance personnel, and administrative staff. This pattern reflects a gradual ramp-up from design through early works, a sharp peak during construction, and a structured demobilization leading to a smaller, stable operational team.

Recruitment will follow a transparent and inclusive process designed to comply with Barbados labor legislation and IDB Environmental and Social Performance Standards. Workforce needs will be verified against project schedules before recruitment begins, ensuring that hiring is aligned with actual demand. Vacancies will be advertised publicly through Barbados employment portals such as Employs, as well as local newspapers, radio, and community boards. Outreach will extend to technical schools and vocational training centers to encourage participation by younger workers and to build local capacity. Local employment will be prioritized, with preference given to Barbadian nationals and subcontractor personnel, alongside specific efforts to include women, persons with disabilities, and other vulnerable groups. Recruitment procedures will include strict verification of age, identity, and right to work, with written contracts provided in languages understood by workers. While recruitment agencies may be used by subcontractors, all hires must comply with the Labour Management Plan standards.

Non-discrimination is a cornerstone of the recruitment process. Discrimination based on sex, age, disability, nationality, race, religion, or sexual orientation is explicitly prohibited, and transparent selection criteria will be applied to all candidates. Mandatory induction and acknowledgement of the Workers' Code of Conduct will ensure that behavioral standards are upheld from the outset. Recruitment data will be collected and disaggregated by sex, age, nationality, and disability status, enabling monitoring of inclusion and identification of differential impacts. Regular audits and reporting will provide accountability and ensure that recruitment remains fair, transparent, and consistent with both national law and international best practice.

The recruitment pathway is illustrated in Figure 85.



Figure 85: Recruitment principles roadmap. This image is AI generated and is intended to summaries the fair, transparent, inclusive, and compliant recruitment pathway described in this section.

The roadmap illustrates recruitment as a controlled sequence of decisions and safeguards rather than a one-time hiring action. It begins with a verified workforce need and moves through fair advertisement, transparent screening, merit-based selection, and clear contracting in a language understood by the worker. It then links recruitment to induction, Code of Conduct obligations, OHS training, grievance access, and equal opportunity monitoring. This sequence helps ensure that Barbadian nationals, Chinese nationals, and subcontractor personnel are recruited and onboarded consistently, without discrimination, coercion, child labor, or gaps in worker protections.

Every worker engaged on the project, whether directly employed by CRSEG or through subcontractors, will receive a written contract in their native language. These contracts will clearly outline wages, working hours, benefits, grievance rights, and disciplinary procedures. Providing contracts in languages understood by workers ensures that they are fully aware of their rights and obligations and prevents misunderstandings that could lead to exploitation. This approach also reflects the project's commitment to accessibility and inclusivity, ensuring that language barriers do not prevent workers from exercising their rights.

Child labor and forced labor are strictly prohibited. CRSEG will enforce a zero-tolerance policy in line with Barbados' Labour Laws and IDB ESPS 2. Verification procedures will be put in place to ensure that all workers meet the minimum age requirements, and that no worker is coerced into employment. Subcontractors will be

required to demonstrate compliance with these standards, and CRSEG will conduct regular audits to verify adherence. This ensures that labor practices across the entire workforce meet both national and international expectations. Identity verification will include cross-checking government-issued identification against employment records, ensuring that workers are legally authorized to work in Barbados. Subcontractors will be required to document these checks and submit compliance records to CRSEG's HR department. Written contracts will be issued in languages understood by workers, and contracts will clearly state terms of employment, rights, and responsibilities. This ensures transparency and prevents exploitation, particularly for migrant workers and younger recruits who may be less familiar with labor rights.

These labor standards also extend to how workers interact with the surrounding community. In alignment with the Community Health Assessment and Programme, CRSEG recognizes that worker behaviour and movement beyond the worksite can influence community health, safety, and social cohesion. The prohibition of child and forced labor, SH/SEA/GBV, therefore operates not only within the workplace but also across the broader worker-community interface.

Verification procedures will include checks on subcontractor practices, recruitment agents, and service providers to ensure that no minors or coerced individuals are engaged in any activity connected to the project or its supply chain. Verification begins with age checks to prevent child labor. No worker under the age of 18 will be employed, and all applicants must provide official documentation such as a national ID card, passport, or birth certificate to confirm legal adulthood. For young workers aged 18–24, additional attention will be given to verifying identity and right-to-work status, recognizing that this group may be entering the workforce for the first time and may require guidance in navigating formal employment processes. Supervisors and the Community Liaison Officer will monitor worker conduct in public spaces, vendor areas, and transport routes identified in the Community Health Assessment as potential interaction points.

By linking labor compliance with community health oversight, CRSEG ensures that labor standards are upheld 24 hours a day, both on-site and off-site, reinforcing the project's commitment to ethical employment and respectful community engagement and with social and gender safeguards.

Oversight of subcontractor labor practices is a critical component of the LMP. Local subcontractors will be engaged to provide specialized services, but they will be held to the same standards of labor management, occupational health and safety, environmental and behavioral expectations as CRSEG employees. Contracts with subcontractors will include explicit provisions requiring compliance with the Workers' Code of Conduct, SH/SEA/GBV provisions and the LMP. CRSEG will monitor and report on subcontractor performance through audits, inspections, and grievance tracking, ensuring that subcontractor workers enjoy the same protections and rights as directly employed staff.

Induction training will be mandatory for all workers upon recruitment. This training will cover the Workers' Code of Conduct, occupational health and safety requirements, environmental topics, SEA/SH prevention, grievance procedures, and community interaction protocols. Induction sessions will be tailored to the diverse workforce, with materials provided in multiple languages and accessible formats. Refresher sessions will be scheduled regularly to reinforce awareness and compliance, ensuring that workers remain informed and engaged throughout the project lifecycle and that non-compliance with environmental, social and gender safeguards will be subject to corrective action and potential contract sanctions.

Importantly, the induction programme is linked to and supported by the project's Health, Safety and Environmental Education and Training Plan, which establishes a three-tier training system (project-level, crew-level, and position-specific) as well as specialized modules for works at heights, high-risk work such as hot works, confined space entry, lifting operations, electrical works, as other topics. Daily toolbox talks, monthly themed safety sessions, including specialized training sessions on the Code of Conduct, gender sensitization and gender risk management, GRM and the Grand emergency response drills ensure that induction is not a one-time exercise but part of a continuous training cycle.

By embedding induction within this broader safety and security framework, the Labour Management Plan demonstrates how workforce orientation is triggered by and connected to other plans. This integration ensures that labor standards, occupational health and safety, environmental, community health, social and gender safeguards are consistently reinforced, monitored, and adapted throughout the project lifecycle.

Equal opportunity provisions will be embedded in recruitment and employment practices. CRSEG will ensure that no worker is discriminated against based on gender, ethnicity, disability, sexual orientation, or other protected characteristics. Reasonable accommodation will be provided for workers with disabilities, and gender-segregated sanitary facilities will be provided and maintained to promote dignity, privacy and safety. Training and advancement opportunities will be made available to all workers, with particular attention to ensuring that women and vulnerable groups are not excluded. The Grievance Redress Mechanism (GRM) will also be utilized, detailing its accessibility through multiple channels and strict safeguards for confidentiality and non-retaliation. It includes specialized, survivor-centered pathways for SEA/SH and GBV concerns, ensuring non-retaliation and referral support. This robust system addresses discrimination, harassment (including sexual and gender-based), exploitation, and other grievances for all workers and community members. These measures align with IDB ESPS 2 and ESPS 9 on Labour and Working conditions and Gender Equality and demonstrate CRSEG's commitment to inclusivity, safe and non-discriminatory work environment.

Recruitment processes will also emphasize cultural sensitivity and cohesion. With Chinese nationals and Barbadian nationals working side by side, induction training and refreshers will include modules on intercultural communication, respect for diversity, and conflict resolution, gender sensitization and gender risk management. Supervisors will be trained to monitor interpersonal dynamics, non-discriminatory leadership, local gender norms and legal protections in Barbados and intervene promptly in cases of discrimination, harassment, or conflict. By fostering mutual respect and understanding, CRSEG will create a cohesive workforce that can collaborate effectively across cultural and national boundaries.

Monitoring and reporting will be integral to recruitment and employment practices. CRSEG will collect disaggregated data on age, sex, disability, nationality, and vulnerability status, and use this data to monitor inclusion and identify disparities and analyzed to identify patterns of under-representation, pay gaps and higher grievance rates among certain groups. Regular audits will be conducted to verify compliance with recruitment and employment standards, and corrective measures/actions will be designed and implemented based on analysis where necessary. This approach ensures that recruitment and employment practices remain fair, inclusive, and responsive to emerging risks.

Finally, recruitment and employment conditions will be communicated transparently to workers and stakeholders (such as government regulators, community members, vulnerable and marginalized groups, civil

society and non-governmental organizations, and education institutions near the site). Information on recruitment processes, employment rights, and grievance mechanisms will be disclosed through accessible materials and engagement sessions. Information reaches women and vulnerable groups through multilingual and accessible formats, mandatory tailored training, community outreach via a CLO, and confidential, survivor-centered grievance channels. Continuous feedback is integrated via structured consultations, disaggregated data analysis, and grievance tracking to ensure responsiveness and adaptive management. The Project Manager submits various labor-related reports to the PEU, including regular OHS data, incident reports, and anonymized SEA/SH/GBV summary findings. Annual Labour Management Plan reviews and escalated serious or unresolved issues are also reported. This transparency builds trust among workers and communities and demonstrates CRSEG's commitment to accountability. By embedding fairness, inclusivity, and equal opportunity into recruitment and employment practices, the project will meet the expectations of the BWA, the Government of Barbados, and the IDB.

Worker Welfare and Accommodation

Worker welfare and accommodation are central to the LMP, as they directly affect the health, safety, and productivity of the workforce. CRSEG recognizes that the Workers' Camp will serve as both a living and working environment for Chinese nationals, Barbadian nationals, and subcontractor personnel. The standards set for accommodation and welfare facilities must therefore reflect not only national legislation but also international best practice and also incorporate zero tolerance for SH/ SEA/ GBV within worker accommodations, ensuring that all workers are treated with dignity and respect. The design and management of the workers camp will consider the specific needs of women and vulnerable groups.

Accommodation facilities will be designed to provide safe, clean, and habitable living conditions. Each worker will be provided with adequate space, ventilation, lockable rooms and privacy, and access to potable water and electricity. Waste management systems will be implemented to ensure proper disposal of solid and liquid waste, thereby preventing environmental contamination and health risks. These measures align with Barbados' Health Services Act and IDB ESPS 2, which require employers to provide safe and healthy living conditions for workers.

Sanitary facilities will be gender-segregated and maintained to high hygiene standards. CRSEG will ensure that toilets, showers, and washing facilities and rest areas are sufficient in number, accessible, private, safe, lockable and regularly cleaned (twice daily on a weekly schedule) with disposal facilities for menstrual products and consideration of menstrual hygiene management in cleaning protocols. Reasonable accommodation will be made for workers with disabilities, including accessible toilets and bathing facilities, ramps, bars etc. These provisions demonstrate compliance with non-discrimination and equal opportunity principles, ensuring that all workers can live and work in dignity regardless of gender or physical ability.

Medical care will be readily available to workers through on-site health services or nearby clinics. CRSEG will establish protocols for medical screenings, emergency response, and referral to specialized care including sexual and reproductive health services and psychosocial support, for women and victims of SH/SEA/GBV and when necessary. Preventive health measures, such as vaccination campaigns and hygiene awareness sessions, will be implemented to reduce the risk of communicable disease transmission. These measures are particularly

important given the anticipated influx of workers from different countries, which may increase exposure to new health risks.

Recreational spaces will be provided to promote worker well-being and social cohesion. Facilities such as common rooms, rest areas, sports areas, and outdoor spaces that are inclusive for women and vulnerable groups which will allow workers to relax and interact outside of working hours. Communication facilities, including internet access and phone services, will be made available to ensure that workers can maintain contact with their families and communities. These services are essential for mental health and morale, particularly for foreign workers who may be far from home.

Regular inspections of accommodation and welfare facilities will be conducted fortnightly to ensure compliance with health and safety standards. A gender sensitive checklist (privacy, safety, hygiene for women's and men's facilities and accommodations) will also be included. Findings will be documented in compliance monthly reports, and corrective actions will be implemented promptly. Inspections will cover cleanliness, functionality of utilities, safety and privacy, adequacy of space, and accessibility of facilities. By maintaining rigorous inspection protocols, CRSEG will demonstrate accountability and continuous improvement in worker welfare.

Camp rules will be consistent with the Workers' Code of Conduct and will strictly prohibit weapons, alcohol, smoking, vaping, and drugs, bullying, discrimination, any form of harassment, SH/SEA/GBV. Such violations can lead to dismissal and referral to authorities and mention retaliation and its implications. These rules are designed to maintain order, safety, and respect within the camp environment. Enforcement will be carried out by supervisors and the Health, Safety and Environment (HSE) Representative, with disciplinary measures applied to violations. By embedding behavioral expectations into camp rules, CRSEG ensures that welfare facilities remain safe and conducive to productivity.

Inclusivity will be a guiding principle in the design and management of welfare facilities. Discrimination, harassment or violence based on sexual orientation, gender identity, nationality or other status is strictly prohibited in the workers' camp. CRSEG will ensure that women, youth, persons with disabilities, and migrant workers have equal access to accommodation, facilities and services. Training and refreshers will be provided to supervisors and camp managers on inclusivity and non-discrimination, gender sensitization and gender risk management and the GRM, ensuring that vulnerable groups are not excluded or marginalized. This approach aligns with IDB ESPS 9 on Gender Equality and demonstrates CRSEG's commitment to equitable treatment.

Finally, worker welfare and accommodation will be integrated into the broader monitoring and reporting framework of the LMP. Data on accommodation standards, health services, recreational facilities, and compliance with camp rules will be collected and analyzed. Grievances related to welfare and accommodation will be tracked through the Worker's Grievance Redress Mechanism (GRM), ensuring that worker concerns are addressed promptly and transparently. By embedding welfare and accommodation into monitoring systems, CRSEG ensures that these provisions remain effective, responsive, and aligned with both national and international standards. Inspection and reporting will be documented through standardized checklists, with data disaggregated by sex, age, nationality, and disability. This allows patterns of exclusion or risk to be identified, analyzed, and managed through corrective actions and adaptive updates to the Labour Management Plan.

Occupational Health and Safety (OHS)

Occupational health and safety are a keystone of the LMP and a fundamental obligation of CRSEG in delivering the SCWRRF and SCSTP projects. The safety of workers, subcontractors, and surrounding communities is paramount, and the LMP establishes a comprehensive framework to prevent accidents, protect health, and promote a culture of safety. This framework is aligned with Barbados' Health and Safety at Work Act (Cap. 356), which enshrines the right of workers to refuse unsafe work, and with IDB ESPS 2 and ESPS 4, which require employers to provide safe working conditions and protect community health and safety.

It is important to note that while OHS provisions appear across several project documents — the Labour Management Plan (LMP), and the Workers' Code of Conduct, the Health and Safety Plan and Management Manual, the intent is not duplication but reinforcement. The LMP provides the overarching framework and workforce obligations, the Code of Conduct sets behavioral standards and sanctions for breaches, while the Health and Safety Plan and Management Manual serve as the detailed technical references covering all procedures, hazard controls, PPE requirements, emergency preparedness, and monitoring systems. To avoid repetition, the LMP makes reference to the Health and Safety Manual and Plan as the authoritative sources for operational detail, ensuring consistency and alignment across all documents while maintaining clarity of roles and responsibilities.

Gender-Specific and Vulnerability-Specific OHS Risks and Measures

Occupational health and safety risks are not experienced uniformly; they can vary significantly depending on gender, age, disability, and migrant status. For women workers, risks include inadequate privacy in sanitation facilities, exposure to harassment or SEA/SH/GBV, and exclusion from PPE designed for male body types. Migrant workers may face language barriers that limit their understanding of safety protocols, as well as heightened vulnerability to SEA/SH/GBV. Persons with disabilities will be accommodated through accessible infrastructure, task adjustments, sign language interpretation and inclusive and adapted training methods (where feasible). Young workers will be paired with mentors, shielded from high-risk tasks until adequately trained, and supported through targeted induction sessions.

Risk management measures will be tailored to these vulnerabilities. For women, gender-segregated facilities, SEA/SH/GBV awareness training, and provision of appropriately sized PPE will be mandatory. Migrant workers will receive induction materials in accessible languages and pictogram-based safety instructions. Persons with disabilities will be accommodated through accessible infrastructure, task adjustments, and inclusive training. Young workers will be paired with mentors, shielded from high-risk tasks until adequately trained, and supported through targeted induction sessions.

All OHS data will be disaggregated by sex, age, nationality, and disability status, worker category, contractor vs. subcontractor, enabling the project to identify patterns of exclusion or disproportionate risk. Findings will be addressed through corrective actions, adaptive management, and regular reporting to the Barbados Water Authority, PEU. This ensures that fairness, inclusivity, and equal opportunity are embedded into OHS practices, and that vulnerable groups are fully considered and integrated into the project's safeguards framework.

The Health and Safety Plan and Management Plan will be implemented across all sites, procedures and activities of the workers campsite, the SCWRRF and the SCSTP. These documents will be setting out detailed

procedures for hazard identification (including gender-specific and vulnerability-specific hazards, risk assessment, and mitigation measures.

Particular attention will be given to time-sensitive situations, such as equipment failures, confined-space hazards, chemical spills, fires, severe weather, medical emergencies, or unsafe work observations, where delayed communication could increase harm. Evacuation routes, muster points will be designed to be safe, well-lit and accessible for women, and PwDs with attention to management of harassment risks. The LMP will therefore require clear escalation protocols, designated bilingual focal points where available, agreed emergency words or signals, and regular multilingual drills so that all workers can quickly alert others, understand instructions, evacuate, seek help, and respond safely without hesitation or confusion.

To operationalize these requirements, CRSEG will include the following language-responsive safety actions in the LMP implementation programme:

- Establish clear escalation protocols for safety concerns, incidents, near misses, unsafe work observations, medical emergencies, environmental releases, fires, severe weather alerts, and other time-sensitive events, including who must be contacted, in what order, and by what communication channel.
- Identify and formally designate bilingual focal points for key work areas, shifts, high-risk activities, camp operations, subcontractor teams, and emergency response functions, with names, roles, contact details, and availability communicated during induction, toolbox talks, and posted notices.
- Agree and train all workers on common emergency words, hand signals, stop-work signals, alarms, color codes, and visual alerts that can be understood quickly across language groups, including Chinese nationals, Barbadian nationals, and subcontractor personnel.
- Conduct regular multilingual drills and practical simulations for evacuation, muster procedures, fire response, first aid response, spill response, severe weather events, confined-space emergencies, equipment isolation, and other credible project scenarios.
- Record participation, comprehension checks, corrective actions, and lessons learned from these drills and communication controls as part of LMP monitoring and OHS reporting.
- Safety materials will be designed for workers with low-literacy, using pictograms, demonstrations, and verbal explanations.
- Participation drills will be monitored and disaggregated by sex, nationality, disability status, and contractor/subcontractor to ensure that women and vulnerable groups are fully included.

Workers will have the legal right to refuse unsafe work without fear of reprisal, in accordance with Barbados law. This right will be communicated clearly during induction training and reinforced through daily toolbox talks. Supervisors will be trained to respect and uphold this right, and mechanisms will be established to investigate and resolve safety concerns promptly. By empowering workers to protect themselves, CRSEG fosters a culture of shared responsibility for safety. Workers may also use confidential or anonymous channels through the workers' GRM to report unsafe conditions if they do not feel comfortable raising issues directly with supervisors.

Routine audits, accident reporting, and corrective action tracking will ensure that safety standards are consistently upheld. Audits will include specific checks on gender-sensitive and inclusive OHS measures. The HSE Representative will lead audits and inspections, documenting findings and implementing corrective measures. Audit processes will include confidential feedback from women workers, migrant workers and PwDs to identify hidden risks or barriers. Accident and incident reports will be logged, analyzed, and used to inform continuous improvement. Lessons learned from incidents will be shared with workers and supervisors, ensuring that mistakes are not repeated and that safety practices evolve over time.

Inclusivity will be embedded in OHS practices. Training and safety protocols will be designed to accommodate workers with different levels of literacy, language proficiency, and physical ability. Gender-sensitive and inclusive measures will be implemented to protect all workers, particularly women workers, LGBTIQ+ workers and PwDs including safe, accessible and separate sanitary facilities, reasonable accommodation measures and clear protocols to prevent and respond to harassment, discrimination and SH/SEA/GBV. These measures align with IDB ESPS 9 on Gender Equality and demonstrate CRSEG's commitment to equitable safety practices. Finally, occupational health and safety will be integrated into the broader monitoring and reporting framework of the LMP. Data on accidents, incidents, PPE compliance, training participation, and emergency drills will be collected and analyzed. Disaggregated data will be used to identify disparities and inform adaptive management measures. Grievances related to OHS will be tracked through the Worker's GRM, ensuring that worker concerns are addressed promptly and transparently. By embedding OHS into monitoring systems, CRSEG ensures that safety provisions remain effective, responsive, and aligned with both national and international standards.

8.11.17. Labour Influx Risk Management

The labor influx screening confirms that the project presents a High residual GBV/SEA/SH risk requiring enhanced management. The risk is not driven only by workforce size, but by the combination of a large and predominantly male workforce, non-local labor presence, nearby residential and community receptors, worker movement outside the site, language requirements, economic asymmetry, and the severe consequence profile of SEA, SH and GBV incidents. The Community Health Assessment identifies SEA, SH and GBV as a standalone health determinant pathway, CH-08 (Sexual Exploitation and Abuse, Sexual Harassment and Gender-Based Violence), linked to workforce presence, economic asymmetry, and reporting barriers. The labor influx assessment will be updated periodically with specific attention to impacts on women and girls, female-headed households, PwDs and other vulnerable groups and will be directly linked to the SH/SEA/GBV Prevention and Response Plan and GRM.

Worker movement in surrounding communities; interaction with residents, vendors, local businesses, schools, transport routes, and nearby residential areas; language and communication barriers; possible under-reporting due to fear, stigma, retaliation, or lack of accessible channels; and heightened vulnerability among women and girls, children, older persons, persons with disabilities, and lower-income households.

Because women make up a small minority of the project workforce, the LMP commits to implementing targeted measures to ensure their safety, dignity, and full inclusion. These measures include gender-segregated and well-lit facilities, privacy and security protocols for accommodation and sanitation

areas, provision of appropriately sized PPE, and tailored OHS training that addresses gender-specific risks. In addition, confidential grievance channels and survivor-centered SEA/SH referral pathways will be reinforced to protect female workers from harassment or exploitation, while mentoring and professional development opportunities will support their progression in a male-dominated environment.

Beyond the worksite, the plan identifies community risk “hotspots” such as residential areas adjacent to the campsite, school zones along narrow access roads, and informal vending locations where workers and residents interact. These areas are particularly sensitive for women and girls who may also face intersecting vulnerabilities as migrants, persons with disabilities, or members of low-income households. The LMP therefore integrates intersectional safeguards to ensure that gender, poverty, disability, and migration status are considered together, reducing compounded risks and promoting equitable treatment both within the workforce and at the worker-community interface.

The screening ratings and their management implications are summarized in Table 170.

Table 170: Labour influx GBV/SEA/SH risk rating summary

Risk Element	Screening Rating	Management Implication
Pre-mitigation likelihood	Possible	Controls must be in place before mobilization and reinforced during peak deployment.
Pre-mitigation consequence	Catastrophic	Survivor-centered prevention and response must be treated as a priority safeguard.
Pre-mitigation significance	Critical	Enhanced management, supervision, and reporting are required.
Post-mitigation likelihood	Unlikely	Likelihood may be reduced only where controls are fully implemented and verified.
Residual significance	High	Residual risk remains a priority for auditing, supervision, grievance monitoring, and corrective action.

Minimum required controls include mandatory Code of Conduct signing before site access; GBV/SEA/SH induction before mobilization and quarterly refreshers; written materials in English and Standard Chinese with spoken interpretation based on confirmed language needs; a worker-community interaction protocol; confidential and anonymous reporting channels separate from the general grievance log for sensitive cases; a verified survivor referral directory; Community awareness sessions will be designed and delivered in collaboration with relevant service providers including NGOs, local police, medical professionals, and social

support agencies to ensure that women, men, boys, girls, persons with disabilities, and other vulnerable groups can safely participate and receive accurate, accessible information.

All subcontractors, supervisors, security personnel, and outsourced service providers who interact with communities will be required to sign the Project Code of Conduct. In addition, they will undergo mandatory training on the Grievance Redress Mechanism (GRM), gender sensitization, and gender risk management to strengthen accountability, reinforce respectful conduct, and reduce risks of discrimination, harassment, or exploitation in community interfaces. Additionally, confidential case management; sanctions for substantiated breaches; and monthly and quarterly monitoring of training, channel functionality, complaint trends, and corrective action close-out.

Immediate escalation to the Project Manager, Community Health Focal Point, and designated confidential case-handling function is required for any allegation of SEA, SH, GBV, or child protection concern; any report of retaliation, intimidation, or pressure; any indication that confidential reporting channels are not functioning or accessible; repeated worker conduct complaints from the same location, vendor area, transport route, or accommodation interface; failure to complete Code of Conduct signing or GBV/SEA/SH induction before site access; or any change in workforce numbers, accommodation, rotation, or transport arrangements that increases worker-community contact.

Roles and Responsibilities

Effective implementation of the LMP requires clear definition of roles and responsibilities across all levels of the project and across the integrated workforce model. Accountability must cover Chinese nationals employed directly by CRSEG, Barbadian nationals engaged through direct hire, and local subcontractors providing project services. Each role must therefore support fair recruitment, safe and dignified working and living conditions, occupational health and safety, language-responsive communication, knowledge transfer, grievance access, and compliance with Barbados legislation, the expectations of the BWA, and the requirements of the IDB's ESPS.

The following graphics summarize the accountability structure and show how responsibilities may overlap or merge depending on the nature, urgency, severity, and confidentiality of a labor or working-conditions issue (see Figures 86 and 87).

Roles and Responsibility Coverage Map

	Project Manager	HR Representative	HSE Representative	Community Liaison Officer	Camp Manager	Subcontractors	Supervisors	Workers
Recruitment & Contracts	✓	✓	✓					
Induction & Training	✓	✓	✓					
OHS & Emergency Response	✓	✓	✓	✓			✓	✓
Welfare & Accommodation	✓	✓	✓	✓	✓	✓		✓
Code of Conduct & SEA/SII Prevention	✓	✓	✓	✓	✓	✓	✓	
Grievance Management	✓			✓				
Community Interface	✓	✓				✓		
Knowledge Transfer	✓							
Monitoring & Reporting	✓							

Figure 86: Roles and responsibility coverage map. This image is AI generated and is intended to show role-specific accountability areas and crossover points where shared coordination is required.

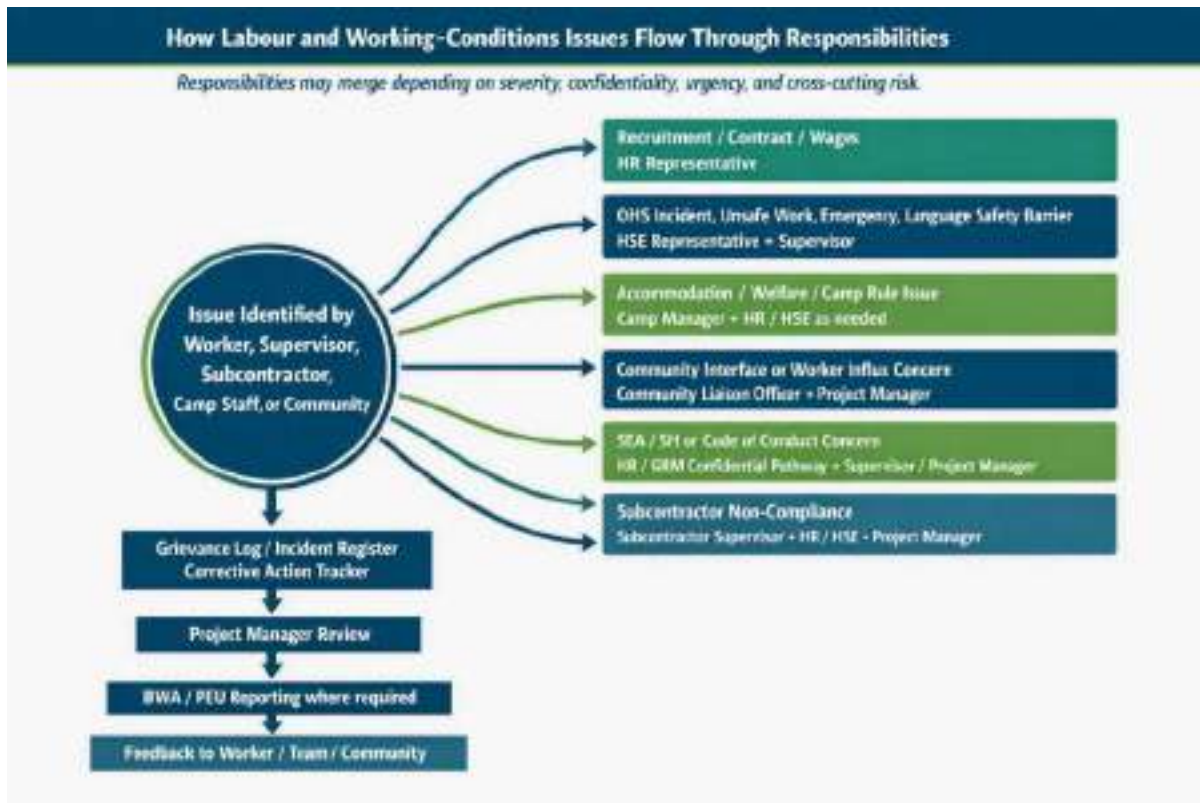


Figure 87: Responsibility flow for labor and working-conditions issues. This image is AI generated and is intended to show how issues may move through different responsible roles and merge into common registers, corrective actions, reporting, and feedback loops.

Together, the visuals clarify that accountability under the LMP is both role-specific and coordinated. Each function retains a clear lead responsibility, but crossover issues are managed through defined escalation, joint review, shared registers, and corrective action tracking. For example, recruitment and contract concerns are led by HR, while safety issues are led by HSE; however, matters involving language barriers, subcontractor practices, worker accommodation, SEA/SH, or community interaction may require coordinated action by supervisors, the Camp Manager, the Community Liaison Officer, subcontractors, and the Project Manager. To avoid confusion, the first responsible officer records the issue, identifies required supporting roles, confirms confidentiality requirements, and escalates to the Project Manager or Grievance Redress Committee where the matter is serious, unresolved, cross-cutting, or reportable to the Supervision Firm and the SCWRP PEU / BWA.

Please refer to the Code of Conduct for the role of the Project Manager. The HR Representative is responsible for gender-sensitive recruitment, contracts, induction, training coordination, employment records, and worker grievance procedures. This role includes implementing the recruitment principles roadmap by verifying workforce needs, supporting fair advertisement and local outreach, applying transparent screening and merit-based selection, ensuring contracts are provided in a language understood by each worker, and preventing discrimination, child labor, forced labor, and coercive recruitment practices. The HR Representative will also ensure that Chinese nationals, Barbadian nationals, and subcontractor personnel receive induction on the

LMP, Workers' Code of Conduct, OHS obligations, SEA/SH prevention, grievance access, equal opportunity, and intercultural respect.

The HSE Representative is responsible for enforcing occupational health and safety standards for all workers and subcontractors. This role includes overseeing hazard identification, risk assessment, PPE compliance for male and female workers and workers with disabilities, high-risk task controls, audits, incident reporting, corrective action tracking, emergency preparedness, and the legal right of workers to refuse unsafe work. In line with the updated OHS provisions, the HSE Representative will also manage language differences as a safety risk by ensuring that safety-critical instructions, warning signs, emergency alerts, stop-work signals, muster information, and incident reporting procedures are understood by the workforce. This includes establishing data and analysis in a disaggregated form to identify any unequal risk patterns and to adjust measures and controls accordingly, escalation protocols, identifying bilingual focal points, agreeing emergency words and signals, conducting multilingual drills, and recording comprehension checks and lessons learned as part of OHS reporting.

The Community Liaison Officer serves as the bridge between CRSEG and affected communities and supports alignment between the LMP and the Community Health and Safety Plan. This role includes gender-sensitive and inclusive engagement, monitoring community concerns, facilitating dialogue, supporting disclosure of workforce-related information, coordinating community awareness sessions, and escalating relevant issues to the PEU. The Community Liaison Officer will work with HR, HSE, camp management, and be trained to safely receive and refer SH/SEA/GBV complaints in coordination with the Social Personnel and subcontractor supervisors to ensure that worker influx, transport, camp-community interaction, grievance access, SEA/SH prevention, and public health matters are managed consistently and transparently.

Subcontractors are responsible for ensuring that their personnel comply with the LMP, the Workers' Code of Conduct, OHS requirements, recruitment standards, accommodation and welfare rules where applicable, and project grievance mechanism. Contracts with subcontractors will include explicit provisions requiring adherence to labor management, occupational health and safety, behavioral standards, language-responsive safety arrangements, and participation in relevant induction, toolbox talks, emergency drills, and technical capacity-building activities. Subcontractors will be subject to audits, inspections, and corrective actions, and persistent non-compliance may result in suspension of work or termination of contracts.

Supervisors play a critical role in translating the LMP into daily practice. They are responsible for ensuring that workers comply with the Code of Conduct, use PPE correctly, follow safe work procedures, report hazards, and participate in training, drills, toolbox talks, and knowledge-transfer activities. Supervisors are accountable for maintaining a work environment free from discrimination, harassment and SH/SEA/GBV, responding promptly and appropriately to any such reports and ensuring no retaliation occurs against witnesses or complainants, will monitor interpersonal dynamics among Chinese nationals, Barbadian nationals, and subcontractor personnel, intervene promptly in cases of discrimination, harassment, conflict, or unsafe behaviour, and confirm that workers understand safety instructions, emergency signals, escalation pathways, grievance channels, and camp rules. They will also support mentoring arrangements by creating practical space for local workers and subcontractors to observe, practice, ask questions, and progressively take on technical responsibilities.

The Camp Manager, in coordination with HR and HSE, is responsible for implementing worker welfare and accommodation requirements. This includes maintaining safe, clean, well-lit routes, lockable rooms, adequate menstrual hygiene management facilities, and dignified accommodation; ensuring gender-segregated sanitary facilities; supporting reasonable accommodations for persons with disabilities; managing access to medical care, recreational areas, and communication facilities; enforcing camp rules consistent with the Workers' Code of Conduct; and prompt response to any reports of harassment or SH/SEA/GBV within the workers camp, documenting regular inspections and corrective actions. The Camp Manager will also ensure that camp information, safety notices, emergency instructions, grievance channels, and welfare arrangements are communicated in languages and formats understood by residents.

Individual workers are responsible for complying with the Code of Conduct and the provisions of the LMP. This includes respecting colleagues and community members, using PPE correctly, participating in induction, refresher training, multilingual drills, toolbox talks, and technical learning opportunities, and reporting unsafe conditions, any observed discrimination, harassment, SH/SEA/GBV involving colleagues or community members, incidents, grievances, or Code of Conduct violations. Workers are empowered to refuse unsafe work without fear of reprisal and are encouraged to use grievance channels when concerns arise. By holding workers accountable for their own behaviour while ensuring that they receive clear information and training, CRSEG fosters a culture of shared responsibility across the integrated workforce.

Finally, monitoring and reporting responsibilities will be distributed across all roles and will reflect the commitments added throughout this LMP. The Project Manager will oversee reporting to the Supervision Firm and the SCWRP PEU, while the HR Representative, HSE Representative, Community Liaison Officer, Social Personnel, Camp Manager, subcontractors, and supervisors will collect and analyze data within their respective domains. Monitoring will include recruitment and onboarding records, workforce composition, subcontractor compliance, accommodation inspections, OHS incidents, multilingual drills, bilingual focal point arrangements, grievance trends, welfare concerns, training participation, and knowledge-transfer activities. This integrated approach ensures that accountability is shared, that the workforce model is managed consistently, and that continuous improvement through monitoring and lessons learned is achieved across the LMP.

8.11.18. Monitoring and Reporting

Monitoring and reporting are integral to the effectiveness of the LMP, providing the evidence base needed to demonstrate compliance, identify gaps, and drive continuous improvement. Effectiveness is defined as the ability of the LMP to ensure safe, fair, and inclusive labor practices that uphold gender equality, prevent SEA/SH/GBV, and promote the meaningful participation of all worker groups. CRSEG recognizes that labor management is not static; it requires ongoing oversight, documentation, and adaptation informed by indicators and feedback from women, youth, migrants, and other vulnerable groups. Monitoring will therefore track gender equality outcomes, inclusion of marginalized workers, and SEA/SH/GBV prevention measures alongside traditional compliance metrics, ensuring that the LMP evolves responsively to workforce realities and community expectations.

Effectiveness and Gender-Responsive Indicators

The effectiveness of the Labour Management Plan (LMP) will be measured by its ability to ensure equitable treatment, safeguard rights, and reduce risks for all workers and affected communities, with particular attention to women, youth, migrants, persons with disabilities, LGBTIQ+ persons, older workers and other vulnerable or marginalized groups. Effectiveness is defined as the consistent achievement of the following outcomes:

- **Gender equality:** Increased representation of women in recruitment, training, and advancement; equitable access to facilities, PPE, and welfare provisions; and reduction of gender-differentiated barriers. Reduced gender gaps in job categories, contract types and remuneration.
- **Inclusion:** Demonstrated participation of vulnerable groups in training, grievance mechanisms, and decision-making processes, with disaggregated monitoring by sex, age, disability, and nationality.
- **SEA/SH/GBV prevention:** Zero tolerance for harassment and exploitation, measured through Code of Conduct compliance, survivor-centered grievance pathways, confidential reporting uptake, and sanctions for breaches. Effectiveness will be assessed not only by reported case numbers, but also by evidence of trust in reporting channels, awareness levels among workers and communities and the timely, survivor-centred handling of cases, recognizing that under-reported is common.

Indicators will include:

- Workforce composition by sex, age, nationality, disability, and job category.
- Number and percentage of women and vulnerable groups participating in induction, training, and welfare programs.
- Frequency and resolution of grievances disaggregated by type, sex, age, and vulnerability status.
- Uptake of SEA/SH/GBV awareness sessions and referrals to survivor-centered support services.
- Community feedback on safety and inclusion in identified “hotspots” such as school zones, vending areas, and residential interfaces.

The LMP will be informed by continuous feedback from women, youth, migrants, and other vulnerable groups through structured consultations, grievance data, and monitoring reports. This feedback will guide **adaptive management**, ensuring that corrective actions are responsive to lived experiences and that safeguards remain relevant as workforce and community conditions evolve. Consultations will be organized in formats that are safe and accessible for women, PwDs, low-literacy groups and migrants. Feedback and recommendations from these groups will be documented and reflected in action plans and subsequent LMP revisions.

The compliance traceability framework is presented in Table 3.

Monthly labor audits will be conducted to review contracts, working hours, welfare facilities, and occupational health and safety compliance. These audits and disaggregated data analysis should review gender and nationality patterns in job categories, pay, training access, contract type, grievances and disciplinary measures as well as patterns by age, disability status, migrant status and contractor/subcontractor and together these should inform targeted actions to correct and identified risks and inequities.

This disaggregation ensures that monitoring captures the experiences of diverse groups, including women, youth, persons with disabilities, and migrant workers. By analyzing disaggregated data, CRSEG can identify disparities, prevent exclusion, and ensure that vulnerable groups are equitably included in project benefits. All disaggregated data will be handled in compliance with data protection laws and confidentiality standards to avoid stigmatization or harm. This approach demonstrates compliance with IDB ESPS 9 on Gender Equality and ESPS 10 on Stakeholder Engagement.

Grievances, incidents, and corrective actions will be systematically tracked through the Grievance Redress Mechanism. The grievance log will record complaints, actions taken, and outcomes, with monthly reviews conducted to identify patterns and recurring issues. SEA/SH-related grievances will be tracked separately to ensure confidentiality and survivor-centered handling. Monitoring will include analysis of whether women, migrants, PwDs and other vulnerable groups are using the GRM at similar rates and whether there are signs of under-reporting. Anonymized Sh/SEA/GBV-related information will be shared in a way that cannot be traced back to the individuals or specific small groups, especially in small communities or work teams. By integrating grievance data into monitoring systems, data protection measures, trend analysis and commitment to share anonymized summary findings with workers, communities and the PEU while safeguarding identities, CRSEG ensures that worker and community concerns inform continuous improvement.

Incident reporting will be a key component of monitoring. All accidents, near misses, safety violations, grievances will be documented, data will be disaggregated, analyzed, and used to inform corrective actions. Incident analysis will distinguish incidents with a gender or social dimension to ensure appropriate remedies and prevention. Where incidents result in physical or psychological harm, affected workers will be informed about and referred to the appropriate support services. Lessons learned from incidents will be shared with workers and supervisors, ensuring that mistakes are not repeated. Incident data will also be reported to the BWA and the PEU, demonstrating transparency and accountability.

Annual reviews of the LMP will be undertaken with CRSEG, the Barbados Water Authority, and the PEU. These reviews will incorporate stakeholder feedback, including targeted consultations with women workers, migrant workers, PwDs and community representatives to validate findings and propose improvements, audit findings, grievance data, and incident reports. The annual review will assess the effectiveness of labor management measures, identify areas for improvement, and update the LMP, as necessary. By conducting annual reviews, CRSEG ensures that the LMP remains relevant, responsive, and aligned with evolving project risks.

Adaptive management will be applied to refine controls based on monitoring results. This means that policies, procedures, and training will be updated in response to emerging risks, grievances, and stakeholder feedback. Adaptive management ensures that the LMP is not static but evolves to meet the needs of workers and communities. It will prioritize interventions that address documented disparities affecting women, youth, migrants, LGBTIQ+ persons and other vulnerable groups, ensuring that their specific risks are addressed promptly. This approach aligns with IDB ESPS 1 on Assessment and Management of Environmental and Social Risks and Impacts, which requires continuous improvement in risk management.

Stakeholder engagement will be integrated into monitoring and reporting. The Stakeholder Engagement Plan would include monitoring and reporting procedures. Workers and communities will be consulted on the effectiveness of labor management measures, and their feedback will be incorporated into audits and reviews. Engagement will use gender-sensitive and inclusive methods (e.g. separate focus groups for women and youth, accessible venues and formats for PwDs, interpreters for migrants) and will be scheduled at times that do not conflict with care responsibilities or wage-earning work. Engagement sessions will provide opportunities for stakeholders to validate monitoring findings and suggest improvements. Findings from engagement will be documented in action plans, with clear timelines and responsibilities for follow-up and progress will be fed back to stakeholders. By involving stakeholders in monitoring, CRSEG ensures that the LMP is grounded in lived experiences and trusted by those it affects.

Finally, monitoring and reporting responsibilities will be distributed across all roles. The Project Manager will oversee reporting to the Supervision Firm and the SCWRP PEU /Barbados Water Authority, while the HR Representative, HSE Representative, Social Personnel and Community Liaison Officer will collect and analyze data within their respective domains. Subcontractors and supervisors will provide input through audits and inspections, and workers will contribute through grievance submissions. This integrated approach ensures that monitoring is comprehensive, accountability is shared, and continuous improvement is achieved.

Table 171: Compliance matrix annex

LMP Section	Relevant Barbados Legislation	Applicable IDB ESPS	Key Measures	Compliance	Responsible Party
Introduction	Employment Rights Act (2012); Health and Safety at Work Act (Cap. 356); Health Services Act (Cap. 44)	ESPS 1 (Risk Management); ESPS 2 (Labour); ESPS 4 (Community Health & Safety); ESPS 9 (Gender Equality); ESPS 10 (Stakeholder Engagement)	Establishes framework for fair labor practices, compliance traceability, and integration with Code of Conduct and GRM.		Project Manager
Workforce Profile	Employment Rights Act; Labour Laws of Barbados	ESPS 2; ESPS 9; ESPS 10	Defines workforce composition (Chinese nationals, Barbadian nationals, subcontractors); inclusivity for vulnerable groups; disaggregated data collection		HR Representative
Recruitment & Employment Conditions	Employment Rights Act; Labour Laws	ESPS 2; ESPS 9	Transparent, merit-based recruitment; contracts in native languages; prohibition of		HR Representative

LMP Section	Relevant Barbados Legislation	Applicable ESPS	IDB	Key Compliance Measures	Responsible Party
				child/forced labor; subcontractor oversight	
Worker Welfare & Accommodation	Health Services Act; Labour Laws	ESPS 2; ESPS 9		Safe, clean accommodation; gender-segregated facilities; medical care, recreation, communication; inspections documented	Camp Manager / HR Representative
Occupational Health & Safety (OHS)	Health and Safety at Work Act (Cap. 356)	ESPS 2; ESPS 4		Workers' Health & Safety Plan; PPE mandatory; emergency preparedness; right to refuse unsafe work; audits and corrective actions, Code of Conduct	HSE Representative
Community Health & Safety	Health Services Act; Environmental Regulations	ESPS 4; ESPS 10		Traffic & Pedestrian Plan; Noise, Air Quality, Waste, Water Protection Plans; security protocols; community liaison	CRSEG Community Liaison Officer
Grievance Redress Mechanism (GRM)	Employment Rights Act; Labour Laws	ESPS 2; ESPS 10		Accessible channels (email, hotline, anonymous); confidentiality; timelines; SEA/SH-sensitive procedures; grievance log. GRM	HR Representative / Grievance Committee, Social personnel
SEA/SH & GBV Prevention	Employment Rights Act; Health Services Act	ESPS 2; ESPS 4; ESPS 9; ESPS 10		Zero tolerance policy; risk screening; survivor-centered response; community awareness sessions; subcontractor compliance, GRM	HR Representative / Supervisors, Social Personnel
Labour Influx Risk Management	Employment Rights Act; Health Services Act; Health and Safety at Work Act	ESPS 1; ESPS 2; ESPS 4; ESPS 9; ESPS 10		Workforce baseline; peak deployment monitoring; worker-community interaction protocol; confidential SEA/SH channels; survivor referral directory; language access;	Project Manager / HR / HSE / CRSEG Community Liaison

LMP Section	Relevant Barbados Legislation	Applicable IDB ESPS	Key Compliance Measures	Responsible Party
			subcontractor cascade; escalation triggers	
Roles & Responsibilities	Employment Rights Act; Labour Laws	ESPS 1; ESPS 2; ESPS 4	Clear accountability structure (Project Manager, HR, HSE, Community Liaison, Supervisors, Workers); subcontractor obligations	Project Manager
Monitoring & Reporting	Employment Rights Act; Health Services Act	ESPS 1; ESPS 2; ESPS 9; ESPS 10	Monthly audits; disaggregated data; grievance/incident tracking; adaptive management; annual review with BWA & PEU	Project Manager / HR / HSE / CRSEG Community Liaison

The Compliance Matrix Annex serves as a traceability tool that links each section of the Labour Management Plan to the relevant national legislation and IDB Environmental and Social Performance Standards. It demonstrates that CRSEG's commitments are not abstract but grounded in enforceable legal and institutional frameworks.

Each row of the matrix identifies:

- The LMP section: The thematic area of labor management (e.g., recruitment, welfare, OHS).
- Relevant Barbados legislation: The statutory obligations that govern labor rights, health and safety, and public health.
- Applicable IDB ESPS: The international standards that elevate compliance to global best practice.
- Key compliance measures: The specific actions CRSEG will take to meet both national and international requirements.
- Responsible party: The individual or role accountable for implementation, monitoring, and reporting.

This matrix provides reviewers with a clear line of sight from commitments in the LMP to the standards they are designed to meet. It also ensures that responsibilities are clearly assigned, preventing gaps in accountability. The matrix will be reviewed periodically to ensure that emerging environmental, social and/or risks and any updated legal/ESPS requirements are incorporated.

