JSS CONSULTING
Environmental Consulting Services

ARAWAK CAY LNG PROJECT

Environmental Impact Assessment

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Executive Summary

The Government of the Commonwealth of The Bahamas (GOTB), through its Ministry of Energy and Transport, as well as Bahamas Power and Light Company Ltd. (BPL), has awarded the proposed shore power liquefied natural gas (LNG) fueled power plant (The Project) to be located on Arawak Cay, New Providence, The Bahamas. This generator facility will supply cruise ships docked at the Nassau Cruise Port and supply any excess power to BPL. This LNG-powered plant will produce seventy megawatts (70 MW) of power using LNG as the main fuel source. It also involves the installation of LNG receiving, storage, and regasification infrastructure, along with a high-capacity power transmission cable connecting the plant to Nassau Cruise Port. The open cycle is scheduled to come online in July 2026, while the combined cycle is scheduled to go online in November 2026. The plant will be located on a ten and eight tenths acres (10.8 ac.) tract located within Arawak Cay, which was historically used for port operations. The Project seeks to reduce reliance on traditional fossil fuels, enhance energy efficiency, and support economic development through stable and sustainable energy sources.

The Project description and Scope, along with the specific Construction Methodology, are also outlined in this document. The discussion process was completed to determine the preferred and alternate routes of the LNG transmission cable, as well as all applicable legislation regarding the implementation of The Project.

Baseline Assessments

Baseline assessments were conducted for the physical, biological, and socio-economic environment to record the existing conditions for the proposed area for The Project infrastructure.

Terrestrial assessments conducted show that the site currently consists of one (1) major terrestrial ecosystem, which is an Interior Upland ecosystem with one (1) vegetation class, which was a Human-Altered Environment. A total of twelve (12) species were recorded on the site, including one (1) protected species and four (4) invasive species.

A total of two (2) avian species were recorded during the investigation, all of which were permanent resident breeding species. All species observed are protected under the Wild Birds Protection Act of The Commonwealth of The Bahamas, 1952. All species observed are considered of Least Concern by the International Union for Conservation of Nature (IUCN). No endangered birds were recorded, and one (1) endemic species was observed.

Marine assessments conducted show that the underwater cable route currently consists of three (3) generalized habitats: Sandy Bottom, Hard Bottom, and Seagrass; and five (5) variations: Sandy Bottom with Macroalgae, Sandy Bottom with Seagrass, Silt with Macroalgae, Hard Bottom with Macroalgae, and Hard Bottom with Seagrass. A total of

seventeen (17) species were recorded on the site, including one (6) fish species, two (1) coral species, six (6) other flora and fauna, and eight (4) flora species. There were six (6) marine species observed that are listed on the Convention on International Trade of Endangered Species (CITES) list and/or the International Union for Conservation of Nature (IUCN) Red List; and four (4) species are important to the economy of The Bahamas, are important key stone species for the marine ecosystems or are protected under The Bahamas Legislation.

Physical parameters investigated included hydrology, tides, geology studies, bathymetry, ambient air quality, air temperature, rainfall, noise levels, and climate risks (e.g., hurricanes and fires).

Socioeconomic assessments investigated The Project site demographics, utilities and services, ship transportation, tourist and recreational areas, aesthetics, legal aspects, and visual quality.

Anticipated Impacts and Mitigations

There are anticipated impacts to the physical, biological, and socioeconomic environment due to the construction and operation of The Project.

The anticipated impacts to the physical environment include a decrease in water and air quality, an increase in solid and hazardous waste, an increase in noise and light pollution, and sediment and erosion impacts. Also, risks are associated with climate factors such as hurricanes and fires.

The anticipated impacts to the biological environment include habitat degradation due to land clearing and placement of the underwater cable line, and negative impacts on wildlife.

Socioeconomic impacts associated with The Project include an increase in traffic congestion and accidents, negative impacts on the surrounding neighborhood and community land use, community impacts, job generation, material sourcing, and commissioning and utilization of hospital services.

Long-term negative impacts on the natural resources in the area are not expected to occur because of the proposed construction work. Construction will be closely monitored to prevent contamination of the adjacent terrestrial habitats and disturbances to the nearby communities. Management Plans will detail mitigation measures that must be adhered to by the contractor to ensure protection of the environment.