For CRSEG, the matrix is a management tool: it serves as an internal audit, it allows supervisors and managers to quickly identify which standards apply to their area of responsibility, what measures must be implemented, and how compliance will be monitored. For the Supervision Firm and SCWRP PEU/BWA, the matrix is an audit tool: it provides evidence that the LMP is aligned with both national law and international standards, and that compliance can be verified through monitoring and reporting.

By integrating this Compliance Matrix Annex into the LMP, CRSEG demonstrates its commitment to transparency, accountability, and continuous improvement. It ensures that labor management measures are not only well-intentioned but also enforceable, traceable, and responsive to both worker and community needs.

8.11.19. Knowledge Transfer, Mentoring, and Technical Capacity Building

The LMP recognizes that the participation of Chinese nationals, Barbadian nationals, and local subcontractors creates an important opportunity for structured transfer of technical knowledge. This knowledge transfer is not expected to occur only through the hiring of local workers or subcontractors, but through planned workplace arrangements that provide time, space, supervision, and resources for mentoring, practical training, and joint problem-solving during construction and commissioning.

CRSEG will therefore use the LMP to support knowledge transfer by pairing experienced technical personnel, including Chinese national specialists where relevant, with Barbadian workers and subcontractor teams in areas such as water reclamation technology, sewage treatment plant construction, equipment installation, process control, quality assurance, commissioning, and maintenance readiness. These arrangements should be built into work planning, toolbox talks, task briefings, and supervisory routines so that local personnel are able to observe, practice, ask questions, and progressively assume greater responsibility for technical tasks.

This approach will require more than informal on-the-job exposure. The LMP will support dedicated mentoring and training spaces, including scheduled technical briefings, translated or interpreted instruction where needed, practical demonstrations, supervised work rotations, and joint inspections involving CRSEG specialists, local workers, and subcontractor supervisors. Where language or cultural differences may affect learning, supervisors will ensure that instructions are clear, respectful, and accessible, and that workers including female workers and workers with disabilities etc., are encouraged to raise questions without fear of embarrassment, retaliation, or discrimination.

Local subcontractors will be included in relevant technical learning opportunities so that capacity building extends beyond directly hired employees. Subcontractor contracts, induction requirements, and supervision arrangements should therefore identify where subcontractor personnel are expected to participate in technical orientation, safety-critical training, quality control briefings, and lessons-learned sessions. This will help ensure that technical standards are consistently understood across the whole workforce and that local firms benefit from exposure to project methods and technologies.

Implementation will be monitored through the LMP's training and reporting system. CRSEG will track participation in technical training, mentoring assignments, refresher sessions, toolbox talks, and subcontractor capacity-building activities, with attention to nationality, role, gender, and employment category where appropriate. Feedback from workers and subcontractors will be systematically reviewed through supervision meetings, audits, and the worker grievance mechanism to identify and address barriers to learning, communication, or equal access to training. Disaggregated training data will be analyzed to detect gaps in participation or progression among women, youth, migrant workers, subcontractor staff, and other vulnerable groups. Where gaps are identified, targeted actions such as adjusted schedules, additional sessions, or tailored training approaches will be implemented to close them.

In this way, the LMP contributes not only to compliant labor management during construction but also to the longer-term development of local technical capacity and the sustainable operation of the completed facilities. By embedding continuous feedback and disaggregated monitoring into training and capacity-building processes, the Plan ensures that all workers, regardless of gender, age, nationality, or disability status, can participate meaningfully and benefit equitably from project opportunities.

8.12. Code of Conduct

This Code of Conduct (CoC) outlines the mandatory standards of behaviour and ethics in labor, health, safety, environmental, human rights, anti-corruption and cultural respect required from all employees, subcontractors, and representatives of CRSEG. This CoC applies to all project-related activities, whether on or off the project site.

It defines the rules of behaviour for all workers related to risks associated with, but not limited to: prevention and management measures for environmental, labor, and social risks of the project, including health and safety risks, third party contractor actions, labor influx, illicit behaviour and crime, sexual and gender-based violence, discrimination, and sexual abuse and exploitation of children and other individuals or vulnerable groups such as Persons with Disabilities (PWDs) and sexual minority groups, namely LGBTIQ+.

This CoC aligns with the IDB's Environmental and Social Safeguards, specifically ESPS 1: Assessment and Management of Social Risks and Impacts; ESPS 2: Safe and Health Working conditions, ESPS 4: Community Health, Safety and Security; ESPS 9: Gender Equality and ESPS 10: Stakeholder Engagement. It is also supported by key project documents outlined in the **draft** *Environmental and Social Impact Assessment (ESIA)* and *Environmental and Social Management Plan (ESMP) for the Workers' Campsite of China Railway Shanghai Engineering Group Co. Ltd, in the ESIA/ESMP for "Upgrading of the existing South Coast Sewage Treatment Plant (SCSTP)"* and in the *"Construction of the New South Coast Water Reclamation and Re-use Facility (SCWRRF)"* Such project documents include the Social Management Plan, Gender Monitoring Plan, Grievance Redress Mechanism (GRM), Labour Management Plan (LMP), Workers' Health and Safety Plan, Emergency Response Plan, Incident Management Plan and the Community Health and Safety Plan.

The Annexes provide supporting implementation details for this Code: Annex 1 lists the supporting plans and their revision status; Annex 2 sets out the Grievance Redress Mechanism (GRM); Annex 3 provides the SH/SEA/GBV Prevention and Response Plan; Annex 4 includes the Safety Education and Training Plan details induction, refresher and specialized training requirements; and Annex 5 describes the Community Health Programme and Plan addresses community health risks and safeguards linked to worker conduct and project activities.

The objective of the Workers' Code of Conduct is to maintain a safe, respectful, productive, and inclusive workplace and to promote harmonious relations with the local community and other stakeholders. Compliance with this Code is strictly mandatory and is a condition of employment.

This CoC outlines mandatory standards of behaviour, ethics, and safety for all CRSEG employees, subcontractors, and representatives. It enforces a zero-tolerance policy for Sexual Harassment (SH), Sexual

Exploitation and Abuse (SEA), and Gender-Based Violence (GBV), applying survivor-centered principles of confidentiality, informed consent, safety, dignity, and non-retaliation for complainants, victims and witnesses.

Recognizing the project's projected workforce profile (252 workers, predominantly male, with 98 non-local workers), the CoC integrates enhanced supervision, mandatory induction, language-appropriate training, and community-interaction protocols to mitigate labor influx risks, SH/SEA/GBV discrimination and other social harms.

Community health risks, including traffic injury, vector-borne disease, wastewater exposure, and SEA/SH/GBV are treated as critical pathways. This Code aligns with the Community Health Programme to ensure worker conduct protects surrounding communities and minimizes social and gender-related harms.

All workers must complete mandatory health, safety, and environment (HSE) training, specialized safety modules, and induction on SH/SEA/GBV prevention, appropriate use of the grievance and reporting mechanism, and community health safeguards. Compliance with this CoC is a condition of employment and contracting, and a cornerstone of upholding non-discrimination, preventing SH/SEA/GBV, respect for community members and maintaining project integrity and community trust.

Non-compliance with this Code of Conduct will result in proportionate disciplinary measures, up to and including removal from site, termination of employment of contract and where the conduct may constitute a criminal offence, referral to the competent authorities in accordance with applicable law.

8.12.16. Purpose

CRSEG has prepared this CoC to regulate the behaviour and actions of all employees, subcontractors, and representatives, and to prevent safety, health, social, and community risks caused by improper conduct.

The CoC integrates safeguards across environmental, labor, social, and gender-related domains, ensuring ethical behaviour in labor practices, health and safety, human rights, working conditions, and community relations. It enforces a zero-tolerance policy for SH, SEA, and GBV, applying survivor-centered principles of confidentiality, informed consent, dignity, safety and non-retaliation, with access to referral services and grievance and reporting mechanisms.

Recognizing the risks associated with labor influx including a large, predominantly male and partly non-local workforce the CoC establishes mandatory induction, language-appropriate training, worker-community interaction protocols, and enhanced supervision to mitigate SEA/SH/GBV risks.

The CoC also integrates community health safeguards, requiring workers to protect surrounding communities from traffic injury, vector-borne disease, wastewater exposure, and SEA/SH/GBV, consistent with the Community Health Programme and Plan and overseen by the Community Health Focal Point.

All workers must complete HSE training, specialized safety modules, and induction on SH/SEA/GBV prevention, appropriate use of grievance and reporting mechanisms, and community health safeguards, reinforced through refresher sessions, toolbox talks, and community engagement.

The CoC applies to all stages of the project — design, construction, and operation — for both the Workers' Campsite, the *"Upgrading of the existing South Coast Sewage Treatment Plant (SCSTP)"* and the *"Construction*

of the New South Coast Water Reclamation and Re-use Facility (SCWRRF)” Non-compliance with this Code of Conduct will result in proportionate disciplinary measures, up to and including removal from site, termination of employment of contract and where the conduct may constitute a criminal offence, referral to the competent authorities in accordance with applicable law.

8.12.17. Responsibility

8.12.17.1. Management Oversight

Project Manager

The Project Manager has ultimate accountability for the overall implementation of the CoC, including its social and gender-related provisions. This responsibility includes ensuring that all subcontractors formally adopt and enforce this document. The Project Manager must ensure that sufficient resources are allocated for welfare facilities, health and safety, training and awareness, and for ongoing communication and enforcement of this document with all relevant stakeholders.

It is also the responsibility of the Project Manager to manage incidents between workers and residents as well as between workers that concern the execution of all project-related activities. The Project Manager will also have oversight to manage the occurrence of any serious incident including SH/SEA/GBV incidents, while also being responsible for reporting and documenting such incidents in line with the GRM and survivor-centered protocols of confidentiality, informed consent, safety, dignity and non-retaliation. Reporting will be made to the Employer/the Project Execution Unit (PEU) and/or to other relevant authorities and stakeholders in accordance with Annex 2: GRM, Annex 3: SH/SEA/GBV Prevention and Response Plan and applicable law.

The Project Manager is also accountable for ensuring labor influx risk controls are implemented, including mandatory Code of Conduct signing, GBV/SEAH induction, and worker-community interaction protocols. They must verify that confidential reporting channels and referral pathways to appropriate services (medical, psychosocial, legal, safety/shelter, protection) are functional before workforce mobilization, and that subcontractors adhere to these requirements. Non-compliance by contractors, subcontractors, or workers must be addressed through corrective actions and proportionate disciplinary measures and where relevant referral to appropriate authorities.

The HR Representative is responsible, with support from the Project Manager for ensuring that the Code of Conduct is clearly displayed through signage across the project site, including at the main entrance and other high-visibility areas, in languages that are understandable to all workers.

Human Resources (HR) Representative

The HR Representative is responsible for communicating, distributing, and monitoring compliance with the Code of Conduct. The HR Representative ensures every worker, and any other relevant stakeholders, receives a copy in their native language, signs the acknowledgment, and understands the Code’s requirements and the available grievance and reporting processes.

In addition to managing grievances, the HR Representative must apply survivor-centered principles — confidentiality, informed consent, dignity, safety and non-retaliation — when handling SEA/SH/GBV cases. Such cases must be recorded only in restricted-access registers, separate from the general grievance log, and

survivors are offered referral to medical, psychosocial, legal, or child protection services as relevant. Further procedural requirements are set out in Annex 2: Grievance Redress Mechanism and Annex 3: SH/SEA/GBV Prevention and Response Plan.

The HR Representative is responsible for ensuring the Code of Conduct is prominently posted at all work sites and common areas, in accessible formats and languages, and updated promptly whenever revisions occur. This responsibility will be supported by the Project Manager and CRSEG, as necessary, to guarantee visibility and compliance across all operations.

The HR Representative ensures grievance channels are accessible in English and Standard Chinese, with interpreters provided where necessary and safe, so that all workers can raise concerns without language barriers. The HR Representative reports anonymized case numbers, types of grievances, and resolution times on at least a quarterly basis to the Project Manager and PEU, ensuring transparency and oversight without compromising confidentiality or survivor safety. Additionally, if necessary, this person will be responsible for organizing a competent team to investigate sensitive cases, abuse of power, humiliation, bullying, gender-related complaints or allegations of harassment, ensuring a safe, unbiased process that is separate from standard management lines.

Further, any serious allegations such as SH/SEA/GBV, child abuse, or severe safety incidents must be immediately escalated to the designated persons, including the Project Manager, HR and/or the HSE Representative, and where necessary, to the relevant authorities. In such cases, the internal investigation process shall be managed in accordance with the Grievance Redress Mechanism (GRM) system and SH/SEA/GBV Prevention and Response Plan, ensuring that actions taken do not expose victims, complainants or witnesses to retaliation and follows the framework featured in Figure 88 below:

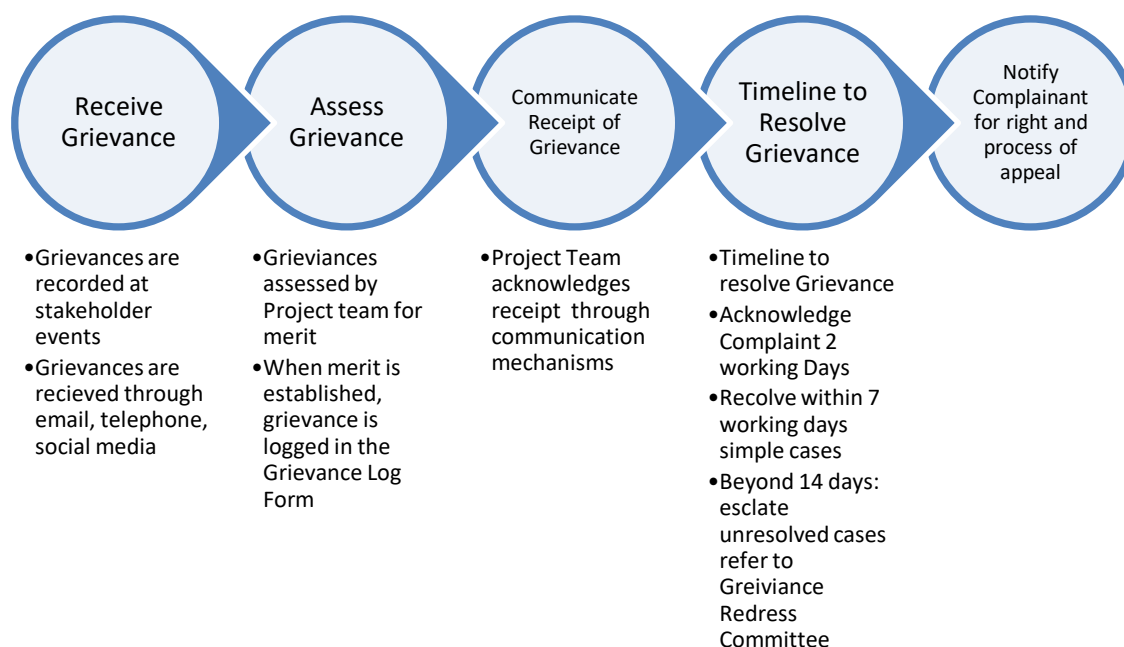


Figure 88: Grievance Mechanism Process

8.12.17.2. Field Enforcement and Daily Monitoring

Site Supervisors and Foremen

Positioned as the primary line of enforcement, Site Supervisors and Foremen are responsible for monitoring day-to-day interpersonal interactions, ensuring fair task distribution, intervening immediately in cases of bullying and/or any observed or reported inappropriate behaviour, and verifying that their crew is operating in full compliance with the signed Code of Conduct. By this token, Site Supervisors and Foremen are responsible for reporting all suspected violations and will be protected from retaliation when they do so in good faith.

In addition to intervening in cases of bullying or misconduct, supervisors are required to escalate SEA/SH/GBV concerns immediately to the HR Representative or the HSE Representative, applying survivor-centered principles of confidentiality, safety, dignity and non-retaliation. They also play a supporting role in community engagement, reinforcing key awareness messages on SH/SEA/GBV, community health and respectful conduct during toolbox talks and daily briefings. By documenting conduct risks and reporting grievance trends, Site Supervisors and Foremen contribute directly to the project's monitoring and accountability framework and to the early identification and mitigation of social and gender-related risks.

Health, Safety, and Environmental (HSE) Representative

The Health, Safety, and Environmental (HSE) Representative plays a pivotal role in ensuring that all project activities are conducted in strict compliance with health, safety, environmental and related social standards. Beyond enforcing the commitments outlined in the CoC, the HSE Representative is tasked with supervising specialized safety training for high-risk operations such as confined space entry, hot work, lifting, electrical works, and working at height. They ensure that workers are properly certified before engaging in these activities and that refresher training is delivered regularly. This responsibility extends to monitoring

occupational health risks and ensuring that personal protective equipment (PPE) is used consistently and correctly across all work areas.

In addition to workplace safety, the HSE Representative is responsible for monitoring community health pathways identified in the Community Health Assessment. These include traffic safety risks, vector-borne disease exposure, wastewater hazards, and the potential for SEA/SH/GBV incidents linked to worker presence and movement in surrounding communities. Where urgent risks arise such as hazardous spills, wastewater releases, traffic near-misses, or suspected outbreaks, or serious SH/SEA/GBV concerns, the HSE Representative must escalate the matter without delay (within 48 hours) to the Community Health Focal Point, the Project Manager and the PEU. This ensures that corrective action is taken swiftly and transparently, protecting both workers and the wider community. Related procedures are supported by the Community Health Programme and Plan and Annex 3: SH/SEA/GBV Prevention and Response Plan.

As such, the management of HSE matters will be conducted in accordance with the project's HSE supporting documents featured in the *Environmental and Social Impact Assessment (ESIA)* and *Environmental and Social Management Plan (ESMP) for the Workers' Camp, in the ESIA/ESMP for "Upgrading of the existing South Coast Sewage Treatment Plant (SCSTP)" and for the "Construction of the New South Coast Water Reclamation and Re-use Facility (SCWRRF)"*. Those plans include, inter alia, the Workers' Health and Safety Plan, Health and Safety Manual, Emergency Response Plan, Incident Management Plan, and the Community Health Programme and Plan.

8.12.17.3. Specialty Oversight and Community Relations

Community Liaison Officer (CLO)

The position and responsibilities of the CLO and Community Focal Point(s) must first be confirmed and agreed by the BWA. Only once this has been formalized may the contractor define and implement the detailed duties of the CLO within its own roles and responsibilities framework. Where subcontractors require support from BWA, assigned CLOs, CRSEG shall submit a formal request to the PEU. Subject to BWA approval and assignment, the CLO(s) will work closely with the PEU through the Communications Officer and the Social/Gender Specialist, in accordance with the mandate and coordination arrangements communicated by the PEU.

The Community Liaison Officer functions as a dedicated focal person with responsibility for oversight, coordination, and quality assurance of community engagement activities. Unlike the Community Focal Point, who manages day-to-day interactions, the CLO provides a higher-level interface between the project, the BWA, and the PEU. The CLO ensures that grievances and feedback collected by Community Focal Points are properly escalated, tracked, and addressed in accordance with the Grievance Redress Mechanism (GRM).

This role includes monitoring the performance of Community Focal Points, offering guidance and training, and ensuring that engagement activities are consistent with the Stakeholder Engagement Plan (SEP). The CLO liaises closely with the PEU Communications Officer and Social/Gender Specialist to integrate community perspectives into project decision-making and safeguard inclusivity. In cases involving Sexual Exploitation, Abuse, or Harassment (SEA/SH/GBV), the CLO upholds strict confidentiality protocols and ensures that

survivors are offered information and referral to appropriate medical, psychosocial, legal, and protection services, following a survivor-centered approach.

By serving as the formal bridge between community engagement structures and project governance, the CLO strengthens accountability, ensures transparency, and supports the project's social license to operate.

Community Focal Point

The Community Focal Point serves as the frontline representative for community engagement, acting as the immediate and accessible contact for residents and stakeholders. This role is responsible for receiving and documenting grievances, ensuring that reporting channels are inclusive and accessible to vulnerable groups such as women, youth, older persons, and persons with disabilities. The Community Focal Point disseminates project information in plain, culturally appropriate language, supports awareness of the grievance mechanism, and coordinates referrals for community health or social concerns when needed. In addition, the Focal Point maintains updated stakeholder records and ensures that community feedback is promptly reported to the CLO and the PEU for escalation and resolution. By serving as the first point of contact, the Community Focal Point helps build trust, ensures transparency, and strengthens the link between the project and the communities it affects.

8.12.17.4. Individual Employee Responsibility

Enforcement of the CoC ultimately relies on the individual compliance of each employee, subcontractor, and other users of this document. Everyone is responsible for their own conduct, for maintaining a respectful and inclusive workplace, for following labor ethics and appropriate behaviour, for not compromising safety, and for committing to the human dignity of all persons involved, regardless of age, gender, nationality, disability or any other status.

Notably, the CoC is intended not only to establish expected standards of behaviour but also to protect the rights, dignity, health, safety, and well-being of all workers throughout the project. It affirms every worker's right to raise concerns or report incidents affecting their physical, psychological, or sexual safety without fear of intimidation, discrimination, or retaliation. The CoC further safeguards workers' right to access and use the Project's GRM to seek resolution of workplace concerns in a fair, confidential, and timely manner with specific safeguards for SH/SEA/GBV-related reports. At the same time, all workers are expected to uphold the principles of the CoC by treating others with respect, avoiding harassment and discrimination, complying with project requirements, and acting in a manner that protects both their own rights and the rights of their colleagues and community members. Non-compliance with these responsibilities may result in corrective and disciplinary measures in line with project procedures and applicable laws.

Table 172 provides a summary of the roles and responsibilities outlined in this section.

Table 172: Summary of CoC Roles and Responsibilities

Role	Key Responsibilities
Project Manager	Ultimate accountability for CoC implementation; ensures subcontractor adoption; approves official project communication with advice, recommendations and support from the PEU, allocates resources for welfare, training, and safety; manages incidents

Role	Key Responsibilities
	and reports to PEU and authorities; verifies labor influx controls, Code signing, signage, induction completion, and functional confidential reporting channels.
HR Representative	Communicates and distributes the CoC; ensures there is signage on the CoC available throughout the site, manages confidential grievance channels; applies survivor-centered principles in SEA/SH/GBV cases (confidentiality, consent, dignity, non-retaliation); maintains restricted records separate from general grievances; ensures worker communications are accessible, inclusive and in plain language; ensures language access (English/Chinese); coordinates referrals to medical, psychosocial, legal, and child protection services; reports anonymized case data quarterly.
HSE Representative	Enforces health, safety, and environmental commitments; provides technical verification of health, safety, and environmental information before release; supervises specialized safety training (confined space, hot work, lifting, electrical, working at height); monitors occupational and community health pathways (traffic, vector control, wastewater, SEA/SH/GBV); ensures accuracy of safety alerts and compliance notices; escalates urgent risks within 48 hours to Community Health Focal Point and PEU; halts unsafe operations and issues sanctions.
Site Supervisors & Foremen	First line of enforcement; monitor daily worker behaviour; intervene in bullying or misconduct; ensure crews comply with the CoC; verify Code signing and GBV/SEAH induction completion before site access; enforce worker-community interaction protocols; escalate SEA/SH/GBV concerns immediately to HR/HSE; reinforce awareness messages during toolbox talks; document conduct risks and report grievance trends.
Community Liaison Officer	Acts as bridge between project and community; facilitates two way communication; manages community grievances confidentially; conducts awareness sessions on prohibited conduct, grievance channels, and referral services; ensures inclusion of vulnerable groups (women, children, PWDs, migrants); coordinates with HR/HSE on SEA/SH/GBV cases; monitors community health concerns (noise, traffic, sanitation, vector control); reports grievance trends quarterly to Project Manager and PEU.
Community Focal Point(s)	Manages interim engagement with communities via PEU; facilitates culturally appropriate communication and grievance awareness sessions.
Individual Employees	Personal responsibility for respectful conduct; complete mandatory HSE and GBV/SEAH training; comply with safety and community health safeguards; report violations without fear of retaliation; uphold dignity and human rights of colleagues and community members.

8.12.18. Stakeholder Engagement, Public Relations and Communications

CRSEG, or its subcontractors, shall manage stakeholder engagement and external communications in coordination with the PEU and in accordance with arrangements approved by the BWA. CRSEG or its subcontractors shall designate in writing a suitably qualified Community and Stakeholder Engagement Focal Point Person(s), together with an alternate, to coordinate implementation. Only persons formally authorized by the PEU and/or BWA may issue official public statements, provide media interviews, or communicate

official project positions. CRSEG, its subcontractors, and their personnel shall not make commitments on behalf of BWA, the PEU, or IDB without written authorization.

Engagement Requirements

Stakeholder engagement shall be timely, meaningful, two-way, culturally appropriate, inclusive, non-discriminatory, and free from intimidation or retaliation. Information shall be provided sufficiently early and in sufficient detail to allow affected stakeholders to understand relevant project activities and impacts, ask questions, raise concerns, provide feedback, and contribute to decisions that may affect them.

Inclusive and Accessible Communication

Targeted, separate, or supported engagement shall be provided where necessary to facilitate the effective participation of groups that may face barriers to participation, including women, persons with disabilities, older persons, young people through appropriate representatives, migrants, low-income households, and other vulnerable or marginalized groups. Communications shall use plain and understandable language and channels appropriate to the stakeholder group, which may include direct notices, letters, telephone, email, community meetings, notice boards, signage, radio, official digital platforms, and recognized community institutions. Where required, accessible formats shall be provided, including large print, accessible electronic text, audio, interpretation, sign-language support, and appropriate non-digital alternatives.

Confidentiality and Data Protection

Personal information and sensitive stakeholder or grievance information shall be protected in accordance with the Barbados Data Protection Act, 2019 and the confidentiality requirements of the project's Grievance Redress Mechanism. Special provisions shall apply to SEA/SH/GBV cases, ensuring survivor-centered handling, limited disclosure, and restricted record-keeping in secure files separate from general grievances.

8.12.18.1. Social Media, Photography and Public Communications

Social Media Conduct

Workers are strictly prohibited from posting confidential, security-sensitive, personal, grievance-related, or unverified project information on social media or other public platforms. Workers shall not engage in online arguments or hostile exchanges with community members, stakeholders, or the public. All online activities must comply with project confidentiality, respect for community relations, and professional standards.

Consent and Authorization

Any project-related photography, filming, interviews, audio recordings, drone footage, or images of community members, children, complainants, victims, or private property shall only be undertaken with prior authorization from the Project Manager or PEU and with the informed consent of the individuals concerned. Consent must be documented and, where applicable, parental or guardian consent must be obtained for minors.

Compliance

Unauthorized disclosure, posting, or recording constitutes a breach of this Code of Conduct and may result in disciplinary action, including termination.

8.12.19. Commitments

This Code of Conduct outlines the rules of behaviour for all employees, subcontractors, and representatives of CRSEG, related to risks associated with, but not limited to, prevention and management measures of environmental, labor, social, and gender-based risks of the Project. This includes labor ethics, human rights, health and safety risks, third-party contractor actions, labor influx, illicit behaviour and crime, sexual and gender-based violence, discrimination, and sexual abuse, harassment, and exploitation of persons, regardless of age, gender and ability. All commitments are as follows:

Courtesy and Respect: all employees, subcontractors, and representatives of CRSEG must conduct themselves in a manner that is lawful, courteous, businesslike, and respectful of all staff, guests, or visitors. Workers must also respect cultural norms and community sensitivities, particularly when interacting with vulnerable groups such as women, children, persons with disabilities, and migrants.

Language and Behaviour: all employees, subcontractors, and representatives of CRSEG cannot engage in behaviour that is rude, threatening, or offensive. Use of profane or insulting language is prohibited. Harassment of any type, including sexual harassment, is strictly prohibited. Abusive, derogatory, obscene, or improper language, gestures, remarks, whistling, cat calls, or other disrespectful behaviour will not be tolerated. Roughhousing, fighting, fisticuffs, physical threats, destruction of property, vandalism, littering, or physical abuse of anyone on the campsite or throughout the project construction and operation is not permitted under any circumstances.

No Weapons, Alcohol, or Drugs: The use, possession, distribution, or sale of any weapon, alcohol, illegal drugs, or controlled dangerous substances by any contractor, contractor's employee, or employee's representative is prohibited while on duty or on-site during project construction and operation, and/or at the Workers' Campsite. Offenders will be removed and reported to the local Police Department.

Reporting: All employees, subcontractors, and representatives of CRSEG are required to report any matter involving a violation of these rules of conduct to the Project Manager or appropriate Representative. Likewise, any matter involving abuse of power, humiliation, bullying, gender-specific harassment, health or safety, including any altercations, should be reported to the Site Supervisor/Foreman or appropriate Representative. We are committed to non-retaliation against any employee, subcontractor, visitor, community resident, and/or victims who report violations of this CoC.

Child/ Children: No person under the age of 16 years will be employed by CRSEG. Child Labor is strictly prohibited. CRSEG shall ensure the protection of children (including prohibitions against sexual activity or abuse, or otherwise unacceptable behaviour towards children, limiting interactions with children, and ensuring their safety in project areas), as prescribed in Labor Laws Chapter 346, L.R.O 1979, the Labor Laws of Barbados. Any allegation of child abuse or exploitation will be escalated immediately to HR/HSE and PEU and referred to child protection authorities.

Health and Safety Requirements: All employees, subcontractors, and representatives of CRSEG shall ensure compliance with applicable health and safety requirements to protect the local community, the Employer's Personnel, and the Contractor's Personnel. Applicable plans to be followed include the *Workers' Health and Safety Plan, Emergency Response Plan, Incident Management Plan, and the Community Health Programme*

and Plan, as listed in the ESMP section of this document and further supported by the Safety Education and Training Plan and Health and Safety Manual. Additionally, in accordance with Chapter 356 of the Health and Safety at Work Act, workers have the right to refuse to work in unsafe conditions without fear of reprisal. All workers must complete HSE training, specialized safety modules, and refresher sessions.

Non-Discrimination: CRSEG and their Employees shall ensure non-discrimination in interactions with the local community (including vulnerable and disadvantaged groups), by the Contractor's Personnel, and subcontractors (for example based on family status, ethnicity, race, gender, religion, language, marital status, age, disability (physical and mental), sexual orientation, gender identity, political conviction or social, civic, or health status). Additionally, the Contractor commits to providing equal opportunities for all persons throughout the project and reasonable accommodation for all persons dwelling and/or using the facilities of the camp. Equal opportunities must be extended to subcontractor and supplier personnel, with reasonable accommodation for vulnerable groups.

Sexual Harassment: Sexual harassment is strictly prohibited. For example, it is strictly prohibited to use language or behaviour towards men, LGBTIQ+ persons, women and/or children that is inappropriate, harassing, abusive, sexually provocative, demeaning, and/or culturally inappropriate. CRSEG enforces a zero-tolerance policy for SH/SEA/GBV. All responses to SH/SEA/GBV concerns must be guided by Survivor-centered principles of confidentiality, consent, dignity, safety, and non-retaliation. Workers are prohibited from engaging in exploitative relationships including those involving unequal power dynamics, or the exchange of money, goods, services, or employment opportunities for sexual or personal favors. Such conduct is strictly forbidden as it undermines safeguarding standards, reinforces harmful social and gender power imbalances, creates risks of abuse, and violates this Code of Conduct. Any alleged breach will be taken seriously, promptly assessed, and substantiated violations will result in proportionate disciplinary action, up to and including termination of employment/contract and where relevant referral to the appropriate authorities in line with national legislation.

Sexual and/or Gender-Based Violence: All employees, subcontractors, and representatives of CRSEG shall ensure that violence, including sexual and/or gender-based violence, does not permeate the Camp or in any project-related activity. Such behaviour is prohibited, and a zero tolerance will be maintained. Such forbidden behaviour includes but is not limited to acts that inflict physical, mental, or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty at the project site, at the workers camp, during transport or in surrounding communities.

Exploitation, including Sexual Exploitation and Abuse: There shall be no exploitation, of any kind, including sexual exploitation and abuse. This includes, for example any exchange or offer of exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or, exploitative behaviour, or any abuse of power between employees or community members. And sexual activity with a child (under the age of 16 years) is strictly prohibited, regardless of local age of consent or mistaken belief about age.

Welfare facilities: China Railway Shanghai Engineering Group Co., Ltd. shall ensure that adequate welfare facilities are provided and maintained (for example, ensure workers use only the specified sanitary facilities provided by their employer and not open areas). CRSEG will provide and maintain gender-segregated sanitary

facilities that are safe, well-lit, accessible to women, LGBTIQ+ persons, persons with disabilities and that these facilities are clean and sanitary at all times. Regular inspections will be conducted to ensure compliance with health and safety, ensuring dignity, and privacy for all workers, particularly women and other vulnerable groups.

Non-retaliation: CRSEG and all its employees, subcontractors, and representatives of shall ensure that no retaliation is taken against workers, community members, and/or other stakeholders who report suspected or actual violations of this Code, or who participate in investigations, provided such reports are made in good faith. Protection extends to workers, community members, complainants, witnesses, and support persons. Any form of intimidation, harassment or retaliation is strictly prohibited and will result in disciplinary action, termination of employment or contract, and where appropriate referral to the relevant authorities.

8.12.20. Compliance with Laws and Regulations

As an Operator in Barbados, CRSEG will act and operate within the confines of the national laws and regulations to ensure a duty of care for all employees, the affected communities, and the environment. Therefore, all the commitments outlined in this Code of Conduct mandate CRSEG and all signatories to comply with all applicable Barbadian laws, regulations, and standards pertaining to construction, labor and employment practices, sexual harassment, sexual exploitation and abuse, gender equality and human rights, environmental protection, and occupational health and safety. This includes but is not limited to:

Construction Laws: Understanding and adhering to the building laws and any other relevant legislation governing construction activities in Barbados.

Labour Practices: Ensuring compliance with Labour laws regarding wages, working hours, employment conditions, and worker rights as specified under the relevant Labour Legislation, Employment Rights Act -2012.

Environmental Regulations: Adhering to the laws, policies, and regulations of the Environmental Protection Department (EPD) to minimize the project's impact on the environment and promote sustainable practices.

Health and Safety: Implementing and enforcing safety measures to protect workers, stakeholders, and the public from hazards associated with construction activities in keeping with the Health Services Act, CAP. 44.

Gender Equality: Promoting and enforcing equal treatment of all workers and stakeholders, ensuring workplaces are free from discrimination, harassment, and exploitation, in keeping with the Sexual Harassment Prevention Act, national legislation and policies on gender equality, non-discrimination, and the protection of vulnerable groups, as well as international conventions such as the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and other institutional safeguards.

Data Protection: Protecting the privacy and personal information of workers' complaints and personal information according to the Data Protection Act (DPA) 2019 of Barbados.

8.12.21. Integrity and Ethical Conduct

Honesty and Transparency: CRSEG, and all its employees, subcontractors, and representatives shall conduct all professional activities with honesty, integrity, and transparency. Provide accurate and truthful information to the Employer, Contractor, Subcontractors, and other Stakeholders at all times, including when reporting

project progress or incidents or issues. Employees shall present information objectively without omitting relevant details or providing misleading, false or doctored information.

Conflicts of Interest: All employees, subcontractors, and representatives of CRSEG shall avoid conflicts of interest that may compromise, or appear to compromise their professional judgment or impartiality, for example, awarding subcontracts to relatives, or close associates, holding financial interests in suppliers or competitors, and any such types of actions recognized as unscrupulous transactions. Such parties shall disclose any actual or potential conflicts of interest promptly to the appropriate manager or stakeholders and seek guidance on how to manage or mitigate them.

Anti-corruption: All employees, subcontractors, and representatives of CRSEG shall refrain from offering, soliciting, or accepting bribes, kickbacks, or any other form of improper advantage. Uphold a zero-tolerance policy towards corruption and report any suspected or observed instances of corruption to the relevant authorities. Decline any offers of gifts or favors from subcontractors or suppliers that could influence your decision-making process or create a conflict of interest. Employees are to decline any offers of gifts, hospitality, or favors from subcontractors or suppliers that could influence the decision-making process or create a conflict of interest. As a general rule, all gifts must be given openly, not hidden, and must be properly documented in the project's expense or gift registers. Hospitality (such as business meals) must have a legitimate, bona fide business purpose and occur in the normal course of standard business practice.

Giving anything of value to government officials, public servants, or employees of state-owned enterprises is strictly prohibited. Offering directly or indirectly any gifts of any value to influence the actions of another party is strictly prohibited. Low-value, infrequent gifts, despite not being intended to influence project decisions, must be recorded. Notwithstanding this, workers are permitted to accept gifts of modest value. These include branded promotional materials for information purposes. All employees and actions of the project are subject to the following laws of Barbados, including the Prevention of Corruption Act, Anti-Corruption and Anti-Terrorism Agency Act, and the Whistleblower Protection Act.

8.12.22. Professionalism

Competence: All employees of China Railway Shanghai Engineering Group Co., Ltd. shall maintain a high level of competence and proficiency in their field of supervision. Stay informed about industry best practices, technological advancements, and relevant regulatory policy changes through continuous learning and professional development activities. When asked, they must attend seminars, workshops, and training sessions on construction management, quality assurance, and project supervision to enhance their skills and knowledge of current happenings in society and industry. The cost for all work-related, recommended training(s), inclusive of associated costs, will be incurred by the CRSEG, unless otherwise advised by relevant stakeholders. Additionally, when various training programs are outlined, the Contractor will share the information on the training structure and competency of the trainer with the PEU prior to the training exercise.

Respect and Collaboration: CRSEG, and all its employees, subcontractors, and representatives are expected to treat all individuals with respect, fairness, and dignity, regardless of their gender, age, nationality, sexual orientation, disability, role or position within the project. Foster a collaborative and inclusive work environment that values diversity, prohibits harassment and discrimination and promotes teamwork. Listen

actively to the perspectives and concerns of all project stakeholders, including subcontractors, workers, and community members, particularly women, youth, persons with disabilities, migrants and other vulnerable groups, to facilitate constructive dialogue and problem-solving.

Professional Image: An image of professionalism and demeanor must be maintained in all interactions related to the project. Dress appropriately for the work environment and maintain a courteous and respectful attitude in communications and meetings. Communicate clearly and professionally in written correspondence, emails, and reports to convey information effectively and maintain professional standards.

8.12.23. Compliance

The Contractor's personnel shall:

General Conduct:

- Employees must comply fully with this Code of Conduct and all applicable organizational policies including those on SH/SEA/GBV prevention, non-discrimination, health and safety and environmental protection.
- Duties shall be carried out competently, diligently, and in a professional manner at all times.
- All individuals in the workplace and local community must be treated with dignity and respect, regardless of position, nationality, race, gender, age, religion, language, sexual orientation, political affiliation, disability, or any other protected characteristic. Harassment, bullying, discrimination and any form of SH/SEA/GBV are strictly prohibited.
- Honesty and truthfulness are required in all professional and community dealings, including when reporting incidents, near-misses or grievances.
- Noise levels must be kept to a minimum, particularly during early morning and late evening hours, to avoid disturbing the local community and to respect vulnerable groups such as children, older persons, and persons with disabilities.
- Workers must maintain hygiene and sanitation standards in living quarters and shared facilities. Proper waste disposal and respect for communal spaces are mandatory. Harassment in or around sanitation, washroom, and changing facilities is strictly prohibited. Separate, secure facilities for female workers must be respected at all times.
- Employees must immediately remove themselves from any situation that presents an imminent danger to their life or health and report the hazard to the project Manager or HSE Representative without delay.
- Workers must minimize health and safety risks to surrounding communities, including dust, noise, traffic hazards, and communicable disease transmission. Disregard for community health safeguards is a violation of the Code.
- Employees must comply with all applicable national laws, regulations, and community rules governing their conduct and operations, including to those related to sexual harassment, GBV, child protection

and human rights. Where uncertainty arises regarding compliance obligations, employees are required to seek clarification from their supervisor and/or the designated Contractor's Representative.

Personal Security:

- Employees must take reasonable precautions to ensure their personal safety, including maintaining awareness of their surroundings and avoiding isolated or high-risk areas.
- In the event of accidents, threats, or other emergencies, employees are required to follow the established *Emergency Response Plan* without delay.
- All security measures must be observed at all times, including the proper display of identification badges and strict adherence to access restrictions.
- Workers are required to follow emergency procedures, including fire drills, evacuation routes, and crisis response instructions. Obstructing or ignoring emergency protocols will be treated as a serious violation.

Occupational Health and Safety:

- It is the Contractor's responsibility to ensure that workplace machinery, equipment, and systems of work are safe and without risks to health. Employees, in turn, have to follow established contractor's health and safety procedures and instructions for each duty or task to develop, taking reasonable care of their own health and safety and of others. The use of machinery and equipment must be responsible in accordance with training and instructions provided. Employees must report any unsafe conditions or practices immediately to their supervisor or the HSE Representative to prevent harm.
- Required Personal Protective Equipment (PPE) must be worn at all times in accordance with safety regulations.
- Employees must follow Health and Safety Plan and Management Manual, where appropriate measures are described for handling chemicals, physical, biological, or other dangerous substances and agents, as also for specific works, like work in heights.
- Employees must adhere to the zero-alcohol policy during work activities and refrain from the use of narcotics or any substances that impair faculties.
- It is strictly forbidden to carry weapons, consume alcoholic beverages or drugs, smoke or vape, or possess pornographic images or objects within all areas of the job site and the community.
- Employees must follow all applicable emergency operating procedures promptly and without deviation.

Workplace and Community Behaviour:

- Employees must refrain from any behaviour that could escalate tensions or provoke conflict.

- All women, men, persons with disabilities (PWDs), older persons, youth, low-income persons, migrants, LGBTIQ+ persons and persons belonging to other marginalized groups (inclusive of those belonging to multiple groups) in the workplace must be treated with dignity and respect.
- All women, men, children, PWDs, older persons, youth, low-income persons, migrants, LGBTIQ+ persons and persons belonging to other marginalized groups (inclusive of those belonging multiple groups) in the local community must be treated with dignity and respect.
- Employees must avoid inappropriate language, harassing, abusive, sexually provocative, demeaning, or culturally offensive language toward women, men, children, PWDs, or LGBTIQ+ persons.
- Any form of harassment is strictly prohibited, including unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual or non-sexual nature.
- The Contractor has a responsibility to provide effective supervision, reporting mechanisms, and safeguarding systems to protect children from harm in all project activities and surrounding project areas. Employees, subcontractors, and representatives of CRSEG must follow established safeguarding policies and this CoC, take reasonable care in their interactions with children, and immediately report any suspicion or knowledge of abuse, exploitation, or unacceptable behaviour. All personnel are required to refrain from any conduct that could harm or put children at risk, whether on or off duty. Allegations of child abuse or exploitation will be escalated immediately to HR and the HSE Representative and referred to the appropriate child protection authorities in accordance with the Labour Laws of Barbados and the project's Grievance Redress Mechanism.
- Exploitation of any kind is prohibited, including abuse of position, power, or trust for sexual or non-sexual purposes, whether for monetary, social, or political gain.
- Employees must not engage in any form of abuse, including sexual abuse and exploitation, involving physical intrusion, coercion, sexual favors, or humiliation.
- Sexual interactions or relationships between employees, subcontractors, or representatives of CRSEG and members of the local community, including project beneficiaries, are strictly prohibited under this Code of Conduct. Any exchange of money, employment, goods, or services for sex, or any behaviour that could be construed as exploitative, coercive, or abusive, is expressly forbidden and will result in disciplinary action, including termination and referral to the appropriate authorities.
- Sexual activity with individuals under the age of 18 is strictly forbidden, including grooming or digital contact. A mistaken belief as to age or child consent is not a defense. Violations will be referred to the Barbadian Police Authorities for enforcement under the full extent of the law.

8.12.24. Reporting of Violations and Incidents:

- Report of violations of this Code in the workplace and in the local community can be done through the following ways:
 - a. Contact the Supervisor and/ or HSE Representative regarding health, safety, and security situations.

- b. Contact the HR Representative about any interpersonal conflicts, bullying, targeted unfair treatment, and/or violation of workers' rights.
- c. Contact security personnel for reporting personal security incidents.
- d. Contact the Community Liaison Officer regarding all types of concerns, especially reporting on gender and sex-related incidents.
- e. Use the Grievance Mechanism for reporting of all types of complaints.

- Do not retaliate against any person who reports violations of this Code of Conduct.

Note: The person's identity will be kept confidential unless the country's law mandates reporting of allegations. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. Any violation of this Code of Conduct by Workers will result in serious consequences, including termination and possible referral to legal authorities.

8.12.25. Training:

- Employees must complete relevant training courses that will be provided related to the environmental and social aspects of the project, including Health, Safety and Personal Security, Sexual Exploitation and Abuse, Sexual Harassment, Gender Based Violence, and use of the Grievance Mechanism. Training will also include introductory sessions on this CoC, conducted in languages understood by the Contractor's personnel and Employer's personnel, and delivered prior to the start of construction. In addition, periodic refresher sessions will be held throughout the life of the project to reinforce awareness of the CoC and the GRM. These requirements are further detailed in the Safety Education and Training Plan, with grievance-related training linked to Annex 2 and SH/SEA/GBV training linked to Annex 3. Regular training on HSE matters will be done according to a specific HSE training schedule and matrix based on the applicability to the employee's position and role. Additionally, daily Toolbox Talks will be held before work sessions.

8.12.26. Confidentiality:

- Safeguard confidential and proprietary information obtained during the course of your work duties. Use this information solely for authorized purposes related to the project and refrain from disclosing it to unauthorized individuals or third parties. Protect sensitive project data, such as financial records, design specifications, and strategic plans, from unauthorized access or disclosure by implementing secure document management practices.

8.12.27. Accountability:

Code Adherence: Adhere to this Code of Conduct and uphold its principles, standards, and guidelines in all aspects of your work. Demonstrate personal accountability for your actions, decisions, and conduct throughout the project lifecycle. Review and acknowledge your understanding of the Code of Conduct annually or upon contract renewal to reaffirm your commitment to ethical behaviour, professionalism, and compliance with legal and regulatory requirements.

8.12.28. Documentation and Audit:

CRSEG will maintain comprehensive documentation and records by following applicable Standard Operating Procedures (SOPs), Work Instructions, and other specific CRSEG Guidelines to demonstrate compliance with contractual obligations, regulatory requirements, and industry standards. Prepare documentation packages containing project plans, specifications, permits, inspection reports, and correspondence with stakeholders for audit purposes to validate compliance with quality, safety, and environmental standards.

8.12.29. Enforcement

Disciplinary Action: Violations of this Code of Conduct may result in disciplinary actions, up to and including termination of contract or employment, depending on the severity and impact of the misconduct.

CRSEG will employ a warning system for misconduct, not limited to failure to comply with health and safety guidelines, insubordination, illegal possession and use of alcohol, drugs, unlawful possession of firearms, and fighting. In keeping with standard employment systems, the Human Resources Officer will develop and implement a sanctions policy that guides the degree of disciplinary measures applied to various indiscretions. This policy will be formally documented within the Labour Management Plan (LMP) and cross-referenced in the GRM to ensure consistency and transparency. Workers will be informed of the policy during induction and refresher sessions on the CoC and GRM, and copies will be made available in languages understood by Contractor and Employer personnel. Sanctions could include, but are not limited to:

- *Verbal Warning:* A documented, informal conversation to notify the employee of the issue and outline clear expectations for improvement.
- *Written Warning:* A formal document placed in the employee's file detailing the infraction, required improvements, and the consequences of continued failure.
- *Performance Improvement Plan (PIP):* A structured, time-bound plan (usually 30 to 90 days) designed to help the employee correct specific performance gaps.
- *Final Written Warning:* The last step before termination, warning that failure to immediately correct behaviour will result in job loss.
- *Suspension or Termination:* Temporary removal from duties (with or without pay) for investigation, or the severance of employment.

Further, the decision to impose disciplinary measures will be made in accordance with contractual agreements, legal obligations, and organizational policies. CRSEG will take disciplinary actions against staff in keeping with the Employment Rights Act, 2012, and the Severance Payment Act (Chapter 355 A) of Barbados.

Stop-work Orders may be issued on an as-needed basis where activities, behaviour, or site conditions are determined to pose an unacceptable risk to the health and safety of workers or the public, the environment, project assets, or where there is non-compliance with applicable legal, contractual, or project requirements. The authority to issue a work order rests with the Engineer and, where applicable, the Supervising Consultant, Project Employer/PEU, or Funding Agency, in accordance with their respective roles and contractual obligations.

Therefore, procedures, responsibilities, conditions for lifting a *Stop-Work Order*, and any associated enforcement measures will be detailed in relevant project governance, contractual, or management documents and not in this CoC. These documents will be communicated to the appropriate stakeholders as necessary to ensure a clear understanding of the *Stop-Work* process and the requirements for resuming work.

How would China Railway Shanghai Engineering Group Co., Ltd. deal with breaches?

All employees, subcontractors, and representatives of CRSEG are expected to adhere to the commitments and guidelines outlined in the previous sections. For daily activities, the following safety precautions must be adhered to:

- All employees must wear hard hats if there is a potential risk of falling debris or other construction materials.
- Erect barricades, signs, cones, delineating devices, other channeling devices, according to manual on uniform traffic control devices (MUTCD) Standards, flashing beacons, and floodlights.

Additionally,

- CRSEG will establish and implement a fall prevention program and *Work-at-Height* protocols to protect workers from such hazards by adhering to local safety regulations and international best practice standards, for example, Chapter 356 Safety at Work Act and OSHA Standards.
- CRSEG will train all employees to recognize the hazards associated with the type of job being undertaken including social and gender-related risks where relevant. Training records would also be maintained and readily available for inspection.
- Training records, including attendance information, will be disaggregated and reported to the Employer/PEU. It will specify the frequency (induction vs. refreshers) and any specialized training for key roles. These documents will be readily available for inspection, as stipulated by the Labour Laws of Barbados.

8.12.30. Acknowledgement

All employees, subcontractors, and representatives of CRSEG are required to read, understand, sign, and adhere to this Code of Conduct. By signing this document, you agree to adhere to this Code of Conduct and understand that any violation of these guidelines may result in disciplinary action, including termination of employment in accordance with the laws of Barbados.

Acknowledgement and Signature I, _____ (print name),
acknowledge that I have read and understood the Workers' Code of Conduct and agree to comply with its provisions.

Signature: _____ Date: _____

8.12.31. The Contractor's Human Rights Declaration

China Railway Shanghai Engineering Group Co., Ltd declares that it will respect and protect the human rights of every employee, contractor, subcontractor, and community member, within the confines of the laws of Barbados and applicable international standards, by ensuring:

- **Freedom of Movement:** CRSEG will respect workers' right to freely move within and outside of the project.
- **Non-Discrimination and Equal Opportunity:** Prohibition of discrimination based on race, color, ethnicity, religion, gender, age, nationality, language, disability, sexual orientation, or disability, migrant status, or any other status.
- **Fair Working Conditions:** Commitment to fair remuneration, reasonable working hours, rest periods, and leave entitlements and a safe, healthy and dignified work environment.
- **Elimination of Exploitative Labour:** Commitment to a zero-tolerance policy for modern slavery, forced labor, debt bondage, human trafficking, and child labor across all its operations and supply chains.
- **Freedom of Association:** Respecting employees' rights to form or join trade unions of their choice, and engage in collective bargaining.
- **Privacy and Data Protection:** Upholding the privacy of employees, community members, complainants, victims of SH/SEA/GBV, clients, and other stakeholders when handling their personal information.

8.13. Grievance Redress Mechanism

This Grievance Redress Mechanism (GRM) document outlines the procedures and principles for receiving, addressing, and resolving grievances and concerns raised by both project workers and community members affected by the Barbados Climate Resilient South Coast Water Reclamation and Reuse Facilities Project. The GRM is developed in accordance with the principles of IDB ESPF 10 and CRSEG's commitment to social responsibility and sustainable project execution.

The primary purpose of this GRM is to provide a centralized, fair, transparent, and efficient channel for all parties to submit feedback and raise concerns related to project operations. It aims to ensure fair, effective, and lasting outcomes, mitigate risks, build trust, and facilitate the systematic identification of emerging issues for corrective and pre-emptive engagement. However, it does not replace social or justice systems in Barbados nor impedes access of stakeholders to administrative and judicial remedies.

8.13.1. Scope Of The GRM

This GRM is designed to cover:

- o **Project Workers:** Applies to all categories of workers, including men, women, migrant workers, youth, and other vulnerable groups, CRSEG employees, workers engaged by third parties (subcontractors), and primary supply workers assigned to the project. It addresses labor and workplace issues such as conditions of employment, discrimination, harassment, SEA/SH/GBV, occupational safety, fair contracts, wages, working hours, rest periods, discrimination, Sexual Harassment (SH), Sexual Exploitation and Abuse (SEA), and Gender-Based Violence (GBV).
- o **Community Members:** Individuals or groups within communities affected by project activities. Grievances may relate to project's environmental impacts (such as dust, noise, lighting, waste management, others) and to social impacts (such as traffic, worker behaviour including harassment or inappropriate behaviour by project workers, safety incidents, security concerns, or any other community-facing impact).

8.13.2. Dual Pathways of the GRM

The GRM operates through two coordinated but distinct pathways, each tailored to the nature of the grievance and the group affected:

1. Worker GRM (Labour and Workplace Issues):

- o Applies to all categories of project workers, including men, women, migrant workers, youth, and vulnerable groups.
- o Addresses concerns related but not limited to employment conditions, wages, discrimination, harassment, SEA/SH/GBV, occupational health and safety, and other workplace rights.
- o Managed by designated workplace focal points (e.g., Project Manager, HR Representative,), with confidentiality safeguards in place for sensitive cases.

2. Community GRM (Project Impacts in Communities):

- o Applies to individuals and groups in communities affected by project activities.
- o Covers grievances related to environmental, social, and gendered impacts, including harassment or inappropriate behaviour by project workers, disproportionate impacts on older persons, PWDs, women, and other vulnerable groups.

Coordination and Confidentiality:

- While both pathways are coordinated under the overall GRM framework, they have different focal points, procedures, and confidentiality requirements.
- Special provisions apply to cases of SEA/SH/GBV. Victims will be offered information on and referral to the appropriate medical, legal, psychosocial, and protection services required.
- Use of external social services is voluntary and survivor-centered, ensuring confidentiality, informed consent, and respect for dignity.

8.13.3. Key Principles

The GRM will operate under the following core principles:

- **Accessibility:** The GRM will be widely communicated and accessible to all project workers and community members, including women, persons with disabilities (PWDs), youth, migrant workers and other potentially vulnerable groups. It will be explained in simple, non-technical language and promoted through multiple channels such as posters, flyers, community meetings, radio, digital platforms, and workplace briefings. Complaints may be submitted through hotlines, email, grievance boxes, in-person reporting, or mobile outreach, with options for anonymous and confidential reporting. These channels will be designed to be safe, ensuring accessibility for women, men, PWDs and low-literacy groups. To respect dignity and confidentiality, complainants may request to interact with a male or female focal point for sensitive cases, including SEA/SH/GBV. All reporting channels will be designed to be inclusive, culturally appropriate, and responsive to the needs of diverse groups.
- **Transparency:** The process for submitting, assessing, and resolving grievances will be clear and communicated to all stakeholders.
- **Fairness and Impartiality:** All grievances will be assessed objectively and resolved in a fair and equitable manner, considering relevant legislation, best practices, and project procedures.
- **Confidentiality and Anonymity:** Grievances will be treated with utmost respect, and anonymity will be enforced where warranted. Confidentiality of complainants and witnesses will be protected to the fullest extent possible. Complaints will follow a survivor-centered approach, ensuring that the victim's informed consent is sought before any information is shared. Disclosure will be strictly limited to essential personnel on a need-to-know basis, and all records will be kept in secure, restricted files that are separate from general grievance documentation. Confidentiality, dignity, and safety will be prioritized at every stage, with procedures designed to protect the identity of victims and prevent re-traumatization.

- **Non-Retaliation:** No retaliatory measures will be taken against residents or workers who report incidents or raise concerns. Complainants, witnesses and those assisting them will be protected from any retaliation or discrimination that may result from using the GRM.
- **Gender-Responsiveness:** This principle ensures that grievance handling and stakeholder engagement processes are sensitive to the differentiated needs of women, men, girls, boys, and gender-diverse persons. It is gender-responsive because victims and complainants may prefer to meet with a male or female focal point, and this choice will be respected. Interviews and grievance discussions will be conducted in private, safe spaces that protect confidentiality and dignity, and scheduled at times compatible with caregiving responsibilities and work schedules to avoid exclusion. GRM information and meetings will actively promote the participation of women and girls through targeted outreach, accessible formats, and the presence of female focal points where appropriate. These measures ensure that barriers to participation are reduced, that vulnerable groups are not disadvantaged, and that the process is inclusive, equitable, and survivor-centered.
- **Timeliness:** Grievances will be acknowledged and resolved within defined timeframes.
- **Accountability:** Clear roles and responsibilities are assigned for managing grievances, and the GRM's effectiveness will be regularly monitored and audited. Lessons learned and trends observed and identified (from the analysis of disaggregated GRM data) will be integrated into periodic reviews and updates of the ESMP.

8.13.4. Roles And Responsibilities

- **Social/ GBV/ SH/ SEA Personnel (Focal Point Person):** A designated Social Specialist/ GBV/ SEA/ SH Focal Point shall be appointed to manage grievances and sensitive cases, including Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH), in line with survivor-centered principles and relevant guidance frameworks. This individual will be responsible for recording, assessing (for general grievances), communicating responses, and maintaining the electronic grievance log. For sensitive GBV/SEA/SH cases, a separate, secure grievance register shall be maintained, distinct from the general log, with access strictly limited to authorized personnel on a need-to-know basis.

Recognizing that Human Resources representative may not always be the safest or most trusted route for victims, the role shall be filled by a suitably qualified professional such as a social worker, psychologist, occupational health and safety doctor, or HR staff member who has received specific training in survivor-centered approaches, confidentiality protocols, and trauma-informed care. Survivors and complainants shall have the option to meet with either a male or female focal point, and at least one female staff member will be designated to handle such cases where feasible, to ensure comfort and dignity. The Social Specialist/ GBV/ SEA/ SH Focal Point shall also serve as a primary contact for external stakeholders, ensuring transparent communication and trust-building. At every stage, confidentiality, informed consent, dignity, and protection of identity will be prioritized, with procedures designed to safeguard survivors, prevent re-traumatization, and uphold professional standards of care.

- **Grievance Redress Committee (GRC):** Comprised of representatives from the Project Executing Unit (PEU), Contractor (CRSEG), and Supervising Consultant. This committee is tripartite, must be gender-inclusive, and is responsible for reviewing and resolving grievances escalated from Tier 1.
- **Project Management / Senior Management:** Responsible for the overall oversight of the GRM, including periodic auditing and review of its accuracy and relevance. Senior Management shall also ensure that corrective actions are taken where recurring or systemic issues are identified, and that lessons learned are integrated into project operations. To build trust and transparency, anonymized summaries of grievance trends and responses will be prepared and shared periodically with the PEU. These summaries will highlight common issues, actions taken, and outcomes, while protecting the confidentiality of complainants.
- **Team Leads (Environmental, Social, Engineering, etc.):** Provide detailed knowledge and input on specific issue categories when grievances are escalated. In addition, they are responsible for ensuring that any mitigation measures arising from grievances are designed with attention to differentiated impacts on women, men, youth, older persons, persons with disabilities (PWDs), and low-income groups. This requires applying a gender-responsive and inclusive lens to technical solutions, so that corrective actions do not inadvertently disadvantage vulnerable populations and instead promote equitable outcomes across stakeholder groups.

8.13.5. Grievance Redress Process (General Grievances)

The grievance management process will follow the subsequent steps:

8.13.5.1. Step I: Receive Grievance

- **Channels:** Grievances can be submitted through:
- Recording at stakeholder engagement events.
- Mailbox
- Designated project email
- Designated project telephone number
- Social media platforms
- In-person complaints to designated male or female focal point persons.
- Notice boards with contact information will be posted at the project site entrance.
- All input received will be recorded by the Social Personnel.

8.13.5.2. Anonymous Submissions

Grievances may also be submitted anonymously through any of the available channels, including mailboxes, email, telephone, or written notes. Anonymous submissions will be treated with the same seriousness as identified complaints, recorded in the Grievance Log, and addressed in accordance with the GRM. While

anonymity may limit follow-up communication, every effort will be made to investigate and resolve the issue while protecting confidentiality.

8.13.5.3. Step II: Communicate Receipt of Grievance & Record

- The Project Team will acknowledge receipt of the grievance within **2 working days**. For emergencies or urgent/important cases, the grievance should be communicated during the first 24 hours and solution provided in 2 working days.
- All grievances, including those from community consultations, will be logged in an electronic **Grievance Log** by the Social Personnel. All grievances are registered upon receipt. The log will categorize grievances as environmental, social or gender (e.g., age, type of stakeholder, vulnerability, dust pollution, sanitation, etc.).
- Complainants will be informed that their grievance has been recorded through the same channel used for submission, unless anonymity was requested. For written or electronic submissions (email, mailbox, telephone, social media), an acknowledgment message will be sent within a specified timeframe (e.g., 5 business days). For in-person submissions, the complainant will receive a verbal confirmation and, where feasible, a written or digital receipt. Notice boards at project sites will also display information on how grievances are acknowledged and tracked.

8.13.5.4. Step III: Assess Grievance for Merit

- The Social Personnel will assess the merit of the grievance through investigation. The assessment shall determine how the complaint is categorized (e.g., environmental, social, gender, or other relevant categories) and how it will be handled. For cases involving SH, SEA), or GBV, a survivor-centered approach will be applied, ensuring confidentiality, informed consent, and protection of identity at every stage. Any photo, interview, or recording undertaken as part of the investigation shall only be conducted with the explicit permission and authorization of the complainant or victim, and in safe, private settings that respect dignity and minimize risk of re-traumatization.
- When merit is established, the grievance is officially logged.

8.13.5.5. Step IV: Resolve Grievance (Tiered Approach)

- **Tier 1 Resolution (Social Consultant):** The Social Personnel (Social Consultant) will endeavor to resolve the grievance.
- **Timeline:** Simple cases are targeted for resolution within **7 working days**. For emergencies or urgent/important cases, the grievance should be communicated during the first 24 hours and solution provided in 2 working days. For cases involving SH, SEA, or GBV, immediate measures will be taken to ensure the safety, dignity, and access to services for survivors. This includes:
 - o Providing safe referral to medical, psychosocial, legal, or protection services within 24 hours.
 - o Ensuring interviews or discussions are conducted in private, secure spaces with the survivor's consent.
 - o Offering the choice of a male or female focal point to handle the case.

- o Implementing corrective actions that restore or improve access and safety for women, children, PWDs, and other vulnerable groups.
 - o All responses will follow a survivor-centered approach, prioritizing confidentiality, informed consent, and protection of identity.
- If not resolved within 7 days, the grievance is moved to Tier 2.
- **Tier 2 Resolution (Grievance Redress Committee):** The Grievance Redress Committee (PEU, Contractor, Supervising Consultant) will review and seek to resolve the grievance.
- **Timeline:** The committee will aim to resolve the grievance within **14 days**.
- If not resolved within 14 days, the grievance can be escalated to Tier 3.
- **Tier 3 Resolution (Legal System):** If the grievance remains unresolved after Tier 2, legal action can be taken to resolve the issue, as the court is the final authority within Barbadian legislation.

8.13.5.6. Step V: Communicate Responses

- The Project's Social Personnel will communicate the resolution or the status of the grievance to the stakeholder who raised the concern. Communication will follow a Process Flow guiding escalation based on severity. All communication with complainants shall use simple, plain language and channels appropriate to their needs, including written notices, phone calls, or in-person discussions. Explanations of decisions and next steps will be provided in a manner that ensures the complainant especially if from a vulnerable group such as women, children, older persons, or PWDs fully understands the outcome and available options.
- Complainants will also be informed of their right to appeal if they are dissatisfied with the resolution, and guidance will be provided on how to access the appeal process.

8.13.5.7. Step VI: Grievance Appeal

- If stakeholders are dissatisfied with the final decision, they may escalate their grievance to the Grievance Redress Committee (Tier 2). Appeals should be submitted within 10 working days of receiving the decision, and the GRC will provide a response within 20 working days. The GRC will determine whether the decision should be reconsidered, taking into account legislation, best practices, and precedence.
- Complainants may also seek support from external social services, protection agencies, or trusted community institutions during the appeal process. In cases involving SH, SEA, or GBV, victims retain the right to escalate their grievance directly to national protection and justice systems at any time, independent of the project's internal process.
- Further escalation could be raised to the Barbados Water Authority (BWA) or the Inter-American Development Bank (IDB) through its grievance protocol form.

8.13.6. Grievance Categories and Escalation Pathways

Section 5.1 uses **Table 2** as the primary screening tool for all grievance categories, including community health and other health-related grievances. The table identifies under Section 5.1. It distinguishes the likely issue type, examples of main community health and worker-community and worker health concerns, the primary focal point, and the escalation pathway to be followed. Its categories, identifies where health-related issues may arise within those categories. The table should be used together with **Figure 89** to determine the appropriate the responsible initial focal point, whether the matter follows the standard Tier 1, which illustrates how grievances move from receipt and acknowledgement through screening, routing, escalation, closure and monitoring. to Tier 3 pathway, and whether the clarifies when a grievance also requires must be treated as an urgent health, safety, environmental, confidential or authority notification actions.

Table 173 presents grievance categories, health-related Issues, focal points and escalation pathways.

Table 173: Grievance Categories, Health-Related Issues, Focal Points and Escalation Pathways

Category	Examples of Issues, Including Community Health and Health-Related Grievances	Primary Focal Point	Escalation Pathway
Emergency & Safety	Fire, flooding, hazardous spills, chemical or fuel release, unsafe conditions, medical emergency, alleged illness or injury, suspected outbreak, wastewater exposure, hydrogen sulphide alarm exceedance, or other urgent community or worker health and safety risk with explicit consideration of the needs of women, children, older persons, PWDs. Where such emergencies intersect with harassment or GBV concerns, these	HSE Representative / Community Health Focal Point	Immediate control action; escalate to HSE Representative and Community Health Focal Point; assess health risk within 48 hours; report to PEU and competent authorities where required; Tier 2: GRC → Tier 3: Legal/Authorities.

Category	Examples of Issues, Including Community Health and Health-Related Grievances	Primary Focal Point	Escalation Pathway
	shall be routed to the confidential SEA/SH/GBV pathway for appropriate handling.		
Occupational Health	Heat stress, PPE concerns, unsafe work conditions, sanitation, potable water, worker accommodation, food hygiene, vector-borne disease risk, exposure to wastewater, dust, chemicals, biological hazards, or occupational illness or injury with explicit recognition of heightened risks for women, pregnant workers, migrants, and youth who may face differential vulnerabilities.	HR Representative / HSE Representative	Tier 1: HR/HSE → Project Manager → Tier 2: GRC → Tier 3: BWA/IDB, Labour Department, health authority or other competent authority where applicable. Urgent health risks require immediate inspection and corrective action. Escalation pathways allow for anonymous reporting.
Worker Influx & Community	Noise, cultural conflicts, harassment (including gendered safety and harassment risks for women, girls and other vulnerable groups), local hiring concerns, nuisance behaviour, littering, crowding, perceived	Community Liaison Officer / HR Representative	Tier 1: CLO/HR → Project Manager → Tier 2: GRC → Tier 3: PEU. Health or safety implications are referred to HSE and the Community Health Focal Point.

Category	Examples of Issues, Including Community Health and Health-Related Grievances	Primary Focal Point	Escalation Pathway
	safety risks, worker-community interactions affecting wellbeing, community stress, or increased risks associated with worker presence.		
SEA/SH/GBV	Sexual harassment, sexual exploitation and abuse, gender-based violence, child protection concerns, coercion, intimidation, retaliation, or sensitive misconduct affecting workers, community members, visitors or service users.	HR Representative / Survivor-Centered Response Team ¹⁵⁸	Confidential pathway only; do not record identifying details in the general grievance log. Use restricted-access records and survivor-centered referral to medical, psychosocial, legal, police or child protection services where requested or required.
Security Personnel	Misconduct, abuse, excessive force, intimidation, discrimination, harassment especially towards to women, youth and migrants, access control concerns, retaliation,	HR Representative / Project Manager	Tier 1: HR/Project Manager → Tier 2: GRC → Tier 3: Authorities. Sensitive cases follow the confidential pathway; urgent safety risks require immediate response.

¹⁵⁸ The Survivor-Centered Response Team will be composed of the other members of the management team who may need to get involved depending on the severity and nature of the case as well relevant national authorities. Additionally, victims may choose a female/male focal point, prioritize urgent safety/medical support, and keep records highly confidential.

Category	Examples of Issues, Including Community Health and Health-Related Grievances	Primary Focal Point	Escalation Pathway
	or health and safety concerns arising from security interactions.		SH/SEA/GBV complaints will be routed to the specific pathways.
Traffic & Mobility ¹⁵⁹	Road disruptions, unsafe transport, speeding, pedestrian near-miss, school-hour movement breach, emergency access blockage, road damage, mud or debris on roads, haulage scheduling, or poor communication of traffic changes.	Social Personnel / Community Liaison Officer / HSE Representative	Tier 1: Social/CLO/HSE → Community Health Focal Point where health or safety risk is alleged → Tier 2: GRC → Tier 3: PEU. Immediate escalation for pedestrian near-miss, injury, school-hour breach or serious safety risk.
Cultural Heritage ¹⁶⁰	Chance finds during excavation, damage to heritage sites, disturbance of culturally important locations, access concerns, community safety concerns, or health and safety issues around heritage areas.	Project Manager / HSE Representative	Tier 1: PM/HSE → Tier 2: GRC → Tier 3: Authorities. Stop-work or chance-find procedures apply where relevant.

¹⁵⁹ Traffic measures for safe access by women, children, older persons and PWDs, especially near schools and health clinics and treat repeated “feeling unsafe” reports as serious and urgent.

¹⁶⁰ Women, elders, faith and cultural leaders will be engaged when heritage issues arise and how restrictions may affect customs/rituals, livelihoods and safety for different groups.

Category	Examples of Issues, Including Community Health and Health-Related Grievances	Primary Focal Point	Escalation Pathway
Labour & Welfare	Wages, working hours, contracts, benefits, rest periods, housing, welfare facilities, sanitation, drinking water, food, discrimination, fatigue, heat stress, mental wellbeing, gender related issues including discrimination, and bullying of LGBTQI+ and migrant workers, ¹⁶¹ and health-related welfare complaints.	HR Representative / HSE Representative	Tier 1: HR/HSE → Tier 2: GRC → Tier 3: Labour Ministry, BWA/IDB or competent authority. Health and welfare risks require prompt inspection and corrective action.
Environmental Impacts ¹⁶²	Dust, particulate matter, noise, vibration, light, waste, odor, sewage odor, bioaerosols, biodiversity concerns, standing water, mosquitoes, rodents, drainage, water quality concerns, wastewater discharge, spills, and community exposure concerns.	HSE Representative / Community Health Focal Point	Tier 1: HSE → Community Health Focal Point → Tier 2: GRC → Tier 3: EPD, Ministry of Health or other competent authority where required. Health-related complaints are assessed within 48 hours and simple cases targeted for closure within 7 working days.

¹⁶¹ These grievances will be recorded and monitored for patterns by sex and worker type.

¹⁶² Dust, odor and noise may disproportionately affect children, pregnant women, older persons and people at home during the day. Complaints from these groups as well those from schools, health clinics and other sensitive receptors will be prioritized.

Category	Examples of Issues, Including Community Health and Health-Related Grievances	Primary Focal Point	Escalation Pathway
General Conduct	Code of Conduct violations, bullying, disrespectful behaviour (which includes sexist, homophobic and gender-based insults and exclusion are violations as well), littering, nuisance behaviour, intimidation, retaliation, or conduct that affects community wellbeing, perceived safety, or access to project-related information and remedies.	Site Supervisors / HR Representative / Community Liaison Officer	Tier 1: Supervisor/HR/CLO → Tier 2: GRC. Health or safety implications are referred to HSE and the Community Health Focal Point; sensitive cases follow the confidential pathway.

Immediate escalation is required where Table 1 identifies an immediate escalation trigger, including alleged illness or injury, hazardous exposure, wastewater or chemical release, suspected disease outbreak, pedestrian near-miss, school-hour traffic breach, or serious safety risk, or any other actual or potential community health and safety consequence. Priority attention shall be given to women, children, older persons, and PWDs as at-risk groups. Harassment and gender-based safety concerns are treated as serious safety risks and routed through the confidential SEA/SH/GBV referral pathway.

All escalated incidents must be communicated through accessible formats and channels (including non-digital and low-literacy options) to ensure timely awareness and response. Each escalated matter shall be recorded in the Grievance Redress Mechanism (GRM) and analyzed, disaggregated by sex and age where possible, to strengthen prevention and mitigation measures. Escalations are reported to the HSE Representative and Community Health Focal Point, and to the PEU in accordance with incident reporting requirements, with cross-reference to related figures and sections for consistency and clarity.

Figure 2 illustrates grievance Category Screening and Escalation Pathway.

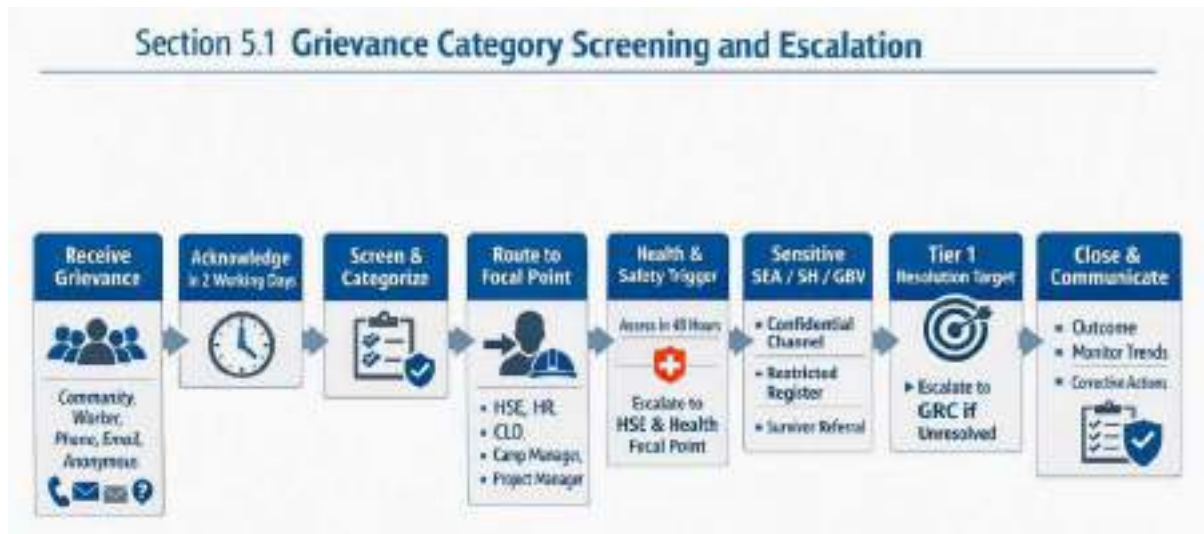


Figure 89: Grievance Category Screening and Escalation Pathway

All health-related grievances are acknowledged within 2 working days. Where a grievance alleges a health risk, exposure, illness, injury, vector concern, spill, traffic safety risk or other potential community health consequence, the matter is, assessed within 24 hours where a health risk is alleged, and routed to the responsible technical lead for immediate control, investigation, control measures, and corrective action, communication.

Figure 90 illustrates health-Related Grievance Screening and Escalation Pathway.

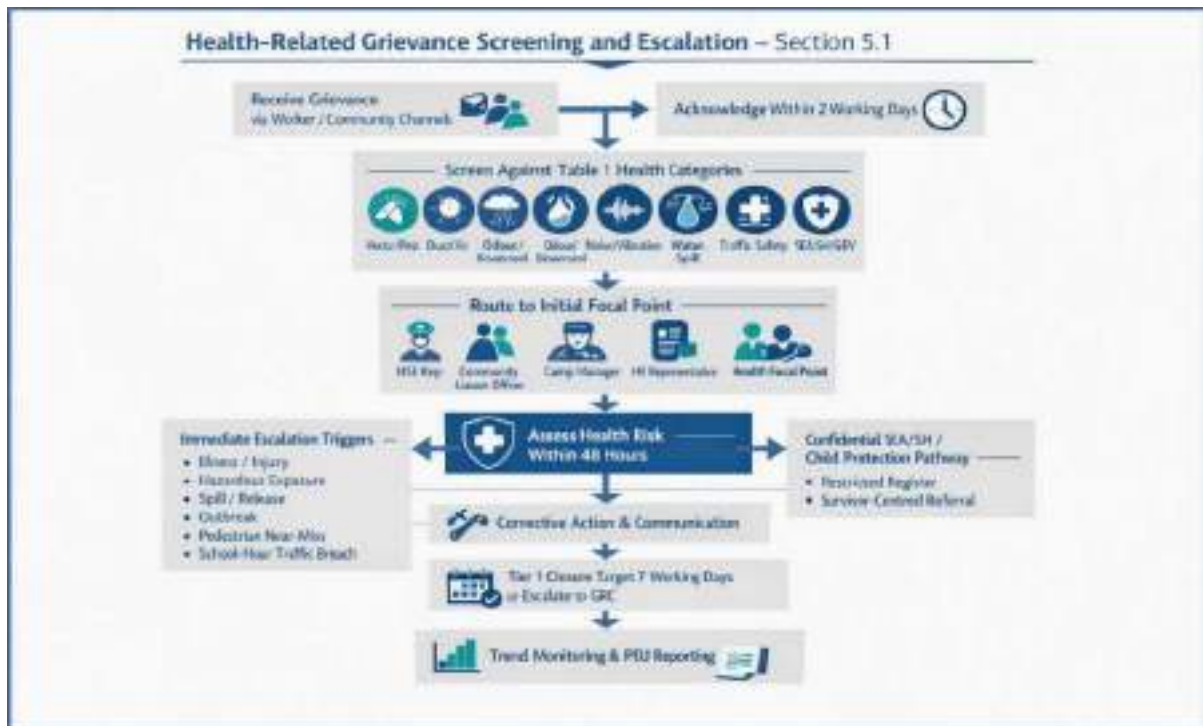


Figure 90: Health-Related Grievance Screening and Escalation Pathway

Any grievance involving alleged illness or injury, hazardous exposure, wastewater or chemical release, suspected disease outbreak, pedestrian near-miss, school-hour traffic breach, or other potential community health consequence is escalated immediately to the HSE Representative and the Community Health Focal Point and reported to the PEU in accordance with the complainant, and trend monitoring reporting requirements.

Figure 91 illustrates combined Health-related grievance screening and escalation pathway, including health-related triggers.

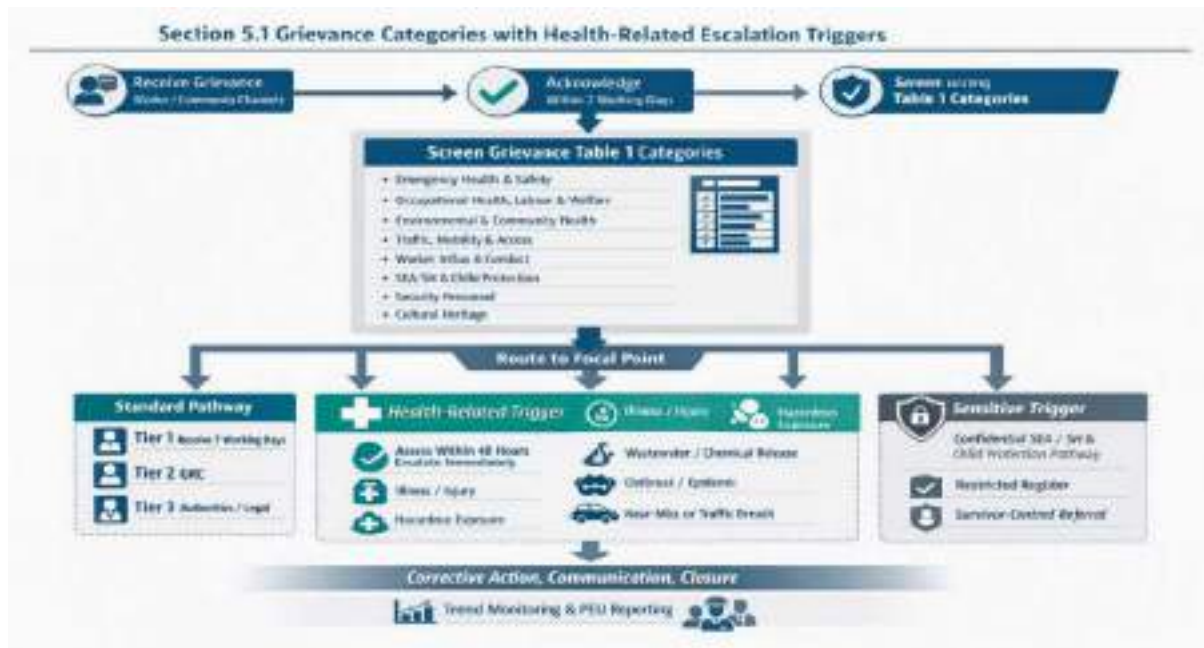


Figure 91: Combined Health-related grievance screening and escalation pathway, including health-related triggers identified

SEA/SH/GBV, child protection and other sensitive cases continue to follow the confidential pathway and worker-conduct grievances are not entered into the general grievance log. They are received through confidential channels, recorded only in a restricted-access register using the minimum information necessary, and managed using a survivor-centered approach based on safety, consent, confidentiality, non-discrimination and non-retaliation.

8.13.7. Specific Procedures For Workers And GBV, SEA, and SH Grievances

CRSEG maintains a **zero-tolerance policy** for Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), and Gender-Based Violence (GBV). Employees and community members who experience or witness SEA/SH/GBV are strongly encouraged to report these cases immediately through the confidential grievance channels. Reporting is not mandatory for victims, but all staff have a duty to act responsibly to protect others and uphold the Code of Conduct. For worker-related cases, the HR Representative will lead the response and case management. For community-related cases, the Social Personnel or designated focal points will take the lead, ensuring survivors have access to trusted personnel with appropriate expertise. All reports will be handled using a survivor-centered approach, prioritizing confidentiality, informed consent, dignity, and protection of identity.

Integrating Gender-Based Violence (GBV) and Sexual Exploitation, Abuse, and Harassment (SEAH) inputs into a Grievance Redress Mechanism (GRM) requires a **survivor-centered approach** focused on **safety, confidentiality, and non-discrimination**. Inputs must ensure the GRM can safely receive, record, and refer sensitive complaints without triggering re-traumatization or risk of retaliation.

8.13.8. Reporting Pathways

- **Confidential channels:** Workers must have multiple safe options to report grievances including an HR hotline, anonymous drop boxes in the camp, secure email, or in-person reporting. Each channel must be accessible in workers' native languages and explained during induction.
- **Immediate escalation:** SEAH/GBV, child abuse, or severe safety incidents bypass routine handling and are escalated directly to HR/HSE and, if necessary, external authorities. Escalation to external authorities (e.g., police, protection services, justice systems) will be undertaken only with the informed consent of the survivor or complainant, except where mandatory reporting is required by law (such as child abuse). Survivors will be supported with clear information on their options and offered safe referral to medical, psychosocial, and legal services. All actions will follow a survivor-centered approach, prioritizing confidentiality, dignity, and protection of identity.
- **Community liaison coordination:** If a grievance involves community members (e.g., harassment, noise, or cultural conflict), HR coordinates with the Community Liaison Officer to ensure joint resolution.

8.13.9. Grievance Handling Protocols

- **Acknowledgment:** Every grievance is acknowledged within **two working days**, with confirmation of receipt and next steps. All allegations of SH, SEA, or GBV will be treated as credible upon receipt and follow a separate survivor-centered process distinct from routine grievances. These cases will be acknowledged immediately, with initial safety and referral measures provided within 24 hours. Feedback to complainants will be delivered in simple, clear formats whether in writing, by phone, or in person, to ensure understanding of the decision, next steps, and available support.
- **Assessment:** HR screens grievances for merit, categorizes them (SH/ SEA/GBV, safety, discrimination, welfare), and logs them in the grievance register.
- **Investigation:**
 - o Routine cases → HR/HSE team investigates.
 - o SEAH/GBV cases → handled by an independent, gender-sensitive team separate from normal management lines.
- **Resolution timeline:**
 - o Simple cases resolved within **7 working days**.
 - o Complex cases escalated after **14 days** to the Grievance Committee.
- **Feedback and appeal:** Complainants receive written feedback and can appeal unresolved cases to the Project Manager or PEU.

8.13.10. SEAH/GBV-Specific Protocols

- **Survivor-centered approach:** Investigations prioritize confidentiality, consent, safety, respect, and non-discrimination. Survivors decide whether investigations proceed and retain control over the pace and scope of the process. No investigation or information-sharing will occur without the survivor's

informed consent, and they may pause, limit, or withdraw participation at any stage. Investigations will be conducted in a survivor-centered manner, prioritizing dignity, confidentiality, and protection of identity, with procedures designed to minimize risk of re-traumatization. **Support services:** Survivors are offered counselling, medical care, and legal aid referrals through approved service providers.

- **Protective measures:** Immediate steps include temporary removal or suspension of the alleged perpetrator pending investigation, to safeguard the victim and community. If necessary, or if specifically requested by the victim, arrangements will be made for the victim's relocation to a safer place or to a location where they feel secure, immediately after the incident.
- **Non-retaliation:** Explicit protection for complainants and witnesses against intimidation, dismissal, or discrimination.
- **Confidential documentation:** SEAH/GBV cases are logged separately with restricted access to authorized personnel only.

8.13.11. Workers' Camp-Specific Protocols

- **Camp grievance box:** Secure boxes placed in common areas, checked weekly by HR/HSE.
- **Camp meetings:** Monthly sessions to discuss recurring issues, preventive actions, and welfare improvements. Where feasible, separate or safe-space discussions will be organized for women and other vulnerable workers (including youth, older persons, and PWDs) to ensure that concerns related to harassment, safety, or welfare can surface without pressure or fear of retaliation. Outcomes from these sessions will be integrated into the broader monthly review to strengthen preventive measures and improve workplace wellbeing.
- **Welfare and sanitation:** Complaints about facilities (e.g., hygiene, food, accommodation) logged and resolved within **7 days**.
- **Safety and emergency:** Unsafe conditions trigger immediate inspection under the Emergency Response Plan.
- **Cultural sensitivity:** Workers trained to respect local customs and community norms to prevent social friction.

8.13.12. Record-Keeping and Monitoring

- **Grievance register:** All cases logged with date, category, and resolution status. SEAH/GBV cases recorded separately for confidentiality.
 - **Anonymized logging:** Use restricted-access, password-protected registers or coding systems instead of recording a survivor's name or identifying details.
 - **Strict data limits:** Restrict the recorded details to minimal facts (date, whether the actor is project-related, and if a referral was made)
- **Periodic review:** Monthly analysis of trends and corrective actions by HR/HSE and Project Manager.

- **Reporting:** Summary reports submitted quarterly to the PEU and Barbados Water Authority.
- **Data protection:** All personal data handled per the Barbados Data Protection Act (2019).
 - **Secure physical storage:** Keep any physical notes or intake sheets in locked cabinets accessible only by designated SH/SEA/GBV focal points

8.13.13. Communication and Awareness

- **Orientation sessions:** All workers trained on GRM use, SH/SEA/GBV awareness, and confidentiality principles during induction. Considerations will be made for women-only orientation sessions led by women facilitators where needed, while sessions with PWDs will consider the use of sign language interpretation, large print and/or alt-text materials and text-to-speech applications where relevant.
- **Posters and signage:** Multilingual posters displayed at the camp and work sites showing reporting channels and timelines.
- **Community outreach:** Liaison Officer conducts quarterly sessions with residents explaining how to access the GRM. This is done with the support of or in conjunction with the contractor personnel tasked with social responsibility of the company.

Feedback loops: Regular updates shared with workers and community members on resolved cases and systemic improvements. Noting public feedback on SH/SEA/GBV cases should be anonymized and aggregated (e.g. ‘number of cases’, ‘types of issues’, ‘general actions taken’) without any details that could identify victims or alleged perpetrators.

8.14. SH/SEA/GBV Prevention and Response Plan

This SH/SEA/GBV Prevention and Response Plan is intended to be read together with the Project’s draft supporting documents, including the draft Code of Conduct, the draft Labour Management Plan, and the draft Community Health Assessment and Community Health Programme. Together, these instruments provide the integrated framework for worker conduct, labor management, community health risk identification, survivor-centered response, grievance handling, monitoring, and corrective action.

8.14.1. Background

Barbados has documented high levels of Gender-Based Violence (GBV), which must be explicitly considered in relation to project risks. Specific pathways include labor influx, traffic changes, security concerns, and economic stressors associated with construction works. These disruptions and stressors can exacerbate Intimate Partner Violence (IPV) and other forms of GBV if not properly managed.

The project therefore commits to ensuring that its activities do not unintentionally increase these risks. This requires integrating gender-responsive and survivor-centered safeguards into workforce management, camp operations, traffic planning, and community engagement. In addition to women and girls, other at-risk and vulnerable groups including LGBTIQ+ persons, persons with disabilities (PWDs), youth, and older persons must be explicitly recognized in risk analysis and mitigation planning.

To strengthen protection, the project will maintain confidential referral pathways for survivors of SEA/SH/GBV and IPV, ensuring timely access to medical, psychosocial, legal, and protection services. These pathways will be communicated clearly to workers and community members, reinforcing trust and accountability.

GBV is an umbrella term for any harmful act that is perpetrated against a person's will and that is based on socially ascribed (i.e., gender) differences between males and females. It includes acts that inflict physical, sexual or mental harm or suffering, threats of such acts, coercion, and other deprivations of liberty. While the term is often used synonymously with 'violence against women, it can and does occur for people of all genders, including men, women, male and female children and gender diverse individuals.

GBV represents a significant human rights violation in Barbados, with women and girls experiencing alarmingly high and escalating rates of physical and sexual violence. This pervasive issue is deeply rooted in the country's colonial past and a "plantocratic patriarchal culture" that has historically perpetuated and enabled gendered oppression. A landmark National Intimate Partner Violence survey revealed that 62% of women have experienced at least one form of intimate partner violence, with emotional abuse, social isolation, and physical violence being the most prevalent forms, often occurring as a pattern of behaviors rather than isolated incidents. Despite Barbados' commitment as a signatory to international human rights instruments and global health initiatives, critical gaps exist, including a lack of formalized national plans for GBV prevention and intervention, and a persistent absence of comprehensive, systematic national data to effectively guide responses. Recognizing these challenges, Barbados commenced efforts in 2025 to develop a Roadmap for a National Domestic Violence Action Plan, aiming for a coordinated, multi-sectoral approach to strengthen its response framework. Moreover, poverty disproportionately affects women and girls, particularly in female-led households, highlighting intersectional vulnerabilities that must be addressed within any comprehensive prevention and response strategy.

SEA (Sexual Exploitation and Assault) and SH (Sexual Harassment) are both manifestations of GBV. Sexual Exploitation is 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 another. Whereas, Sexual Harassment is defined as any unwelcome sexual advance, request for sexual favor, verbal or physical conduct or gesture of a sexual nature, or any other behaviour of a sexual nature that might reasonably be expected or be perceived to cause offense or humiliation to another, when such conduct interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive work environment.

8.14.2. Objectives

A robust SH/SEA/GBV Prevention and Response Plan is imperative given the concerning prevalence of gender-based violence in Barbados. The project acknowledges the presence of human trafficking, sex and labor exploitation, and sex tourism in Barbados, which poses risks, especially for vulnerable populations and undocumented migrants. To address these risks, the project will adopt prevention and response objectives tied directly to project activities such as worker–community interactions, worker camp management, deployment of security personnel, and traffic diversions. These measures will ensure that men, women, girls, boys, and vulnerable groups—including PWDs, migrants, and older persons can safely access information, report concerns, and receive support without fear of retaliation.

Furthermore, the project has a clear obligation to address these issues. Barbados is a signatory to key international instruments such as the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and the Beijing Platform for Action, which mandate action to eradicate discrimination and violence against women. Nationally, the Bureau of Gender Affairs aims to integrate gender equality into all development plans. Crucially, the project is bound by the Inter-American Development Bank (IDB) Guidelines for Environmental and Social Performance Standard 9: Gender Equality, which explicitly obliges the project to anticipate and prevent adverse gender-based risks and impacts, mitigate and compensate for them when unavoidable, prevent SGBV (including sexual harassment, exploitation, and abuse), and respond promptly to incidents. This includes establishing policies, training workers on gender inclusion and SGBV, managing alcohol consumption, ensuring adequate provisions for female workers, and implementing a confidential grievance mechanism with a zero-tolerance policy for SH/SEA/GBV. Therefore, this plan is essential to align with ethical responsibilities, legal requirements, and best practice, mitigating risks to both individuals and the project's successful, sustainable development.

The Community Health Assessment (as annexed in the Workers' Camp ESIA/ESMP and linked in annex 5 of this document) identifies SEA/SH/GBV as a critical community health and social risk pathway requiring advance prevention, confidential reporting, survivor-centered referral arrangements, supervisor accountability, and enforced sanctions. This Plan therefore operationalizes the relevant SEA/SH/GBV commitments contained in the draft Code of Conduct and draft Labour Management Plan, while linking community-facing risk management to the draft Community Health Assessment.

This plan establishes a **zero-tolerance policy** for Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH), and Gender-Based Violence (GBV) within the Barbados Climate Resilient South Coast Water Reclamation Project. It applies to all employees, subcontractors, security personnel, and community interactions.

8.14.3. Principles of the SH/SEA/GBV Prevention and Response Plan

The Prevention and Response Plan is founded on the principle of **zero tolerance** for sexual harassment, sexual exploitation and abuse, and gender-based violence which includes mandatory referral for child abuse as stipulated by the law and consent-based referral for adults. All forms of misconduct are strictly prohibited and will result in immediate disciplinary action, including termination of employment and referral to the relevant authorities under the laws of Barbados. This principle underscores the Contractor's duty of care to workers, communities, and stakeholders.

The Plan adopts a **survivor-centered approach**, ensuring that the dignity, rights, and choices of victims are prioritized. Victims are empowered to determine if, when, and how they report incidents, and to set the pace and scope of any investigation. They may pause, limit, or withdraw a case at any stage without repercussions. Strict guarantees of confidentiality, safety, and access to appropriate support services including counselling, medical care, and legal assistance will be upheld throughout the process. All processes are designed to minimize re-traumatization and uphold respect and non-discrimination.

Effective prevention and response require **confidential and accessible reporting** mechanisms. Multiple channels including hotlines, email, drop boxes, and in-person reporting are available to workers and community members. Routine complaints are acknowledged within two working days, resolved within seven

working days where possible, and escalated to the Grievance Redress Committee (Tier 2) if unresolved after fourteen working days. All allegations of SH, SEA, or GBV will follow a confidential survivor-centered track within the Grievance Redress Mechanism (GRM). These cases are acknowledged immediately, with initial safety and referral measures provided within 24 hours. Resolution actions will prioritize survivor consent, dignity, and access to services, and may proceed on timelines distinct from routine grievances to ensure safety and confidentiality. Reporting pathways are multilingual and culturally sensitive to ensure inclusivity.

The Plan guarantees **non-retaliation** for all individuals who report violations in good faith. Workers, subcontractors, and community members are protected from intimidation, dismissal, or discrimination. This principle reinforces trust in the grievance system and ensures that reporting is safe and encouraged. Victims and witnesses who experience retaliation may report it as a separate grievance, which will be handled with the same confidentiality, urgency, and survivor-centered safeguards as other serious cases.