The purpose of the Arawak Cay LNG Project Environmental Impact Assessment (EIA) is to assess and document existing conditions of The Project area and the potential impacts associated with the proposed Project. The EIA has been designed to assist with achieving the Health, Safety, Social, and Environmental (HSSE) Policy to ensure that all its activities during the construction and operational phases are conducted in a manner that results in minimal

adverse impacts to the environment. The Environmental Management Plan is also outlined in this document to ensure that all activities completed within the construction and operation phases incorporate mitigation measures to avoid, negate, or minimize potential impacts that will be employed by management, staff, and sub-contractors during construction and operation.

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Acronyms and Abbreviations

Ac	Acre
Ar	Argon
Bahamas	Commonwealth of The Bahamas
bar(g)	Bar Gauge
BOG	Boil of gas
BOP	Balance of Plant
DEPP	Department of Environmental Planning and Protection
BIA	Bahamas Investment Authority
°C	Degrees Celsius
CAPEX	Capital Expenditure
CI	Commercially Important
CITES	Convention on International Trade of Endangered Species
CO_2	Carbon Dioxide
cm	Centimeter
cm/s	Centimeter per Second
dBA	A-Weighted Decibels
DEHS	Department of Environmental Health Services
DPP	Department of Physical Planning
E	Endemic Species
EDI	Electrodeionization Plant
EH&S	Environmental, Health, and Safety
EI	Ecologically Important
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ES	Endangered Species
°F	Degrees Fahrenheit
FOCOL	Freeport Oil Company Limited
ft	Foot or Feet
g/L	Grams per Liter
GHG	Greenhouse Gas
GOTB	The Government of the Commonwealth of The Bahamas
GPS	Global Positioning System
GIS	Gas Insulated Switch Gear
HCO	Hydraulic Clearance Optimization system
Hg	Mercury
HIGS	High-Integrity Generator Switchgear
HRSG	Heat Recovery Steam Generator
H_2O	Water

IFC	International Finance Corporation
IGV	Inlet Guide Vanes
in	inch
IUCN	International Union of Conservation of Nature
km	Kilometer
km2	Square Kilometer
km/h	Kilometers Per Hour
kW	Kilowatt
LC	Least Concern (Conservation-IUCN)
LER	Low Energy Relay
LNG	Liquefied Natural Gas
Lp	Sound Pressure Level
m	Meter(s)
m3	Cubic Meter
MAWP	Maximum Allowable Working Pressure
mg/L	Milligrams per Liter
mbar	Millibar
mi	Mile(s)
mi2	Square Mile(s)
mm	Millimeter
MLLW	Mean Lower Low Water
MOW	Ministry of Works
MOEH	Ministry of Environment and Housing
MSDS	Material Safety Data Sheet
msl	Mean Sea Level
µg/m3	Micrograms of Gaseous Pollutant per Cubic Meter of Ambient Air
MW	Megawatts
NB	Nominal Bore
N_2	Nitrogen
N_2O	Nitrous Oxide
NGO	Nongovernmental Organization
NOAA	National Oceanic and Atmospheric Administration
NO_x	Nitrogen oxides
NPEP	New Providence Ecology Park
NT	Near Threatened (Conservation-IUCN)
NTU	Nephelometric Turbidity Unit
OPM	Office of the Prime Minister
O_2	Oxygen
PLC	Programmable Logic Controller
PM	Particulate matter

ppt	Parts per Trillion
PRB	Permanent Resident Breeding
PS	Protected Species
RBDF	Royal Bahamas Defense Force
RBPF	Royal Bahamas Police Force
RO	Reverse Osmosis
RS	Regulated Species
SCADA	Supervisory Control and Data Acquisition
SO_2	Sulfur Dioxide
SFC	Specific Fuel Consumption
SGT	Siemens Gas Turbo
SRB	Summer Resident Breeding
UWR	Uncommon Winter Resident
WB	World Bank
WSC	Water and Sewage Corporation

1.0 Background

The Shore Power for The New Providence Cruise Ship Terminal Via Liquefied Natural Gas, hereafter referred to as the Arawak Cay LNG Project (The Project), will be located on a ten and eight tenths acre (10.8 ac) tract on Arawak Cay.

In 1969, Arawak Cay was constructed from spoils acquired during the dredging of Nassau Harbour, and shipping operations commenced in the 1980s. In the summer of 1994, the Arawak Cay Conch, Fish, Vegetable, and Food Vendors Association was formed, and official leases for stalls were granted in May 2002. From there, activities on Arawak Cay increased with the construction of the Nassau Container Port in 2011. Now, Arawak Cay is not only a shipping hub but is also known for its authentic local cuisines and entertainment.

With New Providence's growing population and the expansion of the Nassau Cruise Port, there has been an increase in energy demands in the northern section of the island. With the advantage of being in a convenient and centralized location, The Project aims to meet these demands by:

- Modernizing the island's energy infrastructure while adhering to the highest standards of environmental sustainability,
- Significantly reducing the island's reliance on traditional fossil fuels,
- Enhance energy efficiency across the island, and
- Support the economic development of New Providence by providing a more stable and sustainable energy source.

The LNG plant is designed to meet stringent safety and environmental requirements, incorporate features to prevent emissions, manage waste, and respond to emergencies effectively. During construction, advanced construction techniques will be employed to minimize disruption to urban activities and ecological systems, with an emphasis on protecting critical habitats and avoiding impacts on existing utilities.

The Government of the Commonwealth of The Bahamas (GOTB), through its Ministry of Energy and Transport, as well as Bahamas Power and Light Company Ltd. (BPL), has awarded the proposed shore power liquefied natural gas (LNG) fueled power plant to be located on Arawak Cay, Nassau, The Bahamas. This generation facility will supply cruise ships docked at the Nassau Cruise Port and supply any excess power to BPL. This LNG-powered plant will produce seventy megawatts (70 MW) of power. The open cycle is scheduled to come online in July 2026, while the combined cycle is scheduled to go online in November 2026.

1.1 Purpose

The Project is an important infrastructure initiative aimed at improving energy supply and resilience at the Nassau Cruise Port. As a key hub for international tourism and maritime

operations, the port plays a crucial role in New Providence's economy. The LNG-generated power will significantly enhance the port's energy efficiency, support sustainable operations, and reduce its reliance on traditional energy sources.

2.0 Project Description and Scope

The Project traverses urbanized areas with moderate road networks and spans sections of coastal environments. The site is located on the northwestern coast of New Providence (GPS Coordinates: 25° 4'56.32"N, 77°21'41.58"W), approximately six and nine tenths (6.9 mi) miles from the Sir Lynden Pindling International Airport (See Figure 1), and two point eight one miles (2.81 mi) away from the Southwest Marine National Park (See Figure 15). The site is currently uninhabited and does not contain any structures.

The Project involves the construction of a thermoelectric Combined Cycle Power Generation plant that will use LNG as its primary fuel. It will include facilities for receiving, unloading, storing, and regasifying LNG. Additionally, The Project will feature an interconnection switchyard and switchgear, cryogenic storage tanks, regasification units, auxiliary safety systems, along with the necessary mechanical and electrical equipment, and associated instruments to enable the import, storage, and conversion of LNG into reusable energy (see Appendix A).

Complementing the plant is the installation of a high-capacity power transmission cable that will run eastward, connecting to the Nassau Cruise Port. This strategically designed cable will provide the cruise port with a reliable and sustainable energy source to power its operations.

The main electrical system includes two (2) electric circuits on 13.8 kV-132 kV, connected to their own step-up transformers and connected in parallel to a Gas Insulated Switch Gear (GIS) of ninety to ninety-five (90 – 95) (TBD later) MVA and further interconnections to the BPL system and to the Cruise Port.

LNG Process

LNG will be burned using a Siemens Energy SGT800/SGen Gas Turbine-Generator. The exhaust of the Gas Turbine is then fed to a single-pressure Heat Recovery Steam Generator (HRSG) unit, which uses natural circulation to produce steam. Steam is then sent to a Siemens Energy Steam Turbine-Generator SST300/SGen6, and the exhaust produced is sent to an Air Cooled Condenser (ACC) or to a conventional Shell and Tube water condenser with a closed, dry-cooling tower circulating water system. This closed chilled water system should be used for a Food Cool Chain (Optional) and cool the air at the intake structure of the Gas Turbine to increase its power and improve efficiency.

Both generators are TEWAC (Totally Enclosed Water to Air-Cooled).

Each of these main components will be supplemented by its own:

- Auxiliaries and mechanical systems
- Electrical equipment
- Control system

In addition to the main equipment of the power plant, there is the Balance of Plant (BOP) equipment.