Clear **accountability and oversight** structures are established. The Project Manager holds ultimate responsibility for overall implementation of the Code of Conduct and grievance framework. For worker-related cases, the HR Representative manages confidential reporting and investigations, ensuring survivor-centered handling and access to support services. For community-related cases, the Social Personnel or designated Community Focal Points lead the response, coordinating with HR/HSE as needed to ensure survivors are supported through appropriate channels. At least one female focal point will be designated with specific responsibility for SH/SEA/GBV cases, to provide survivors with trusted, gender-sensitive access to reporting and support.

The Plan is fully **integrated with safeguards** outlined in the ESIA and ESMP, including the Workers' Health and Safety Plan, Health and Safety Manual, Emergency Response Plan, Incident Management Plan, Community Health and Safety Plan, and the Project's draft supporting documents: the Code of Conduct, Labour Management Plan, and Community Health Assessment and Community Health Programme and Plan. It aligns with IDB Environmental and Social Safeguards (ESPS 1, 2, 4, 9, and 10) and national legislation, ensuring consistency across all workers, community, health, safety, environment and grievance-management frameworks.

Table 174: Alignment of the SH/SEA/GBV Prevention and Response Plan with project safeguards and supporting documents

SH/SEA/GBV Prevention and Response Plan		
Central integrating instrument for prevention, reporting, referral, monitoring, sanctions, and survivor-centered response		
Project safeguard plans	Draft supporting documents	Compliance framework
- ESIA and ESMP - Workers' Health and Safety Plan - Emergency Response Plan	- Draft Code of Conduct - Draft Labour Management Plan - Draft Community Health Assessment and Community Health Programme	- IDB ESPS 1, 2, 3, 4, 5, 6, 8, 9, and 10 - Applicable national labor, human rights, health, safety, environmental and

- Incident Management Plan - Community Health and Safety Plan		grievance-management requirements
Aligned outcomes Consistent worker conduct expectations • confidential reporting • survivor-centered referral pathways • community health risk management • monitoring indicators • disciplinary action • corrective action and continuous improvement		

Prevention is strengthened through **training and awareness**. All workers undergo mandatory induction training on SH/SEA/GBV, with regular refresher sessions and scenario-based exercises. Training content and exercises will be designed to reflect the diverse realities of different groups including men, women, youth, migrants, persons with disabilities, and other vulnerable populations rather than relying only on generic examples. Awareness materials will be provided in accessible formats, such as plain language, large print, sign language interpretation, and other inclusive methods, to ensure that all workers can fully understand and engage with the content.

Finally, the Plan emphasizes **monitoring and sanctions**. A confidential grievance register is maintained, with monthly reviews and quarterly reporting (noting that when SH/SEA/GBV cases ensure that survivors' details are fully anonymous and confidential) to the Project Execution Unit and Barbados Water Authority. Violations result in clear disciplinary measures, including suspension, termination, and referral to legal authorities, ensuring that accountability is enforced transparently while protecting survivor confidentiality.

8.14.4. Phase specific planning

Effective prevention and response to Sexual Harassment, Sexual Exploitation and Abuse, and Gender-Based Violence (SEA/SH/GBV) requires a dynamic approach that evolves with the project's lifecycle. Each phase pre-construction, construction, and early operations/handover presents distinct social, cultural, and operational contexts that influence risk exposure and mitigation strategies.

Phased planning ensures that safeguards are not static but responsive to changing environments, workforce composition, and community interactions. It allows proactive identification of vulnerabilities before they escalate, embeds accountability mechanisms during high-activity periods, and sustains respectful engagement as operations stabilize.

By integrating SEA/SH/GBV considerations into every stage, the project reinforces its commitment to zero tolerance, survivor-centered protection, and inclusive community relations. This approach also aligns with the IDB's Environmental and Social Safeguards (ESPS 1, 4, and 9) and Barbados' national labor and human rights legislation.

Across all phases, implementation of this Plan should be coordinated with the draft Code of Conduct and draft Labour Management Plan so that worker obligations, supervisor responsibilities, disciplinary pathways, labor welfare provisions, and grievance procedures are mutually reinforcing. Findings from the draft Community

Health Assessment should inform phase-specific outreach, monitoring priorities, and referral-readiness measures, particularly where worker influx, accommodation, traffic, site access, or community interaction may elevate social and gender-related health risks. Risk analysis and mitigation will explicitly examine differential impacts on vulnerable groups including women, men, girls, boys, LGBTIQ+ persons, persons with disabilities, migrants, and older persons. Reviews will incorporate disaggregated data from both the GRM and the Community Health Assessment, ensuring that monitoring captures variations in exposure, access, and outcomes across different populations.

8.14.4.1. Planning for each phase

This section sets out the planning logic that applies across the project lifecycle. It establishes how SEA/SH/GBV prevention, confidential reporting, referral readiness, worker conduct, grievance management, consultations with different groups including women's groups, youth and disability advocates to verify measures are working on the ground and monitoring will be adjusted as the project moves from preparation to construction and then to early operations and handover.

8.14.4.2. Phase 1

Phase 1 establishes the enabling conditions for prevention and response before major site activity begins. The emphasis is on finalizing policies, aligning the draft Code of Conduct, draft Labour Management Plan, and draft Community Health Assessment with project procedures, assigning implementation responsibilities, preparing the GRM, and ensuring that training and referral arrangements are in place before workforce mobilization.

In addition, Phase 1 will ensure that:

- At least one female focal point is designated with responsibility for SH/SEA/GBV cases.
- Safe, confidential, community-level reporting channels are operational, allowing women, men, girls, boys, and vulnerable groups to raise concerns without fear of retaliation.
- Referral arrangements with protection services, medical care, psychosocial support, and legal assistance are established and tested, ensuring readiness before workforce mobilization.

This subsection will summarize the initial labor influx risk screening undertaken during the pre-construction phase. It should describe the anticipated workforce profile, likely worker accommodation arrangements, potential interaction points between workers and nearby communities, and the implications for SEA/SH/GBV prevention, community health, grievance management, and referral readiness.

8.14.4.3. Key GBV/SEAH Risks Identified in the Labour Influx Screening

Large and Predominantly Male Workforce

The project workforce is planned at 252 workers, including 230 men and 22 women. A predominantly male workforce, particularly during peak construction periods, increases the potential for inappropriate behaviour, sexual harassment, exploitation, and power imbalances between workers and community members.

To strengthen oversight, the contractor will provide the Project Execution Unit (PEU) with a complete list of all workers, including details on the roles and duties of the 22 women. The list will specify whether they will

reside in the workers' campsite and outline their work schedules, distinguishing between daytime and nighttime shifts.

Where women are assigned to night shifts, the contractor must demonstrate the security measures in place to safeguard them, including safe transport, adequate lighting, female focal points, and supervision protocols.

In addition, the contractor must implement targeted measures for female workers' safety and inclusion, including:

- Adequate and gender-sensitive sanitation facilities.
- Proper personal protective equipment (PPE) tailored for women.
- Accessible and confidential reporting channels.
- Regular women-only sessions to surface concerns safely.

Supervision will be increased, with mandatory Code of Conduct trainings and refresher sessions, alongside strict controls on off-duty behaviour, including clear rules on alcohol and drug use. These measures will be reviewed by the PEU to ensure compliance with project standards and protection of vulnerable groups.

Presence of Non-Local Workers

The workforce includes 98 Chinese nationals alongside local workers. Labour influx from outside the host community can increase risks associated with cultural and language barriers, reduced social accountability, and difficulties in communicating project standards and reporting mechanisms if not properly managed.

To mitigate these risks, the contractor will provide culturally and linguistically adapted training on SH/SEA/GBV, local norms, and national laws for all non-local workers. Reporting channels and awareness materials will be made available in relevant languages, and interpreters will be engaged where needed to ensure that workers fully understand project standards, grievance procedures, and their rights.

Worker-Community Interactions

The Community Health Assessment identifies worker presence and movement within surrounding communities as a key pathway for SEA, SH and GBV risks. Interactions with residents, local businesses, vendors, and other community members create opportunities for misconduct if adequate controls are not enforced.

Economic Power Imbalances

Differences in income and employment opportunities between project workers and local community members may create conditions for sexual exploitation or coercive relationships, particularly affecting economically vulnerable individuals. The assessment specifically identifies economic asymmetry as a GBV/SEAH risk driver.

To mitigate these risks, all worker trainings will include explicit warnings against transactional sex and the exploitation of economic vulnerability. Awareness sessions will emphasize respect for community members and reinforce the Code of Conduct's zero-tolerance stance on exploitation.

Information on rights, GRM, and available support services will be proactively disseminated to economically vulnerable groups in the community, ensuring they can access protection and assistance without barriers.

Risks to Vulnerable Groups

Women and girls are identified as primary groups potentially affected by SEA, SH and GBV. Other vulnerable populations include children, persons with disabilities, older persons, and lower-income households, who may face greater exposure to harm or barriers to reporting incidents. The project will reinforce tailored safeguards for women and girls, youth, children, persons with disabilities, older persons, and low-income households. These groups will be specifically invited and supported to attend community information sessions and GRM awareness activities, with accommodations provided to ensure safe and meaningful participation.

Under-Reporting and Access Barriers

Language differences, fear of retaliation, stigma, confidentiality concerns, and limited awareness of reporting mechanisms may discourage survivors or witnesses from reporting incidents. The assessment therefore emphasizes confidential, survivor-centered grievance including anonymous and off-site reporting options which utilize multiple channels and simple language and referral systems.

Peak Construction Period Risk

Risk levels are expected to be highest during peak labor deployment when worker numbers are greatest and interactions with communities are most frequent. During these peak periods, there will be an increase in field supervision, security checks, spot checks, frequency of toolbox talks, GRM monitoring and rapid response capacity. The labor plan identifies a peak workforce of 203 workers during construction.

Overall Risk Conclusion

The screening concludes that **GBV/SEAH is a High residual risk requiring enhanced management throughout the project lifecycle**. Before mitigation, the risk is assessed as **Critical** due to the combination of labor influx, workforce demographics, community proximity, economic asymmetries, and the potentially severe consequences of SEA/SH/GBV incidents. Even after mitigation measures are implemented, the residual risk remains **High** and requires continuous monitoring, reporting, supervision, and enforcement of the Code of Conduct.

Figure 92 illustrates initial labor influx risk screening framework.



Figure 92: Initial labor influx risk screening framework

8.14.4.4. Pre-Construction Phase

This phase focuses on establishing the foundational policies, frameworks, and preparatory measures before any significant workforce is mobilized.

Policy and Framework Development:

- Develop and enforce a zero-tolerance sexual harassment policy, ensuring workers receive it upon arrival that is delivered alongside the contractor's health and safety policy.
- Establish employment discrimination policies in accordance with Barbadian laws and regulations.

Outline contractor obligations regarding worker management and compliance reporting.

Risk Assessment and Gender Analysis:

- Conduct a Labour Influx Risk Screening (see Section 3.2.1) and use the draft Labour Management Plan and draft Community Health Assessment to characterize the likelihood and significance of labor influx, worker accommodation, community health, and SEA/SH/GBV impacts. The contractor, in coordination with the PEU and relevant social and environmental specialists, will be responsible for developing the Labour Influx Risk Screening. The PEU will review and validate the screening to ensure consistency with project safeguards and compliance requirements.

- If inherent gender-based risks are identified, a detailed gender analysis will be mandatory to determine disproportionate impacts by gender and other intersecting vulnerabilities. Particular attention will be given to women, girls, youth, children, persons with disabilities, older persons, and low-income households. Mitigation actions will be designed and implemented for each group to address identified risks, ensuring that project measures are inclusive, equitable, and responsive to the needs of those most exposed to harm or barriers to reporting.

Human Resources and GRM Setup:

- Establish the Human Resource Team and define roles, including the HR Representative responsible for managing SEA/SH/GBV reports. In addition, the Social Personnel will have defined responsibilities for handling sensitive community-level SH/SEA/GBV cases, ensuring survivor-centered approaches and coordination with external protection and support services. At least one female focal point will be included on the team to provide trusted, gender-sensitive access for survivors and complainants.
- Develop and communicate the project's GRM for both workers and communities, including the multi-tiered resolution hierarchy, anonymous reporting, simple language and multiple languages and disability accommodations. and timelines.
- Train GRM personnel on how the mechanism works, basic training on SH/SEA/GBV cases and survivor-centered approach for handling sensitive cases, confidentiality protocols, and who to consult for different issue categories.

Training and Awareness Planning:

- Develop induction and refresher training materials covering the Code of Conduct, SH/SEA/GBV provisions, scenarios of unacceptable behaviour, and how to use the GRM (including anonymous and confidential reporting options).
- Plan community engagement which may include having women-only, youth focused and PWDs inclusive sessions, and training on gender inclusion, SEA/SH/GBV, and harassment, including how to report cases.

Accommodation Planning:

- Ensure adequate provisions for female workers, including separate dwelling and bathroom facilities equipped with locks, proper lighting, and safe access routes. Clear and enforced camp rules against harassment will apply in and around the camp and women's facilities, supported by supervision and grievance mechanisms to ensure safety and dignity.

8.14.4.5.Phase 2

Phase 2 is the period of highest implementation intensity and therefore requires active supervision, frequent communication, and rapid response capacity. During construction, the Plan focuses on enforcing worker conduct standards, strengthening community engagement, maintaining accessible reporting channels, monitoring accommodation and site-community interfaces, and addressing SEA/SH/GBV risks linked to workforce presence and construction activities.

Construction Phase

This phase involves active project work with a potentially large and diverse workforce, requiring continuous implementation, monitoring, and proactive engagement with the surrounding community.

Worker Management and Conduct:

- Enforce the Workers' Code of Conduct diligently, in coordination with the draft Labour Management Plan, responding to any reports or suspected violations promptly.

Ensure all workers receive and sign the Code of Conduct, explicitly highlighting mandatory behaviors regarding sexual and gender safeguards. Noting that gendered misconduct (catcalling, sexist jokes, targeted bullying, homophobic slurs etc.) as Code of Conduct violations.

- Prohibit alcohol misuse, smoking or vaping, illegal substances, gambling, fighting, and other disruptive conduct within the camp or surrounding community, with clear disciplinary actions.
- Manage accommodation and welfare arrangements to support privacy, safety, and orderly conduct, including clear access controls and supervision.
- Provide specific provisions for female workers' safety and inclusion (sanitation, PPE fit, washroom and changing areas, protection from harassment by co-workers and supervisors).

Ongoing Training and Awareness:

- Provide regular induction and refresher training to all personnel on community health and safety requirements identified in the draft Community Health Assessment, worker conduct requirements set out in the draft Code of Conduct, GRM and grievance reporting, and security-related expectations.

Conduct regular Sexual and Gender-Based Violence training with all workers.

- Utilize toolbox talks to reinforce key risks, lessons learned, and expectations for respectful community interactions and engagement.
- Educate foreign workers on local laws regarding SEA/SH/GBV and cultural norms.

Community Engagement and Grievance Management:

- Implement the community GRM effectively, managing grievances related to worker behaviour, noise, traffic, and other community-facing impacts.
- Include gender vulnerability in local engagement by discussing the GRM and how community members including vulnerable groups can safely report concerns.
- Promote safe space engagements and equitable participation in consultation and stakeholder engagement processes, regardless of gender, sexual orientation, or gender identity.
- Work with law enforcement to maintain social stability and prosecute offenders in accordance with Barbadian laws.

Monitoring and Supervision:

- Monitor SEA/SH/GBV incidents regularly which includes analysis by age and sex and track patterns.
- Conduct weekly formal inspections of worker accommodation interfaces and implement mitigation measures.
- Review social and gender-related incidents, complaints, and trends monthly, and consult with community representatives (including women, PWDs, and youth).
- Manage alcohol and substance consumption among workers.
- Ensure transient workers are allowed to go home at intervals to spend time with family and friends and encourage them to socialize away from the project area.

8.14.4.6. Phase 3

Phase 3 focuses on sustaining safeguards as the project transitions from construction to operations and handover. The priority is to embed SEA/SH/GBV prevention and response requirements into operational management systems, confirm that unresolved grievances and referral arrangements are properly transferred, and ensure that remaining workers and new operational staff continue to apply the Code of Conduct, GRM, and community health and safety commitments.

Early Operations/Handover Phase

This phase involves the transition from construction to operational activities, with a potentially smaller, more stable workforce (noting that there can still be risk of SH/SEA/GBV), and focuses on sustained vigilance and institutionalizing the prevention and response mechanisms.

Sustained Compliance and Policy Enforcement:

- Continue to enforce the zero-tolerance SEA/SH/GBV policy and the Workers' Code of Conduct for all operational staff, contractors, subcontractors, security personnel, etc., consistent with the draft Labour Management Plan and any handover requirements arising from the draft Community Health Assessment.

Ensure that any new hires during early operations receive full induction and training on the Code of Conduct and SEA/SH/GBV provisions.

GRM Functionality and Accessibility:

- Maintain the visibility, functionality and accessibility of the GRM for both plant workers and the surrounding communities, businesses, citizens, and tourists.
- Regularly communicate the GRM, including contact information, through notice boards and community engagement efforts.
- Address cultural norms and language differentiation during this phase, even if language issues are less likely to apply to plant workers. Awareness of local customs and respect for community members remains crucial.

Community Relations and Monitoring:

- Continue monitoring worker behaviour and community interactions, particularly with businesses, citizens and tourists, ensuring respectful engagement.
- Regularly review and analyze community complaints and trends for gendered patterns, especially those related to worker conduct, and take corrective actions as needed.
- Collaborate with local authorities and law enforcement for social stability and to address any incidents.

Handover Documentation and Training:

- Ensure that all relevant SEA/SH prevention and response policies, procedures, and training materials are documented and effectively handed over to the operational management team.
- Provide specific training to the operational staff responsible for managing social risks and grievances, particularly concerning gender equality and SEA/SH/GBV risk management.
- Conduct a final assessment of social and gender-related incidents and trends, ensuring that mitigation measures remain effective and responsive to community need.

8.14.5. SH/SEA/GBV Prevention and Response Plan

The main goal of this plan is to propose appropriate GBV risk mitigation measures, prevent SEA/SH, and establish an adequate response framework for the Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities Project. It applies to all workers, subcontractors, community members, visitors. The referral services that support survivor-centered response are presented in Table 1.

This Plan complements the draft Code of Conduct by translating conduct expectations into practical prevention, reporting, referral, and disciplinary procedures. It complements the draft Labour Management Plan by clarifying how labor management, worker welfare, supervisor accountability, training, worker accommodation, and grievance handling will address SEA/SH/GBV risks. It also draws on the draft Community Health Assessment, which treats social and gender-related health risks, including SEA/SH/GBV, as part of the wider community health and safety risk profile for the Project. The plan should be updated if monitoring shows new or reoccurring SH/SEA/GBV patterns or gaps.

8.14.6. Confidential reporting channels

- The Human Resources (HR) Representative is responsible for maintaining "confidential reporting channels for harassment or discrimination".
- Serious allegations such as SH/SEA/GBV and child abuse are to be immediately escalated to designated persons (HR and/or HSE Representative) and relevant authorities.
- The internal investigation process for such cases will be managed according to the Grievance Redress Mechanism (GRM) system and will be aligned with the confidentiality, non-retaliation, and worker-management requirements set out in the draft Code of Conduct and draft Labour Management Plan.

- Workers can report violations in the workplace and local community through the Grievance Mechanism for all types of complaints. The person's identity will be kept confidential unless mandated by law, and anonymous complaints will be considered.
- Additional external referral pathways are detailed in Annex 1 and summarized in Table 1, which lists verified service providers and contact points for health, psychosocial, legal, shelter, and protection support.

8.14.7. Survivor-Centered Referral Arrangements:

- CRSEG commits to "survivor-centered principles for managing SH/SEA/GBV cases," including confidentiality, consent, referral pathways to support services, safety, respect, and non-discrimination.
- While specific referral *arrangements* are not detailed, the commitment to "support services" implies a process for connecting survivors with necessary aid.
- The Code also affirms every worker's right to raise concerns or report incidents affecting their physical, psychological, or sexual safety without fear of intimidation, discrimination, or retaliation, and to access and use the Project's GRM for resolution in a fair, confidential, and timely manner.

8.14.8. Sanctions and Disciplinary Framework:

- Violations of the Code of Conduct may result in disciplinary actions, up to and including termination of contract or employment, depending on the severity and impact of the misconduct. The application of sanctions should be consistent with the draft Labour Management Plan and the worker discipline procedures communicated during onboarding.
- CRSEG will employ a warning system for misconduct, which includes (but is not limited to) illegal possession and use of alcohol, drugs, unlawful possession of firearms, and fighting.
- The HR Officer will develop a policy guiding the degree of sanctions, to be shared during onboarding. Sanctions could include verbal warnings, written warnings, Performance Improvement Plans (PIP), final written warnings, suspension, or termination.
- The decision to impose disciplinary measures will align with contractual agreements, legal obligations, and organizational policies, specifically referencing the Employment Rights Act, 2012, and the Severance Payment Act of Barbados.
- Sexual activity with individuals under the age of 18 is strictly forbidden, and violations will be referred to the Barbadian Police Authorities for enforcement under the full extent of the law.
- Any violation of the Code by Workers will result in serious consequences, including termination and possible referral to legal authorities. For SH/SEA/GBV violations, sanctions will bypass the normal warning system and normally lead to immediate suspension pending investigation. If substantiated, such violations will result in termination and referral to relevant authorities. Sanctions for SH/SEA/GBV cases will be clearly differentiated from lesser misconduct (e.g., lateness, minor safety breaches) to

demonstrate the seriousness of these offences. All sanctions will be applied consistently and without exception, regardless of worker rank, nationality, or contract type, ensuring fairness and accountability across the workforce.

8.14.9. Monitoring and Reporting Indicators:

- The HR Representative is responsible for monitoring compliance with the Code of Conduct, while monitoring indicators should also draw from the draft Labour Management Plan and draft Community Health Assessment to track worker conduct, grievance trends, referral readiness, and community health and safety concerns.
- The Project Manager is responsible for managing incidents between workers and residents, oversight of serious incidents, and reporting such incidents to the Employer/Project Execution Unit (PEU) and/or other relevant authorities and stakeholders.
- Training records, including attendance information, will be "disaggregated and reported to the Employer/PEU".
- The Grievance Mechanism process includes steps for receiving, assessing, logging, and resolving grievances, with a timeline for resolution and escalation for unresolved cases.

8.14.10. Training and Awareness Requirements, Including Records of Participation:

- Employees must complete relevant training courses related to the environmental and social aspects of the project, including Sexual Exploitation and Abuse, Sexual Harassment, Gender-Based Violence, use of the Grievance Mechanism, requirements of the draft Code of Conduct, labor obligations under the draft Labour Management Plan, and relevant community health and safety risks identified in the draft Community Health Assessment.
- Training will include introductory sessions and refresher training on the CoC, conducted in languages understood by personnel, and will occur prior to the start of construction.
- Training records, including attendance information, will be disaggregated and reported to the Employer/PEU, specifying frequency (induction vs. refreshers) or specialized training for key roles, and will be available for inspection.
- All employees are required to read, understand, and sign the Code of Conduct, acknowledging their agreement to adhere to it.

8.14.11. Safeguarding Guidelines for SH/SEA/GBV Training Facilitators, ESM Consultants, HR Representatives and others

This section provides safeguarding guidance for organizations, supervisors, colleagues, and project teams working with SGBV/SEAH training facilitators. It recognizes that facilitators delivering training on SGBV, SEA, SH, and related safeguards may themselves experience harassment, discrimination, intimidation, reputational harm, or retaliation because of the sensitive nature of their work and the power dynamics it challenges. The

guidance should be applied as a supplement to the Project's GRM, enhanced GBV/SEAH procedures, draft Code of Conduct, draft Labour Management Plan, and associated capacity-building arrangements.

The safeguarding guidance in this section was developed based on safeguarding guidelines prepared for the 3RCReWS project, which focuses on upgrading the Bridgetown Sewage Treatment Plant (BTSP). It has been adapted for this SH/SEA/GBV Prevention and Response Plan to support safe delivery of SGBV/SEAH training and related capacity-building activities under the Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities.

Purpose and Scope

The purpose of these guidelines is to ensure that internal and external facilitators are protected, supported, and able to deliver SGBV/SEAH training safely and professionally. The guidance applies to project staff, contractors, supervisors, training participants, contract managers, implementing agencies, and partners involved in the design, delivery, supervision, evaluation, or follow-up of SGBV/SEAH training and capacity-building activities.

Core Safeguarding Principles

- Survivor-centered approach: facilitators who experience harassment or abuse must be treated with dignity, respect, confidentiality, autonomy, and informed consent. They may choose whether, when and how to report grievances and can pause or withdraw without losing access to support.
- Do no harm: responses must avoid exposing facilitators to further harm, stigma, intimidation, reputational damage, or unwanted attention.
- Non-retaliation: facilitators must be protected from adverse contractual, employment, reputational, or professional consequences for reporting or disclosing harassment.
- Equity and intersectionality: responses should recognize that facilitators may face different risks due to intersecting identities, including gender, disability, migrant status, minority status, or other factors that may increase vulnerability.

Organizational Responsibilities

- Establish clear anti-harassment and safeguarding procedures that explicitly cover training facilitators, contractors, and consultants.
- Ensure leadership communicates zero tolerance for harassment, discrimination, intimidation, or retaliation in training environments.
- Provide facilitators with accessible information on their rights, reporting options, safeguarding focal points, GRM procedures, referral pathways, and available support services before training begins.
- Maintain safe, confidential, and accessible reporting channels, including options for anonymous reporting or escalation outside the immediate training environment where appropriate.
- Respond promptly and sensitively to concerns, including through psychosocial support, medical referral, legal information, safety planning, and adjustment of assignments where necessary.

- Investigate complaints fairly, impartially, and confidentially, using external expertise where needed to ensure credibility and independence. To avoid conflicts of interest, any investigation or facilitation of complaints will be kept separate from those who commissioned or evaluated the training. This ensures that investigators are not influenced by prior involvement and that findings remain credible and impartial.

Preventive Measures Before and During Training

- Conduct a pre-training risk assessment that considers power dynamics, location, participant profile, institutional context, past incidents, survey feedback, warning signs, and potential red flags.
- Agree escalation arrangements before training, including when to contact the Project Gender, Stakeholder and GRM Specialist, relevant social inclusion and gender specialists, security, or contract management staff.
- Pair facilitators where possible, especially in higher-risk contexts, to reduce isolation and strengthen safety and peer support.
- Set ground rules at the start of every training session (which should be visibly supported by Management), including respectful engagement, zero tolerance for harassment, and redlines for behaviour that may result in intervention, sanctions, or removal from the session.
- Intervene promptly when inappropriate conduct occurs, support the facilitator, reinforce boundaries, and document the incident in accordance with confidential reporting procedures.
- Use participant feedback, including anonymous feedback where appropriate, to identify problems early and adapt facilitation and safeguarding arrangements.

Peer, Supervisor, and Contract Management Support

- Colleagues should listen without judgment, affirm facilitators' experiences, avoid blame, and offer practical support such as accompanying the facilitator to report or helping document incidents.
- Supervisors and contract managers should promptly review training reports for warning signs, red flags, inappropriate conduct, or incidents requiring follow-up.
- Contract supervision should provide immediate practical support, document incidents, respect the facilitator's choices, and escalate concerns where further prevention, mitigation, or sanctions may be required.
- Project teams should create safe spaces for facilitators to debrief, share challenges, contribute to safeguarding improvements, and inform the design and evaluation of future training. Any retaliation or poor performance ratings linked to a facilitator's reporting of harassment are strictly prohibited and sanctionable. Facilitators' safeguarding experiences will be included as a standard item in post-training reviews and contract evaluations, ensuring that their input directly informs programme improvements and accountability measures.

Special Considerations

- Facilitators from marginalized or minority groups may face heightened risks and should receive specific briefings, debriefings, and organizational support to address discrimination and barriers they may encounter.
- Remote and hybrid trainings must include clear online codes of conduct, procedures for managing online abuse, and confidential options for reporting virtual harassment.
- Training contracts and capacity-building terms of reference should include safeguarding expectations, reporting arrangements, facilitator support provisions, and flexibility for breaks, adjustments, or time off where harassment or stress affects well-being. Facilitators will have the explicit right to stop or pause a session if harassment occurs, without penalty or negative consequences. This safeguard ensures that facilitators can prioritize safety and well-being while maintaining the integrity of the training environment.

Monitoring, Reporting, and Learning

- Monitor safeguarding issues during training implementation, including warning signs, red flags, participant behaviour, facilitator safety, and effectiveness of reporting and response arrangements.
- Include safeguarding issues affecting facilitators should be tracked using anonymized or coded data, disaggregated where possible in quarterly and annual GBV/SEAH reporting, while protecting confidentiality and avoiding disclosure of identifying information.
- Evaluate whether the GRM, referral pathways, contract supervision, and accountability frameworks are effective in protecting facilitators and addressing incidents.
- Use lessons learned from incidents, feedback, and debriefings to update training materials, facilitator guidance, contract language, and safeguarding procedures.

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Annex 1: Biodiversity Evidence Register

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities

Project No. BA-L1063 5908/OC-BA/BA-L1063

Table 175. Biodiversity Evidence Register

R EF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATI ON
R 1	BA- L1063 – Barbado s Climate Resilient South Coast Water Reclama tion Plant – ESIA, ESMP and ESMS	2024	Principal project-specific environmental assessment. Provides project description and footprint; Graeme Hall wetland context; habitats including mangrove, freshwater/bra ckish wetland, grassland, shrubland, woodland and sedge communities; flora/fauna and January 2024 avifaunal observations; groundwater/h ydrology and water quality; Worthing/Sout h Coast marine environment including coral reef and seagrass; species of conservation concern;	Very High – project footprint, SCSTP/new facility, immediately adjacent Graeme Hall Swamp and potentially connected drainage/coastal/mar ine receiving environment.	A – Existing or Proposed Protected Area / Internationall y Recognized Site: supports Ramsar and conservation context. B – Area Necessary to Maintain a Protected Area: supports hydrology, drainage, groundwater and wetland–coastal connectivity assessment. C – Habitat Crucial for CR/EN/VU/N T Species: supports screening of threatened flora/fauna and marine taxa. D – Endemic/Ran ge-Restricted Species: supports	High for project description, infrastructure and proposed mitigation/ma nagement; Medium–High for biodiversity baseline.	Some biodiversity information is secondary and derived from earlier studies. January 2024 observations provide useful recent evidence but limited temporal/sea sonal coverage. Species status and occurrence require verification against current sources. Marine receptors require pathway screening to determine their relationship to the CHA assessment area.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			project activities and potential impact pathways; cumulative impacts; and existing biodiversity/water-quality mitigation, monitoring and management measures.		screening of endemic/restricted-range fauna. E – Migratory Species/Routes or Congregations : supports avifaunal and migratory-use screening. F – Habitat Highly Suitable for Biodiversity Conservation : supports assessment of mangrove, wetland, seagrass, reef, ecological processes and ecosystem condition.		
R 2	NEMUS – Final ESMP, South Coast: R's for Climate Resilience Wastewater System in Barbados Preparat	2021	Consolidates earlier ecological studies and project impact assessment. Identifies Graeme Hall Swamp as a principal ecological receptor and degraded wetland requiring ecological	Very High – project site, Graeme Hall Swamp, Nature Sanctuary, Bisecting Canal, ponds and connected Worthing/coastal environment.	B – Area Necessary to Maintain a Protected Area: strong evidence on hydrology, salinity and swamp-sea connectivity. C – Habitat Crucial for CR/EN/VU/N T Species: supporting where	High for project risks, mitigation and monitoring framework; Medium–High for ecological baseline.	Much biodiversity evidence derives from 2018/2019 and earlier studies. Ecological baseline was geographically limited in places, particularly to the Nature Sanctuary. Historic

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
.	ion Project		recovery. Uses December 2018 EEC work as an ecological baseline and identifies fish community and mangrove habitat as ecological-status indicators. Establishes detailed wetland water-quality parameters and repeat sampling locations. Addresses swamp-sea salinity/connectivity, rehabilitation objectives and Little Egret breeding/dispersal considerations. Identifies project pathways including pollution, vegetation clearance, fauna disturbance, turbidity/TSS, marine habitat damage and		relevant species are identified in underlying studies. D – Endemic/Range-Restricted Species: supporting where applicable. E – Migratory Species/Routes or Congregation s: supporting evidence through Little Egret breeding/dispersal and wetland bird use. F – Habitat Highly Suitable for Biodiversity Conservation : strong evidence through mangrove/wetland condition, ecological recovery needs and fish/mangrove indicators.		sampling methods were not always comparable. Prior ESIA significance ratings are not KBF-specific and should not automatically be adopted by the CHA.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			effects on coral/seagrass.				
R 3	Ramsar Sites Information Service – Annotated List / Ramsar Information for Graeme Hall Swamp, Site No. 1591	Designated 2005; most recent RIS information 2005	Confirms Graeme Hall Swamp as a 33-ha Wetland of International Importance. Describes a naturally created coastal wetland comprising mangrove forest, seagrass bed, shallow nearshore coral reef and a 12-acre artificial lake. Records at least 84 bird species, Red and White mangrove stands described as the largest healthy mangrove areas remaining in Barbados, and more than 20 freshwater/brackish-water fish species, including marine species isolated from the sea that	Very High – directly describes Graeme Hall Swamp and its ecological components; also relevant to wetland–coastal/marine connectivity.	A – Existing or Proposed Protected Area / Internationally Recognized Site: direct/strong evidence through Ramsar designation. B – Area Necessary to Maintain a Protected Area: supporting evidence through linked wetland, seagrass and reef components and ecological connectivity. C – Habitat Crucial for CR/EN/VU/NT Species: supporting species evidence requiring current status verification. E – Migratory Species/Routes or	High for Ramsar designation, site area and stated ecological character at designation.	Ecological information is approximately 20 years old. Does not establish current species abundance, habitat condition or CHA thresholds. Species records and ecological character require comparison with more recent evidence.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			became breeding residents of the lake. Also records historical water-quality and invasive tilapia concerns.		Congregations: strong evidence through bird diversity and wetland use. F – Habitat Highly Suitable for Biodiversity Conservation: strong evidence through national rarity and ecological character of mangrove/wetland habitats.		
R 4	Government of Barbados – National Biodiversity Strategy and Action Plan (NBSAP)	2020	Provides national biodiversity status, trends, conservation priorities and threats. Confirms Graeme Hall as Barbados' sole Ramsar Site and identifies it as a rest stop for migratory birds on the North American flyway. Records national importance of coral reefs,	Medium–High overall; High for national conservation context and Graeme Hall migratory-bird/Ramsar recognition.	A – Existing or Proposed Protected Area / Internationally Recognized Site: supporting national confirmation of Ramsar/conservation recognition. C – Habitat Crucial for CR/EN/VU/N T Species: supporting national context for threatened	High for national policy, conservation priorities and national biodiversity context.	Primarily national-scale. Does not establish project-area occurrence, population thresholds or current abundance for most species. Some underlying biodiversity information predates 2020. Current IUCN status must be independently verified.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			mangroves, seagrasses and marine turtles; recognizes pollution, excess nutrients, habitat loss and invasive species as biodiversity pressures. Provides national context for endemic and restricted-range biodiversity and acknowledges biodiversity monitoring/data gaps.		species. D – Endemic/Range-Restricted Species: supporting national context. E – Migratory Species/Routes or Congregation s: strong contextual evidence through flyway/rest-stop function. F – Habitat Highly Suitable for Biodiversity Conservation : supporting evidence through national conservation significance of wetland, mangrove, seagrass and coral ecosystems.		
R 5	Mahon, R., Warren, S., Wood, J. & Yarde, T. – Barbados National	2023	Dedicated Graeme Hall assessment covering wetland setting, hydrology/water regime, water chemistry,	Very High – dedicated assessment of Graeme Hall and its constituent habitats and ecological processes.	A – Existing or Proposed Protected Area / Internationally Recognized Site: strong evidence through Ramsar and	High – recent national wetland inventory incorporating literature review, spatial/GIS work and field/ground-	Publication date does not represent the observation date of all underlying evidence. Several water-quality, fish, bird and

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
.	Wetland Inventory		habitats, biota, changes in ecological character, ecosystem services, pressures, conservation status and monitoring. Maps Graeme Hall habitats and documents open-water areas, canals, woodland and wetland vegetation. Records 33 documented flora species and historical mangrove diversity. Documents major decline in salinity and transition from brackish toward freshwater conditions, with associated changes in benthic fauna and implications for mangrove and brackish-water communities.		national wetland recognition. B – Area Necessary to Maintain a Protected Area: strong evidence through hydrology, water regime, sea connection and wetland ecological processes. C – Habitat Crucial for CR/EN/VU/N T Species: supporting where threatened species are identified. D – Endemic/Range-Restricted Species: strong supporting evidence through IBA/KBA-related bird information. E – Migratory Species/Routes or Congregation s: strong evidence through Little Egret and	truthing approaches.	ecological-condition findings derive from older studies. Does not provide comprehensive contemporary population estimates for candidate KBF species.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
					wider migratory/wetland bird importance. F – Habitat Highly Suitable for Biodiversity Conservation : strong evidence through national importance, mangrove rarity, wetland ecological character and ecosystem functions.		
R 6	Mahon et al. – <i>Graeme Hall Swamp Barbados: studies, surveys, plans and development up to 2025</i> . CERMES Technical Report No. 110, UWI Cave Hill	2025	Comprehensive Graeme Hall-specific synthesis covering watershed and wetland boundaries; geology; hydrology and limnology; connection to the sea; adjacent marine environment; terrestrial ecosystems and biodiversity; human uses and impacts;	Very High – entire Graeme Hall system, watershed, sea connection and adjacent marine environment. Particularly important for defining the CHA assessment area and understanding ecological connectivity and historical/current change.	A – Existing or Proposed Protected Area / Internationally Recognized Site: strong synthesis of Ramsar and national conservation status. B – Area Necessary to Maintain a Protected Area: very strong evidence through watershed, groundwater,	High – core evidence source. Recent Graeme Hall-specific technical synthesis by UWI/CERMES and specialist authors, drawing together an extensive scientific and technical evidence base.	Primarily a synthesis/evidence gateway , rather than a new comprehensive ecological survey. Underlying evidence spans several decades. Material species records, population thresholds and current-condition findings should be

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
.			sewage discharges; flooding; development; management; and ecosystem monitoring. Identifies Graeme Hall as the last remaining complete coastal wetland ecosystem of its kind in Barbados and synthesizes extensive evidence on mangroves, fish, wetland birds and ecological connectivity. Reviews Graeme Hall IBA/KBA recognition and the underlying evidence concerning four range-restricted birds and Little Egret. Also provides recent habitat mapping based on 2023 drone imagery and consolidates historical		sea connection, lagoon and marine ecological linkages. C – Habitat Crucial for CR/EN/VU/N T Species: important evidence gateway for threatened-species occurrence. D – Endemic/Range-Restricted Species: strong supporting evidence through four range-restricted bird taxa and Yellow Warbler information. E – Migratory Species/Routes or Congregations: very strong evidence through Little Egret, nesting colonies and wider migratory bird use. F – Habitat Highly		traced to original sources or recent verification where they could change the CHA determination.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			ornithological evidence, including nesting/roosting use by wading birds.		Suitable for Biodiversity Conservation : very strong evidence, particularly the identification of Graeme Hall as the last remaining complete coastal wetland ecosystem of its kind in Barbados and the island's last remaining mangrove forest.		
R 7	BrinsJen Systems Development Specialists – ESIA and ESMP for the Workers' Camp, BA-L1063	July 2026; fieldwork April 2026	Provides the most recent project-area field evidence reviewed. Includes April 2026 Rapid Biodiversity Assessment and geo-referenced flora/fauna observations around workers' camp/project footprint; largely modified grassland	Very High – workers' camp, existing and proposed treatment-plant environs, immediate Graeme Hall interface and connected waterways.	A – Existing or Proposed Protected Area / Internationally Recognized Site: supporting through recognition of Graeme Hall/Ramsar context. B – Area Necessary to Maintain a Protected Area: strong evidence through	High for project configuration and April 2026 observations/sampling; Medium–High for broader biodiversity baseline.	Rapid field survey with limited seasonal coverage. Many wider Graeme Hall species records are literature-derived rather than April 2026 observations. The assessment explicitly was not a formal CHA. Its conclusion

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
.			camp habitat; conservation-priority trees near project/access areas; contemporary bird observations including Barbados Bullfinch; compilation of Graeme Hall bird and fish records; recent water-quality sampling from swamp, canal and connected stream; evidence of freshwater shift/salinity change; and project-specific clearing, runoff, sediment, wastewater, spill, noise and wildlife-disturbance pathways.		recent project-wetland interface and connected waterways. C – Habitat Crucial for CR/EN/VU/N T Species: supports threatened-species screening, including project-proximate flora and marine taxa referenced in the study. D – Endemic/Range-Restricted Species: supports through contemporar y Barbados Bullfinch occurrence and compiled Graeme Hall bird evidence. E – Migratory Species/Routes or Congregations: supports through compiled Little Egret/migratory-bird		concerning absence of Critical Habitat within the camp footprint should therefore not be treated as a CHA determination. Single-period water sampling is not a temporal trend dataset.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
					evidence. F – Habitat Highly Suitable for Biodiversity Conservation : supports through wetland ecological condition, mangrove context and recent environmental observations.		
R 8	IUCN Red List of Threatened Species™ – online database;	Current database; accessed Aug. 2026	Used to verify current global conservation status of priority species emerging from project/Graeme Hall records and to identify species requiring further CHA screening. Priority screening included threatened plants, <i>Acropora</i> corals, marine turtles, Little Egret, Barbados Bullfinch and other endemic/range	Species-specific – relevance depends on confirmed occurrence/use within project footprint, Graeme Hall or connected coastal/marine assessment area.	C – Habitat Crucial for CR/EN/VU/N T Species: primary evidence source for current global conservation status. D – Endemic/Range-Restricted Species: supporting where Red List range/distribution information is relevant. E – Migratory Species/Routes or Congregation s: only	High for current global Red List status.	Global Red List status alone does not establish Critical Habitat or local occurrence. Some subspecies/local populations are not separately assessed. Site dependence, abundance, breeding use and migratory/congregatory thresholds require evidence from other sources.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			-restricted birds. Particularly relevant to distinguishing global threat status from site-level importance: globally LC species may remain CHA-relevant because of range restriction, breeding, migration or congregation.		indirectly supportive; site-level congregation evidence must come from other sources.		
09	Williams, A.N. – <i>The Wetlands of Graeme Hall: An Initial Assessment of Value</i>	11 July 2008	Historical synthesis of Graeme Hall wetland extent, watershed, floodplain and buffer context; wetland habitat map; mangrove, open-water, pond, canal, grassland and woodland habitats; former mangrove–seagrass–reef ecological linkage; sluice-controlled sea connection; migratory/nati	High – Graeme Hall Ramsar wetland, 100-year floodplain, buffer areas, 1,158-acre watershed and St Lawrence Lagoon/coastal connection.	A - Existing or Proposed Protected Area / Internationally Recognized Site: – supports Ramsar/Natural Heritage context; B – Area Necessary to Maintain a Protected Area: – strong historical support for watershed, buffer, drainage and wetland–sea processes	Medium–High as historical synthesis; Medium for biodiversity baseline. Useful for spatial/ecological history and pressures.	Dated 2008 and not a biodiversity field survey. Primarily an economic valuation based on desk review and secondary sources. Many ecological statements derive from the 2007 Master Plan, Ramsar, UNESCO/CARI COMP and earlier studies, so it should not be

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			ve waterbird roosting and breeding functions; fish and other fauna; Ramsar/Natural Heritage designations; wetland hydrological, pollutant-attenuation, habitat/refuge and monitoring functions; CARICOMP mangrove-seagrass monitoring; historical 2005 raw-sewage diversion into GHS; agricultural/vector-control pressures; restoration, buffer and monitoring considerations.		needed to maintain the site; E – Migratory Species/Routes or Congregations : supports migratory/congregatory bird use; F – Habitat Highly Suitable for Biodiversity Conservation : strong supporting evidence on ecological functions, habitat/refuge value, wetland rarity and land-sea connectivity.		treated as independent corroboration where those underlying sources are already used. Current habitat condition, species abundance and monitoring status require newer evidence.
10	Environmental Engineering Consultants, Inc. (EEC) – <i>Mangrove Ecosystems</i>	30 Apr. 2010	Primary field investigation of wetland environmental health including surface-water and sediment chemistry, bacteriological	Very High – GHNS and wider GHS hydrological system; includes Ramsar wetland, adjacent SCSTP, agricultural lands, drainage network, groundwater/surface-water catchment,	A – Existing or Proposed Protected Area / Internationally Recognized Site: corroborates Ramsar/international	High for 2010 conditions. Primary multidisciplinary field investigation with environmental sampling, laboratory	Historical (2010); conditions cannot be assumed to represent 2026 status. Study commissioned by GHNS

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
.	<i>m Assessment: Graeme Hall Nature Sanctuary, Barbados</i>		sampling, benthic community assessment, mangrove/biological indicators, fish/crab sampling, drainage, geology/hydrogeology and surrounding pollution sources. Documents 1,156-acre surface-water catchment; groundwater and surface-water pathways into GHS; SCSTP immediately adjacent to Ramsar site; historical emergency sewage discharge pathway; dysfunctional sluice and restricted tidal exchange; decline in lake salinity from 8.4 ppt (2002) to 1.9 ppt (2010); freshwater transformation of mangrove	Bisecting Canal, sluice and coastal outlet.	recognition; B – Area Necessary to Maintain a Protected Area: – strong direct evidence that hydrological processes and activities beyond the protected-area boundary maintain/influence ecological character; E – Migratory Species/Routes or Congregation s: – migratory bird habitat and roosting; F – Habitat Highly Suitable for Biodiversity Conservation : mangrove ecological character, rarity, long-term persistence, ecological degradation and dependence on hydrological/tidal	analyses, biological assessment, drainage/hydrogeological investigation and site reconnaissance.	and field investigations focus substantially on the privately owned Sanctuary portion rather than providing uniform ecological sampling across the entire Ramsar site. Some historical/background information is secondary. Contemporary condition and species presence require verification.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
			ecosystem; replacement of saltwater benthos by freshwater taxa; poor water quality, pesticides and nutrient loading; fish/crab kills; mangrove sensitivity to loss of tidal exchange; migratory bird habitat and egret roosting; historical mangrove–seagrass–reef connectivity.		processes. Also highly relevant to Steps 5–6 impact pathways.		
11	Lashley, C. H. – <i>Collaboration and enforcement: the missing pieces of the puzzle in managing the Graeme Hall Swamp in</i>	Mar. 2016	Synthesis of Graeme Hall watershed characteristics, ecological importance, surrounding land uses, hydrological constraints, pollution pressures and management/governance issues. Identifies 1,156-acre watershed; GHS relationship with St.	High – wider Graeme Hall watershed, Ramsar wetland, surrounding agricultural/residential/commercial areas, SCSTP and wetland–coastal connection.	A – Existing or Proposed Protected Area / Internationally Recognized Site: corroborates international/national recognition; B – Area Necessary to Maintain a Protected Area: – supports functional importance of wider watershed	Moderate–High as synthesis/contextual source. Prepared for GWP training and draws on government, technical and academic sources. Useful integration of watershed, governance, hydrology and ecological pressures.	Predominantly secondary literature review rather than primary field investigation. Much technical/ecological evidence derives from earlier sources already included in CHA evidence base. Historical species-status terminology

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
.	Barbados. Case study prepared for Global Water Partnership training on Integrated and Adaptive Water Resources Planning, Management and Governance.		Lawrence Lagoon; mangrove–seagrass–reef proximity; resident/migratory bird importance; surrounding residential, commercial and agricultural land uses; South Coast Sewerage Treatment Facility; runoff and nutrient pathways; historical emergency sewage discharge; impaired seawater exchange and sluice operation; reported salinity decline; and need for integrated watershed management. Includes watershed and habitat maps illustrating wetland relationship to wider catchment and		and hydrological processes outside Ramsar boundary; E – Migratory Species/Routes or Congregations: corroborates migratory/wading-bird importance; F – Habitat Highly Suitable for Biodiversity Conservation : supports uniqueness and vulnerability of coastal wetland/mangrove ecosystem. Relevant to Steps 1, 5 and 6.		should not be used as current conservation status. Does not establish current 2026 conditions.

REF	SOURCE	DATE	INFORMATION EXTRACTED	SPATIAL RELEVANCE	CHA CRITERION SUPPORTED	RELIABILITY	GAP/LIMITATION
.			coastal environment.				

Note: The “CHA Criterion Supported” column identifies criterion(s) from Step 3 in the CHA Methodology to which each source contributes evidence. It does not constitute the determination that the criterion is met. Final screening positions will be assigned in the Critical Habitat Assessment Matrix as **Confirmed Trigger, Potential Trigger, Not Triggered, or Insufficient Information**, based on the combined evidence for each KBF.



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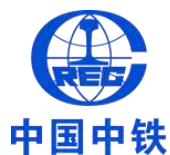
Annex 2: Priority Species Screening Matrix

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities

Project No. BA-L1063 5908/OC-BA/BA-L1063

Table 176. Priority Species Screening Matrix

SCIENTIFIC NAME	COMMON NAME	TAXON	SOURCE/RECORD	RESIDENT/MIGRATORY	IUCN STATUS	ENDEMIC/RANGE RESTRICTED?	HABITAT ASSOCIATION	CHA RELEVANCE
<i>EGRETTA GARZETTA</i>	Little Egret	Bird	R1, R2, R3, R5, R6, R7 – historical/site and breeding records; R8 status	Resident breeding population at GHS; species also dispersive/migratory	LC	No	Mangrove islands, wetland margins and shallow water; nesting, roosting and foraging habitat	Very High – Criterion E. Historical evidence indicates GHS supported ≥1% of a biogeographic population and an important breeding colony; potential direct congregatory/breeding trigger
<i>EGRETTA THULA</i>	Snowy Egret	Bird	R1, R2, R3, R5, R6, R7 – historical/site and nesting	Resident / locally dispersive	LC	No	Mangrove nesting/roosting areas, marsh and shallow wetland	High – Criteria E/F. Important component of GHS nesting/roosting assemblage and



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			records; R8 status					Ramsar ecological character
<i>BUBULCUS IBIS</i>	Cattle Egret	Bird	R1, R2, R3, R5, R6, R7 – principally historical/site records; R8 status	Resident / locally dispersive	LC	No	Mangrove nesting/roosting areas, wetland margins, grassland/agricultural areas	Supporting – Criteria E/F. Historically important component of congregatory nesting/roosting assemblage
<i>LOXIGILLA BARBADENSIS</i>	Barbados Bullfinch	Bird	R7 – observed April 2026 in project environs; R1, R3, R5, R6 – site/literature records; R8 status	Resident	LC	Yes – Barbados endemic	Woodland, shrubland and wooded wetland margins; project environs	High – Criterion D. Contemporary occurrence confirmed and species forms part of GHS range-restricted bird assemblage
<i>SETOPHAGA PETECHIA/DENDROICA PETECHIA</i>	Yellow Warbler / Barbados Yellow Warbler	Bird	R1, R2, R3, R5, R6, R7, R11 – historical/site records including historical	Resident breeding population	LC at species level	Barbados population/subspecies range-restricted	Mangrove, shrubland and wetland-edge vegetation	High – Criterion D. Historical evidence indicates an important breeding population at GHS



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			breeding estimate; R8 species status					
<i>EULAMPIS HOLOSERICEUS</i>	Green-throated Carib	Bird	R3, R5, R6, R7 – site/literature records; R8 status	Resident	LC	Caribbean/Lesser Antillean restricted range	Woodland, shrubland and flowering wetland-edge vegetation	High – Criterion D , principally as part of the range-restricted resident bird assemblage
<i>ORTHORHYNCHUS CRISTATUS</i>	Antillean Crested Hummingbird	Bird	R3, R5, R6, R7 – site/literature records; R8 status	Resident	LC	Lesser Antillean range-restricted	Woodland, scrub and flowering vegetation	High – Criterion D , as part of range-restricted assemblage
<i>ELAENIA MARTINICA</i>	Caribbean Elaenia	Bird	R3, R5, R6, R7 – site/literature records; R8 status	Resident	LC	Caribbean-restricted	Woodland, scrub and wetland-edge vegetation	High – Criterion D , as part of range-restricted assemblage
<i>CALIDRIS PUSILLA</i>	Semipalmated Sandpiper	Bird	R6 – historical/site record; R8 – status	Migratory	NT	No	Shallow wetlands, mudflats and wetland margins used principally for migratory feeding and roosting	High – Criteria C/E . Near Threatened long-distance migratory shorebird recorded at GHS; relevant to Criterion C screening and strengthens



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								evidence for GHS as habitat for migratory wetland birds under Criterion E
<i>FALCO PEREGRINUS</i>	Peregrine Falcon	Bird	R3, R5, R6, R11 – historical/site records; R8 status	Migratory/visitor	LC	No	Open wetland/coastal habitat and prey-rich bird habitat	Supporting – Criterion E. Historic Ramsar relevance, but not a current Criterion C threatened-species trigger
<i>FULICA AMERICANA</i> (HISTORICALLY <i>F. CARIBAEA</i>)	American Coot / historically Caribbean Coot	Bird	R3, R5, R6, R11 – historical/site records; R8 taxonomy/status	Resident/visitor	LC	No	Open water, ponds and freshwater/brackish marsh	Supporting – Criteria E/F. Component of wetland bird assemblage and ecological character
<i>PLUVIALIS DOMINICA</i>	American Golden-Plover	Bird	R4, R6, R7 – migratory/site records; R8 status	Migratory	LC	No	Mudflats, shallow wetlands and open areas	Criterion E. Supports GHS migratory stopover/feeding function
<i>TRINGA FLAVIPES</i>	Lesser Yellowlegs	Bird	R4, R6, R7 – migratory/site	Migratory	LC	No	Shallow freshwater/brackish	Criterion E. Component of



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			records; R8 status				wetland and mudflats	migratory wetland assemblage
<i>CALIDRIS HIMANTOPUS</i>	Stilt Sandpiper	Bird	R6, R7 – site/literature records; R8 status	Migratory	LC	No	Marshes, shallow ponds and mudflats	Criterion E. Component of migratory wetland assemblage
<i>LIMNODROMUS GRISEUS</i>	Short-billed Dowitcher	Bird	R6, R7 – site/literature records; R8 status	Migratory	LC	No	Shallow wetland, mudflats and coastal margins	Criterion E. Supports migratory-wetland function
<i>CALIDRIS MELANOTOS</i>	Pectoral Sandpiper	Bird	R4, R6 – migratory/site records; R8 status	Migratory	LC	No	Shallow wetland/mudflat habitat	Criterion E. Supports migratory stopover function
<i>STERNA DOUGALLII</i>	Roseate Tern	Bird	R6 – historical/site record; R8 status	Migratory/marine	LC	No	Coastal and marine feeding habitat	Potential supporting Criterion E. GHS record alone does not demonstrate site importance
<i>RHIZOPHORA MANGLE</i>	Red Mangrove	Plant	R1, R2, R3, R5, R6, R7 – extensive site/habitat	N/A	LC	No globally; nationally rare/important	Brackish mangrove forest and lake margins	Very High – Criteria F/B. Core habitat-forming species and component of



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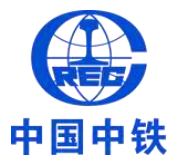
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			records; R8 status			habitat-forming species		Ramsar ecological character
<i>LAGUNCULARIA RACEMOSA</i>	White Mangrove	Plant	R1, R2, R3, R5, R6, R7 – extensive site/habitat records; R8 status	N/A	LC	No globally; nationally important habitat-forming species	Mangrove forest, particularly less saline margins	Very High – Criteria F/B. Core component of nationally rare GHS mangrove ecosystem
<i>AVICENNIA GERMINANS</i> (HISTORICALLY <i>A. NITIDA</i>)	Black Mangrove	Plant	R3, R5, R6 – principally historical records; R8 status	N/A	LC	No	Mangrove/intertidal wetland	Supporting – Criterion F. Part of historical mangrove diversity and ecological character
<i>CONOCARPUS ERECTUS</i>	Buttonwood / Button Mangrove	Plant	R3, R5, R6 – historical/site records; R8 status	N/A	LC	No	Upper wetland/mangrove transition	Supporting – Criterion F. Component of wetland vegetation/ecological character
<i>ELEOCHARIS MUTATA</i>	Sedge / Rush	Plant	R1, R2, R5, R6 – marsh vegetation records	N/A	NE	No evidence identified of restricted range	Freshwater marsh/sedge communities	Supporting – Criterion F. Characteristic habitat species



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								rather than stand-alone KBF
<i>GUAIACUM OFFICINALE</i>	Roughbark Lignum-vitae / Tree of Life	Plant	R7 – observed April 2026 immediately adjacent/near project area; R8 status	N/A	EN	Regionally distributed; not Barbados endemic	Dry terrestrial/tree habitat or landscaped environment near project footprint	High – Criterion C. Threatened species in immediate project environs; strong avoidance relevance
<i>SWIETENIA MAHAGONI</i>	West Indian Mahogany	Plant	R7 – observed April 2026 near project/access area; R8 status	N/A	NT	Caribbean/South Florida restricted native range	Terrestrial woodland/landscaped project environs	Criteria C/D screening. Conservation-priority project-proximate species; current evidence does not establish crucial habitat
<i>MEGALOPS ATLANTICUS</i>	Atlantic Tarpon	Fish	R2, R3, R5, R6, R7 – historical/site records; persistence recorded in 2019; R8 status	Resident/use of GHS; marine/estuarine connected	VU	No	Fresh/brackish lake, canals, estuarine and marine environments	High – Criterion C; also supports B/F. Vulnerable species historically associated with GHS and an important top predator within the wetland food



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								web, including a reported role in regulating tilapia populations. Its occurrence also provides evidence of wetland–marine ecological connectivity.
<i>KRYPTOLEBIAS MARMORATUS</i>	Mangrove Rivulus	Fish	R2, R5, R6 – historical/site records; R8 status	Resident	LC	No	Mangrove pools and shallow brackish wetlands	Supporting – Criteria F/B. Component of mangrove aquatic biodiversity/ecological character
<i>CENTROPOMUS UNDECIMALIS</i>	Common Snook	Fish	R2, R3, R6 – historical GHS records; R8 status	Marine/estuarine migrant; historically used wetland	LC	No	Estuarine channels, mangrove and coastal waters	Supporting – Criteria B/F. Evidence of historical wetland–marine ecological connectivity
<i>MUGIL CUREMA</i>	White Mullet	Fish	R2, R3, R6 – historical GHS	Marine/estuarine migrant/resident	LC	No	Brackish lake, channels and nearshore waters	Supporting – Criteria B/F. Evidence of



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SCIENTIFIC NAME	COMMON NAME	TAXON	SOURCE/RECORD	RESIDENT/MIGRATORY	IUCN STATUS	ENDEMIC/RANGE RESTRICTED?	HABITAT ASSOCIATION	CHA RELEVANCE
			records; R8 status					historical connectivity and fish-community function
ACROPORA PALMATA	Elkhorn Coral	Coral	R1, R2, R3, R6 – marine/site context; R8 status	N/A	CR	Caribbean/western Atlantic restricted	Shallow, high-energy coral reef	Very High – Criteria C/F. Potential direct threatened-species KBF if current occurrence within the relevant marine area is established
ACROPORA CERVICORNIS	Staghorn Coral	Coral	R1, R2, R6 – marine context; R8 status	N/A	CR	Caribbean/western Atlantic restricted	Shallow to moderate-depth coral reef	Very High – Criteria C/F. Potential threatened-species KBF
ERETMOCHELYS IMBRICATA	Hawksbill Turtle	Reptile	R1, R4, R6 – national/project marine context; R8 status	Migratory	CR	No	Coral reef/coastal foraging habitat and sandy nesting beaches	High – Criterion C; potentially E. CR migratory species with clear South Coast relevance
CHELONIA MYDAS	Green Turtle	Reptile	R1, R4, R6 – national/project	Migratory	LC globally	No	Seagrass beds and shallow coastal/reef habitats used for foraging; sandy	Supporting – Criteria E/F and Key Biodiversity Features (KBF).



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SCIENTIFIC NAME	COMMON NAME	TAXON	SOURCE/RECORD	RESIDENT/MIGRATORY	IUCN STATUS	ENDEMIC/RANGE RESTRICTED?	HABITAT ASSOCIATION	CHA RELEVANCE
			marine context; R8 status				beaches may provide nesting habitat.	Migratory marine species associated with seagrass foraging habitat, including the St Lawrence Lagoon seagrass system into which Graeme Hall Swamp drains. Its occurrence reinforces the ecological relevance of the connected coastal and marine habitats considered under KBF 5: Connected Coastal and Marine Habitats , although its current global LC status does not independently trigger Criterion C.

Source Codes



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R1 – BA-L1063 2024 ESIA, ESMP and ESMS

R2 – Earlier NEMUS ESMP and biodiversity studies cited within the 2024 documents

R3 – Ramsar Information Sheet and Ramsar site information for Graeme Hall

R4 – Barbados National Biodiversity Strategy and Action Plan

R5 – Barbados National Wetland Inventory

R6 – *Graeme Hall Swamp Barbados: Studies, Surveys, Plans and Development up to 2025*

R7 – BrinsJen Systems Development Specialists – ESIA and ESMP for the Workers' Camp, BA-L1063

R8 – IUCN Red List of Threatened Species™ / current online status verification

R9 - *The Wetlands of Graeme Hall: An Initial Assessment of Value 2008*

R10 - Mangrove Ecosystem Assessment: Graeme Hall Nature Sanctuary, Barbados 2010

R11 - Collaboration and enforcement: the missing pieces of the puzzle in managing the Graeme Hall Swamp in Barbados.

IUCN Red List Status Key

EX – Extinct

EW – Extinct in the Wild

CR – Critically Endangered

EN – Endangered

VU – Vulnerable

NT – Near Threatened

LC – Least Concern

DD – Data Deficient

NE – Not Evaluated / no current IUCN assessment confirmed

CHA Criterion Key



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A – Existing or Proposed Protected Area / Internationally Recognized Site

B – Area Necessary to Maintain a Protected Area

C – Habitat Crucial for CR/EN/VU/NT Species

D – Endemic/Range-Restricted Species

E – Migratory Species/Routes or Congregations

F – Habitat Highly Suitable for Biodiversity Conservation

Note: This matrix is a priority CHA screening tool rather than a complete inventory of all species recorded from Graeme Hall Swamp and the surrounding environment. Species were prioritized where the available evidence indicates potential relevance to **Criterion C – Habitat Crucial for CR/EN/VU/NT Species; Criterion D – Endemic/Range-Restricted Species; Criterion E – Migratory Species/Routes or Congregations; or Criterion F – Habitat Highly Suitable for Biodiversity Conservation**, including species that help define wetland ecological character and functional connectivity. The wider species inventories contained in the source documents may be retained as supporting annex material. Historical occurrence has not been treated as equivalent to contemporary presence. Where a species could materially affect the Critical Habitat determination, current verification is identified, particularly for Little Egret, Atlantic Tarpon, threatened corals, marine turtles and project-proximate threatened flora.

Annex 3: Ecological Field Verification Report

Rapid Critical Habitat Assessment

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities

Project No. BA-L1063 5908/OC-BA/BA-L1063

Field Verification Dates: 21, 24 and 28 August 2026

Field Team: Tracy Phillips, Gregory Franklin and Katherine Blackman

Introduction and Purpose

As part of the Rapid Critical Habitat Assessment (CHA) for the Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities, three ecological field verification visits were undertaken on **21, 24 and 28 August 2026**. The exercise was designed to ground-truth the findings of the desktop assessment and provide current field evidence concerning habitat condition, Key Biodiversity Features (KBFs), hydrological and ecological connections, existing environmental pressures and the principal interfaces between the proposed Project and the wider Graeme Hall wetland system.

The field verification was specifically intended to:

- confirm the presence and general condition of major habitat types identified through the desktop review;
- verify spatial relationships between the Project and Graeme Hall Swamp, particularly drainage and hydrological connections;
- document visible evidence of existing habitat degradation and environmental pressures;
- verify credible pathways through which Project activities could potentially affect Critical Habitat features;
- record opportunistic observations of flora and fauna relevant to the CHA;
- identify sensitive areas potentially requiring avoidance or other management measures; and
- determine whether field findings materially altered the desktop evidence, preliminary KBF screening or preliminary Critical Habitat Assessment Area (CHAA).

The three visits provided repeat observations under differing weather conditions. Conditions were slightly overcast with light rainfall on 21 August, sunny on 24 August, and overcast with scattered showers on 28 August. The exercise covered the seven field verification stations, subject to access constraints (*please refer to Figure 1: Ecological Field Verification Route & Table1: Field Verification Stations*)

Field Verification Approach

The verification followed the approved Rapid CHA Field Verification Methodology and used the same seven stations across the visits, where accessible

Table 177: Field Verification Stations

STATION	VERIFICATION AREA	PRINCIPAL PURPOSE
FV-01	SCSTP / Project Interface	Project footprint and immediate wetland interface
FV-02	Eastern Marsh	Wetland habitat closest to Project
FV-03	Upper Drainage	Drainage and hydrological inputs
FV-04	Bisecting Canal	Internal wetland connectivity
FV-05	Nature Sanctuary	Representative Core Critical Habitat features
FV-06	Southern Wetland Interface	Wetland–urban/coastal interface
FV-07	Sluice Gate / Coastal Connection	Downstream wetland–coastal connectivity



Figure 93: Ecological Field Verification Stations

At each accessible station, observations were made of habitat and vegetation condition, open/standing water, wildlife, drainage and apparent hydrology, visible environmental pressures and relevant Project–habitat interfaces. Photographs and GPS coordinates were recorded where practicable. Habitat condition was qualitatively assessed using the **Good – Moderate – Degraded – Highly Degraded** classification specified in the methodology.

The Upper Drainage station (FV-03) could not initially be accessed on 21 August because of dense vegetation but was subsequently accessed on 24 and 28 August after a route was opened. The remaining August stations were observed across the three-day exercise.

Access to the **Graeme Hall Nature Sanctuary** was not granted in time for the August field exercise. Accordingly, observations reported for FV-05 are **not August 2026 verification observations**. They are based on the Field Officer's most recent visit to the Sanctuary on **10 April 2026** and are retained solely to provide recent contextual information for that station.

The exercise was a rapid verification rather than a comprehensive flora, fauna or seasonal survey. Accordingly, wildlife records are opportunistic, and non-detection during the visits should not be interpreted as evidence of species absence.

Field Verification Findings

FV-01 – SCSTP / Project Interface

FV-01 confirmed the location of the Project site within the broader natural watershed immediately north of the Graeme Hall wetland system. The area comprised predominantly brushland/shrubbery with several mature trees, including mahogany and lignum-vitae/Tree of Life, together with River Tamarind, Jamaica Caper and other vegetation recorded along the site margins. Overall habitat and vegetation condition at the station were assessed as **Good**. Birds and butterflies were observed opportunistically, including a cattle egret.



Figure 94: Project Interface - Site for the new Water Reclamation Facility

A natural gully was observed along the eastern side of the Project area, further demonstrating the local drainage setting. The field evidence supported the desktop understanding that the Project is situated within the watershed from which water generally drains southwards toward the wetland and ultimately toward the coast.



Figure 95: Project Interface – Natural Gully to the East of the Project Site

Project works and construction access were evident. Shade cloth was being used as an existing dust-control measure. No wetland encroachment was identified at this station, and a physical separation between the Project area and wetland habitat remained evident. Existing lighting and some activity/noise associated with the existing plant were also noted.

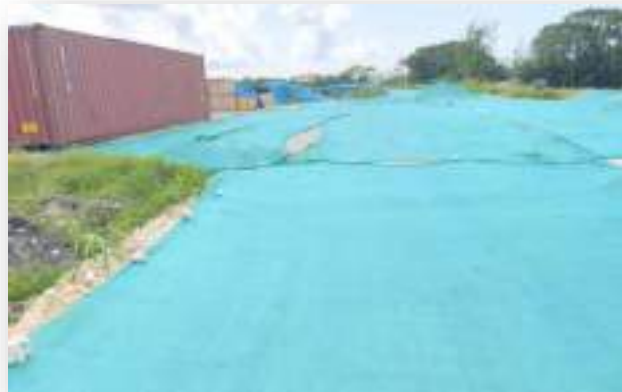


Figure 96: Project Interface: Shade cloth being used for dust mitigation

The principal CHA relevance of FV-01 is therefore not direct occupation of wetland habitat, but the source–pathway relationship created by the site's position within the watershed, particularly the potential for construction-related runoff and sediment to move downslope towards wetland receptors.

FV-02 – Eastern Marsh

The Eastern Marsh, immediately southeast of the sewage treatment plant, comprised marsh habitat with open and standing water and was assessed as being in **Good to Moderate condition**. Vegetation was relatively well established and included sedge/rush habitat, Water Lettuce, Water Hyacinth, duckweed and other wetland and edge vegetation. Opportunistic fauna observations included butterflies, dragonflies, common ground doves, cattle egrets, mongooses and tilapia.

Standing water was present, with water depths recorded at approximately 2 ft 6 in or greater in some areas. The water showed tannin coloration but no notable odor during the field visits. No obvious siltation or sedimentation was recorded at the time of inspection.



Figure 97: Eastern Marsh – Southeast of the South Coast Sewage Treatment Plant

Importantly, the station confirmed **multiple urban surface-water drainage connections into the wetland**. Four drainage pipes/areas were identified as allowing surface water from the surrounding southeast urban environment to enter the swamp as part of the wider drainage/flood-management system. The photographic record documents drainage from both the Harmony Hall and Bamboo Road areas.



Figure 98: Surface water drainage from Harmony Hall & Bamboo Road (Urban environment) discharging into the swamp as part of flood mitigation

The station also showed evidence of existing anthropogenic pressures. Illegal dumping was recorded, including discarded household material and appliances. White mangroves at the edge of the marsh exhibited visible storm damage from **Hurricane Beryl**, as confirmed by fishermen in the area. The photographic record also documents the collection/use of white-mangrove wood by fishermen from the St. Lawrence area for construction of fish pots.



Figure 99: Eastern Marsh – Illegal Dumping

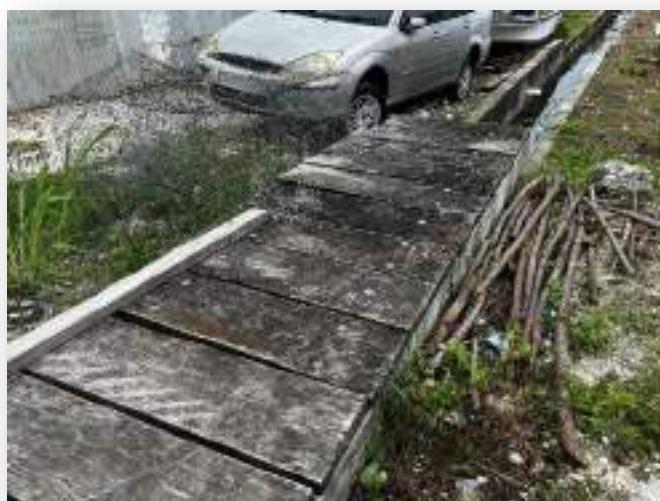


Figure 100: Eastern Marsh – White Mangrove (Laguncularia racemosa) wood used by fisherman in the St. Lawrence area to make fish pots



Figure 101: Eastern Marsh – White Mangrove (Laguncularia racemosa). Damaged by Hurricane Beryl

The field findings confirmed FV-02 as an important Project–habitat interface because it is located downslope of the Project and receives drainage from the surrounding watershed. Construction-related runoff, sediment transport and changes in drainage therefore constitute credible impact pathways requiring consideration in the CHA and subsequent mitigation planning.

FV-03 and FV-04 – Upper Drainage and Bisecting Canal

The Upper Drainage and Bisecting Canal together confirmed the continuity of mangrove and wetland habitat within the government-owned portion of the Graeme Hall system and the importance of internal drainage pathways.

At FV-03, mature **red mangrove (*Rhizophora mangle*)** and **white mangrove (*Laguncularia racemosa*)** were recorded. Habitat conditions varied spatially. The eastern section appeared comparatively healthy, with a few fallen white mangroves, while fallen and damaged red mangroves were evident toward the western section. The recorded damage was attributed to Hurricane Beryl. Open/standing water was present, approximately 2–3 ft deep, with visible tannin coloration but no noticeable odor. No evident siltation, erosion, solid waste, or wastewater contamination was recorded at this station.



Figure 103: Upper Drainage – Mature red (*Rhizophora mangle*) and White mangroves (*Laguncularia racemosa*), Sour Bush (*Pluchea carolinensis*) dense vegetation



Figure 102: Upper Drainage – Fallen White mangroves (*Laguncularia racemosa*) from the passage of Hurricane Beryl.



Figure 104: Upper Drainage Standing Water - Tannins Visible

At FV-04, the canal was confirmed as a waterbody separating the privately owned and government-owned portions of the mangrove swamp and providing an internal hydrological connection between wetland areas.

The channel was narrower toward its southern section and broadened northwards. Water depth was approximately 2 ft, with tannin coloration and no noticeable odor. Duckweed was present on the water surface.

Mangrove vegetation at FV-04 was assessed as **Good to Moderate**, although some red mangroves had also been damaged by Hurricane Beryl. Butterflies and dragonflies were observed along the margins. No significant sediment accumulation, erosion, debris or obvious contamination was observed during the visits.



Figure 105: Bisecting Canal

Together, FV-03 and FV-04 demonstrate that the interior wetland retains substantial areas of mature mangrove habitat and standing/open water despite localized storm damage. They also support the desktop interpretation that the wetland functions as an interconnected hydrological system rather than as isolated habitat patches.



Figure 106: Bisecting Canal – Fallen Red Mangrove (*Rhizophora mangle*)

FV-05 – Graeme Hall Nature Sanctuary

No field verification of the Nature Sanctuary was undertaken during the 21, 24 or 28 August 2026 exercise because the necessary access permission was not received in time. The observations presented here therefore derive from the Field Officer's previous visit on 10 April 2026 and should not be interpreted as contemporaneous August observations.

During the April visit, the Nature Sanctuary supported mangrove swamp, open water and associated wetland habitats and was assessed as being in Good to Moderate condition. Red and white mangroves were present together with Sea Grape and Water Hyssop. Lake Tarpon provided a substantial open-water feature.

A comparatively diverse assemblage of birds and aquatic fauna was recorded during that visit, including Little Egret, Snowy Egret, Cattle Egret, Barbados Bullfinch, Barbados Yellow Warbler, Antillean Crested Hummingbird, Caribbean Elaenia, American Golden-Plover, Lesser Yellowlegs, Stilt Sandpiper, Short-billed Dowitcher and Pectoral Sandpiper. Atlantic Tarpon and tilapia were also recorded. Egret Island was identified as a breeding/nesting/roosting feature.

The April observations are consistent with the desktop evidence regarding the Sanctuary's ecological importance but pre-date the August verification exercise.

FV-06 – Southern Wetland Interface

FV-06 represents the transition between the mangrove wetland and the developed Highway 7/coastal corridor. The area supported mangrove swamp and standing water and was assessed as being in **Moderate condition**. Some red mangroves showed storm-related damage, while Water Lettuce and duckweed were recorded within the waterbody.

Water depth was approximately 1 ft 5 in at the point measured. Tannin coloration was visible and no notable odor was recorded. The station also confirmed the continuation of the existing SCSTP outflow infrastructure through the wetland. Two pumping stations were observed and associated pipes continued southwards through this portion of the swamp toward Sandy Beach. Based on the proposed Project design, this existing conveyance pathway is expected to change, with treated water instead directed to the new water reclamation facility for reuse, including aquifer recharge and/or agricultural purposes.

Human influence is comparatively more pronounced at this station because of the proximity of Highway 7, existing infrastructure, road lighting and urban activity.



Figure 107: Southern Wetland Interface at Highway 7 showing the existing SCSTP outflow infrastructure within the wetland–urban interface.



FV-07 – Sluice Gate / Coastal Connection

FV-07 confirmed the physical relationship between the Graeme Hall wetland system and the downstream coastal environment.

The sluice gate appeared to be **inoperable** during the field visits, with low, largely stagnant water within the channel. Tannin-related discoloration and a mild odor were recorded, together with some solid waste/debris. The observations indicated restricted wetland–coastal exchange at the time of the visits.

The station was therefore assessed as **Degraded**, principally because of the non-functioning sluice structure and evident beach erosion. The adjacent coastal habitat consisted of sandy beach and nearshore marine environment. The field record also notes that green sea turtles are common in the wider area and identifies a nearshore reef ecosystem as an ecologically relevant feature; these observations should be treated as contextual rather than as confirmation of turtle presence during the three verification visits.

Two existing SCSTP outflow pipes were traced through the southern wetland interface to the coastal outlet, where they continue offshore. This directly verified a Project/wastewater–wetland–coastal pathway that had been identified during the desktop assessment.

The apparent lack of effective sluiceway operation is also important for understanding present wetland hydrology. No visible active exchange of seawater through the structure was observed during the visits, indicating that wetland–marine hydrological exchange was constrained at the time of verification.



Figure 108: Sluice gate and channel at FV-07. The structure appeared inoperable during the August 2026 field visits, with low/stagnant water and restricted apparent wetland–coastal exchange.



Figure 109: Existing SCSTP outflow pipes at Sandy Beach continuing towards the marine environment.

Cross-Cutting CHA

Findings

and Implications for the

The field verification largely confirmed the desktop evidence. The principal findings relevant to the CHA are summarized below.

Wetland habitat and ecological condition

The field visits confirmed a mosaic of marsh, mangrove, canal/open-water and coastal-interface habitats across the assessment area. Overall, the interior wetland was generally assessed as **Moderate to Good**, with mature red and white mangrove habitat remaining present. The Eastern Marsh was comparatively healthy, while localized mangrove damage was recorded in the Upper Drainage, Bisecting Canal and Southern Wetland Interface. A notable addition to the desktop evidence was the field confirmation of **visible residual mangrove damage attributed to Hurricane Beryl**, particularly affecting red and white mangroves in portions of the wetland.

Hydrological connectivity

The exercise strongly confirmed that hydrological connectivity is a central feature of the Project–Critical Habitat relationship. The Project lies within a watershed draining generally southwards towards the Graeme Hall wetland and coast. Multiple urban drainage points discharge into the Eastern Marsh, while internal waterways connect different wetland components. Existing SCSTP outflow infrastructure extends through the southern wetland and ultimately offshore.

This field evidence reinforces **KBF 2 – Hydrological and ecological processes supporting Graeme Hall** and supports continued treatment of hydrological pathways as a principal basis for defining the Project's interaction with Critical Habitat.

Existing pressures

Existing non-Project pressures recorded during the exercise included:

- localized illegal dumping in the Eastern Marsh;
- hurricane-related mangrove damage;
- urban stormwater inflows;
- existing wastewater conveyance infrastructure through the southern wetland;
- physical disturbance associated with the developed wetland margin;
- an apparently inoperable sluice gate;
- stagnant water and debris in the coastal outlet channel; and
- beach erosion at Sandy Beach.

These pressures are important to the CHA because they establish the existing condition and cumulative context within which Project impacts must be assessed.

Project-related pathways

The field exercise verified two principal source–pathway–receptor relationships relevant to the subsequent impact assessment:

Project construction area → stormwater/runoff and potential sediment transport → Eastern Marsh/internal wetland → mangrove and wetland ecological processes;

and

existing/current SCSTP infrastructure → southern wetland conveyance route → sluice/coastal outlet → nearshore marine environment.

The first pathway is particularly relevant during construction, while the second provides important context for assessing the changes associated with the proposed water reclamation system.

Key Biodiversity Features

Field observations were consistent with the six KBF groupings identified during the CHA process:

- **KBF 1:** Graeme Hall Ramsar wetland and ecological character;
- **KBF 2:** hydrological and ecological processes supporting Graeme Hall;
- **KBF 3:** migratory/congregatory wetland birds;
- **KBF 4:** endemic and range-restricted resident birds;
- **KBF 5:** connected coastal and marine habitats; and
- **KBF 6:** threatened species associated with the Project/CHAA.

The August field exercise was particularly effective in verifying the physical habitat and hydrological basis for **KBFs 1, 2 and 5**. Opportunistic fauna observations provided supplementary evidence relevant to KBF 3, while the April Nature Sanctuary record provides contextual evidence for KBFs 3 and 4. The rapid nature of the exercise means the absence of particular priority species during the August visits should not affect the species screening conclusions.

Limitations and Follow-up

The principal limitation of the exercise was the inability to obtain access to the **Graeme Hall Nature Sanctuary during the August verification period**. Consequently, FV-05 was not contemporaneously verified. The 10 April 2026 observations are useful supporting evidence but should remain clearly differentiated from the 21, 24 and 28 August observations.

The field exercise also did not include systematic fauna surveys, quantitative vegetation surveys, hydrological monitoring or water-quality sampling, consistent with its agreed rapid-verification scope.

Two matters in the field records would benefit from **project-team confirmation rather than additional ecological survey**:

1. the function and configuration of the drainage/outflow pipes observed at the Eastern Marsh and downstream locations; and
2. the operational status and management arrangements for the sluice gate.

These issues are relevant because both influence the interpretation of existing and future hydrological pathways.

No field finding indicates that the preliminary CHAA requires material contraction or expansion. Rather, the verified drainage network, internal wetland connectivity, existing southward conveyance route and coastal outlet support retaining the preliminary CHAA spatial framework, including the **Project–wetland interface, the interconnected Graeme Hall wetland system and the downstream coastal environment**, for subsequent Critical Habitat determination and impact-pathway assessment.”

Conclusion

The three-day ecological field verification exercise substantially achieved its intended purpose of ground-truthing the desktop assessment and confirming current habitat, hydrological and Project–habitat conditions across the Graeme Hall assessment area.

Overall, the accessible wetland was found to be in **Moderate to Good ecological condition**, with established marsh and mangrove habitats, open and standing water, and opportunistic observations of wildlife. Localized degradation and disturbance were nevertheless evident, including hurricane-related mangrove damage, illegal dumping, existing infrastructure and urban influence.

Most importantly for the CHA, the field exercise clearly verified the **hydrological connectivity between the Project area, the wetland and the downstream coastal environment**. Surface-water drainage enters the wetland from the surrounding urban watershed, internal channels connect wetland areas, and the existing SCSTP outflow infrastructure continues through the southern wetland towards the coastal outlet. The apparently inoperable sluice gate currently constrains observable wetland–coastal water exchange.

The findings therefore reinforce the desktop identification of hydrological and ecological processes as a key consideration in assessing potential Project effects on Graeme Hall Critical Habitat. They also support continued assessment of construction-related runoff and sedimentation pathways and the potential consequences of changes to existing wastewater conveyance and wetland hydrology.

The field verification did **not identify evidence requiring a fundamental change to the preliminary Critical Habitat screening**. Rather, the observations provide current field confirmation to support refinement of the Biodiversity Evidence Register, KBF screening, Critical Habitat determination, impact-pathway assessment and subsequent mitigation and monitoring requirements.

Annex 4: Habitat Scoring

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities

Project No. BA-L1063 5908/OC-BA/BA-L1063

Table 178. Final Critical Habitat Screening and Determination

IDB CRITICAL HABITAT CRITERION	RELEVANT KBF(S)	KEY EVIDENCE – DESKTOP ASSESSMENT	FIELD VERIFICATION EVIDENCE – AUGUST 2026	FINAL DETERMINATION
CRITERION A – EXISTING OR PROPOSED PROTECTED AREA / INTERNATIONALLY RECOGNIZED SITE	KBF 1 – Graeme Hall Ramsar wetland and ecological character	Graeme Hall Swamp is designated as a Wetland of International Importance under the Ramsar Convention (Ramsar Site No. 1591) . The designation establishes the international biodiversity significance of the wetland and its ecological character. Desktop evidence identifies the Ramsar wetland as comprising mangrove, marsh, open-water and associated wetland habitats supporting resident and migratory fauna and important ecological functions.	Field verification was consistent with the ecological characteristics identified through the desktop assessment. Accessible portions of the Graeme Hall wetland contained an established mosaic of marsh, mangrove, canal/open-water and coastal-interface habitats . The interior wetland was generally assessed as Moderate to Good , with mature red and white mangroves, marsh vegetation and open/standing water remaining present. No field observation contradicted the desktop evidence supporting the Ramsar designation. The Nature Sanctuary itself was not accessed during August; observations for FV-05 therefore remain based on the field officer's 10 April 2026 visit and existing literature.	CONFIRMED TRIGGER. Graeme Hall's designation as a Ramsar Wetland of International Importance independently satisfies Criterion A under the Critical Habitat framework applied in this assessment. Field verification does not alter this determination and provides current corroborating evidence that the wider wetland continues to support the wetland habitat types and ecological characteristics underpinning its biodiversity significance.
CRITERION B – AREA NECESSARY TO MAINTAIN A PROTECTED AREA	KBF 1 – Graeme Hall Ramsar wetland and ecological character KBF 2 – Hydrological and ecological processes supporting Graeme Hall KBF 5 – Connected coastal and marine habitats	Desktop evidence identifies hydrology, salinity regime, drainage and wetland–sea exchange as fundamental to maintaining the ecological character and functioning of Graeme Hall. The wetland forms part of a wider watershed and hydrological system extending beyond the formal Ramsar boundary. Existing evidence also identifies the sluice gate/coastal outlet as an important component of the wetland's hydrological connection with the marine environment. The preliminary assessment therefore identified a strong functional basis for treating adjoining hydrologically connected areas as potentially necessary to maintain the Ramsar site.	Field verification strongly confirmed the hydrological basis for this criterion . The Project lies within a watershed draining generally southwards toward Graeme Hall and the coast. A natural gully was confirmed immediately east of the Project site. Multiple urban drainage points discharge into the Eastern Marsh, including four drainage pipes/areas conveying surface water from the surrounding southeast urban environment. The Upper Drainage and Bisecting Canal form part of the interconnected internal wetland system; the Bisecting Canal was confirmed as a waterbody connecting wetland areas. Existing SCSTP outflow infrastructure continues through the southern wetland toward the sluice/coastal outlet and offshore environment. The field report concludes that these verified connections support retaining the Project–wetland interface, interconnected Graeme Hall wetland system and downstream	CONFIRMED TRIGGER. Field verification resolves the principal uncertainty identified during preliminary screening by demonstrating the functional hydrological connections linking the Project watershed, Eastern Marsh, internal wetland drainage system, southern wetland and coastal outlet. These areas and processes contribute to maintaining the hydrological and ecological functioning of the internationally recognized Graeme Hall wetland and are therefore relevant under Criterion B.

IDB CRITICAL HABITAT CRITERION	RELEVANT KBF(S)	KEY EVIDENCE – DESKTOP ASSESSMENT	FIELD VERIFICATION EVIDENCE – AUGUST 2026	FINAL DETERMINATION
CRITERION C – HABITAT CRUCIAL FOR CR/EN/VU/NT SPECIES	KBF 6 – Threatened species associated with the Project/CHAA Relevant candidate taxa identified during screening include <i>lignum-vitae (Guaiacum officinale)</i> , Atlantic Tarpon, marine turtles and threatened coral taxa associated with the connected coastal/marine environment.	Desktop species screening identified several conservation-priority taxa occurring within or potentially using habitats within the CHAA. Evidence includes threatened terrestrial flora associated with the Project/wetland interface and threatened or conservation-priority aquatic/marine species potentially associated with the wetland–coastal system. However, the preliminary assessment did not establish that the CHAA represents habitat crucial to the survival of these species, and several marine species records relate to the wider coastal environment rather than confirmed dependence on the Project-affected area.	coastal environment within the preliminary CHAA. Field verification strengthened occurrence evidence for <i>lignum-vitae (Guaiacum officinale)</i> , which was directly confirmed and photographed at FV-01 at the Project interface (Photographic Record, Photo 1). However, the rapid field exercise did not include targeted threatened-species surveys or establish abundance, population size, breeding status, habitat dependence or relative importance of the CHAA to candidate threatened species. Marine habitats/species were similarly not systematically surveyed.	POTENTIAL TRIGGER – NOT INDEPENDENTLY CONFIRMED. Field verification strengthens evidence that at least one qualifying threatened species occurs at the Project interface but does not establish that affected habitat is crucial to the survival, feeding, breeding or movement of threatened taxa. The evidence is therefore insufficient to confirm Criterion C independently. Candidate threatened species nevertheless remain KBFs/sensitive receptors requiring consideration in the Project impact assessment and mitigation framework.
CRITERION D – ENDEMIC OR RANGE-RESTRICTED SPECIES	KBF 4 – Endemic and range-restricted resident birds	Desktop evidence identifies endemic and restricted-range resident birds associated with Graeme Hall and its surrounding habitats, including the Barbados Bullfinch and other restricted-range taxa. Historical records demonstrate that the wetland and adjoining habitats support a diverse resident avifaunal assemblage. However, available evidence did not establish the proportion of relevant species' populations supported by the CHAA or otherwise demonstrate that applicable population/range thresholds are met.	Opportunistic fauna observations were made during the field exercise, but the August verification did not constitute a systematic avifaunal survey and was not designed to establish abundance, population size or seasonal habitat use. The Nature Sanctuary could not be accessed during August, further limiting contemporary verification of the area most strongly associated with the documented resident bird assemblage. The 10 April 2026 Nature Sanctuary observations remain contextual supporting evidence rather than August field verification. The field report identifies the August exercise as particularly effective for KBFs 1, 2 and 5, while April observations provide contextual evidence for KBFs 3 and 4.	POTENTIAL TRIGGER – NOT INDEPENDENTLY CONFIRMED. Existing evidence supports the occurrence and conservation relevance of endemic and restricted-range species within Graeme Hall, but available desktop and rapid field evidence does not provide the population-level information required to demonstrate that the site meets Criterion D independently. KBF 4 is nevertheless retained for subsequent impact assessment because Project-related changes to wetland habitat or ecological functioning could affect resident bird habitat.
CRITERION E – MIGRATORY SPECIES, ROUTES OR CONGREGATIONS	KBF 3 –Migratory/congregatory wetland birds	Graeme Hall is well documented as habitat for migratory, nesting and roosting wetland birds . Historical evidence records a diverse migratory avifauna and identifies the wetland as an important refuge and feeding/roosting area. Preliminary screening identified particularly strong evidence for this criterion, including historical evidence associated with species such as the Little Egret , but available current information did not conclusively demonstrate that applicable congregatory/population thresholds continue to be met.	Field verification confirmed the continued presence of habitat capable of supporting migratory and congregatory birds, including marsh, open/standing water, canal and mature mangrove habitat . Birds were recorded opportunistically during the exercise. However, observations were not systematic and cannot establish abundance, seasonal use or current congregatory thresholds. The inability to access FV-05 during August also means that contemporary observations of the Nature Sanctuary's principal open-water/mangrove bird habitats were	POTENTIAL TRIGGER – HIGH CONFIDENCE. Historical evidence, Ramsar context and continuing availability of suitable wetland habitat provide a strong basis for retaining Criterion E as a high-confidence potential trigger. However, the rapid verification exercise did not generate the abundance or population-level evidence required to confirm current globally significant concentrations. Migratory/congregatory birds therefore remain a priority KBF for the Project impact, mitigation and monitoring assessment.

IDB CRITICAL HABITAT CRITERION	RELEVANT KBF(S)	KEY EVIDENCE – DESKTOP ASSESSMENT	FIELD VERIFICATION EVIDENCE – AUGUST 2026	FINAL DETERMINATION
			unavailable. The methodology expressly provides that non-detection during the rapid exercise cannot be interpreted as evidence of absence.	
CRITERION F –HABITAT HIGHLY SUITABLE FOR BIODIVERSITY CONSERVATION	KBF 1 – Graeme Hall Ramsar wetland and ecological character KBF 2 – Hydrological and ecological processes supporting Graeme Hall Related KBFs 3, 4 and 5 contribute to the site's overall conservation value.	Desktop evidence identifies Graeme Hall as the largest remaining significant mangrove/wetland system of its type in Barbados and a nationally rare ecosystem supporting mangrove, marsh, open-water and associated habitats. The wetland performs important hydrological and ecological functions and supports diverse resident and migratory fauna. Existing literature documents historical modification and degradation but also substantial remaining ecological value and opportunities for restoration. Preliminary screening therefore concluded that Graeme Hall's national rarity, ecological functions, biodiversity value and restoration potential satisfy Criterion F.	Field verification strongly corroborated this assessment. Accessible portions of the wetland retained a mosaic of established marsh, open/standing-water and mangrove habitat. Mature red mangrove (<i>Rhizophora mangle</i>) and white mangrove (<i>Laguncularia racemosa</i>) were confirmed in the Upper Drainage and Bisecting Canal. Overall interior wetland condition was Moderate to Good . Existing pressures included localized illegal dumping, hurricane-related mangrove damage, urban stormwater inputs, existing wastewater infrastructure, developed wetland margins, an apparently inoperable sluice gate, stagnant water/debris in the coastal outlet and beach erosion. Nevertheless, the field exercise did not indicate loss of the wetland's overall ecological value or functioning.	CONFIRMED TRIGGER. Current field evidence reinforces the desktop determination that Graeme Hall retains nationally significant wetland and mangrove biodiversity values despite localized degradation. Its rarity within Barbados, remaining mature wetland habitats, hydrological/ecological functions, biodiversity-support value and restoration potential support confirmation under Criterion F. Existing degradation is relevant to baseline condition and cumulative impact assessment but does not negate the site's Critical Habitat significance.
OVERALL DETERMINATION	FINAL FINDING			
CRITICAL HABITAT / CRITICAL NATURAL HABITAT – CONFIRMED	Graeme Hall Swamp qualifies as Critical Habitat/Critical Natural Habitat under the applicable IDB framework. Criterion A is confirmed through its designation as a Ramsar Wetland of International Importance. Field verification additionally provides sufficient evidence to confirm Criterion B, demonstrating the functional hydrological connections between the Project watershed, interconnected wetland system and downstream coastal outlet, and strengthens the existing confirmed determination under Criterion F concerning the site's nationally significant wetland/mangrove biodiversity and ecological functions. Criteria C, D and E remain potential species-based triggers because the rapid assessment does not provide the population-level evidence necessary to confirm those criteria independently. Their associated threatened, endemic/range-restricted and migratory/congregatory species nevertheless remain Key Biodiversity Features requiring explicit consideration in the Project impact, significant conversion/degradation, mitigation and monitoring assessments.			