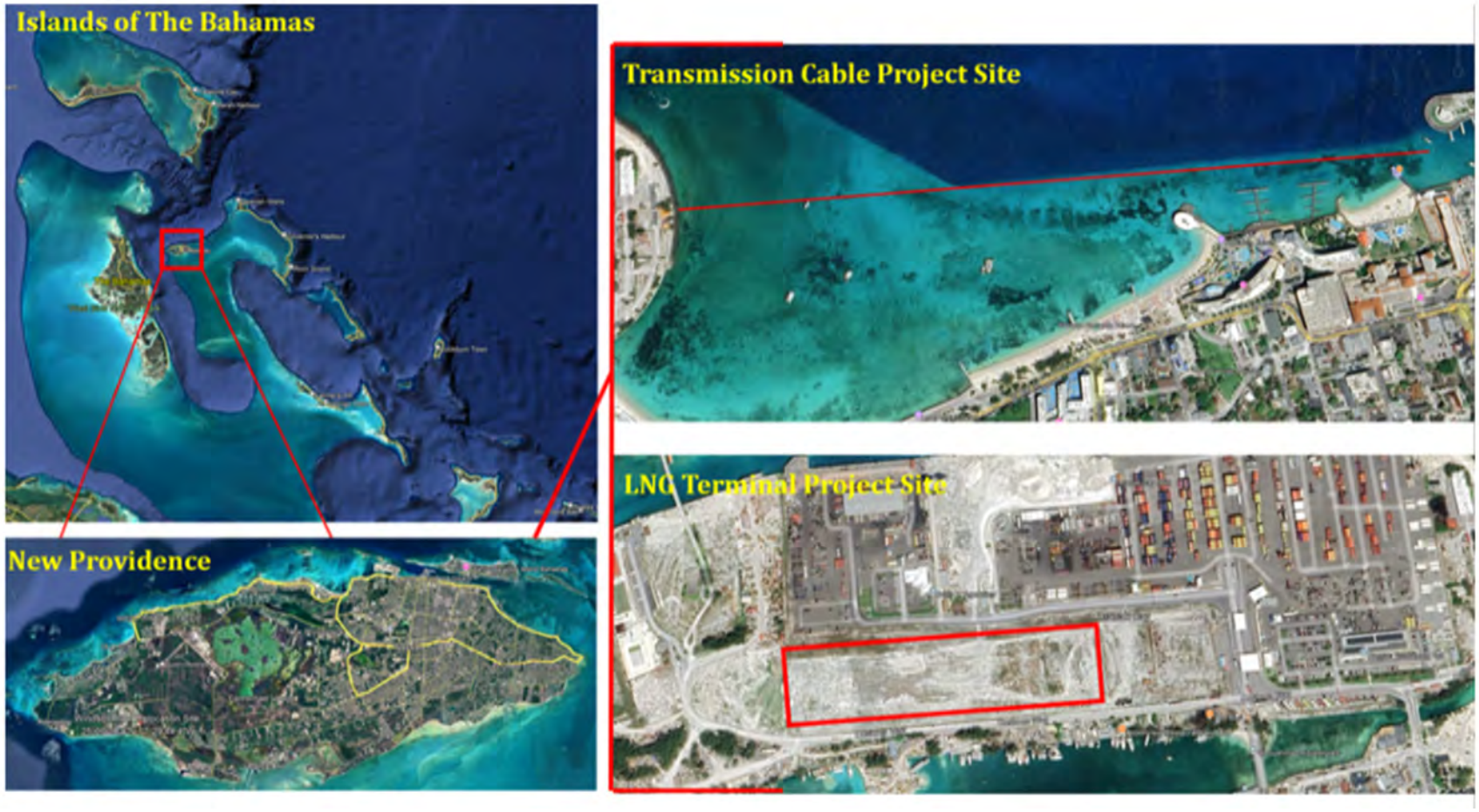


Figure 1: Site location Map.

2.1 Project Components

The Project components will consist of a Discharge station, LNG storage facility, Regasification system, Demi-plant, Power Plant, and Sub-station (See Figure 2).