Annex 5: Impact Matrix

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities

Project No. BA-L1063 5908/OC-BA/BA-L1063

Table 179. Critical Habitat Impact and Significance Matrix

PROJECT ACTIVITY / PRESSURE	KBF(S) AFFECTED	IMPACT PATHWAY / POTENTIAL EFFECT	EXISTING ESIA/ESMP MITIGATION	VULNERABILITY / IRREPLACEABILITY	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	LIKELIHOOD	CUMULATIVE CONTEXT	RESIDUAL SIGNIFICANCE	SIGNIFICANT CONVERSION / DEGRADATION?	ADDITIONAL CHA MEASURE / REQUIREMENT
CONSTRUCTION ADJACENT TO WETLAND / VEGETATION CLEARANCE	KBF 1 – Ramsar wetland and ecological character; KBF 6 – Threatened species	Direct encroachment or vegetation clearance could cause habitat loss/degradation or affect conservation-priority flora at the Project interface.	No wetland clearing; construction-area demarcation and localized development controls.	Very High for Ramsar wetland; High for conservation-priority flora.	Low, provided footprint remains outside wetland habitat.	Project interface / localized.	Short-term construction; permanent if habitat were lost.	Wetland habitat loss potentially difficult to reverse; localized terrestrial vegetation loss potentially restorable.	Unlikely with confirmed footprint controls.	Wetland already subject to surrounding urban/infrastructure pressure.	Low	No, provided there is no encroachment into Ramsar/wetland habitat and sensitive vegetation is appropriately managed.	Confirm final construction boundary/no-go areas before works; avoid wetland encroachment; identify and protect or appropriately manage conservation-priority flora, including confirmed lignum-vitae, where affected by works.
EARTHWORKS, EXPOSED SOILS AND STORMWATER RUNOFF	KBF 1 – Ramsar wetland/ecological character; KBF 2 – Hydrological/ecological processes; secondarily KBFs 3, 4 and 6	Sediment-laden or contaminated runoff moves downslope from the Project area into the Eastern Marsh/internal wetland, causing increased turbidity, sedimentation or deterioration in water quality and aquatic/wetland habitat.	Silt traps; drainage, erosion and sediment controls; construction-site management measures.	Very High	Moderate pre-mitigation; Low with effective controls.	Local; potentially extending through connected wetland drainage.	Short-term/intermittent during construction, particularly rainfall events.	Generally reversible if limited and rapidly controlled; repeated inputs could have longer-term effects.	Possible without effective controls; Unlikely with effective implementation.	Existing urban runoff and water-quality pressures already affect the wetland. Field verification confirmed multiple existing drainage inputs.	Low–Medium	No, with effective erosion, sediment and stormwater controls. Uncontrolled or repeated substantial releases could contribute to degradation.	Treat prevention of runoff to Critical Habitat as a priority requirement. Confirm controls at the Project–wetland interface; inspect before/during earthworks and following significant rainfall; maintain corrective-action records.
CHEMICAL AND FUEL STORAGE/HANDLING DURING CONSTRUCTION	KBF 1, KBF 2, KBF 3 and KBF 6	Spill or contaminated runoff enters the connected drainage system and wetland, causing toxicity, water-quality deterioration and effects on vegetation/aquatic fauna.	Bunded storage; spill-prevention and response measures; appropriate chemical/fuel handling and waste-management controls.	Very High	Low–High, depending on nature and volume of release.	Local; potentially wider where contaminants enter connected drainage.	Temporary to long-term depending on contaminant and event severity.	Generally reversible for small/contained spills; potentially difficult for substantial contamination.	Unlikely with controls.	Existing contamination/water-quality pressures increase sensitivity to additional pollutant loads.	Low under normal controlled conditions; potentially High for a major uncontrolled release.	No under normal operations. A substantial uncontrolled release could cause material degradation.	Ensure hazardous materials and refueling are kept away from wetland/drainage pathways; verify spill containment and response arrangements specifically account for Graeme Hall; immediate notification and response for any release with potential to reach Critical Habitat.

ROUTINE OPERATION / CHANGE IN WASTEWATER AND RECLAIMED-WATER MANAGEMENT	KBF 1 and KBF 2; indirectly KBFs 3, 4 and 6	Changes to existing wastewater conveyance and water management could alter water quantity, water quality, salinity or hydrological conditions supporting wetland ecological character. Conversely, diversion of treated water for reuse may reduce existing wastewater-related pressure.	Operational treatment and water-quality controls; water-quality monitoring and management provisions contained in ESIA/ESMP.	Very High	Low– Moderate, subject to final operational configuratio n and hydrological response.	Functional wetland/hydrologica l area.	Long-term.	Potentially reversible through operational adjustment, depending on nature/duration of change.	Possible, given change from existing water- management arrangement.	Graeme Hall already experiences altered hydrology, constrained seawater exchange and water-quality pressures.	Low– Medium, subject to design confirmation and monitoring.	Not anticipated, provided operation does not cause material adverse alteration of wetland hydrology or water quality.	Confirm the future configuration/function of existing outflow and drainage infrastructure and demonstrate that final operating arrangements will not materially adversely alter the water balance, water quality, salinity regime or ecological functioning of Graeme Hall. Establish appropriate operational monitoring.
PLANT FAILURE, OVERFLOW OR MAINTENANCE/EMERGEN CY EVENT	KBF 1, KBF 2, KBF 3, KBF 5 and KBF 6	Untreated or inadequately treated wastewater enters drainage/wetland/coast al pathways, causing acute water-quality deterioration, oxygen stress, contamination or habitat/faunal effects.	Existing emergency/operation al provisions, plant controls and wastewater- management measures.	Very High	High for a substantial uncontrolle d event.	Local to wider wetland system; potentially downstream coastal environment.	Short-term event with potentially longer-term ecological consequences.	Variable; potentially difficult to reverse if event is severe or prolonged.	Unlikely, assuming effective design, containment and response systems.	Existing wetland water- quality/hydrological stress could reduce ecological resilience to an additional acute event.	Low– Medium with robust containment ; potentially High/Critical without containment .	No under designed/manag ed conditions. A severe or prolonged uncontrolled release represents a credible significant- degradation scenario.	Engineering confirmation of emergency containment, overflow, backup and plant- failure arrangements before operation. Emergency planning must explicitly prevent or minimize release to Graeme Hall and connected drainage/coastal pathways.
ARTIFICIAL LIGHTING DURING CONSTRUCTION AND OPERATION	KBF 3 – Migratory/congregat ory birds; KBF 4 – Endemic/range- restricted birds; other nocturnal fauna	Light spill into adjoining habitat could alter behaviour, movement or habitat use and cause localized disturbance/displaceme nt.	Directional fixtures, shielding and lighting controls.	High	Low	Localized Project– wetland interface.	Short-term during construction; long-term during operation.	Reversible through modification/remov al of lighting.	Possible without controls; Unlikely with low-spill design.	Existing urban and SCSTP lighting already contributes to baseline disturbance.	Low	No	Confirm low-spill lighting design at wetland interface; orient lighting away from wetland; use shielding and minimum illumination necessary for safety/security; inspect night-time light spill and correct where required.
CONSTRUCTION NOISE, VIBRATION AND HUMAN ACTIVITY	KBF 3 and KBF 4; other wetland fauna	Construction activity causes temporary behavioral disturbance or displacement from habitat near the Project interface.	Restriction/managem ent of nuisance- generating activities; equipment and work- hour controls.	High	Low	Localized.	Short-term.	Reversible once activity ceases.	Likely locally during active construction, although ecological response may vary.	Existing SCSTP, roads and surrounding development already generate anthropogenic disturbance.	Low	No	Maintain construction activities within approved areas/hours; avoid unnecessary high-disturbance activity adjacent to wetland margins; apply targeted timing restrictions if sensitive breeding/roosting

													activity is identified during works.
DRAINAGE MODIFICATION / CHANGE IN HYDROLOGICAL REGIME	KBF 1 – Ramsar ecological character; KBF 2 – Hydrological/ecological processes; indirectly KBFs 3, 4 and 6	Altered drainage, water quantity, inundation, water quality or salinity changes wetland ecological processes and habitat condition.	Drainage-management/design measures in ESIA/ESMP.	Very High	Potentially High if material hydrological alteration occurs; Low where hydrological function is maintained.	Functional ecological/hydrological area.	Long-term.	Potentially difficult to reverse where ecological/hydrological change becomes established.	Possible , depending on final design and operational configuration.	Existing hydrological alteration and constrained wetland–sea exchange make the system particularly sensitive to additional change.	Low–Medium , provided adverse hydrological change is avoided and monitored.	No , provided no material adverse alteration occurs. Potentially Yes if Project-related change substantially and persistently impairs hydrological processes necessary to maintain Critical Habitat.	Demonstrate through design review that the Project will not materially adversely alter wetland hydrological function. Confirm function/configuration of drainage/outflow pipes and sluice management arrangements. Establish hydrological/water-quality indicators sufficient to identify material Project-related change.
CHANGE IN EXISTING DOWNSTREAM WASTEWATER CONVEYANCE / COASTAL DISCHARGE PATHWAY	KBF 2 – Hydrological/ecological processes; KBF 5 – Connected coastal/marine habitats; potentially KBF 6	Change or cessation of the existing SCSTP southward conveyance/discharge route alters water quantity/quality reaching the southern wetland or coastal environment; accidental releases may also be transported downstream.	Operational water-quality/discharge controls and Project water-reuse arrangements.	High–Very High	Low–Moderate , subject to final configuration and actual ecological dependence on the pathway.	Southern wetland interface to downstream coastal environment.	Long-term.	Potentially reversible through operational adjustment; ecological response may be slower.	Possible because the Project intentionally changes existing water-management arrangements.	Existing sluice appears inoperable; wetland–coastal exchange is already impaired. Existing SCSTP outflow infrastructure currently follows this route.	Low–Medium / Uncertain pending technical confirmation	Not presently indicated. Insufficient evidence that the planned change would cause significant degradation, but the pathway requires confirmation.	Confirm future function/configuration of existing outflow pipes and the implications of cessation/change in existing discharge. Confirm sluice operational/management status. Assess whether changes materially affect wetland water balance or downstream coastal water quality before final operational arrangements are confirmed.
EXISTING ENVIRONMENTAL PRESSURES + PROJECT PRESSURES (CUMULATIVE)	All KBFs , principally KBF 1 and KBF 2	Incremental Project pressures interact with existing hydrological alteration, urban runoff, wastewater influence, habitat disturbance, dumping and hurricane-related damage, reducing ecological resilience or contributing to progressive degradation.	Existing ESMP measures across water quality, drainage, waste, pollution prevention and biodiversity management.	Very High	Low–Moderate incremental Project contribution , provided mitigation is effective.	Wetland system / functional ecological area.	Long-term.	Variable; some cumulative ecological changes may be difficult to reverse.	Possible if Project controls are ineffective or hydrological changes compound existing stress.	High relevance. Field verification confirmed existing urban runoff, infrastructure influence, localized dumping, hurricane damage and impaired coastal exchange while finding the accessible wetland overall in	Low–Medium with effective controls and monitoring.	No , based on currently identified Project pathways and proposed controls. Could contribute to significant degradation if substantial Project-related hydrological or pollution pressures are	Integrate Critical Habitat indicators into Project monitoring; distinguish Project-related change from baseline pressures where practicable; establish thresholds/triggers for investigation and corrective action; apply adaptive management where adverse trends are detected.

Overall finding: The assessment does not identify any Project activity that, following implementation of existing ESIA/ESMP controls and the additional CHA requirements identified above, is predicted to result in significant conversion or degradation of Graeme Hall Critical Habitat. Direct conversion of Ramsar wetland or mangrove habitat is not anticipated. The principal residual risks arise from indirect hydrological and water-quality pathways, particularly construction runoff, changes to drainage or wastewater conveyance, and accidental/emergency releases. These risks are considered capable of being avoided or reduced to acceptable residual levels through appropriate design, construction controls, operational safeguards and monitoring. A material, sustained adverse alteration of wetland hydrology or water quality, or a substantial uncontrolled wastewater/pollution release, would however represent a potential significant-degradation scenario and should therefore be subject to explicit prevention, monitoring and adaptive-management requirements.

Annex 5: Action Matrix

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities

Project No. BA-L1063 5908/OC-BA/BA-L1063

Table 180. Critical Habitat Mitigation, Monitoring and Follow-up Action Matrix

KBF / RISK	REQUIRED MEASURE	MITIGATION HIERARCHY	EXISTING ESIA/ESMP PROVISION	ADDITIONAL CHA REQUIREMENT	RESPONSIBLE PARTY	TIMING	MONITORING / VERIFICATION
KBF 1 – WETLAND/MANGROVE HABITAT: CONSTRUCTION ENCROACHMENT	Maintain all Project construction activities outside Ramsar wetland, mangrove, marsh and associated wetland habitat and clearly demarcate no-go areas.	Avoid	No wetland clearing; localized development and construction-area controls.	Confirm final construction footprint and no-go boundaries before works. Prohibit unauthorized access, storage, spoil disposal, equipment placement or temporary works within wetland habitat.	Contractor / BWA	Pre-construction and construction	Pre-construction boundary verification; routine boundary inspection; photographic records; incident/non-compliance reporting and corrective action.
KBF 6 – CONSERVATION-PRIORITY FLORA: VEGETATION CLEARANCE	Minimize vegetation clearance and avoid impacts to conservation-priority flora at the Project interface where practicable.	Avoid / Minimize	Vegetation and construction-footprint management measures.	Identify conservation-priority vegetation within areas proposed for clearance before works, including confirmed lignum-vitae (<i>Guaiacum officinale</i>). Avoid where practicable; where avoidance is not feasible, determine appropriate management before removal.	Contractor / BWA / Environmental Specialist	Pre-construction and construction	Pre-clearance verification; records of plants retained/affected and management action; photographic verification.
KBFS 1 & 2 – WETLAND HABITAT AND HYDROLOGICAL PROCESSES: CONSTRUCTION SEDIMENT/RUNOFF	Prevent sediment-laden or contaminated construction runoff from entering the Eastern Marsh or other connected wetland drainage pathways.	Avoid / Minimize	Silt traps; drainage, erosion and sediment-control measures.	Confirm adequacy and placement of controls at the Project–wetland interface and along pathways capable of conveying runoff towards the wetland. Controls to be installed before significant ground disturbance and maintained throughout works.	Contractor	Pre-construction and construction	Routine inspection of erosion/sediment controls; inspections following significant rainfall; runoff/turbidity observations where warranted; maintenance and corrective-action records.
KBFS 1, 2 & 6 – WETLAND VEGETATION/FAUNA: FUEL, CHEMICAL AND CONTAMINANT RELEASES	Prevent and rapidly contain fuel, chemical and other contaminant releases capable of reaching	Avoid / Minimize	Chemical/fuel storage, bunding, waste-management and spill-response requirements.	Locate hazardous-material storage/refueling away from wetland margins and connected drainage pathways. Ensure	Contractor / BWA	Construction and operation, as applicable	Storage/containment inspections; spill and incident records; response documentation;

KBF / RISK	REQUIRED MEASURE	MITIGATION HIERARCHY	EXISTING ESIA/ESMP PROVISION	ADDITIONAL CHA REQUIREMENT	RESPONSIBLE PARTY	TIMING	MONITORING / VERIFICATION
	wetland habitat or drainage pathways.			response arrangements specifically recognize Graeme Hall as Critical Habitat and provide for immediate containment and notification of releases capable of reaching the wetland.			corrective-action verification.
KBFS 1 & 2 – WETLAND ECOLOGICAL CHARACTER AND HYDROLOGICAL PROCESSES: ROUTINE WASTEWATER/RECLAIMED-WATER MANAGEMENT	Ensure final wastewater and reclaimed-water arrangements do not materially adversely alter wetland water quantity, water quality, salinity, drainage or ecological functioning.	Avoid / Minimize	Operational treatment, water-quality, drainage and reclaimed-water management provisions.	Confirm the final operational configuration and demonstrate that changes from the existing wastewater-management arrangement will not materially adversely alter hydrological or water-quality conditions supporting Graeme Hall.	BWA / Design Team / Operator	Detailed design / pre-operation / operation	Design and operational verification; relevant flow/discharge records; water-quality and hydrological monitoring; review of trends against baseline/reference conditions.
KBFS 1 & 2 – WETLAND HYDROLOGY: DRAINAGE MODIFICATION	Avoid material adverse alteration of drainage, water balance, inundation, salinity or hydrological connectivity supporting Critical Habitat.	Avoid / Minimize	Drainage-management and design provisions.	Verify that final drainage design maintains wetland hydrological function. Any subsequent design change capable of materially altering drainage, discharge, groundwater interaction or wetland water balance should be reviewed for Critical Habitat implications before implementation.	BWA / Design Team / Engineering Team	Detailed design / pre-construction and when relevant design changes occur	Design review/technical verification; inspection of constructed drainage; hydrological and water-quality indicators sufficient to identify material Project-related change.
KBFS 2 & 5 – WETLAND–COASTAL CONNECTIVITY: EXISTING OUTFLOW/COASTAL PATHWAY	Ensure changes to existing downstream conveyance arrangements do not cause material adverse effects on wetland hydrology or connected coastal receptors.	Avoid / Minimize	Existing wastewater conveyance/discharge and Project water-reuse provisions.	Confirm the function and future configuration of existing drainage/outflow infrastructure , including infrastructure observed at the Eastern Marsh and existing SCSTP conveyance route. Confirm the operational status, management responsibility and intended future arrangements for the sluice gate/coastal outlet . Determine whether	BWA / Design & Engineering Team / Operator	Detailed design / before operation	Documented engineering/operational confirmation; design review; relevant flow/water-quality verification where required.

KBF / RISK	REQUIRED MEASURE	MITIGATION HIERARCHY	EXISTING ESIA/ESMP PROVISION	ADDITIONAL CHA REQUIREMENT	RESPONSIBLE PARTY	TIMING	MONITORING / VERIFICATION
				proposed changes could materially affect wetland water balance or downstream water quality.			
KBFS 1, 2, 3, 5 & 6 – PLANT FAILURE/OVERFLOW/EMERGENCY WASTEWATER RELEASE	Prevent untreated or inadequately treated wastewater from entering Graeme Hall or connected coastal pathways during plant failure, maintenance or emergency events.	Avoid / Minimize	Operational controls, emergency-response and plant-failure provisions.	Engineering confirmation that credible failure scenarios—including overflow, loss of treatment capacity, equipment failure, power interruption and maintenance events—can be contained or managed without substantial uncontrolled discharge to Critical Habitat. Emergency procedures should explicitly address Graeme Hall and connected downstream pathways.	BWA / Engineering Team / Operator	Detailed design / before operation and throughout operation	Engineering verification; emergency-procedure review/testing; operational and incident records; notification records; post-incident environmental verification where a material release occurs.
KBFS 3 & 4 – MIGRATORY/CONGREGATORY AND RESIDENT BIRDS: ARTIFICIAL LIGHTING	Minimize artificial light spill into adjoining wetland habitat.	Minimize	Directional fixtures, shielding and lighting controls.	Confirm low-spill lighting design at the wetland interface. Direct lighting away from wetland habitat and use shielding and the minimum illumination required for safety/security.	Contractor / BWA / Operator	Design, construction and operation	Design review; night-time inspection where warranted; corrective action where excessive spill is identified.
KBFS 3 & 4 – WETLAND BIRDS/FAUNA: CONSTRUCTION NOISE AND ACTIVITY	Minimize unnecessary noise, activity and disturbance adjacent to wetland habitat.	Minimize	Construction nuisance controls and working-hour requirements.	Maintain activities within approved areas/hours. Avoid unnecessary high-disturbance activities adjacent to wetland margins. Apply targeted temporary restrictions where significant nesting, roosting or other sensitive fauna activity is identified immediately adjacent to works.	Contractor	Construction	Routine site inspection; environmental observations; record and verification of any targeted temporary controls implemented.
RELEVANT KBF – ACCIDENTAL HABITAT DISTURBANCE	Restore or rehabilitate habitat	Restore / Rehabilitate	Site-restoration and reinstatement requirements.	Restoration measures should be proportionate	Contractor / BWA /	As required	Restoration plan/record where applicable;

KBF / RISK	REQUIRED MEASURE	MITIGATION HIERARCHY	EXISTING ESIA/ESMP PROVISION	ADDITIONAL CHA REQUIREMENT	RESPONSIBLE PARTY	TIMING	MONITORING / VERIFICATION
	promptly where accidental disturbance occurs.			to the affected KBF, habitat type and severity of disturbance and should seek to restore ecological condition/function rather than only physical appearance.	Environmental Specialist		inspection; photographic verification; follow-up condition check sufficient to confirm establishment/recovery.
PRINCIPALLY KBFS 1 & 2 – CRITICAL HABITAT HYDROLOGY AND WATER QUALITY: MONITORING	Verify that Project activities are not causing material deterioration in hydrological or water-quality conditions supporting Graeme Hall.	Monitor / Adaptive Management	Existing water-quality, drainage and environmental monitoring provisions.	Integrate CHA-relevant parameters and locations into existing Project monitoring rather than establish a parallel programme. Monitoring should be capable of detecting material Project-related changes in relevant water-quality and hydrological conditions and identifying when investigation/corrective action is required.	BWA / Operator / Environmental Team	Construction and operation	Periodic review against baseline/reference conditions; trend analysis; investigation of material adverse changes; documented corrective/adaptive-management action.
ALL RELEVANT KBFS – CUMULATIVE PRESSURES AND ECOLOGICAL CONDITION	Prevent Project-related pressures from materially adding to existing hydrological, water-quality and habitat stress or reducing ecological resilience.	Avoid / Minimize / Adaptive Management	Existing biodiversity and environmental monitoring and ESMP controls.	Review Project monitoring results in the context of existing pressures. Where practicable, distinguish Project-related changes from wider baseline variation and investigate adverse trends plausibly linked to the Project.	BWA / Operator / Environmental Team	Construction and operation	ESMP/CHA monitoring reports; periodic trend review; incident and corrective-action records; adaptive-management actions where trigger conditions are identified.
ALL RELEVANT KBFS – MATERIAL PROJECT CHANGE / NEW IMPACT PATHWAY	Review biodiversity implications where subsequent Project changes introduce an impact pathway not assessed by the CHA.	Avoid / Follow-up	Project change-management/environmental review procedures, as applicable.	Undertake targeted Critical Habitat review before implementing any material change involving new wetland footprint, altered drainage/water-management arrangements, new discharge pathways or another credible pathway capable of materially changing the CHA conclusions or required mitigation.	BWA / Design Team / Environmental Specialist	Before relevant Project change is approved/implemented	Documented change review; additional targeted technical/ecological assessment only where necessary; incorporation of resulting requirements into design/ESMP.

Annex 6: Photographic record

Site visit photographic annex

Project ref.	Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities (Project Number: 5908/OC-BA/BA-L1063	Photographer	Tracy Phillips Gregory Franklin Katherine Blackman
Site name	Graeme Hall Swamp and Surrounding Area	Camera / device	Cellular Phone
Parish / district	Christ Church	Datum (default WGS 84)	Yes
Date(s) of visit	21 August 2026 24 August 2026 28 August 2026	Total photographs	

Stations: FV-01 – SCSTP / Project Interface · FV-02 – Eastern Marsh · FV-03 – Upper Drainage · FV-04 – Bisecting Canal · FV-05 – Nature Sanctuary · FV-06 – Southern Wetland Interface · FV-07 – Sluice Gate / Coastal Connection

Category codes: A Project Site · B Natural Habitat · C Flora and Vegetation · D Fauna · E Built Environment · F Existing Impacts and Hazards



Photo 1	<i>Project Interface East of the current Plant –Lignum-vitae Tree of Life (Guaiacum officinale)</i>			
GPS: 13°04'19.4"N 59°34'18.6"W	Date / time: 21 Aug	Facing: North	Station: FV-01:SCSTP / Project Interface	Category: C - flora and vegetation



Photo 2

Project Interface in front of the current Plant– Mahogany Tree (Swietenia mahagoni)

GPS: 13°04'19.4"N
59°34'20.4"W

Date/time: 28 Aug

Facing: West

Station: FV-01: SCSTP /
Project Interface

Category: C - flora and vegetation



Photo 3

Project Interface: Western Boundary of the Site for the new Water Reclamation Facility, current Sewage Treatment Plant (left)

GPS: 13°04'22.7"N 59°34'22.0"W	Date / time: 21 Aug	Facing: East	Station: FV-01 SCSTP / Project Interface	Category: A – Project site
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Photo 4	<i>Project Interface: Site for the new Water Reclamation Facility</i>			
GPS: 13°04'22.7"N 59°34'22.0"W	Date/time: 21 Aug	Facing: Northeast	Station: FV-01 SCSTP / Project Interface	Category: A – Project Site



Photo 5	<i>Project Interface: Site for the new Water Reclamation Facility – Shade cloth being used for dust mitigation</i>			
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GPS: 13°04'22.7"N 59°34'22.0"W	Date/time: 21 Aug	Facing: East	Station: FV-01 SCSTP / Project Interface	Category: A – Project site
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Photo 6	<i>Project Interface Western Boundary Jamaica Caper Quadrella cynophallophora (formerly part of the Capparis genus).</i>			
GPS: n/a	Date/time: 21 Aug	Facing: Southwest	Station: FV-01 SCSTP / Project Interface	Category: C - flora and vegetation



Photo 7	<i>Project Interface Western Boundary Wireweed/Broomweed (Sida acuta)</i>			
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GPS: n/a	Date/time: 21 Aug	Facing: Southwest	Station: FV-01 SCSTP / Project Interface	Category: C - flora and vegetation
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Photo 8	<i>Project Interface Southwest Boundary— River Tamarind (Leucaena leucocephala)</i>			
GPS: n/a	Date/time: 21 Aug	Facing: Southwest	Station: FV-01 SCSTP / Project Interface	Category: C - Flora and Vegetation



Photo 9	<i>Project Interface – Natural Gully to the East of the Project Site</i>			
GPS: 13°04'19.4"N 59°34'18.6"W	Date/time: 24 Aug	Facing: East	Station: FV-01 SCSTP / Project Interface	Category: B - Natural Habitat



Photo 10	<i>Project Interface Cattle Egret (Ardea ibis, formerly Bubulcus ibis)</i>			
GPS: n/a	Date/time: 28 Aug	Facing: n/a	Station: FV-01 SCSTP / Project Interface	Category: D - Fauna



Photo 11	<i>Eastern Marsh – Southeast of the South Coast Sewage Treatment Plant</i>			
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GPS: 13.00702090, -59.5770550	Date/time: 21 Aug	Facing: West	Station: FV-02 Eastern Marsh	Category: B - Natural Habitat
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Photo 12	<i>Eastern Marsh – Sedge/Rush (Eleocharis mutata)</i>			
GPS: 13.00702090, -59.5770550	Date / time: 21 Aug	Facing: West	Station: FV-02 Eastern Marsh	Category: B - Natural Habitat



Photo 13	<i>Eastern Marsh – Southeast of the South Coast Sewage Treatment Plant</i>			
GPS: 13.00702090, -59.5770550	Date / time: 21 Aug	Facing: West	Station: FV-02 Eastern Marsh	Category: B - Natural Habitat



Photo 14

Eastern Marsh – Southeast of the South Coast Sewage Treatment Plant

GPS: 13.00702090, -59.5770550

Date / time: 21 Aug

Facing: West

Station: FV-02 Eastern Marsh

Category: B - Natural Habitat



Photo 15

Surface water drainage from Harmony Hall (urban environment) discharging into the swamp as part of flood mitigation

GPS: 13°04'14.6"N
59°34'21.4"W

Date / time: 21 Aug

Facing: n/a

Station: FV-02 Eastern
Marsh

Category: E – Built Environment



Photo 16	<i>Eastern Marsh – Water Coloration</i>			
GPS: 13.00702090, -59.5770550	Date/time: 21 Aug	Facing: n/a	Station: FV-02 Eastern Marsh	Category: B - Natural Habitat



Photo 17	<i>Eastern Marsh – White Butterfly Great Southern White (Ascia monuste)</i>			
GPS:	Date/time: 21 Aug	Facing: n/a	Station: FV-02 Eastern Marsh	Category: D - Fauna



Photo 18

Eastern Marsh – Little Yellow Butterfly (Eurema lisa)

GPS: n/a

Date / time: 21 Aug

Facing: n/a

Station: FV-02 Eastern Marsh

Category: D - Fauna



Photo 19

Eastern Marsh – Primrose Willow/Water Primroses (Ludwigia octovalvis)

GPS: n/a	Date / time:21 Aug	Facing:	Station: FV-02 Eastern Marsh	Category: C - Flora and Vegetation
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Photo 20	Eastern Marsh - Caster Bean/Oil Plant (<i>Ricinus communis</i>)			
GPS: n/a	Date / time:21 Aug	Facing: n/a	Station: FV-02 Eastern Marsh	Category: C - Flora and Vegetation



Photo 21	<i>Eastern Marsh – Water Lettuce (Pistia stratiotes)</i>			
GPS: n/a	Date/time: 21 Aug	Facing: n/a	Station: FV-02 Eastern Marsh	Category: C - Flora and Vegetation



Photo 22	<i>Eastern Marsh – Water Hyacinth (Pontederia crassipes)</i>			
GPS: n/a	Date/time: 21 Aug	Facing: n/a	Station: FV-02 Eastern Marsh	Category: C - Flora and Vegetation



Photo 23	<i>Eastern Marsh – Duckweed (Spirodela polyrhiza)</i>			
GPS: n/a	Date/time: 21 Aug	Facing: n/a	Station: FV-02 Eastern Marsh	Category: C - Flora and Vegetation



Photo 24	<i>Surface water drainage from Bamboo Road (Urban environment) discharging into the swamp as part of flood mitigation</i>			
GPS: 13°04'13.8"N 59°34'29.6"W	Date / time: 21 Aug	Facing: n/a	Station: FV-02 Eastern Marsh	Category: E – Built Environment



Photo 25

*Eastern Marsh – White Mangrove (*Laguncularia racemosa* wood used by fisherman in the St. Lawrence area to make fishpots*

GPS: 13°04'13.8"N
59°34'29.6"W

Date / time: 21 Aug

Facing: n/a

Station: FV-02 Eastern
Marsh

Category: F Existing Impacts and Hazards



Photo 26

*Eastern Marsh - Napier Grass / Elephant Grass (*Cenchrus purpureus*, formerly *Pennisetum purpureum*)*

GPS: n/a

Date / time: 21 Aug

Facing: n/a

Station: FV-02 Eastern
Marsh

Category: C - Flora and Vegetation



Photo 27

Eastern Marsh – Illegal Dumping Old Mattress

GPS: 13°04'13.7"N
59°34'30.6"W

Date / time: 21 Aug

Facing: n/a

Station: FV-02 Eastern
Marsh

Category: F Existing Impacts and Hazards



Photo 28

Eastern Marsh – Illegal Dumping Old Appliances

GPS: 13°04'13.7"N
59°34'30.6"W

Date / time: 21 Aug

Facing: n/a

Station: FV-02 Eastern
Marsh

Category: F Existing Impacts and Hazards



Photo 29	<i>Eastern Marsh – White Mangrove (Laguncularia racemosa). Damaged by Hurricane Beryl</i>			
GPS:13.070245, - 59,575785	Date / time: 21 Aug	Facing: West	Station: FV-02 Eastern Marsh	Category: C - Flora and Vegetation



Photo 30

Upper Drainage – Mature red (*Rhizophora mangle*) and White mangroves (*Laguncularia racemosa*), dense vegetation

GPS:13.070245, - 59,575785

Date/time: 24 Aug

Facing: North

Station: FV-03 Upper
Drainage

Category: C - Flora and Vegetation;
B - Natural Habitat



Photo 31

Upper Drainage – Mature red (*Rhizophora mangle*) and White mangroves (*Laguncularia racemosa*), dense vegetation

GPS:13.070245, - 59,575785	Date/time: 24 Aug	Facing: North	Station: FV-03 Upper Drainage	Category: C - Flora and Vegetation; B - Natural Habitat
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Photo 32	<i>Upper Drainage – Fallen White mangroves (Laguncularia racemosa) from the passage of Hurricane Beryl</i>			
GPS: 13.070245, - 59,575785	Date/time: 28 Aug	Facing: East	Station: FV-03 Upper Drainage	Category: C - Flora and Vegetation; B - Natural Habitat



Photo 33	<i>Upper Drainage – Fallen Red mangroves (Rhizophora mangle) from the passage of Hurricane Beryl.</i>			
GPS:	Date / time: 28 Aug	Facing: West	Station: FV-03 Upper Drainage	Category: C - Flora and Vegetation; B - Natural Habitat



Photo 34	<i>Upper Drainage Sour Bush (Pluchea carolinensis)</i>			
GPS:13.070176, - 59,577093	Date/time: 28 Aug	Facing: n/a	Station: FV-03 Upper Drainage	Category: B - Natural Habitat



Photo 35	<i>Upper Drainage Standing Water - Tannins Visible</i>			
GPS:13.070176, - 59,577093	Date/time: 28 Aug	Facing: n/a	Station: FV-03 Upper Drainage	Category: B - Natural Habitat



Photo 36	<i>Bisecting Canal – Red Mangrove (Rhizophora mangle)</i>			
GPS:13.070176, - 59,577093	Date/time: 21 Aug	Facing: South	Station: FV-04 – Bisecting Canal	Category: B - Natural Habitat



Photo 37

Bisecting Canal – Red Mangrove (Rhizophora mangle) & Duckweed

GPS:13.070176, - 59,577093

Date/time: 21 Aug

Facing: Northwest

Station: FV-04 – Bisecting Canal

Category: B - Natural Habitat



Photo 38

Bisecting Canal – Fallen Red Mangrove (Rhizophora mangle)

GPS:13.070176, - 59,577093

Date / time: 21 Aug

Facing: West

Station: FV-04 – Bisecting Canal

Category: C - Flora and Vegetation



Photo 39

Bisecting Canal – Red Mangrove (Rhizophora mangle)

GPS:13.070176, - 59,577093

Date / time: 21 Aug

Facing: West

Station: FV-04 – Bisecting Canal

Category: C - Flora and Vegetation



Photo 40

Bisecting Canal – Swamp Flatsedge (Cyperus ligularis)

GPS: n/a

Date / time: 24 Aug

Facing: n/a

Station: FV-04 – Bisecting Canal

Category: C - Flora and Vegetation



Photo 41	Bisecting Canal – Sour Bush (<i>Pluchea carolinensis</i>)			
GPS:	Date / time: 24 Aug	Facing: East	Station: FV-04 – Bisecting Canal	Category: C - Flora and Vegetation



Photo 42	Bisecting Canal – White Mangrove (<i>Laguncularia racemosa</i>)			
GPS:	Date/time: 24 Aug	Facing: East	Station: FV-04 – Bisecting Canal	Category: C - Flora and Vegetation



Photo 43	<i>Bisecting Canal – Spanish needles (Bidens alba)</i>			
GPS:	Date / time:24 Aug	Facing: n/a	Station: FV-04 – Bisecting Canal	Category: C - Flora and Vegetation



Photo 44	<i>Bisecting Canal – Bushy lippia (Lippia alba)</i>			
GPS: n/a	Date/time: 28 Aug	Facing: n/a	Station: FV-04 – Bisecting Canal	Category: C - Flora and Vegetation



Photo 45

Bisecting Canal – Cattle bush (Trichodesma zeylanicum)

GPS: n/a

Date/time: 28 Aug

Facing: East

Station: FV-04 – Bisecting Canal

Category: C - Flora and Vegetation



Photo 46

Bisecting Canal – Tropical buckeye (Junonia evarete) butterflies

GPS:	Date / time:24 Aug	Facing: n/a	Station: FV-04 – Bisecting Canal	Category: D - Funa
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Photo 47	<i>Bisecting Canal – Widow skimmer (Libellula luctuosa) dragonfly</i>			
GPS:	Date / time:24 Aug	Facing: n/a	Station: FV-04 – Bisecting Canal	Category: D - Funa

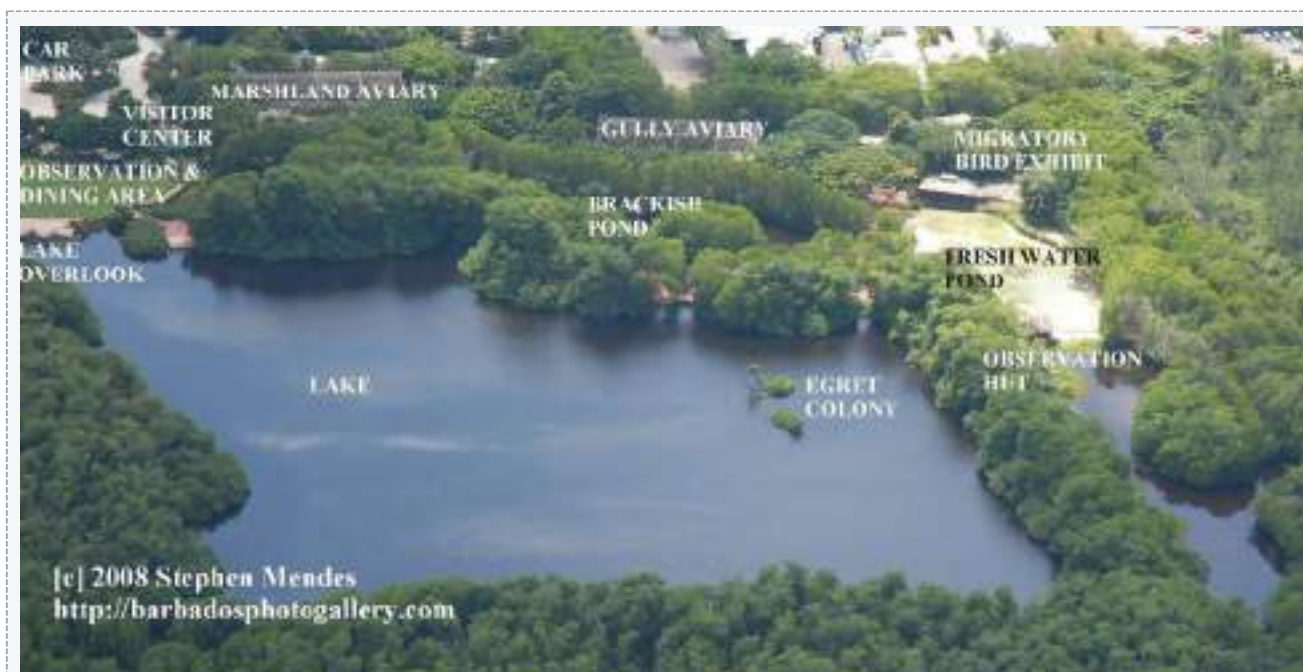


Photo 48	<i>Graeme Hall Nature Sanctuary Layout – Stock Photo from Literature</i>			
GPS: n/a	Date/time: 2008	Facing: Aerial View	Station: FV-05 – Nature Sanctuary	Category: n/a



Photo 49

FV-06 – Southern Wetland Interface – Intersection of the Swamp with Highway 7

GPS: 13°04'11.4"N
59°34'38.0"W

Date/time: Aug 21

Facing: South

Station: FV-06 – Southern
Wetland Interface

Category: E Built Environment; F Existing
Impacts and Hazards



Photo 50

FV-06 – Southern Wetland Interface – SCSTP Outflow Pipe

GPS:13°04'11.4"N 59°34'38.0"W	Date/time: 21 Aug	Facing: South	Station: FV-06 – Southern Wetland Interface	Category: F Existing Impacts and Hazards
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Photo 51

FV-06 – Southern Wetland Interface SCSTP Outflow Pumping Station (2 present in the area)

GPS: 13°04'11.4"N 59°34'38.0"W	Date/time: 21 Aug	Facing: South	Station: FV-06 – Southern Wetland Interface	Category: E Built Environment; F Existing Impacts and Hazards
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Photo 52

FV-06 – Southern Wetland Interface - SCSTP Outflow Pump (2 present in the area)

GPS: 13°04'11.4"N
59°34'38.0"W

Date/time: 24 Aug

Facing: n/a

Station: FV-06 – Southern
Wetland Interface

Category: E Built Environment;



Photo 53	<i>FV-06 – Southern Wetland Interface – SCSTP Outflow Pipe branches into two under bridge and into the channel on Sandy Beach</i>			
GPS: 13°04'10.2"N 59°34'38.3"W	Date/time: 24 Aug	Facing: Southwest	Station: FV-06 – Southern Wetland Interface	Category: E Built Environment; F Existing Impacts and Hazards



Photo 54	<i>FV-06 – Southern Wetland Interface – SCSTP Outflow Pipes continue through the channel at Sandy Beach</i>			
GPS: 13°04'10.2"N 59°34'38.3"W	Date/time: 24 Aug	Facing: Northwest	Station: FV-06 – Southern Wetland Interface	Category: E Built Environment; F Existing Impacts and Hazards



Photo 55

Sluice Gate – Beach Erosion

GPS: 13°04'09.5"N
59°34'38.7"W

Date/time: 28 Aug

Facing: South

Station: • FV-07 –
Sluice Gate / Coastal
Connection

Category: E Built Environment; F Existing
Impacts and Hazards



Photo 56

Sluice Gate

GPS: 13°04'09.5"N 59°34'38.7"W	Date/time: 21 Aug	Facing: South	Station: FV-07 – Sluice Gate / Coastal Connection	Category: E Built Environment; F Existing Impacts and Hazards
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Photo 57 *Water Channel leading to the Sluice Gate*

GPS: 13°04'09.5"N 59°34'38.7"W	Date/time: 21 Aug	Facing: North	Station: FV-07 – Sluice Gate / Coastal Connection	Category: E Built Environment
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Photo 58

Sluice Gate - Debris in the water channel

GPS: 13°04'09.5"N
59°34'38.7"W

Date/time: 21 Aug

Facing: n/a

Station: FV-07 – Sluice
Gate / Coastal
Connection

Category: E Built Environment; F Existing
Impacts and Hazards



Photo 59	<i>Sluice Gate- Outflow from the sewage plant culminates here and heads offshore</i>			
GPS: 13°04'09.5"N 59°34'38.7"W	Date/time: 21 Aug	Facing: South	Station: FV-07 – Sluice Gate / Coastal Connection	Category: E Built Environment; F Existing Impacts and Hazards

Annex 7: Field Verification Data Sheet

Purpose

The field verification is intended to ground-truth the findings of the desktop assessment and confirm current habitat conditions, Key Biodiversity Features (KBFs), project–habitat interfaces, hydrological/ecological connections and relevant environmental pressures.

The exercise is **not intended to constitute a comprehensive ecological or species survey**. Observations of flora and fauna will be opportunistic, and non-detection of a species during the rapid verification exercise will not be interpreted as evidence of absence.

A. Visit Information

Field	Record
Date	21 August 2026 / 24 August 2026/ 28 August 2026
Start / End Time	21 AUG 10:10 AM – 2:30 PM/ 24 August 9:00 AM – 1:30 PM/ 28 AUG 10:30 AM – 12:30 PM
Field Team	Tracy Phillips, Gregory Franklin, Katherine Blackman
Weather Conditions	21 AUG – Slightly Overcast/Light Rainfall; 24 AUG – Sunny; 28 AUG Overcast/Scattered Showers
Recent Rainfall / Relevant Weather	21 AUG – Light Showers; 28 AUG – Scattered Showers
General Site Conditions	
Access Constraints / Areas Not Visited	Upper Drainage: unable to access due to dense vegetation; needed to cut a path (Accessed on August 24 & August 28); Nature Sanctuary: Permission not granted to access property
Other Relevant Notes	

B. Proposed Field Verification Stations

The precise location of each station may be adjusted based on site access, safety and field conditions.

STATION	VERIFICATION AREA	PRIMARY CHA PURPOSE
FV-01	SCSTP / Project Interface	Verify the Project footprint, immediate wetland interface and potential Project-related impact pathways
FV-02	Eastern Marsh	Verify the condition and characteristics of the wetland habitat closest to the Project

STATION	VERIFICATION AREA	PRIMARY CHA PURPOSE
FV-03	Upper Drainage	Verify drainage inputs, runoff pathways and hydrological influences on the wetland
FV-04	Bisecting Canal	Verify internal hydrological connectivity and condition of the principal canal
FV-05	Nature Sanctuary	Verify representative mangrove, open-water and other Core Critical Habitat features
FV-06	Southern Wetland Interface	Verify the wetland–urban/coastal interface and associated environmental pressures
FV-07	Sluice Gate / Coastal Connection	Verify downstream hydrological connectivity and the pathway between the wetland and coastal/nearshore environment

C. Field Verification Station Record

Complete one Station Record for each of FV-01 to FV-07.

Station Information

Field Record

Station ID **FV-01**

Verification Area **SCSTP/Project Interface**

Date / Time August 21 10:10 am / August 24 9:00 am / August 28 10:30 am

GPS Coordinates 13.072974, -59.572763

Team Members T. Phillips, G. Franklin, K. Blackman

Access Point / Route : North of Sewerage Plant, The new site development

General Description Bushland and Shrubbery

Photo Reference(s) See photographic reference sheet: Brushland – River tamarind, mahogany, Tree of Life,
Many mature trees, Jamaica caper, Woman's Tongues

The following prompts identify the priority issues to be examined at FV-01 – SCSTP / Project Interface. They are intended to guide, rather than limit, field observations.

FV-01 – SCSTP / Project Interface

- Project footprint and proximity to Ramsar/wetland boundary – **North of the boundary**
- Existing and proposed infrastructure **-Yes**

- Drainage/stormwater direction and connections – **Sits in the natural watershed; water flows southwards, drains into the swamp, and out to sea.**
- Potential wastewater, overflow or emergency discharge pathways
- Construction access and temporary works areas - **Yes**
- Potential wetland encroachment -**No**
- Existing buffer/separation from wetland habitat -**Yes**
- Artificial-light sources – **Existing plant**
- Noise/activity interface – **Existing plant**
- Existing environmental controls – **Shade cloth being used for dust control**

Habitat and Ecological Condition

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	CHA / KBF RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
HABITAT TYPE(S) PRESENT	Brushland – shrubbery (some mature trees – Mahogany & Tree of life, Tamarind	KBF 2 & KBF 6	Photos 3, 4, 5 & 9	-
HABITAT CONDITION	Good	KBF 2	Photos 3, 4, 5, & 9	-
VEGETATION CONDITION	Good	KBF 2	Photos 1, 2,6,7,9	-
OPEN WATER / STANDING WATER, WHERE APPLICABLE	-			-
EVIDENCE OF INVASIVE VEGETATION	-			-
BIRDS / WILDLIFE OBSERVED	Birds and Butterflies (Little Egret - <i>Egretta garzetta</i> & Cattle Egret - <i>Bubulcus ibis</i>)	KBF 3	Photo 10 & 17	-
BREEDING / NESTING / ROOSTING FEATURES				-
OTHER RELEVANT ECOLOGICAL FEATURE	Gully exists to eastern end	KBF 2	Photo 9	-

Hydrology and Environmental Pressures

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
DRAINAGE / WATER CONNECTION	In watershed	KBF 2	Photo 4	
APPARENT FLOW / WATER LEVEL	n/a			
WATER CONDITION – VISUAL / ODOUR ONLY	n/a			
SILTATION / SEDIMENTATION	n/a			
EROSION / RUNOFF EVIDENCE	n/a			
WASTEWATER / CONTAMINATION INFLUENCE	n/a			
SOLID WASTE / DEBRIS	Yes			
OTHER EXISTING HABITAT DEGRADATION	n/a			

Project–Habitat Interface

VERIFICATION ITEM	OBSERVATION	KBF / HABITAT POTENTIALLY AFFECTED	EXISTING CONTROL OBSERVED	POTENTIAL CONCERN / FOLLOW-UP
PROJECT FOOTPRINT / INFRASTRUCTURE	Yes	KBF 2		
DRAINAGE / STORMWATER PATHWAY	Yes	KBF 2		
WASTEWATER / OVERFLOW PATHWAY				
CONSTRUCTION ACCESS / TEMPORARY WORKS	Yes	KBF 2	Shade material is being used for dust control.	
POTENTIAL ENCROACHMENT	n/a			
ARTIFICIAL LIGHTING	Yes			

NOISE / ACTIVITY	Yes, minimum noise from the current plant
POTENTIAL AVOIDANCE / NO-GO AREA	n/a
OTHER	n/a
Station Assessment	Good

Overall Habitat Condition:

Good / Moderate / Degraded / Highly Degraded / Not Applicable

Basis for Rating:

Existence of mature trees, wildlife (flora and fauna).

Key KBF / Critical Habitat Observation:

KBF 2 – Hydrological and ecological processes supporting; KBF 3 – Migratory/congregatory wetland birds; KBF 6 – Threatened Species Associated with the Project/CHAA

Key Project–Habitat Interaction or Impact Pathway Identified:

Sits in the natural watershed; water flows southwards, drains into the swamp, and out to sea.

Material Difference from Desktop Information:

Yes / **No**

If yes, describe:

.....

Further Verification / Follow-up Required:

Yes / **No**

If yes, specify:

.....

Station Information

Field	Record
Station ID	FV-02
Verification Area	Eastern Marsh
Date / Time	August 21 10:48 am / August 24 10:05 / August 28 10:45 am

Field	Record
GPS Coordinates	13.070900, -59.573050
Team Members	T. Phillips, G. Franklin, K. Blackman
Access Point / Route	Southeast of the Sewerage Plant
General Description	Marsh Swamp Land
Photo Reference(s)	See photographic reference sheet

The following prompts identify the priority issues to be examined at FV-02 – Eastern Marsh. They are intended to guide, rather than limit, field observations.