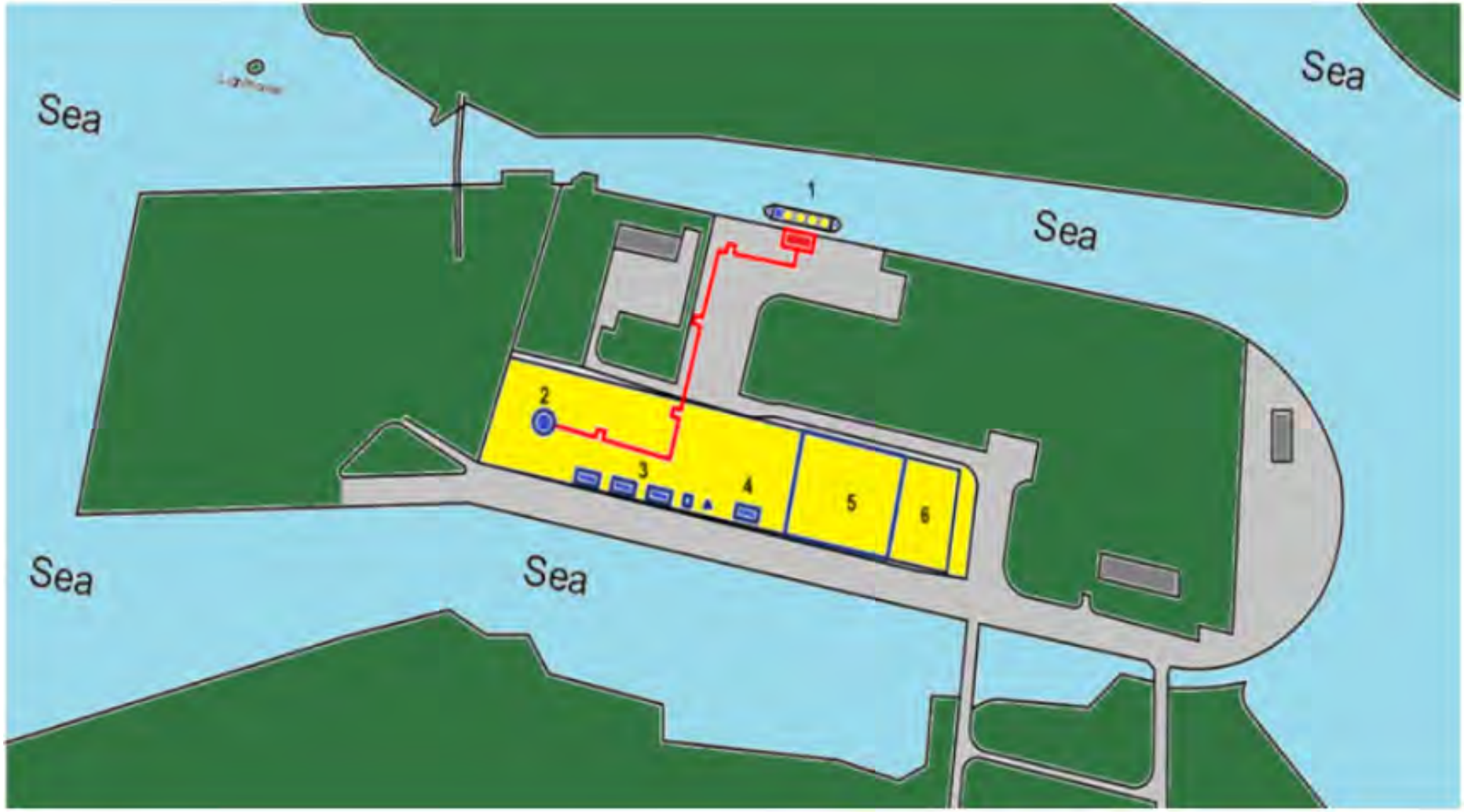


Figure 2: Schematic plot of project components (only as a reference). 1) LNG Discharge 2) LNG Storage 3) Regasification 4) Demi-plant 5) Power Plant 6) Sub-station

2.1.1 LNG Discharge

The LNG discharge area will be where LNG carriers dock to offload cargo from the transport ship. The discharge area already consists of a bulkhead and docking amenities.

The main systems within the discharge area include:

- Ship unloading station.
- Interconnecting and Transfer pipes.

The Ship unloading station will consist of pneumatic valves, manual valves, a Coriolis-type flow meter, and a Drain Drum Assembly.