FV-02 – Eastern Marsh

- Marsh/sedge habitat characteristics **Yes**
- Habitat and vegetation condition **Good**
- Standing/open water and apparent hydrological condition- **Yes , good to moderate**
- Drainage connections **Two pipes towards eastern end**
- Siltation, runoff or contamination evidence **no**
- Invasive vegetation - **no**
- Birds/wildlife and habitat-use observations – **Birds - Common Ground Dove - *Columbina passerina*; Cattle Egret- *Ardea ibis***
- Existing degradation/disturbance – **non-visible**
- Relationship to SCSTP/Project area – **Directly southeast of the sewage plant**
- Potential sensitive/no-go areas

Habitat and Ecological Condition

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	CHA / KBF RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
HABITAT TYPE(S) PRESENT	Marsh	KBF 1 & 2	Photos 11, 13 & 14	no
HABITAT CONDITION	Good	KBF 1 & 2	Photos 11, 13 & 14	no
VEGETATION CONDITION	Good	KBF 1 & 2	Photos 12, 18-23, 26,29	no
OPEN WATER / STANDING WATER, WHERE APPLICABLE	Yes	KBF 1 & 2	Photos 11,13,14, 16	no
EVIDENCE OF INVASIVE VEGETATION	No	n/a		no
BIRDS / WILDLIFE OBSERVED	White butterflies, dragonflies, common ground dove - <i>Columbina passerina</i> , Tilapia, mongoose		Photos 17 & 18	no
BREEDING / NESTING / ROOSTING FEATURES	n/a	n/a		no
OTHER RELEVANT ECOLOGICAL FEATURE	Lots of trees including casuarina, castor bean plant, clammy cherry, Water lettuce, wetland rush sp, water hyacinth, duckweed, Spotted aloe (may have been introduced given location)			

Hydrology and Environmental Pressures

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
DRAINAGE / WATER CONNECTION	In watershed	KBF 1 & 2	Photos 15 & 24	no
APPARENT FLOW / WATER LEVEL	Medium ranges from at least 2ft 6 inches	KBF 1 & 2	Photos 11, 13, 14 & 16	no
WATER CONDITION – VISUAL / ODOUR ONLY	No odor, tannins visible	KBF 1 & 2	Photos 11, 13, 14 & 16	no

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
SILTATION / SEDIMENTATION	No			no
EROSION / RUNOFF EVIDENCE	Four drainage pipes/areas allow for surface water drainage from the surrounding southeast urban environment into the swamp as part of flood mitigation	KBF 1 & 2	Photos 15 & 24	Yes
WASTEWATER / CONTAMINATION INFLUENCE	To the immediate southeast of the plant. current outflow pipes from the sewage plant run southwards along the area	KBF 1 & 2		no
SOLID WASTE / DEBRIS	Illegal dumping - solid waste present	KBF 1 & 2	Photos 27 & 28	no
OTHER EXISTING HABITAT DEGRADATION	At the end of the marsh are mangrove trees (white mangrove) which experienced storm damage after the passage of Hurricane Beryl (Photo 29), as confirmed by fishermen in the area			

Project–Habitat Interface

VERIFICATION ITEM	OBSERVATION	KBF / HABITAT POTENTIALLY AFFECTED	EXISTING CONTROL OBSERVED	POTENTIAL CONCERN / FOLLOW-UP
PROJECT FOOTPRINT / INFRASTRUCTURE	No			
DRAINAGE / STORMWATER PATHWAY	Yes	KBF 1 & 2		No
WASTEWATER / OVERFLOW PATHWAY	Yes – Pipes	KBF 1 & 2		No
CONSTRUCTION ACCESS / TEMPORARY WORKS	No			
POTENTIAL ENCROACHMENT	No			
ARTIFICIAL LIGHTING				
NOISE / ACTIVITY	No	n/a		No
POTENTIAL AVOIDANCE / NO-GO AREA	n/a			

OTHER	n/a
Station Assessment	Good

Overall Habitat Condition:

Good / Moderate / Degraded / Highly Degraded / Not Applicable

Basis for Rating:

Relatively healthy vegetation and presence of Wildlife.

Key KBF / Critical Habitat Observation:

KBF 1 – Graeme Hall Ramsar wetland and ecological character; KBF 2 – Hydrological and ecological processes supporting Graeme Hall

Key Project–Habitat Interaction or Impact Pathway Identified:

Part of the watershed, siltation/Sedimentation from construction, as it sits downhill (south/southwest) of the project site and is part of the watershed. Current outflow pipes from the sewage plant run southwards along the area. With the upgrade to the current facility and the new water reclamation facility, water from the plant will no longer follow this pathway instead, water from the current facility will be channeled to the water reclamation facility and used to replenish aquifers in the Christ Church area or for agriculture.

Material Difference from Desktop Information:

Yes / No

If yes, describe:

.....

Further Verification / Follow-up Required:

Yes / No

If yes, specify:

.....Purpose of pipes.....

Station Information

Field	Record
Station ID	FV-03
Verification Area	Upper Drainage
Date / Time	August 24 11:00 am / August 28 11:10 am
GPS Coordinates	13.071806, -59.57656
Team Members	T. Phillips, G. Franklin, K. Blackman

Field	Record
Access Point / Route	Government access point into the government own Swamp lands. Entering from the bridge on Highway 7 heading north
General Description	Mangrove swamp - mature Red and white mangroves
Photo Reference(s)	See photographic reference sheet

The following prompts identify the priority issues to be examined at FV-03 – Upper Drainage. They are intended to guide, rather than limit, field observations.

FV-03 – Upper Drainage

- Drainage channels entering or influencing the wetland
- Apparent flow direction and water level – **South approximately 2 ft -3ft of water**
- Runoff pathways – **Part of the watershed**
- Sediment/siltation - **No**
- Water condition and odor – **Tannin coloration**
- Wastewater or other contamination indicators - **No**
- Surrounding land uses and potential external pressures -**No**
- Vegetation along drainage pathway – **Yes, Sedge rush, duckweed, and Red & white mangroves**
- Hydrological connection to wetland habitats - **Government own mangrove/Swamp lands**

Habitat and Ecological Condition

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	CHA / KBF RELEVANCE	PHOTO REF.	FOLLOW- UP REQUIRED?

HABITAT TYPE(S) PRESENT	Mangrove swamp	KBF 1 & 2	Photos 30 & 31
HABITAT CONDITION	West end damage from hurricane East end – healthier Lots of Sour bush on Eastern end	KBF 1 & 2	Photos 32, 33 & 34
VEGETATION CONDITION	Fallen red and white mangroves from the passage of Hurricane Beryl. Healthier, mainly white mangrove on the Eastern side. Sedge Rush and duckweed	KBF 1 & 2	Photos 32 & 33
OPEN WATER / STANDING WATER, WHERE APPLICABLE	Yes	KBF 1 & 2	
EVIDENCE OF INVASIVE VEGETATION	No		
BIRDS / WILDLIFE OBSERVED	Birds	KBF 3	
BREEDING / NESTING / ROOSTING FEATURES	No		
OTHER RELEVANT ECOLOGICAL FEATURE	n/a		

Hydrology and Environmental Pressures

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
DRAINAGE / WATER CONNECTION	In watershed	KBF 1 & 2	Photo 35	
APPARENT FLOW / WATER LEVEL	Medium approximately 2 ft -3ft of water			
WATER CONDITION – VISUAL / ODOUR ONLY	Tannis visible; no odor	KBF 1 & 2	Photo 35	

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
SILTATION / SEDIMENTATION	No			
EROSION / RUNOFF EVIDENCE	No			
WASTEWATER / CONTAMINATION INFLUENCE	No			
SOLID WASTE / DEBRIS	None			
OTHER EXISTING HABITAT DEGRADATION	Western end (Red mangroves)			

Project-Habitat Interface

VERIFICATION ITEM	OBSERVATION	KBF / HABITAT POTENTIALLY AFFECTED	EXISTING CONTROL OBSERVED	POTENTIAL CONCERN / FOLLOW-UP
PROJECT FOOTPRINT / INFRASTRUCTURE	No			
DRAINAGE / STORMWATER PATHWAY	Yes- part of the watershed	KBF 1 & 2		
WASTEWATER / OVERFLOW PATHWAY	No			
CONSTRUCTION ACCESS / TEMPORARY WORKS	-			
POTENTIAL ENCROACHMENT	No			
ARTIFICIAL LIGHTING	No			
NOISE / ACTIVITY	No			
POTENTIAL AVOIDANCE / NO-GO AREA	-			
OTHER	-			

Station Assessment

Overall Habitat Condition:

Good / **Moderate / Degraded** / Highly Degraded / Not Applicable

Basis for Rating:

Mature red and white mangroves, some damaged by the passage of Hurricane Beryl

Key KBF / Critical Habitat Observation:

KBF 1 – Graeme Hall Ramsar wetland and ecological character; KBF 2 – Hydrological and ecological processes supporting Graeme Hall; KBF 3 – Migratory/congregatory wetland birds

Key Project–Habitat Interaction or Impact Pathway Identified:

Siltation/Sedimentation from construction, as it sits downhill (south/southwest) of the project site and is part of the watershed.

Material Difference from Desktop Information:

Yes / **No**

If yes, describe:

.....

Further Verification / Follow-up Required:

Yes / **No**

If yes, specify:

.....

Station Information

Field	Record
Station ID	FV-04
Verification Area	Bisecting Canal
Date / Time	August 21 11:42 am / August 24 10:30 / August 28 11:40 am
GPS Coordinates	13.070498, -59.576994
Team Members	T. Phillips, G. Franklin, K. Blackman
Access Point / Route	Government Access Point
General Description	Canal separates the privately owned lands from the government-owned lands of the mangrove swamp
Photo Reference(s)	See photographic reference sheet

The following prompts identify the priority issues to be examined at FV-04 – Bisecting Canal. They are intended to guide, rather than limit, field observations.

FV-04 – Bisecting Canal

- Canal location, dimensions and general condition – **Narrow at the south end, widening as you move north**
- Apparent water level and flow – **Moderate, approximately 2 ft**
- Bank condition and vegetation – **Moderate. Some red mangrove trees were damaged due to the passage of Hurricane Beryl**
- Sediment, debris or obstructions - **No**
- Water condition and odor – **Tannins visible; no odor**
- Connection between eastern and western wetland components **Yes**
- Evidence of channel modification - **No**
- Habitat use by birds/wildlife - **Mainly butterflies and dragonflies**
- Potential role in conveying Project-related effects

Habitat and Ecological Condition

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	CHA / KBF RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
HABITAT TYPE(S) PRESENT	Mangrove Swamp	KBF 1 & 2	Photos 36 & 37	
HABITAT CONDITION	Red Mangrove impacted	KBF 1 & 2	Photos 36,37, 38 & 39	
VEGETATION CONDITION	Some red mangrove trees were damaged due to the passage of Hurricane Beryl. Duckweed (<i>Spirodela polyrhiza</i>) present	KBF 1 & 2	Photos 38 - 45	
OPEN WATER / STANDING WATER, WHERE APPLICABLE	Yes	KBF 1 & 2	Photos 36 & 37	
EVIDENCE OF INVASIVE VEGETATION	-			
BIRDS / WILDLIFE OBSERVED	Mainly butterflies and dragonflies near margins	KBF 1 & 2	Photos 46 & 47	

BREEDING / NESTING / ROOSTING FEATURES	-
OTHER RELEVANT ECOLOGICAL FEATURE	-

Hydrology and Environmental Pressures

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
DRAINAGE / WATER CONNECTION	Yes- part of the watershed	KBF 1 & 2	Photos 36 & 37	
APPARENT FLOW / WATER LEVEL	Approximately 2 ft 1 inch	KBF 1 & 2	Photos 36 & 37	
WATER CONDITION – VISUAL / ODOUR ONLY	Tannis visible; no odor	KBF 1 & 2	Photos 36 & 37	
SILTATION / SEDIMENTATION	No			
EROSION / RUNOFF EVIDENCE	No			
WASTEWATER / CONTAMINATION INFLUENCE	No			
SOLID WASTE / DEBRIS				
OTHER EXISTING HABITAT DEGRADATION				

Project–Habitat Interface

VERIFICATION ITEM	OBSERVATION	KBF / HABITAT POTENTIALLY AFFECTED	EXISTING CONTROL OBSERVED	POTENTIAL CONCERN / FOLLOW-UP
PROJECT FOOTPRINT / INFRASTRUCTURE	No			
DRAINAGE / STORMWATER PATHWAY	Yes- part of the watershed	KBF 1 & 2		
WASTEWATER / OVERFLOW PATHWAY				
CONSTRUCTION ACCESS / TEMPORARY WORKS				

POTENTIAL ENCROACHMENT	
ARTIFICIAL LIGHTING	
NOISE / ACTIVITY	
POTENTIAL AVOIDANCE / NO-GO AREA	
OTHER	

Station Assessment

Overall Habitat Condition:

Good / Moderate / Degraded / Highly Degraded / Not Applicable

Basis for Rating:

Mature red and white mangroves, some damaged by the passage of Hurricane Beryl, particularly the red mangroves

Key KBF / Critical Habitat Observation:

KBF1 - Graeme Hall Ramsar wetland and ecological character; KBF 2 – Hydrological and ecological processes supporting Graeme Hall;

Key Project–Habitat Interaction or Impact Pathway Identified:

Siltation/Sedimentation from construction, as it sits downhill (south/southwest) of the project site and is part of the watershed.

Material Difference from Desktop Information:

Yes / No

If yes, describe:

.....

Further Verification / Follow-up Required:

Yes / No

If yes, specify:

Station Information

Field	Record
Station ID	FV-05

Field	Record
Verification Area	Nature Sanctuary
Date / Time	The observations recorded below are from the field officer's last visit to the Sanctuary on 10 April 2026, as access to the nature sanctuary and relevant permissions were not granted in time to compile this report.
GPS Coordinates	13.071698, -59.577331
Team Members	Tracy Phillips
Access Point / Route	Sanctuary Nature Trails
General Description	Natural Swamp with some man-made alterations.
Photo Reference(s)	

The following prompts identify the priority issues to be examined at FV-05 – Nature Sanctuary. They are intended to guide, rather than limit, field observations.

FV-05 – Nature Sanctuary

- Representative mangrove habitat - **Yes**
- Mangrove structure and condition - **Good**
- Open-water habitat - **Yes**
- Other wetland vegetation -**Yes**
- Birds and other wildlife -**Yes**
- Breeding/nesting/roosting features - **Yes**
- Invasive species
- Water/habitat condition – **Mainly freshwater; Limited Saltwater mixing due to inoperable Sluice Gate**
- Existing degradation or disturbance – **Some artificial channeling of water**
- Relationship to canal and other hydrological connections – **Sits in the watershed; upper levels drain into the main lake – Lake Tarpon**

Habitat and Ecological Condition

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	CHA / KBF RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
HABITAT TYPE(S) PRESENT	Mangrove Swamp	KBF 1 & 2	Photo 48	
HABITAT CONDITION	Moderate/Good			
VEGETATION CONDITION	Moderate/Good – Red (<i>Rhizophora mangle</i>) & White (<i>Laguncularia racemosa</i>) Mangroves; Sea Grape (<i>Coccoloba uvifera</i>); Water Hyssop (<i>Bacopa monnieri</i>)	KBF 1 & 2		
OPEN WATER / STANDING WATER, WHERE APPLICABLE	Yes – Lake Tarpon	KBF 1 & 2		
EVIDENCE OF INVASIVE VEGETATION	No			
BIRDS / WILDLIFE OBSERVED	Yes - Little Egret, Snowy Egret, Cattle Egret, Barbados Bullfinch, Yellow Warbler / Barbados Yellow Warbler, Antillean Crested Hummingbird, Caribbean Elaenia, American Golden-Plover, Lesser Yellowlegs, Stilt Sandpiper, Short-billed Dowitcher, Pectoral Sandpiper, Atlantic Tarpon, Tilapia	KBF 3 & 4		
BREEDING / NESTING / ROOSTING FEATURES	Yes – Egret Island	KBF 3 & 4		
OTHER RELEVANT ECOLOGICAL FEATURE	Lots of Bird Species	KBF 3 & 4		

Hydrology and Environmental Pressures

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
DRAINAGE / WATER CONNECTION	Yes	KBF 1 & 2		

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
APPARENT FLOW / WATER LEVEL	Limited - Mainly freshwater; Limited Saltwater mixing due to inoperable Sluice Gate	KBF 1 & 2		
WATER CONDITION – VISUAL / ODOUR ONLY	Tannins visible; no odor			
SILTATION / SEDIMENTATION	No			
EROSION / RUNOFF EVIDENCE	No			
WASTEWATER / CONTAMINATION INFLUENCE	No			
SOLID WASTE / DEBRIS	No			
OTHER EXISTING HABITAT DEGRADATION	No			

Project–Habitat Interface

VERIFICATION ITEM	OBSERVATION	KBF / HABITAT POTENTIALLY AFFECTED	EXISTING CONTROL OBSERVED	POTENTIAL CONCERN / FOLLOW-UP
PROJECT FOOTPRINT / INFRASTRUCTURE	No			
DRAINAGE / STORMWATER PATHWAY	Yes -Sits in the watershed; upper levels drain into the main lake – Lake Tarpon	KBF 2		
WASTEWATER / OVERFLOW PATHWAY	No			
CONSTRUCTION ACCESS / TEMPORARY WORKS	No			
POTENTIAL ENCROACHMENT	No			
ARTIFICIAL LIGHTING	Limited			
NOISE / ACTIVITY	Limited			

POTENTIAL AVOIDANCE
/ NO-GO AREA

OTHER

Station Assessment

Good /Moderate

Overall Habitat Condition:

Good / Moderate / Degraded / Highly Degraded / Not Applicable

Basis for Rating:

Relatively healthy mangrove ecosystem

Key KBF / Critical Habitat Observation:

KBF 1 – Graeme Hall Ramsar wetland and ecological character; KBF 2 – Hydrological and ecological processes supporting Graeme Hall; KBF 3 – Migratory/congregatory wetland birds; KBF 4 – Endemic and range-restricted resident birds

Key Project–Habitat Interaction or Impact Pathway Identified:

Siltation/Sedimentation from construction, as it sits downhill (south/southwest) of the project site and is part of the watershed.

Material Difference from Desktop Information:

Yes / No

If yes, describe:

.....

Further Verification / Follow-up Required:

Yes / No

If yes, specify:

.....

Station Information

Field	Record
Station ID	FV-06
Verification Area	Southern Wetland Interface
Date / Time	August 21 1:00 pm / August 24 10:25 pm / August 28 11:50 am
GPS Coordinates	13.069841, -59.577225

Field	Record
Team Members	T. Phillips, G. Franklin, K. Blackman
Access Point / Route	Foot of the bridge on the mangrove swamp side, heading to Highway 7
General Description	
Photo Reference(s)	

The following prompts identify the priority issues to be examined at FV-06 – Southern Wetland Interface. They are intended to guide, rather than limit, field observations.

FV-06 – Southern Wetland Interface

- Wetland boundary condition - **Moderate**
- Highway 7 / **developed-area interface -Urban Development**
- Drainage connections - **yes**
- Encroachment or physical disturbance/ Evidence modification – **Yes. The outflow from the sewage plant continues here.**
- Noise and human activity – **yes, highway traffic etc.,**
- Artificial-light sources - **yes, road lighting**
- Waste/debris or runoff - **yes**
- Habitat condition – **moderate**
- Ecological connection toward sluice/coastal outlet – **stagnant water visible**
- Potential sensitive/no-go areas

Habitat and Ecological Condition

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	CHA / KBF RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
HABITAT TYPE(S) PRESENT	Mangrove Swamp	KBF 1 & 2	Photos 49 & 51	
HABITAT CONDITION	Red Mangrove impacted	KBF 1 & 2	Photo 36	
VEGETATION CONDITION	Some red mangrove trees were damaged due to the passage of Hurricane Beryl.	KBF 1 & 2	Photos 36, 49 & 51	

	Water Lettuce (<i>Pistia stratiotes</i>) and Duckweed (<i>Spirodela polyrhiza</i>) present		
OPEN WATER / STANDING WATER, WHERE APPLICABLE	Yes	KBF 1 & 2	Photos 49, 51, 53 & 54
EVIDENCE OF INVASIVE VEGETATION	-		
BIRDS / WILDLIFE OBSERVED	Mainly butterflies and dragonflies near margins	KBF 1 & 2	
BREEDING / NESTING / ROOSTING FEATURES	-		
OTHER RELEVANT ECOLOGICAL FEATURE			

Hydrology and Environmental Pressures

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
DRAINAGE / WATER CONNECTION	Yes- part of the watershed	KBF 1 & 2	Photos 49,51, 53 & 54	
APPARENT FLOW / WATER LEVEL	Approximately 1 ft 5 in	KBF 1 & 2	Photos 5 49,51, 53 & 54	
WATER CONDITION – VISUAL / ODOUR ONLY	Tannis visible; no odor	KBF 1 & 2	Photos 49. 53 & 54	
SILTATION / SEDIMENTATION	No			
EROSION / RUNOFF EVIDENCE	No			
WASTEWATER / CONTAMINATION INFLUENCE	The outflow from the sewage plant continues here. There are two visible pumping stations, and the pipes run through this part of the mangrove swamp.	KBF 1 & 2	Photos 49 - 54	

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
SOLID WASTE / DEBRIS				
OTHER EXISTING HABITAT DEGRADATION				

Project–Habitat Interface

VERIFICATION ITEM	OBSERVATION	KBF / HABITAT POTENTIALLY AFFECTED	EXISTING CONTROL OBSERVED	POTENTIAL CONCERN / FOLLOW-UP
PROJECT FOOTPRINT / INFRASTRUCTURE				
DRAINAGE / STORMWATER PATHWAY	Yes- part of the watershed	KBF 1 & 2		
WASTEWATER / OVERFLOW PATHWAY	Yes	KBF 1 & 2	SCSTP Outflow pipes	
CONSTRUCTION ACCESS / TEMPORARY WORKS				
POTENTIAL ENCROACHMENT				
ARTIFICIAL LIGHTING				
NOISE / ACTIVITY				
POTENTIAL AVOIDANCE / NO-GO AREA				
OTHER				

Station Assessment

Good / **Moderate** / Degraded / Highly Degraded / Not Applicable

Basis for Rating:

Mature red and white mangroves some damaged by the passage of Hurricane Beryl

Key KBF / Critical Habitat Observation:

Graeme Hall Ramsar wetland and ecological character; KBF 2 – Hydrological and ecological processes supporting Graeme Hall;

Key Project–Habitat Interaction or Impact Pathway Identified:

Siltation/Sedimentation from construction, as it sits downhill (south/southwest) of the project site and is part of the watershed. The outflow from the sewage plant continues here. There are two visible pumping stations, and the pipes run through this part of the mangrove swamp. With the upgrade to the current facility and the new water reclamation facility, water from the plant will no longer follow this pathway instead, water from the current facility will be channeled to the water reclamation facility and used to replenish aquifers in the Christ Church area or for agriculture.

Material Difference from Desktop Information:

Yes / **No**

If yes, describe:

.....

Further Verification / Follow-up Required:

Yes / **No**

Station Information

Field	Record
Station ID	FV-07 Sluice Gate / Coastal Connection
Verification Area	
Date / Time	August 21 1:28 pm / August 24 12:05 pm / August 28 12:15
GPS Coordinates	13.069309, -59.577418
Team Members	T. Phillips, G. Franklin, K. Blackman
Access Point / Route	Sandy Beach
General Description	
Photo Reference(s)	See photographic reference sheet

The following prompts identify the priority issues to be examined at FV-07 – Sluice Gate / Coastal Connection. They are intended to guide, rather than limit, field observations.

FV-07 – Sluice Gate / Coastal Connection

- Sluice gate location and physical condition – **degraded**
- Apparent operational/functionality status, where observable - **Inoperable**

- Canal/channel condition – **stagnant water, debris -plastic litter**
- Water level and apparent flow – **low levels, stagnant**
- Sediment/debris or obstruction – **some debris present (solid waste)**
- Evidence of restricted or altered connectivity - **yes**
- Wetland–coastal hydrological connection - **minimal**
- Coastal outlet condition – **moderate, some coastal erosion**
- Immediate beach/nearshore setting – **seed weed present**
- Evidence relevant to determining whether connected coastal/nearshore habitat should remain within the final CHAA

Habitat and Ecological Condition

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	CHA / KBF RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
HABITAT TYPE(S) PRESENT	Sandy Beach	KBF 5	Photo 55 & 56	
HABITAT CONDITION	Some Coastal Erosion		Photo 55	
VEGETATION CONDITION	n/a	KBF 5		
OPEN WATER / STANDING WATER, WHERE APPLICABLE	Yes, in the channel leading to the Sluice Gate	KBF 2 & 5	Photo 57 & 58	
EVIDENCE OF INVASIVE VEGETATION	n/a			
BIRDS / WILDLIFE OBSERVED	Birds	KBF 3		
BREEDING / NESTING / ROOSTING FEATURES	n/a			
OTHER RELEVANT ECOLOGICAL FEATURE	Green sea turtles are common in the area; nearshore reef ecosystem.	KBF 6		

Hydrology and Environmental Pressures

VERIFICATION ITEM	OBSERVATION / CURRENT CONDITION	POTENTIAL CHA RELEVANCE	PHOTO REF.	FOLLOW-UP REQUIRED?
DRAINAGE / WATER CONNECTION	Yes- part of the watershed	KBF 1, 2 & 5	Photo 56, 57 & 58	
APPARENT FLOW / WATER LEVEL	Low levels, stagnant		Photo 56, 57 & 58	
WATER CONDITION – VISUAL / ODOUR ONLY	Some discoloration due to tannins, mild odor	KBF 1, 2 & 5	Photo 56, 57 & 58	
SILTATION / SEDIMENTATION	n/a			
EROSION / RUNOFF EVIDENCE	Yes- Beach erosion present in the area	KBF 5	Photo 55	
WASTEWATER / CONTAMINATION INFLUENCE	The outflow from the sewage plant culminates here and heads offshore		Photo 59	
SOLID WASTE / DEBRIS	Yes- some debris present (solid waste)		Photo 58	
OTHER EXISTING HABITAT DEGRADATION				

Project–Habitat Interface

VERIFICATION ITEM	OBSERVATION	KBF / HABITAT POTENTIALLY AFFECTED	EXISTING CONTROL OBSERVED	POTENTIAL CONCERN / FOLLOW-UP
PROJECT FOOTPRINT / INFRASTRUCTURE	Yes – 2 pipes. The outflow from the sewage plant culminates here	KBF 1, 2 & 5		
DRAINAGE / STORMWATER PATHWAY	Yes- part of the watershed	KBF 1, 2 & 5		
WASTEWATER / OVERFLOW PATHWAY	Yes	KBF 1, 2 & 5	2 outflow pipes	

CONSTRUCTION ACCESS / TEMPORARY WORKS	-
POTENTIAL ENCROACHMENT	-
ARTIFICIAL LIGHTING	-
NOISE / ACTIVITY	-
POTENTIAL AVOIDANCE / NO-GO AREA	-
OTHER	-
Station Assessment	Poor (in-operable sluice gate), beach erosion is evident

Overall Habitat Condition:

Good / Moderate / **Degraded** / Highly Degraded / Not Applicable

Basis for Rating:

Beach erosion present, inoperable sluice gate

Key KBF / Critical Habitat Observation:

Graeme Hall Ramsar wetland and ecological character; KBF 2 – Hydrological and ecological processes supporting Graeme Hall; KBF 5 – Connected coastal and marine habitats; KBF 6 – Threatened species associated with the project/CHAA

Key Project–Habitat Interaction or Impact Pathway Identified:

Part of the watershed and outlet for runoff that exits to the sea. No visible mixing of fresh seawater, which is necessary for a healthy mangrove environment. Siltation/Sedimentation from construction, as it sits downhill (south/southwest) of the project site and is part of the watershed. The outflow from the sewage plant culminates here, with 2 pipes that head out to sea offshore. With the upgrade to the current facility and the new water reclamation facility, water from the plant will no longer follow this pathway; instead, water from the current facility will be channeled to the water reclamation facility and used to replenish aquifers in the Christ Church area or for agriculture.

Material Difference from Desktop Information:

Yes / **No**

If yes, describe:

.....

Further Verification / Follow-up Required:

Yes / No

If yes, specify:

.....Reason for the pipes.....

F. End-of-Day Field Verification Summary

1. Key Biodiversity Features / Habitats Verified

KBF 1 – Graeme Hall Ramsar wetland and ecological character; KBF 2 – Hydrological and ecological processes supporting; KBF 3 – Migratory/congregatory wetland birds; KBF 4 – Endemic and range-restricted resident birds; KBF 5 – Connected coastal and marine habitats; and KBF 6 – Threatened species associated with the project/CHAA

2. Key Project–Habitat Interfaces Verified

Stations FV02 -FV07 run southwards of the project area. Therefore Siltation/Sedimentation from construction is a possibility, as they are downhill (south/southwest) of the project site and are part of the watershed. Shed cloth is currently being used for dust mitigation.

3. Hydrological / Ecological Connections Verified

Major watershed. Four drainage pipes/areas allow for surface water drainage from the surrounding southeast urban environment into the swamp as part of flood mitigation. Current outflow pipes from the sewage plant run southwards along the area and eventually out to sea.

4. Existing Environmental Pressures or Habitat Degradation Observed

Illegal dumping; No visible mixing of fresh seawater, which is necessary for a healthy mangrove environment, as the sluice gate appears inoperable.

5. Potential Sensitive / Avoidance / No-Go Areas Identified

.....

6. Material Differences from Desktop Evidence

Mangrove trees damaged by Hurricane Beryl in 2024

7. Implications for the Critical Habitat Assessment Area

Does the field evidence indicate that the preliminary CHAA should be refined?

Yes / **No**

If yes, explain the recommended change:

.....

8. Implications for Key Biodiversity Features / Critical Habitat Screening

None

9. Information Requiring Specialist or Project-Team Verification

None

10. Additional Investigation Required

Yes / **No**

If yes, identify the information required and explain why it could materially affect the **Critical Habitat determination, impact significance assessment or required mitigation**:

.....

11. Overall Field Verification Conclusion

Overall, the mangrove area is in moderate to good condition.

Annex 8: Draft Letter: Technical Resource Persons

Subject: Invitation to Participate – Technical Validation of Rapid Critical Habitat Assessment Findings

Dear [Name],

As part of the **Rapid Critical Habitat Assessment (CHA)** being undertaken for the **Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities (BA-L1063)**, I am writing to invite you to participate as a Technical Resource Person in a short **Targeted Technical Validation Session**.

The CHA has now progressed through the desktop evidence review, biodiversity and species screening, Critical Habitat determination, field verification and Project-impact assessment. The purpose of the session is to provide an opportunity for relevant technical resource persons to review and validate the principal findings before the assessment is finalized.

The session is **not intended to seek formal endorsement of the CHA**. Rather, participants will be invited to draw on their technical knowledge and experience to identify whether the key findings should be validated, qualified or revised, and to highlight any additional information that could materially affect the Critical Habitat determination, assessment of Project-related impacts, or required mitigation and monitoring measures.

Proposed Session Details

Date: [Insert date]

Time: [Insert time]

Format/Location: [Virtual / Insert location]

Duration: Approximately 45–60 minutes

A short **Key Findings Participant Handout** will be provided in advance to support the discussion. No detailed review of the full CHA report is required.

We would greatly appreciate your participation and technical input into this final stage of the assessment. Kindly confirm your availability at your earliest convenience.

Thank you in advance for your time and contribution.

Kind regards,

Annex 9: Targeted Technical Validation Of Rapid Critical Habitat Assessment Findings – Facilitator Guide

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities
Project No. BA-L1063 5908/OC-BA/BA-L1063

Facilitator Guide and Technical Validation Record

Targeted Technical Validation Session

Proposed Duration: 45–60 minutes

Time	Activity
5 minutes	Welcome, introductions and purpose
8–10 minutes	Brief overview of CHA approach and key findings
30–35 minutes	Guided technical validation
5–10 minutes	Outstanding issues, actions and close

Suggested Opening

Thank you for making the time to participate. The Rapid Critical Habitat Assessment has now progressed through the desktop evidence review, species and biodiversity-feature screening, Critical Habitat determination, field verification and Project-impact assessment.

The purpose of today's discussion is to provide targeted technical validation of the principal findings before the assessment is finalized. We are not seeking formal endorsement of the report. Rather, we would like to test whether the findings are consistent with your technical knowledge and experience and identify any areas that should be qualified or revised.

In particular, we are interested in additional information that could materially affect the Critical Habitat determination, the assessment of Project-related impacts, or the mitigation and monitoring requirements arising from the assessment.

Facilitation Approach

For each of the six findings:

First: briefly present the finding. Avoid presenting all of the underlying evidence unless needed.

Second: ask the main validation question from the participant handout.

Third: where necessary, probe using the facilitator prompts below.

Fourth: establish whether the feedback represents **Agreement, Qualification or Disagreement** and record the technical basis.

Importantly, **silence should not be recorded as agreement**. Record agreement only where the participant affirmatively validates the finding.

Facilitator Prompts

Finding 1 — Critical Habitat Determination

Use only where needed:

- Is there anything about Graeme Hall's current condition that would change the interpretation of Criteria A, B or F?
- Are there contemporary records or specialist knowledge that would strengthen Criteria C, D or E?
- For migratory birds specifically, is there evidence regarding current use, congregation, feeding, roosting or seasonal importance that the assessment should capture?
- Does any available evidence justify moving one of the potential triggers to confirmed—or conversely weakening it?

Finding 2 — KBFs

Probe:

- Are mangrove, marsh and open-water habitats adequately represented?
- Are aquatic communities sufficiently captured within the existing KBF structure?
- Are there species/groups that warrant separate treatment rather than being captured within the existing KBFs?
- Are the ecological processes supporting the wetland characterized appropriately?

Finding 3 — Connectivity

This deserves particular attention.

Probe:

- Are there drainage inputs to Graeme Hall not captured by the assessment?
- How important are groundwater inputs relative to surface drainage?
- Does the Bisecting Canal function as characterized?
- What is currently understood about wetland–sea exchange?
- What ecological consequences arise from the current condition/operation of the sluice?

- How strong is the functional relationship between Graeme Hall and the adjacent seagrass/reef environment?
- Should any part of the proposed Functional Ecological Influence Area be expanded, contracted or qualified?

Finding 4 — Impact Pathways

Probe:

- Could construction activities create another credible pathway not identified?
- Are there operational risks associated with the new reclamation/reuse system that require greater consideration?
- Could groundwater recharge affect Graeme Hall through a plausible groundwater pathway?
- Are emergency/failure scenarios adequately characterized?
- Are existing pressures likely to interact cumulatively with Project effects in ways not captured?
- Is any pathway presently characterized as material when it should actually be considered negligible?

Finding 5 — Significant Conversion/Degradation

This is the key decision point.

Probe:

- Could any identified Project effect plausibly cause a **long-term major change** in the area, integrity, ecological character or functioning of Graeme Hall?
- Could the Project materially impair the hydrological processes supporting the wetland?
- Could impacts materially affect the ability of the wetland to support its identified biodiversity features?
- Are the proposed controls realistically capable of avoiding/minimizing those outcomes?
- Is there an uncertainty significant enough that the current conclusion should be qualified?

If someone disagrees, ask:

What specific Project activity or pathway do you consider capable of causing significant conversion or degradation, and what evidence supports that conclusion?

That will help distinguish a substantive CHA issue from a broader environmental concern.

Finding 6 — Mitigation/Monitoring

Probe:

- What parameters would provide the clearest early warning of adverse Project-related hydrological or water-quality change?
- Are there existing monitoring programs/data that could provide appropriate reference conditions?
- Are there particular locations within the wetland that should be prioritized?
- Is species-specific monitoring necessary for any identified KBF based on a credible Project pathway?
- Are the two outstanding technical confirmations sufficient?
- Would any further investigation materially affect the CHA conclusion or merely improve general ecological knowledge?

Table 181. Technical Validation Record

FINDING	POSITION	KEY TECHNICAL FEEDBACK / EVIDENCE	COULD THIS MATERIALLY AFFECT THE CHA?	CHA RESPONSE / ACTION
1. CRITICAL HABITAT DETERMINATION	☐ Agree ☐ Agree with Qualification ☐ Disagree		☐ Yes ☐ No	
2. KEY BIODIVERSITY FEATURES	☐ Agree ☐ Agree with Qualification ☐ Disagree		☐ Yes ☐ No	
3. HYDROLOGICAL/ECOLOGICAL CONNECTIVITY	☐ Agree ☐ Agree with Qualification ☐ Disagree		☐ Yes ☐ No	
4. PROJECT–CRITICAL HABITAT IMPACT PATHWAYS	☐ Agree ☐ Agree with Qualification ☐ Disagree		☐ Yes ☐ No	
5. SIGNIFICANT CONVERSION/DEGRADATION DETERMINATION	☐ Agree ☐ Agree with Qualification ☐ Disagree		☐ Yes ☐ No	

**6. MITIGATION, MONITORING AND
FOLLOW-UP**

- ☐ Agree
- ☐ Agree with
Qualification
- ☐ Disagree

- ☐ Yes
- ☐ No

Please Note:

Agree: The finding is technically sound as presented; no substantive change is suggested.

Agree with Qualification indicates that the participant broadly agrees with the finding but recommends a clarification, caveat or refinement. The basis for the qualification should be recorded in the Technical Feedback/Evidence column.

Disagree: The participant considers the finding technically incorrect or unsupported and recommends a materially different conclusion.

Could this materially affect the CHA: Feedback is considered material where it could reasonably change or substantively refine the Critical Habitat determination, KBFs or assessment area, Project–Critical Habitat impact assessment, significant conversion/degradation conclusion, or required mitigation, monitoring or follow-up measures.

Materiality Test:

For any qualification, disagreement or new information, determine whether it could reasonably:

- A.** change the Critical Habitat determination;
- B.** change the assessment of Project impact significance or significant conversion/degradation;
- C.** change the required mitigation, management or monitoring; or
- D.** require modification of the CHA Assessment Area.

If none applies, record the information but it does not necessarily warrant additional investigation or substantive revision.

Agree with Qualification” does not automatically mean “Yes – Material.” Someone can agree with qualification but suggest only a minor clarification. Similarly, a disagreement is likely to be material **only if it is supported by information capable of affecting the assessment.**

Participant and Consultation Record

Date:

Time:

Format/Location:

Facilitator:

PARTICIPANT	ORGANIZATION	ROLE / TECHNICAL EXPERTISE

Documents/materials provided: Key Findings Brief / other supporting information as applicable.

Additional evidence/documents identified during consultation:

Material follow-up actions identified:

Overall technical validation outcome:

- ☐ Findings generally validated without material change
- ☐ Findings validated subject to specified qualifications
- ☐ Material revisions to CHA required
- ☐ Additional targeted information required before finalization

Annex 10: Targeted Technical Validation Of Rapid Critical Habitat Assessment Findings – Participants Handout

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities
Project No. BA-L1063 5908/OC-BA/BA-L1063

Participants Handout

Purpose of the Session

A Rapid Critical Habitat Assessment (CHA) has been undertaken to determine whether biodiversity features potentially affected by the Project qualify as Critical Habitat under the applicable IDB framework and, where Critical Habitat is present, whether Project activities could result in significant conversion or degradation.

The assessment draws primarily on existing environmental and biodiversity information, supplemented by priority species screening and targeted ecological field verification undertaken on **21, 24 and 28 August 2026**. The field verification focused on current habitat conditions, Project–habitat interfaces, hydrological and ecological connectivity, and plausible pathways through which Project activities could interact with Graeme Hall.

This session provides an opportunity for targeted technical validation of the principal findings before the CHA is finalized. It is **not intended to seek formal endorsement of the report**, but rather to identify whether the findings should be validated, qualified or revised based on relevant technical knowledge, experience or additional evidence.

Participants are particularly encouraged to identify any additional information that could **materially affect the Critical Habitat determination, assessment of Project-related impacts, or required mitigation and monitoring measures**.

Finding 1 — Critical Habitat Determination

Draft finding: Graeme Hall Swamp qualifies as **Critical Habitat/Critical Natural Habitat** under the applicable IDB framework.

The assessment finds:

- **Criterion A – Confirmed Trigger:** Graeme Hall's Ramsar designation independently establishes an internationally recognized Critical Habitat trigger.
- **Criterion B – Confirmed Trigger:** Hydrologically and ecologically connected areas and processes contribute to maintaining the functioning and ecological character of the Ramsar wetland.
- **Criterion F – Confirmed Trigger:** Graeme Hall retains substantial biodiversity-conservation significance through its nationally significant wetland/mangrove habitats, ecological functions and biodiversity-support value.

- **Criteria C and D – Potential Triggers, Not Independently Confirmed:** Relevant threatened, endemic and range-restricted species are present or associated with the area, but available evidence does not establish the population-level or crucial-habitat importance required for independent confirmation.
- **Criterion E – Potential Trigger, High Confidence:** Strong historical evidence supports the importance of Graeme Hall for migratory/congregatory birds, although current population or congregatory thresholds have not been established.

Question for validation:

Is this overall Critical Habitat determination consistent with your technical knowledge of Graeme Hall? Is there evidence that would materially change the determination of any of the criteria?

Finding 2 — Key Biodiversity Features

Draft finding: Six Key Biodiversity Features (KBFs) capture the principal biodiversity values and ecological processes requiring consideration and protection:

1. **Graeme Hall Ramsar Wetland and Ecological Character**
2. **Hydrological and Ecological Processes Supporting Graeme Hall**
3. **Migratory/Congregatory Wetland Birds**
4. **Endemic and Range-Restricted Resident Birds**
5. **Connected Coastal and Marine Habitats**
6. **Threatened Species Associated with the Project/CHAA**

Hydrology, drainage, salinity, water quality and wetland–coastal exchange are considered important ecological processes influencing the viability and ecological character of the wetland and its associated biodiversity.

Question for validation:

Do these KBFs adequately represent the principal biodiversity values and ecological processes requiring protection? Is anything important missing or overstated?

Finding 3 — Hydrological and Ecological Connectivity

Draft finding: The Critical Habitat assessment should **not be confined solely to the formal Ramsar boundary**.

Desktop evidence and field verification support functional connections between the Project area, Eastern Marsh, internal wetland drainage system and downstream coastal environment. Field verification confirmed drainage towards Graeme Hall, surface-water inputs to the Eastern Marsh, connectivity through the Upper Drainage and Bisecting Canal, and a downstream connection towards the sluice/coastal outlet.

The assessment therefore considers the **Core Critical Habitat Area**, **Project–Habitat Interface Area** and **Functional Ecological Influence Area** rather than defining Critical Habitat relevance solely according to the Project footprint or Ramsar boundary.

Question for validation:

Does this reasonably characterize the hydrological and ecological functioning of Graeme Hall? Are there important connections or dependencies that should be added, removed or qualified?

Finding 4 — Principal Project–Critical Habitat Impact Pathways

Draft finding: The principal relationship between the Project and Critical Habitat is **predominantly indirect and hydrological rather than direct habitat conversion**.

Field verification did not identify Project encroachment into Ramsar wetland habitat at the immediate Project interface. The principal credible pathways identified are:

- construction runoff, sediment and contaminants reaching the Eastern Marsh/wetland;
- changes to water management, drainage, water quality, salinity or hydrological functioning;
- accidental wastewater, chemical or fuel releases;
- changes to existing downstream conveyance/discharge arrangements;
- localized noise, artificial lighting, dust and human disturbance;
- vegetation clearance affecting conservation-priority flora; and

- cumulative interactions with existing pressures affecting Graeme Hall.

Of these, **hydrological and water-quality change is considered the most important cross-cutting Critical Habitat risk.**

Question for validation:

Does the assessment capture the principal credible Project–Critical Habitat pathways? Are any important pathways missing, or are any of those identified overstated?

Finding 5 — Significant Conversion or Degradation

Draft finding: Based on the available Project information, desktop evidence and field verification, the Project is **not presently expected to result in significant conversion or degradation of Critical Habitat**, provided that the identified Critical Habitat safeguards are incorporated into Project design, construction and operation and effectively implemented.

Direct significant conversion is not anticipated because the available evidence does not indicate direct occupation or permanent conversion of Ramsar wetland or mangrove habitat.

The more material risk is potential **indirect degradation**, particularly through substantial or sustained deterioration in wetland hydrology or water quality. The identified risks are considered amenable principally to avoidance, minimization, environmental management and monitoring.

Question for validation:

Is there any ecological evidence or Project–habitat interaction that could materially alter this conclusion, including the condition that the identified safeguards are effectively implemented?

Finding 6 — Mitigation, Monitoring and Follow-up

Draft finding: Priority Critical Habitat requirements are to:

- maintain physical separation between Project activities and wetland habitat;
- prevent uncontrolled sediment, pollutant and wastewater inputs;
- avoid material adverse alteration of wetland water balance, drainage, water quality, salinity or ecological functioning;

- protect conservation-priority vegetation where practicable;
- maintain adequate containment and emergency-response arrangements;
- minimize unnecessary noise and artificial-light disturbance; and
- monitor priority hydrological and water-quality pathways to identify Project-related change.

Monitoring should build upon existing ESIA/ESMP requirements rather than establish a parallel programme.

The CHA does **not presently identify a need for additional broad ecological surveys**. However, targeted technical confirmation is required regarding:

1. the function and future configuration of relevant drainage/outflow infrastructure and wastewater/reclaimed-water conveyance arrangements; and
2. the operational status, management responsibility and intended future arrangements for the sluice gate/coastal outlet.

Question for validation:

Are the proposed mitigation, monitoring and follow-up priorities sufficient and appropriate? Is there any additional requirement that could materially affect protection of the identified Critical Habitat?

Final Validation Question

Taking these findings together, is there any aspect of the draft assessment that, in your professional judgement, should be materially revised before the Rapid CHA is finalized?

Where a revision is recommended, participants are encouraged to identify:

the finding concerned → the recommended change → the technical basis/evidence supporting the change.

Annex 11: Targeted Technical Validation Of Rapid Critical Habitat Assessment Findings – Participants Handout

Barbados Climate Resilient South Coast Water Reclamation Project and Reuse Facilities
Project No. BA-L1063 5908/OC-BA/BA-L1063

Participants Handout

Purpose of the Session

A Rapid Critical Habitat Assessment (CHA) has been undertaken to determine whether biodiversity features potentially affected by the Project qualify as Critical Habitat under the applicable IDB framework and, where Critical Habitat is present, whether Project activities could result in significant conversion or degradation.

The assessment draws primarily on existing environmental and biodiversity information, supplemented by priority species screening and targeted ecological field verification undertaken on **21, 24 and 28 August 2026**. The field verification focused on current habitat conditions, Project–habitat interfaces, hydrological and ecological connectivity, and plausible pathways through which Project activities could interact with Graeme Hall.

This session provides an opportunity for targeted technical validation of the principal findings before the CHA is finalized. It is **not intended to seek formal endorsement of the report**, but rather to identify whether the findings should be validated, qualified or revised based on relevant technical knowledge, experience or additional evidence.

Participants are particularly encouraged to identify any additional information that could **materially affect the Critical Habitat determination, assessment of Project-related impacts, or required mitigation and monitoring measures**.

Finding 1 — Critical Habitat Determination

Draft finding: Graeme Hall Swamp qualifies as **Critical Habitat/Critical Natural Habitat** under the applicable IDB framework.

The assessment finds:

- **Criterion A – Confirmed Trigger:** Graeme Hall's Ramsar designation independently establishes an internationally recognized Critical Habitat trigger.
- **Criterion B – Confirmed Trigger:** Hydrologically and ecologically connected areas and processes contribute to maintaining the functioning and ecological character of the Ramsar wetland.
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- **Criteria C and D – Potential Triggers, Not Independently Confirmed:** Relevant threatened, endemic and range-restricted species are present or associated with the area, but available evidence does not establish the population-level or crucial-habitat importance required for independent confirmation.
- **Criterion E – Potential Trigger, High Confidence:** Strong historical evidence supports the importance of Graeme Hall for migratory/congregatory birds, although current population or congregatory thresholds have not been established.