Pipelines will have to be installed to lead from the discharge area to storage facilities. The LNG pipeline will be eight inches (8") in diameter and twenty meters (20 m.) in length. The pipeline will consist of a five to six (5-6) main band vacuum-insulated double-walled unloading hose, which can handle an LNG flow rate of five hundred cubic meters per hour (500 m^3/hr.).

The Boil-off Gas (BOG) line, which is a pipe system that collects and transports BOG generated within LNG tanks, will be three inches (3") in diameter and twenty meters (20 m.) in length.

Final connection from the Ship to the unloading station shall depend on the types of ships used and shall take into account the tools and equipment for the connection.

Photo 1: Example of an LNG carrier

Photo 2: Example of the Unloading Station

2.1.2 Water Treatment and Demineralization Plant

The water treatment plant will convert seawater to process water to be used in the demineralization plant. The main components of the water treatment plant include:

- Desalination Plant.
- Pre-treated water Tank.
- Demineralization Plant.
- Service water and Fire Water System.

2.1.2.1.1 Desalination Plant

Seawater will be sourced from open free (submerged) structures or by an intake well with suction pumps. Seawater will be pretreated, where the small solid particles, sediments, and contaminants will be removed before being pumped through reverse osmosis membranes.

2.1.2.2 Demineralization-plant

After the desalination process, the water will be demineralized to make up the feed water to the Heat Recovery Steam Generator. Water will then be stored in a demineralized water tank.

The main components of the demineralization plant are:

- Service water feed pumps system.
- Pre-treatment plant.
- Pre-treated water tank.
- Demi-water treatment plant.
- Electrodeionization (EDI) plant.
- Demi-water tank.
- Control system Interphase.

2.1.2.3 Service Water and Fire Water System

Processed water from the pre-treatment process, as well as the reverse osmosis plant, will be used for service and fire-fighting water. The fire protection system is made up of the following main equipment and subsystems:

- A storage tank, shared with the service water system.
    - To ensure the availability of water in the quantity required by the fire system, the intake nozzle for the service water system is located at a height in the tank above the required level corresponding to the capacity required for firefighting.
- A main fire pump driven by an electric motor.
- A diesel-powered fire reserve pump.
- A pump for pressurizing the fire network (jockey) driven by an electric motor.
- Network of pipes for feeding hydrants, hoses, and sprinklers.
- Carbon Dioxide (CO^2) extinguishing system, for fighting possible fires in facilities such as components of the gas turbo-generator and the steam turbine-generator.
- FM-200 clean agent extinguishing system in the control room and server room.
- The Integral Fire Protection System, which is made up of a Central Control Panel, local panels, and fire detectors that allow the activation of extinguishing systems and alarms in the event of an emergency.

2.1.3 Power Plant

The Power Plant will comprise one (1) combined cycle unit in a 1-1-1 configuration with an output of fifty-seven megawatts (57 MW). The Siemens SCC800 unit configuration comprises:

- One (1) natural gas-fired gas turbine (GT). The model of the turbine is ST800
- One (1) Te-wac cooled four-pole generator, for the GT.
- One (1) steam turbine (ST). The model of the steam turbine is SST 300.
- One (1) Te-wac cooled four-pole generator, for the ST.
- One (1) horizontal type, single or dual pressure, non-reheat water/steam cycle Heat Recovery Steam Generator (HRSG).

The Power Station will be connected to a one hundred and thirty-two kilovolts (132 kV) Gas Insulated Switchgear (GIS), and through this switchgear, it is connected to the Cruise Port and the Nassau Island grid.

2.1.3.1 Gas Turbine-Generator

The Siemens Gas Turbo-generator, SGT-800, will be operated in simple or combined cycle mode, where the hot gases produced by the combustion of LNG natural gas are sent through a diffuser duct towards a diverter damper (bypass stack). The gas will then be sent to the

Heat Recovery Steam Generator (HRSG) or expelled towards the atmosphere through a By-pass chimney.

The following are the SGT-800 and its auxiliary system, as per the SGT-800 Scope of:

- Air intake system (Filtering & Cooling (if applicable)). Silencer and air quality control.
- Compressor and Expansion (Casing, rotor, bearings, diaphragms, blades) descriptions.
- Exhaust gas system (Diffuser).
- Electric generator & auxiliaries, SEE (excitation), AVR, SFC (if applicable).
- Supervision and control system (GT instrumentation).
- Fire protection system.
- Fuel Gas System (meter) and fuel Manifold. Burners and combustion chamber description.
- Fuel Gas Throttle valves.
- Lubrication and lifting oil system of the Gas Turbo-generator.
- Lube oil cooler system.
- Hydraulic Oil supply system (Vanes & fuel gas actuators).
- Inlet Guide Vanes (IGV).
- Pneumatic for blow-off system and actuators.
- Hydraulic Clearance Optimization system (HCO).
- Drain system.
- Compressor cleaning system (Manual or Automatic).
- Secondary air system.
- Pneumatic air block system for fuel gas, including actuators.
- Combustion Chamber Instrumentation System.
- Instrument air system.
- Generator instrumentation.
- HVAC.
- Noise abatement control.
- Start-up system.
- Step up transformer.
- Auxiliary Transformer.
- LER (Low Energy Relay) and auxiliary GT equipment.
- HISG Generator Switch generator.
- Transformer protection system.
- Interconnecting piping and cabling.

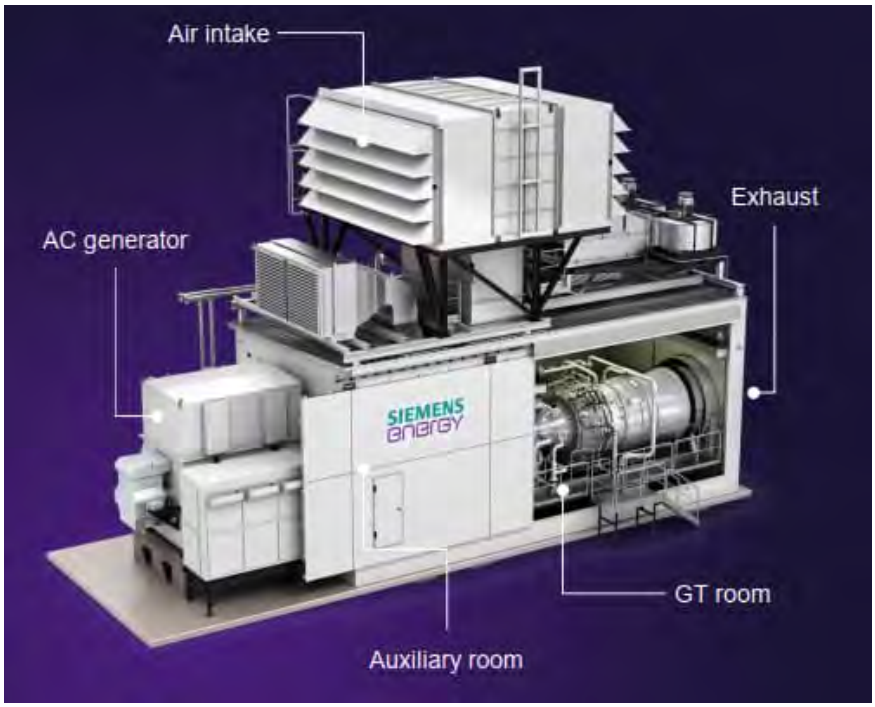


Figure 3: SGT-800 57MW Classic

2.1.3.2 HRSG & Bypass Chimney-Diverter Damper

The HRSG receives the exhaust gases from the gas turbine through a Diverter-Damper. The HRSG will be a single-pressure pressure and provide the steam at the conditions required for the operation of the steam turbine.

The bypass diverter-damper will be able to operate in the mode of partial opening that permits combustion gases to pass through the HRSG and to the by-pass stack simultaneously.

The following are the main systems of the HRSG & Bypass Chimney-Diverter Damper:

- HRSG and auxiliary systems:
  - Main steam system, economizer, evaporator, superheater.
  - High-pressure steam temperature control.
  - Drum level control.
  - Condensate water preheating system.
  - Drainage system.
  - Safety valves.
  - HRSG Diverter Damper operational coordination.
  - Control operation & protection coordination
- Chemical dosing system.
- Sampling system.
- Continuous emissions monitoring system.
- Stack by-pass.
- De-aerator.
- Steam vents and drainage system.

- Non-return valves.
- Main stack.
- HP Feed water pumps.
- Control System Interface.
- Interconnecting piping and cabling.