Question for validation:

Is this overall Critical Habitat determination consistent with your technical knowledge of Graeme Hall? Is there evidence that would materially change the determination of any of the criteria?

Finding 2 — Key Biodiversity Features

Draft finding: Six Key Biodiversity Features (KBFs) capture the principal biodiversity values and ecological processes requiring consideration and protection:

7. **Graeme Hall Ramsar Wetland and Ecological Character**
8. **Hydrological and Ecological Processes Supporting Graeme Hall**
9. **Migratory/Congregatory Wetland Birds**
10. **Endemic and Range-Restricted Resident Birds**
11. **Connected Coastal and Marine Habitats**
12. **Threatened Species Associated with the Project/CHAA**

Hydrology, drainage, salinity, water quality and wetland–coastal exchange are considered important ecological processes influencing the viability and ecological character of the wetland and its associated biodiversity.

Question for validation:

Do these KBFs adequately represent the principal biodiversity values and ecological processes requiring protection? Is anything important missing or overstated?

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Draft finding: The Critical Habitat assessment should **not be confined solely to the formal Ramsar boundary**.

Desktop evidence and field verification support functional connections between the Project area, Eastern Marsh, internal wetland drainage system and downstream coastal environment. Field verification confirmed drainage towards Graeme Hall, surface-water inputs to the Eastern Marsh, connectivity through the Upper Drainage and Bisecting Canal, and a downstream connection towards the sluice/coastal outlet.

The assessment therefore considers the **Core Critical Habitat Area**, **Project–Habitat Interface Area** and **Functional Ecological Influence Area** rather than defining Critical Habitat relevance solely according to the Project footprint or Ramsar boundary.

Question for validation:

Does this reasonably characterize the hydrological and ecological functioning of Graeme Hall? Are there important connections or dependencies that should be added, removed or qualified?

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Draft finding: The principal relationship between the Project and Critical Habitat is **predominantly indirect and hydrological rather than direct habitat conversion**.

Field verification did not identify Project encroachment into Ramsar wetland habitat at the immediate Project interface. The principal credible pathways identified are:

- construction runoff, sediment and contaminants reaching the Eastern Marsh/wetland;
- changes to water management, drainage, water quality, salinity or hydrological functioning;
- accidental wastewater, chemical or fuel releases;
- changes to existing downstream conveyance/discharge arrangements;
- localized noise, artificial lighting, dust and human disturbance;
- vegetation clearance affecting conservation-priority flora; and

- cumulative interactions with existing pressures affecting Graeme Hall.

Of these, **hydrological and water-quality change is considered the most important cross-cutting Critical Habitat risk.**

Question for validation:

Does the assessment capture the principal credible Project–Critical Habitat pathways? Are any important pathways missing, or are any of those identified overstated?

Finding 5 — Significant Conversion or Degradation

Draft finding: Based on the available Project information, desktop evidence and field verification, the Project is **not presently expected to result in significant conversion or degradation of Critical Habitat**, provided that the identified Critical Habitat safeguards are incorporated into Project design, construction and operation and effectively implemented.

Direct significant conversion is not anticipated because the available evidence does not indicate direct occupation or permanent conversion of Ramsar wetland or mangrove habitat.

The more material risk is potential **indirect degradation**, particularly through substantial or sustained deterioration in wetland hydrology or water quality. The identified risks are considered amenable principally to avoidance, minimization, environmental management and monitoring.

Question for validation:

Is there any ecological evidence or Project–habitat interaction that could materially alter this conclusion, including the condition that the identified safeguards are effectively implemented?

Finding 6 — Mitigation, Monitoring and Follow-up

Draft finding: Priority Critical Habitat requirements are to:

- maintain physical separation between Project activities and wetland habitat;
- prevent uncontrolled sediment, pollutant and wastewater inputs;
- avoid material adverse alteration of wetland water balance, drainage, water quality, salinity or ecological functioning;

- protect conservation-priority vegetation where practicable;
- maintain adequate containment and emergency-response arrangements;
- minimize unnecessary noise and artificial-light disturbance; and
- monitor priority hydrological and water-quality pathways to identify Project-related change.

Monitoring should build upon existing ESIA/ESMP requirements rather than establish a parallel programme.

The CHA does **not presently identify a need for additional broad ecological surveys**. However, targeted technical confirmation is required regarding:

1. the function and future configuration of relevant drainage/outflow infrastructure and wastewater/reclaimed-water conveyance arrangements; and
2. the operational status, management responsibility and intended future arrangements for the sluice gate/coastal outlet.

Question for validation:

Are the proposed mitigation, monitoring and follow-up priorities sufficient and appropriate? Is there any additional requirement that could materially affect protection of the identified Critical Habitat?

Final Validation Question

Taking these findings together, is there any aspect of the draft assessment that, in your professional judgement, should be materially revised before the Rapid CHA is finalized?

Where a revision is recommended, participants are encouraged to identify:

the finding concerned → the recommended change → the technical basis/evidence supporting the change.

Annex 12: Community Health Risks, Communication and Management Matrix

Communication should be presented as a formal risk-control measure rather than a standalone engagement activity. Communication requirements should therefore be linked directly to each significant community health pathway, the associated management measures, monitoring indicators, corrective-action triggers and emergency-response arrangements. This enables community members, institutions and vulnerable groups to receive information that is proportionate to the specific risks they may experience and ensures that emerging issues are communicated in a timely manner before they result in harm.

The communication requirements established in this Programme support implementation of the management components in Section 11, the monitoring and reporting processes in Section 14, the corrective-action requirements in Section 15, and the emergency notification arrangements under Sections 11.5 and 11.10. Communication is triggered by planned activities, monitoring results, incidents, complaints, emergencies and corrective-action findings. Particular emphasis is placed on the priority residual-risk pathways of road traffic injury (CH-06), sexual exploitation and abuse, sexual harassment and gender-based violence (CH-08), and emergency and disaster events (CH-10), together with pathways involving potential community exposure to wastewater, odor, hydrogen sulphide, communicable disease and vector-borne disease. Information shall be provided in formats accessible to women, older persons, persons with disabilities, schools, businesses, healthcare providers and other vulnerable or disproportionately affected groups. The communication measures identified in Table XX provide a direct link between identified health risks, management actions and communication activities.

Health Pathway	Key Stakeholders	Communication Trigger	Communication Requirement	Link to Management / Monitoring / Response
CH-01 Vector-borne Disease	Nearby residents, Ministry of Health, schools, vulnerable households	Before wet season; vector-index exceedance; three or more mosquito-related complaints in one month	Community outreach on source reduction, drainage management, fogging schedules and household prevention measures	Linked to Sections 11.1, 11.12, KPI-01 and KPI-02, and escalation trigger for elevated vector indices and complaint trends
CH-02 Particulates and Respiratory Health	Nearby residents, schools, households with sensitive occupants	High-dust activities; visible dust migration; air-quality exceedance	Advance notification of dusty works; advice for sensitive receptors; communication of	Linked to Section 11.2 controls, KPI-03 and KPI-04, work-stoppage trigger for visible off-site dust migration, and

			exceedances and corrective measures	corrective action process at Section 15.1
CH-03 Odor, H₂S and Bioaerosols	Residents, businesses, schools, healthcare facilities	Planned high-odor works; H ₂ S alarm exceedance; significant odor complaint trend	Advance notice of odorous activities; immediate notification of exceedances; precautionary instructions where exposure may occur	Linked to Section 11.3, KPI-05 and KPI-06, emergency response activation and notification to the Project Execution Unit following alarm exceedance
CH-04 Noise, Vibration and Sleep Disruption	Nearby residents, schools, businesses	Night works; monitoring exceedance; vibration complaints	Advance notification of out-of-hours works; communication of expected duration and mitigation measures; follow-up on complaints	Linked to Section 11.4, KPI-07, complaint investigations and corrective-action requirements under Section 15.1
CH-05 Water, Sanitation and Gastrointestinal Illness	Residents, recreational users, businesses, healthcare facilities, regulators	Wastewater release; sewage bypass event; water-quality non-compliance	Immediate notification of affected areas; health precautions; restrictions on contact with water and response actions	Linked to Section 11.5, KPI-08 and KPI-09, sewage spill protocol, emergency response measures and work-stoppage trigger for releases with community exposure potential

CH-06 Transport and Road Traffic Injury	Residents, schools, caregivers, public transport users, older persons, persons with disabilities	Traffic-management changes; altered haulage routes; near-miss events; school-term mobilization	Advance notification of traffic changes; road-safety awareness; consultation with schools and affected communities	Linked to Section 11.6, KPI-10 to KPI-12, near-miss investigations, transit restrictions and corrective-action requirements for driver non-compliance
CH-07 Communicable Disease and Labor Influx	Residents, Ministry of Health, healthcare facilities, vulnerable groups	Suspected outbreak; communicable-disease cluster; enhanced health surveillance measures	Targeted health-risk communication, outbreak notification and public-health guidance in coordination with the Ministry of Health	Linked to Section 11.7, KPI-13 and KPI-14, outbreak reporting within 24 hours and annual testing of outbreak response procedures
CH-08 SEA/SH/GBV	Women and girls, students, vulnerable groups, community organisations	Prior to mobilization; periodic awareness campaigns; changes to reporting arrangements	Awareness of prohibited conduct, reporting channels, survivor support services and non-retaliation protections	Linked to Section 11.8, confidential grievance mechanisms, annual accessibility review and survivor-centered response arrangements
CH-09 Food Safety and Zoonoses	Adjacent residents, Ministry of Health if required	Gastrointestinal outbreak; rodent infestation with	Notification of health precautions and corrective	Linked to Sections 11.7 and 11.9, illness-rate monitoring

		community implications	actions where community exposure is possible	and outbreak-response measures
CH-10 Emergency, Disaster and Climate Events	All affected stakeholders, emergency services, local authorities	Fire, flooding, hurricane warning, hazardous-material release, evacuation event	Immediate emergency notifications, protective instructions, evacuation information and ongoing situation updates	Linked to Section 11.10, emergency response plan, community notification within one hour of off-site consequence and KPI-18 and KPI-19
CH-11 Health Service Capacity Displacement	Ministry of Health, healthcare facilities, vulnerable service users	Evidence of Project-related pressure on local health services	Consultation and coordination regarding service demand, referral arrangements and mitigation measures	Linked to Section 11.11 and quarterly reviews of healthcare utilization and displacement risk
CH-12 Wellbeing and Livelihood Loss	Residents, local businesses, informal vendors, women and youth	Major schedule changes; prolonged nuisance conditions; complaint trends	Advance schedule communication, outreach on access restrictions, feedback sessions and communication of corrective actions	Linked to Section 11.12, KPI-20, grievance trend analysis and adaptive management requirements under Section 15.3

Cumulative Community Health Risks	All affected communities, businesses, schools and vulnerable groups	Simultaneous high-impact activities; cumulative complaint trends; cumulative monitoring concerns	Consolidated notifications covering traffic, odor, noise, dust and other interacting impacts; communication of integrated mitigation measures	Linked to Section 7.3 requirement for coordinated scheduling, consolidated notifications, joint monitoring and combined complaint tracking
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Table xx. Matrix of health risks, management actions and communication activities.

Annex A. Consolidated Community Health Impact and Management Matrix

This matrix consolidates the twelve pathway assessments at Section 6 into a single view, permitting comparison across pathways on each assessment variable. It repeats no content beyond that presented in Section 6 and is provided so that the assessment can be read across issues as well as within them.

Ref	Pathway	Health domain	Source activity	Potential impact	Risk to health	Extent	Duration	Pre L	Pre M	Pre-mitigation significance
CH-01	Vector-borne disease	Environmental; human	Excavation, standing water, waste storage, drainage and canal alteration	Standing water and harborage supporting disease-competent mosquito species; obstruction of larvivorous fish movement	Dengue, Zika, chikungunya and Oropouche incidence; degradation of an existing public health control	Local	Short to long term	4	4	Very High
CH-02	Particulates and respiratory health	Environmental; human	Earthmoving, site leveling, unpaved tracks, haulage	Elevated PM10 and PM2.5 at residential and school receptors	Exacerbation of asthma, COPD and cardiovascular conditions in older persons and children	Local	Short term	4	3	High

Ref	Pathway	Health domain	Source activity	Potential impact	Risk to health	Extent	Duration	Pre L	Pre M	Pre-mitigation significance
CH-03	Odor, hydrogen sulfide, bioaerosols	Environmental; human	Construction adjacent to the operating plant; sludge and wastewater handling	Community exposure to hydrogen sulfide, odor compounds and biological aerosols	Headache, nausea, respiratory irritation; acute toxicity at elevated concentration	Local	Short to long term	4	3	High
CH-04	Noise, vibration, sleep disruption	Environmental; social	Heavy machinery, generators, night works, structural anchoring	Elevated noise at residential receptors already at or above guideline level	Sleep disruption and stress; cardiovascular effect from chronic disturbance	Local	Short term	4	3	High
CH-05	Water, sanitation, gastrointestinal illness	Environmental; human	Camp wastewater; spills; drainage to Graeme Hall Swamp; emergency bypass at the	Contamination of surface water, groundwater or coastal water with pathogens	Gastrointestinal illness; skin and eye infection; acute exposure to raw sewage	Local to regional	Temporary to long term	3	4	Very High

Ref	Pathway	Health domain	Source activity	Potential impact	Risk to health	Extent	Duration	Pre L	Pre M	Pre-mitigation significance
			operating plant	or chemicals						
CH-06	Transport and road traffic injury	Safety and security	Heavy vehicles and deliveries on a narrow shared residential access road	Collision with pedestrians, cyclists or vehicles; roadside exhaust emissions; road surface degradation	Pedestrian strike, particularly of schoolchildren and accompanying caregivers; serious injury or fatality	Local	Short term	4	5	Critical
CH-07	Communicable disease and labor influx	Human; social	Accommodation of 98 non-local personnel within a workforce of 252, of whom 22 are women	Transmission of communicable disease between the camp and the host community	Community outbreak; increased local disease burden	Local to national	Short to long term	3	4	Very High
CH-08	Sexual exploitation and abuse,	Social; safety and security	Presence of a predominant	Sexual exploitation ,	Physical and psychological injury;	Local	Short term with long-term	3	5	Critical

Ref	Pathway	Health domain	Source activity	Potential impact	Risk to health	Extent	Duration	Pre L	Pre M	Pre-mitigation significance
	sexual harassment, gender-based violence		tly male non-local workforce; economic asymmetry; movement in the community	harassment and violence affecting women and girls, students, migrant women and persons with disabilities	infection; stigma; community conflict		consequence			
CH-09	Food safety and zoonoses	Environmental; human	Camp catering for up to 105 occupants; vegetable garden; food waste storage	Foodborne illness with onward transmission; rodent proliferation	Gastrointestinal outbreak; leptospirosis and other rodent-associated disease	On-site to local	Temporary	3	3	High
CH-10	Emergency, disaster and climate events	Safety and security; human	Natural hazards and climate events; technological and	Accommodation fire; flooding and storm surge; chemical or	Injury and fatality; community exposure to released materials;	Local	Temporary	3	5	Critical

Ref	Pathway	Health domain	Source activity	Potential impact	Risk to health	Extent	Duration	Pre L	Pre M	Pre-mitigation significance
			hazardous material incidents; failure of emergency response	wastewater release; response failure	displacement					
CH-11	Health service capacity displacement	Human	Demand of approximately 105 camp occupants on local health services	Increased demand at polyclinics and the emergency department	Delayed care for residents, particularly older persons and low-income households	Local	Short term	3	3	High
CH-12	Wellbeing and livelihood loss	Social	Cumulative particulate, noise, odor, traffic and visual impact over an extended period	Chronic annoyance and stress; loss of income from visitor accommodation, hospitality and informal vending	Mental health deterioration; food insecurity; economic hardship as a health determinant	Local	Long term	4	3	High

Table 38. Consolidated assessment matrix: source, impact and pre-mitigation risk for all twelve pathways.

The management side of each pathway follows. The two matrices share the reference and pathway columns and are read together, so that any pathway can be traced from its source activity through to the residual management arrangements.

Ref	Pathway	Key mitigation measures	Component	Post L	Post M	Residual significance	Residual management	Priority
CH-01	Vector-borne disease	Weekly inspection; standing water eliminated within 24 hours; canal flow maintained; fish breeding station protected; Ministry of Health coordination	11.1	2	3	Medium	Monthly vector index reported to the PEU; escalation on index rise or three complaints	
CH-02	Particulates and respiratory health	Water suppression; covered stockpiles and loads; wheel wash; continuous receptor monitoring; work stop on	11.2	2	2	Low	Monthly exceedance reporting; control review after any school receptor exceedance	

Ref	Pathway	Key mitigation measures	Component	Post L	Post M	Residual significance	Residual management	Priority
		visible migration						
CH-03	Odor, hydrogen sulfide, bioaerosols	Continuous hydrogen sulfide monitoring with alarm; odor procedure for bypass and sludge work; wind-referenced scheduling; 48 hour notice	11.3	3	2	Medium	Complaint response within 24 hours; quarterly review against guideline values	
CH-04	Noise, vibration, sleep disruption	Daytime restriction; generator attenuation and siting; condition survey; boundary and school monitoring; shielded lighting	11.4	3	2	Medium	Complaint-triggered monitoring; wellbeing enquiry within investigation	

Ref	Pathway	Key mitigation measures	Component	Post L	Post M	Residual significance	Residual management	Priority
CH-05	Water, sanitation, gastrointestinal illness	Closed wastewater systems; potable and discharge monitoring; groundwater baseline; bypass status confirmed before adjacent works	11.5	2	3	Medium	Monthly effluent and receiving water monitoring; community notification within 12 hours of any release	
CH-06	Transport and road traffic injury	School-hour transit prohibition; 15 and 10 km/h limits; trained wardens; off-site staging; vehicle maintenance and emission standards; driver induction and movement log	11.6	2	4	High	Weekly compliance audit; driver suspension and investigation within 24 hours of any near miss	Priority

Ref	Pathway	Key mitigation measures	Component	Post L	Post M	Residual significance	Residual management	Priority
CH-07	Communicable disease and labor influx	Pre-mobilization health assessment; occupancy and ventilation standards; isolation facility; bilingual health education; outbreak notification	11.7	2	3	Medium	Monthly camp morbidity reporting; outbreak arrangements tested annually	
CH-08	Sexual exploitation and abuse, sexual harassment, gender-based violence	Community awareness of prohibited conduct; confidential and anonymous reporting; survivor referral established in advance; enforced sanctions	11.8	2	5	High	Separate confidential register; quarterly reporting without identifying detail; annual review of channel accessibility	Priority

Ref	Pathway	Key mitigation measures	Component	Post L	Post M	Residual significance	Residual management	Priority
CH-09	Food safety and zoonoses	Handler certification; weekly kitchen inspection; cold chain logging; sealed waste; perimeter rodent control	11.9	2	2	Low	Weekly inspection records; camp illness rate against outbreak threshold	
CH-10	Emergency, disaster and climate events	Emergency arrangements within the Health and Safety Manual and project Emergency Response Plan; elevation and evacuation routes mapped; verified contacts; mutual notification	11.10	2	4	High	Quarterly drills with records; annual review; quarterly verification of contacts	Priority
CH-11	Health service capacity displacement	On-site first aid and primary care; private	11.11	2	2	Low	Quarterly review of worker	

Ref	Pathway	Key mitigation measures	Component	Post L	Post M	Residual significance	Residual management	Priority
		arrangements for non-emergency care; advance coordination with polyclinic and hospital					presentations to public facilities	
CH-12	Wellbeing and livelihood loss	Proactive schedule communication ; visible complaint resolution; controlled vendor arrangements; local procurement where practicable	11.12	3	2	Medium	Complaint trend analysis by category and household; engagement satisfaction assessment	

Table 39. Consolidated management matrix: mitigation, residual risk and management arrangements for all twelve pathways.

Table 44. Consolidated impact and management matrix. L denotes likelihood and M denotes magnitude; each scored 1 to 5 in accordance with Section 3.2.

Reading across the matrix produces four observations that are not visible from the individual assessments.

Magnitude drives the priority classification. All three priority pathways carry post-mitigation magnitude of 4 or 5, and each has post-mitigation likelihood reduced to 2. Mitigation is effective at reducing the probability of occurrence and cannot reduce the severity of the outcome, which is why these pathways retain High residual significance.

Environmental pathways respond well to mitigation. CH-02, CH-09 and CH-11 all fall to Low residual significance, and the remaining environmental pathways fall to Medium. These are managed through established engineering and housekeeping controls with measurable thresholds.

The access route is the single feature carrying the highest-consequence pathway. CH-06 is the only pathway rated Critical on likelihood as well as magnitude before mitigation.

Local extent predominates. Ten of twelve pathways are local in extent, with CH-05 extending to regional through coastal waters and CH-07 to national through communicable disease transmission. Management is accordingly concentrated at the site boundary and the access route.

Annex B. Community Health Monitoring and Inspection Forms

The following forms support delivery of the Programme and are maintained as controlled documents available for inspection.

Form CH-B1, Weekly vector inspection record, covering the site, camp and 50 meter perimeter, standing water, containers and receptacles, drainage condition, canal flow obstruction, fish breeding station condition, actions taken and closure.

Form CH-B2, Daily boundary inspection record, covering visible dust migration, waste storage condition, housekeeping, lighting direction, road condition and off-site impacts.

Form CH-B3, Vehicle movement and route compliance log, recording time of departure and arrival, route taken, driver, load, transit window compliance and speed compliance.

Form CH-B4, Camp health and illness register, recording presentations by date, symptom category and outcome, maintained consistently with the Data Protection Act 2019.

Form CH-B5, Kitchen hygiene inspection record, covering storage, cold chain temperatures, preparation surfaces, waste handling and handler certification status.

Form CH-B6, Community health incident report form, recording incident description, community exposure pathway, immediate control applied, investigation findings, corrective and preventive actions, owner and closure date.

Form CH-B7, Emergency Response Form, recording incident type, time, response actions, notifications issued, evacuation status and outcome.

Form CH-B8, Monthly community health report template, structured to the indicators at Section 14.1.

Annex C. Health Referral Directory

The directory is completed before mobilization and verified quarterly. Contact details are displayed at the camp, at the site office and at community engagement sessions.

Service	Provider	Location	Contact	Hours
Emergency medical response				
Ambulance service				
Nearest polyclinic				
Hospital	Queen Elizabeth Hospital			
Sexual and reproductive health services				
Survivor support: medical				
Survivor support: psychosocial				
Survivor support: legal				
Police				
Child protection				
Mental health services				
Ministry of Health vector control unit				
Environmental Protection Department				
Sanitation Service Authority				
Barbados Water Authority Project Execution Unit				

Table 45. Health referral directory template

Table 24: The fish recorded in Graeme Hall Swamp by various studies

Scientific Name	Common name	Source/Reference
1 <i>Centropomus undecimalis</i>	Snook	Hutt 1982b, Cattaneo et al. 1987
2 <i>Mugil curema</i>	White mullet	Johnson 1986, Cattaneo et al. 1987, Mahon 1997,
3 <i>Kryptolebias</i> (formerly <i>Rivulus</i>) <i>marmoratus</i>	Mangrove rivulus	Cattaneo et al. 1987; Parker and Oxenford 1998; Kramer et al 2007, EEC 2019b
4 <i>Elops saurus</i>	Ladyfish	Mahon 1997
5 <i>Poecilia latipinna</i>	Sailfin molly	Johnson 1986, Cattaneo et al. 1987, Kramer et al 2007,
6 <i>Poecilia sphenops</i>	Shortfin molly	Cattaneo et al. 1987; Kramer et al 2007, EEC 2019b
7 <i>Poecilia reticulata</i>	Guppy	Johnson 1986, Cattaneo et al. 1987; Kramer et al 2007, EEC 2019a
8 <i>Xiphophorus maculatus</i>	Southern platyfish	Kramer et al. 2007
9 <i>Megalops atlanticus</i>	Atlantic tarpon	Hutt 1982b, Johnson 1986, Cattaneo et al. 1987; EEC 2010; EEC 2019b
10 <i>Cichlasoma bimaculatus</i>	Black acara	Cattaneo et al. 1987; Kramer et al 2007, EEC 2019b
11 <i>Cichlasoma octofasciatum</i>	Jack Dempsey	Cattaneo et al. 1987; Kramer et al 2007, EEC 2019b
12 <i>Thorichthys meeki</i>	Firemouth cichlid	Kramer et al 2007,
13 <i>Caranx bartholomaei</i>	Yellow jack	Johnson 1986, Cattaneo et al. 1987
14 <i>Caranx latus</i>	Horseeye jack	Mahon 1997
15 <i>Ecinostomus</i> sp.	Mojarra	Cattaneo et al. 1987
16 <i>Eucinostomus gula</i>	Silver jenny	Mahon 1997
17 <i>Lutjanus apodus</i>	Schoolmaster	Johnson 1986, Cattaneo et al. 1987

18 <i>Polycentrus schomburgkii</i>	Guyana leaf fish	Cattaneo et al. 1987; Kramer et al 2007, EEC 2019b, Cox and Mathurin 2023
19 <i>Oreochromis aureus</i>	Blue tilapia	Johnson 1986, ARA 1997
20 <i>Oreochromis mossambicus</i>	Mozambique tilapia	Johnson 1986, Kramer et al 2007, EEC 2010, EEC 2019b
21 <i>Poecilia sp.</i>	Guppies and mollies	ARA 1997
22 <i>Cichlasoma spp.</i>	Cichlids	ARA 1997
23 <i>Gobionellus spp.</i>	Goby	Cattaneo et al. 1987
24 <i>Atherinomous sp.</i>	Silverside	Cattaneo et al. 1987
25 <i>Erotelis smaragdus</i>	Emerald sleeper	Cattaneo et al. 1987
26 <i>Gobiomoris dormitor</i>	Bigmouth sleeper	Mahon 1997

Annex 13: Worker Declaration (English Version)

I agree and understand that while working for ***China Railway Shanghai Engineering Group Co., Ltd and on this Barbados Climate Resilient South Coast Water Reclamation Project***, I will:

1. Consent to a Police background check as a requirement for employment.
2. Attend and actively participate in mandatory training courses related to CoC, ESHS, OHS, and GBV as requested and facilitated by the employer, prior to the commencement of work at the camp site, and during the life of my employment with the project.
3. Wear my Personal Protective Equipment (PPE) at all times when at the work site or when engaging in project-related activities off-site.
4. Take all practical steps to implement and adhere to the Contractor's Environmental and Social Management Plan (C-ESMP).
5. Adhere to a zero-alcohol policy during work activities and refrain from the use of narcotics or other substances that can impair faculties at all times when employed by the project.
6. Submit to random drug and alcohol screening at all times.
7. Treat women, children (persons under the age of 16 - child" means a person who has not attained the age of 16 years as per Chapter 346 of the Laws of Barbados), and men with respect, regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
8. Refrain from using language or behaviour towards women, children, men, older persons, youth, low-income persons, migrants, LGBTIQ+ persons and persons belonging to other marginalized groups (inclusive of those belonging multiple groups) that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.

9. Not sexually exploit or abuse project beneficiaries and members of the surrounding communities.
10. Not engage in sexual harassment of work personnel and staff -for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature is prohibited. e.g., obvious staring, looking somebody up and down; making kissing, howling, or smacking sounds; hanging around somebody; whistling and catcalling; in some instances, giving personal gifts.
11. Not engage in sexual favors, for instance, making promises of favorable treatment (e.g. promotion), threats of unfavorable treatment (e.g. loss of job) or payments in kind or in cash, dependent on sexual acts, or other forms of humiliating, degrading or exploitative behaviour.
12. Unless there is full consent by all parties involved, 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 (including prostitution). Such sexual activity is considered “non-consensual” within the scope of this Code.
13. Reporting through the GRM or to my manager any suspected or actual GBV/SEA/SH by a fellow worker, whether employed by my company or not, or any breaches of this Code of Conduct.

By signing this Code of Conduct, I agree that I have read and understood the content of the document. I declare that I have signed this Code of Conduct of my own volition, without coercion, and fear of reprisal. I agree to uphold the clauses stated herein.

Employee/Worker's Name:

Nationality:

Job Title/ Responsibility:

Signature:

Date:

Name of Witness to the signed Declaration:

Annex 14: 员工声明 (Worker's Declaration – Chinese Version)

【说明：如前所述，本《行为准则》（Code of Conduct，以下简称“CoC”）将以雇主、分包商及相关利益相关方的母语提供。因此，为确保员工在签署本文件前能够充分理解并同意以下全部内容，以下声明亦将以员工的母语提供。】

本人同意并理解，在受聘于中铁上海工程局并参与巴巴多斯气候韧性南海岸水资源回收项目期间，本人将：

1. 同意接受警方背景调查，并将其作为受聘的必要条件。
2. 按照雇主要求，在进入营地开展工作前及项目雇佣期间，参加并积极参与与《行为准则》（CoC）、环境、社会、健康与安全（ESHS）、职业健康与安全（OHS）以及性别暴力（GBV）相关的强制性培训。
3. 在施工现场及参与任何与本项目相关的现场外活动期间，始终正确佩戴个人防护装备。
4. 采取一切切实可行的措施，落实并遵守承包商环境与社会管理计划的各项要求。
5. 在工作期间严格遵守零酒精政策，并在整个项目受雇期间，不使用麻醉品或任何可能影响个人判断能力、工作能力或行为的药物及其他物质。
6. 同意随时接受随机药物及酒精检测。
7. 无论种族、肤色、语言、宗教、政治或其他观点、国籍、民族或社会出身、财产状况、残疾、出生或其他身份如何，均尊重女性、儿童（16周岁以下人员——根据《巴巴多斯法律》第346章规定，“儿童”是指未满16周岁的人）以及男性。
8. 不使用任何针对女性、儿童或男性的不当、骚扰性、辱骂性、具有性挑逗性质、贬低人格或不符合当地文化习俗的语言或行为。
9. 不对项目受益人及周边社区成员实施任何形式的性剥削或性虐待。
10. 不对项目工作人员实施任何形式的性骚扰，包括但不限于：作出不受欢迎的性挑逗、提出性要求或实施任何具有性意味的言语或身体行为。例如：明显地上下打量他人、发出接吻声、嚎叫声或咂嘴声、尾随他人、吹口哨、言语调戏，以及在某些情况下赠送私人礼物等行为，均属于禁止行为。
11. 不得以任何形式索取或提供性交易或性好处，包括但不限于：以晋升等有利待遇作为交换条件，或以解雇等不利待遇作为威胁，要求发生性行为；亦不得以现金、实物或其他利益交换性行为；不得实施任何侮辱性、贬低性或剥削性的行为。

12. 除非所有相关方均已充分、自愿表示同意，否则本人不得与周边社区成员发生任何性关系。这包括以提供或承诺提供任何实际利益（包括金钱或非金钱利益）作为交换条件，与社区成员发生性行为（包括卖淫）。根据本《行为准则》，上述情形均视为非自愿性行为。

13. 如发现任何员工（无论是否受雇于本人所在公司）涉嫌或实际实施性别暴力（GBV）、性剥削（SEA）或性骚扰（SH），或存在违反本《行为准则》的行为，本人将通过申诉机制或直接向直属管理人员进行报告。

声明

本人签署本《行为准则》，即表示：

本人已阅读并充分理解本文件的全部内容；

本人系在完全自愿、未受任何胁迫或报复威胁的情况下签署本《行为准则》；

本人承诺遵守并履行本《行为准则》所载的全部条款。

员工姓名：_____

国籍：_____

职务/岗位职责：_____

员工签字：_____

日期：_____

见证人姓名（员工声明签署见证人）：_____

Annex 15: Grievance Redress Mechanism (GRM) Form

CONFIDENTIAL

This form is for submitting grievances, feedback, or concerns related to the SCWRP. All grievances will be treated with utmost respect, confidentiality, and fairness, following the established GRM principles and procedures. No retaliatory measures will be taken against individuals who report incidents or raise concerns.

Section A: Complainant Information

- **Please note:** Providing your personal details is optional. If you wish to remain anonymous, please indicate below. However, providing contact information will allow us to communicate with you regarding the progress and resolution of your grievance.
- **For SH/SEA/GBV cases:** Your identity will be kept confidential to the fullest extent possible, as per survivor-centred protocols.

1. **Name (Optional):**

2. **Contact Information (Optional):**

- **Phone Number:** _____
- **Email Address:** _____
- **Physical Address/Location (for community members):**

- **Preferred Method of Contact (if providing details):**

3. **Relationship to Project:**

- Project Worker (CRSEG employee, subcontractor, primary supply worker)
- Community Member (Affected by project activities)
- Other (Please specify): _____

4. **Anonymity/Confidentiality Preference:**

- I wish to remain completely anonymous (no personal details shared, communication may be limited).
- I wish my identity to remain confidential and only be known to the designated Social Personnel/HR Representative handling the grievance.
- I consent for my identity to be shared with relevant parties involved in the investigation and resolution process.

5. **Preferred Language for Communication:**

Section B: Grievance Details

1. **Date of Grievance Submission:** ____ / ____ / ____ (DD/MM/YYYY)
2. **Date(s) of Incident(s):** ____ / ____ / ____ to ____ / ____ / ____ (DD/MM/YYYY)
3. **Location of Incident(s):** (e.g., specific project site, community area, worker camp, road)

4. **Grievance Category (Please check one or more):**
 - Emergency & Safety (e.g., fire, flooding, hazardous spills, unsafe conditions, other)
 - Occupational Health (e.g., heat stress, wastewater exposure, PPE concerns, other)
 - Worker Influx & Community (e.g., noise, cultural conflicts, local hiring concerns, other)
 - Sexual Exploitation and Abuse (SEA) / Sexual Harassment (SH) / Gender-Based Violence (GBV)
 - Security Personnel Misconduct (e.g., abuse, excessive force, intimidation, bullying, other)
 - Traffic & Mobility (e.g., road disruptions, unsafe transport, poor communication, air pollution, other)
 - Cultural Heritage (e.g., chance finds, damage to heritage sites, other)
 - Labour & Welfare (e.g., wages, working hours, housing, facilities, discrimination, other)
 - Environmental Impacts (e.g., air (dust), noise, waste, biodiversity, water, soil)
 - General Conduct (e.g., Code of Conduct violations, bullying, disrespectful behaviour, force abuse, other)
 - Other (Please specify): _____
5. **Description of Grievance/Incident:** Please describe what happened in as much detail as you are comfortable sharing. Include who was involved (if known), what they did, when, and where. *For SEAH/GBV cases, you are not required to provide excessive detail here; we prioritize your safety and will handle your case with sensitivity and a survivor-centred approach.*

6. **Available Evidence:** Do you have any supporting evidence (e.g., photos, videos, documents, witness contacts)? If so, please briefly describe it. You may be contacted to provide this evidence securely.
_____ \

Annex 16: LMP Implementation Templates

The following templates should be adapted by CRSEG before mobilization and used to document implementation of the LMP. The template suite is summarized in Table 4, while the detailed template models are provided in Tables 5 to 13. Completed forms should be retained as auditable records and reviewed during monthly and quarterly monitoring.

These templates translate the LMP's requirements into practical records that CRSEG, subcontractors, supervisors, and designated focal points can use during mobilization, daily site management, monitoring, and reporting. They support implementation by creating consistent evidence that workers have been inducted, the Code of Conduct has been signed and understood, labor influx and worker-community risks are monitored, grievances are handled within defined timelines, SEA/SH matters are managed through confidential survivor-centered pathways, accommodation is inspected, subcontractors are held to equivalent standards, training is tracked, and incidents or corrective actions are closed out. Used together, the templates help connect the LMP with the Workers' Code of Conduct and the Community Health Plan by ensuring that labor, welfare, OHS, GBV/SEA/SH prevention, community interface, language access, non-retaliation, and reporting commitments are documented, assignable, auditable, and capable of being updated through adaptive management.

Table 182: LMP implementation templates summary

Template	Key Fields	Responsible User
Worker induction checklist	Worker name, sex/gender, age group, category, disability, language support used, employer, nationality, language, contract issued, CoC signed, OHSE training, GBV/SEA/SH training, GRM briefing, accommodation briefing, trainer signature.	HR / HSE
Code of Conduct acknowledgement form	Worker details, employer, language of briefing, prohibited conduct confirmation, sanctions explained, worker signature, witness signature.	HR
Labour influx risk monitoring checklist	Workforce count (by sex, age group, nationality, category, camp vs non-camp, peak deployment status, accommodation pattern, transport routes, worker-community hotspots, type of conduct complaints, community feedback, consultation conducted (with women's, youth, disability groups), corrective actions.	Community Liaison / Project Manager
Worker grievance intake form	Date, channel, complainant category, sex/gender, age group, nationality, complainant preference, issue type, confidentiality level, fear of retaliation/protective measures requested, referred to SH/SEA/GBV confidential pathway, responsible lead, acknowledgement date, action taken, close-out date.	HR /
SEA/SH confidential referral log	Non-identifying case number, date received, alleged perpetrator link to the project, referral offered, survivor consent recorded separately, safety plan agreed, mandatory reporting obligations triggered, service type, status, close-out. No survivor-identifying details in general logs.	Designated SEA/SH/GBV focal point (refer to Code of Conduct)

Template	Key Fields	Responsible User
Accommodation inspection checklist	Consultation with relevant regulatory agencies. Occupancy, sanitation, potable water, ventilation, lighting, gender-segregated facilities, safety/privacy checks, menstrual health management features, disability access, medical access, recreation, grievances, corrective actions.	Camp Manager / HSE
Subcontractor labor compliance checklist	Contracts, workforce breakdown by sex/gender, age category, nationality, job category, contract type, age verification, equal wages for equal work verified, working hours, CoC signatures and training, induction, PPE, accommodation if applicable, GRM access, training records, corrective actions.	HR / HSE / Subcontractor manager
Training attendance register	Relationship to the project, age group, type of training/refresher, Training topic, date, trainer, participant name, employer, nationality, gender, language support used, signature, comprehension check.	HR / HSE
Incident and corrective action tracker	Incident category or finding, persons affected, source, severity, responsible lead, immediate action, root cause, referral to the GRM, corrective action, due date, any systemic gender or inclusion factors identified, closure evidence, lessons learned.	Project Manager / HSE

Annex 16A: Worker Induction Checklist

Table 183: Worker induction checklist template

Field / Requirement	Record / Confirmation
Worker name, employer, role, age group, category, nationality, gender, voluntary disability self-identification, language, and contact details	To be completed before site access
Written contract issued in language understood by worker	Yes / No / Not applicable
Code of Conduct explained (key topics covered, language support used, and signed	Yes / No; attach signed acknowledgement
OHSE briefing completed, including PPE, right to refuse unsafe work, emergency signals, escalation protocols, bilingual focal points, and multilingual drill requirements, comprehension confirmed.	Date, trainer, language support used
SEA/SH and GBV prevention training completed, including zero tolerance, prohibited conduct, non-retaliation, confidential reporting, survivor referral, and worker-community interaction rules, comprehension confirmed, language support used.	Date, trainer, comprehension check
GRM briefing completed, including anonymous options, sensitive-case pathway, non-retaliation guarantee explained, acknowledgement timelines, and confidentiality protections	Yes / No
Accommodation, camp rules, transport, community health, communicable disease, waste, hygiene, and gender-specific measures explained, disability related accommodations and accessible routes explained, rules on respectful interactions with community members, including minors and vulnerable adults explained, respectful conduct requirements explained	Yes / No / Not applicable
Worker confirms understanding and receives contact information for HR, HSE, GRM, bilingual focal point, camp manager, and Community Liaison Officer	Worker signature / date

Annex 16B: Code of Conduct Acknowledgement Form

I acknowledge that I have received, understood, and agree to comply with the Workers' Code of Conduct, the LMP, site rules, camp rules, OHSE requirements, community interaction requirements, SEA/SH and GBV prevention rules, and grievance procedures. I understand that prohibited conduct includes child labor, forced labor, discrimination, harassment, intimidation, retaliation, violence, sexual exploitation, sexual abuse, sexual harassment, abuse of authority, unsafe acts, possession or use of prohibited weapons, alcohol or drugs in restricted areas, and disrespectful conduct toward workers, residents, vendors, or community members. I understand that violations may result in disciplinary action, removal from site, contract termination, referral to authorities, or other remedies consistent with law and contract requirements.

Table 184: Code of Conduct acknowledgement form template

Item	Acknowledgement
Name, employer, sex/gender, age group, category, role, nationality, language of briefing	To be completed
Code of Conduct explained in language understood by worker, copy of Code of Conduct provided to worker.	Yes / No
Trainer confirms all topics covered SH/SEA/GBV, Worker understands zero tolerance for SEA/SH, GBV, harassment, exploitation, abuse, retaliation, and discrimination	Initials
Worker understands rules on respectful community interaction expectations (by vulnerable group and list each one), and sanctions for misconduct	Initials
Worker understands grievance process, anonymous reporting options, and SH/SEA/GBV confidential sensitive-case channels and non-retaliation protections.	Initials
Worker signature, witness signature, HR signature, date	To be completed before site access

Annex 16C: Labour Influx Risk Monitoring Checklist

Table 185: Labour influx risk monitoring checklist template

Monitoring Area	Information to Record	Action / Follow-up
Workforce numbers and profile	Total workforce (by age group, job category, nationality, voluntary disability self-identification, Chinese nationals, Barbadian/local personnel, subcontractor personnel, gender, peak deployment status, new arrivals, demobilization	Compare with baseline and escalate significant changes, sudden increase in young male workers, camp occupancy or proportion of non-local workers, very low or declining proportion of women in technical or supervisory roles.
Accommodation and rotation	Camp occupancy by sex and nationality, commuting patterns, transport routes, off-duty movement rules, visitor controls, camp rule breaches, reports or indications of harassment, intimidation or SH/SEA/GBV in/around accommodation, gender-segregated and accessible facilities, types of camp rule breaches.	Update worker-community interaction controls, adjust camp layout, lighting, security patrols and rules, conduct targeted SH/SEA/GBV briefings and engage Social Personnel.
Community interface hotspots	Types of users at hotspot, type of complaints, Shops, vendors, bus stops, residential edges, schools, transport routes, recreational areas, complaints by location	Increase supervision and Code of Conduct enforcement, coordinate SH/SEA/GBV awareness sessions, or access controls, consider adjusting worker routes, transport schedules or restricting access to specific areas/times.
SEA/SH and GBV risk indicators	Non-identifying victim category, alleged perpetrator link to the project, disaggregated counts of SH/SEA/GBV complaints by sex, age group and nationality, under reporting indicators, Conduct complaints, repeated concerns, under-reporting signals, confidential channel functionality, non-retaliation concerns	Escalate sensitive cases through confidential pathway, Social Personnel conducts periodic trend analysis and reports to Management and PEU, if under-reporting suspected, increase outreach on confidential channels and review barriers with women's groups and workers.
Corrective actions	Category of issue, Action, responsible person, due date, closure evidence, trend review, whether the corrective action addresses a gender or inclusion gap.	Report monthly and quarterly, highlights corrective actions related to gender equality, inclusion and SH/SEA/GBV, assesses whether similar issues recur disproportionately for particular groups.

Annex 16D: Worker Grievance Intake Form

Table 186: Worker grievance intake form template

Field	Entry
Date received, channel, received by, anonymous or named, language support needed	To be completed
Complainant category	Direct worker / subcontractor worker / supplier worker / community member / Security/ other
Issue type	Recruitment / wages / working hours / OHS / accommodation / discrimination / conduct / community interaction / subcontractor issue / harassment/bullying/ SEA/SH/GBV sensitive pathway / other
Summary of concern	Record facts only; do not include unnecessary personal details; for SH/SEA/GBV-related cases record only the non-identifying information.
Acknowledgement date and responsible lead	Acknowledgement within two working days; for SH/SEA/GBV cases acknowledgement is provided through the Social Personnel in a survivor-centered approach; complainant can choose mode of contact and preferred sex of focal point person where feasible.
Resolution, escalation, corrective action, close-out, feedback provided	Include dates and evidence; protect confidentiality; non-retaliation measures agreed/implemented; complainant satisfaction; for SH/SEA/GBV cases – non-identifying information to be included.

Annex 16E: SEA/SH Confidential Referral Log Template

This template must be kept separate from the general grievance log. It must contain only non-identifying information and must be managed by the designated confidential case handler. Survivor consent, names, contact details, and service records must not be copied into general project logs or reports.

Table 187: SEA/SH confidential referral log template

Non-identifying Field	Entry
Case number, age group, date received, sex/gender, reporting channel, language support provided	To be completed without identifying details
Referral types offered, referral accepted, mandatory reporting triggered under national law.	Medical / psychosocial / legal / police / child protection / other, based on survivor consent and applicable safeguarding requirements
Immediate safety or retaliation concern, safety plan agreed and initiated.	Yes / No; escalation action without disclosure of identity
Status and close-out, approximate resolution time band.	Open / referred / closed; non-identifying resolution time only

Annex 16F: Accommodation Inspection Checklist

Table 188: Accommodation inspection checklist template

Inspection Area	Criteria	Finding / Corrective Action
Occupancy and living space	Sex disaggregated occupancy and allocation, Adequate space, ventilation, lighting, bedding, privacy, cleanliness, safety and privacy checks, accessibility, and safe electrical arrangements	Record finding, safe living spaces confirmed, responsible person, due date
Sanitation and hygiene	Clean toilets, showers, handwashing, potable water, waste disposal, gender-segregated and accessible facilities, women's sanitation and MHM, safety of access and accessibility.	Record finding and feedback from women and PWDs, and action
Health, safety, and emergency readiness	First aid, fire safety, emergency routes, multilingual notices, muster points, incident reporting, access controls, awareness and accessibility, inclusive emergency readiness	Record finding and action
Camp conduct and welfare	Camp rules, recreational spaces, communication access, grievance information, GRM and SEA/SH prevention notices posted in languages and formats understood by workers, non-retaliation messaging	Record finding and action, capture feedback disaggregated by sex and nationality

Annex 16G: Subcontractor Labour Compliance Checklist

Table 189: Subcontractor labor compliance checklist template

Compliance Area	Verification Requirement	Status / Action
Contracts and recruitment	Written contracts, age verification, nationality, job category, no fees charged to workers, no forced labor, fair recruitment, equal opportunity	Compliant / action needed
Code of Conduct and SEA/SH controls	CoC training/signed, spot checks, GBV/SEA/SH induction completed, community interaction rules communicated, sanctions understood	Compliant / action needed/ targeted refreshers
OHSE and emergency readiness	PPE fit and availability for male and female workers, attendance at toolbox talks, incident reporting, multilingual safety communication, emergency drills, right to refuse unsafe work, accessible routes and muster points for PWDs	Compliant / action needed
GRM and monitoring	Workers informed of GRM, access and awareness, anonymous options, non-retaliation, confidential sensitive-case pathway, training records including disaggregated data, corrective action tracking, periodic checks	Compliant / action needed

Annex 16H: Training Attendance Register

Table 190: Training attendance register template

Training Record Field	Entry
Training topic, date, location, trainer, session type, modules, language used, interpretation provided	To be completed
Participant name, employer, role, nationality, gender, age group, worker category, signature	To be completed for each participant
Training content covered, include topics and checkboxes	LMP, Code of Conduct, OHS, GBV/SEA/SH, GRM, community health, camp rules, subcontractor obligations, labor influx controls, emergency signals
Comprehension check method, result, and follow-up required	Questions answered, refresher needed, worker support needed

Annex 16I: Incident and Corrective Action Tracker

Table 191: Incident and corrective action tracker template

Tracker Field	Entry
Incident, finding, grievance trend, audit finding, or labor influx concern	Describe issue, date, source, location, responsible lead, and issue category, include affected group
Severity, confidentiality, and escalation status	Low / medium / high / serious; confidential pathway if sensitive; Project Manager, BWA, PEU, or Community Health Focal Point notified where required
Immediate action, root cause, corrective action, responsible person, due date	To be completed
Closure evidence, lessons learned, communication to workers or community, monitoring follow-up	To be reviewed during monthly and quarterly reporting