2.1.3.3 Steam Turbine-Generator

The Siemens Steam Turbo-generator, SST-300, will receive steam from the HRSG. The steam turbine will convert the thermal energy of the steam into mechanical work to move electrical generation which will transform this work into electrical energy. The SST-300 is a single casing turbine, with stop (emergency) and Control valves, reaction-type blades, exhaust temperature and pressure control protection. The ST exhaust steam is condensed in an Air-Cooled Condenser (ACC).

Figure 4: SST-300 steam turbine

The Steam Turbine / Generator (SST-300) and its auxiliary systems consist of:

- Casing and rotor, blades, and diaphragms construction.
- Seal component system.
- Bearings (support and axial thrust).
- Control and Trip Oil System.
- Shaft Monitoring System.
- Turning gear Device System.
- Jacking oil system.
- Drainage system.
- Gland Steam system.
- TEWAC Electric Generator.

- Main steam by-pass system.
- Speed and load control (Pressure control and sliding pressure operation).
- Supervisory and control operation instruments.
- DCS integration and connection.
- Connection with condenser.
- Electrical generator operation supervisory system.
- Automatic Voltage regulation.
- Neutral grounding system.
- Main Terminal box (line and neutral equipment).
- Exhaust system.
- Electrical/Control/Instrumentation Package.
- Lube Oil Package w/ main, auxiliary & emergency pump.
- Steam turbine enclosure.
- GSU Step Up Transformer.
- Generator Circuit Breaker.
- Control System Interface.
- Interconnecting Piping and Cabling.

2.1.4 Regasification System

The regasification system will receive LNG from carriers through an eight inch (8") vacuum insulated pipeline and convert it back into natural gas.

The main components of the regasification system include:

- LNG Storage Tanks.
- Pump Station.
- Ambient Air Vaporizer.
- Buffer Tanks.
- Gas Nitrogen Separator.

2.1.4.1 LNG Storage

The LNG storage facility will consist of large-scale industrial holding tanks used to store LNG. There will be approximately ten (10) vacuum and perlite insulated cryogenic tanks which have a gross volume of one thousand five hundred cubic meters (1,500 m^3) each.

Photo 3: Example of the storage tanks

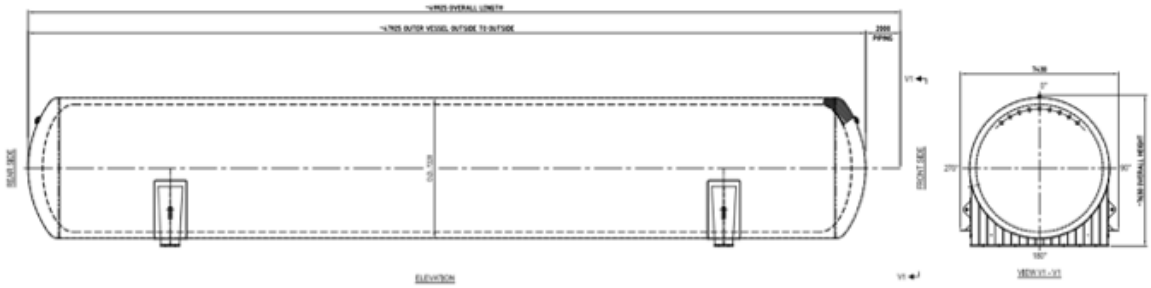


Figure 5: Schematic of the storage tanks

2.1.4.2 Pump Station

The pump station will consist of two (2) working and one (1) standby cryogenic pot-mounted submerged process pumps. Each pump will have a capacity of up to two hundred and fifty-five liters per minute (255 LPM) at three hundred and sixty pounds per square inch (360 psi) delivery pressure. The pump station will also include a skid with valves & instruments.

Photo 4: Example of the pump station

2.1.4.3 Ambient Air Vaporizer

An Ambient Air Vaporizer is a heat exchanger that vaporizes liquefied gas using absorbed heat from the ambient air. The vaporizer will be suitable for eight thousand (8000) USG/Hour.

Photo 5: Example of an LNG Ambient Air Vaporizer

2.1.4.4 Buffer Tank

The buffer tank will be used to manage and re-liquefy the BOG that naturally occurs from stored LNG. The buffer tank will act as a pressure reservoir and provide a stable supply of gas at a consistent pressure to meet localized demand. The buffer tank will have a capacity of fifty cubic meters (50 m^3) and be provided before the Natural Gas Pressure Control Valve.

2.1.5 Sub-Station

The sub-station will be designed to convert the higher voltages produced by the LNG Plant to lower voltages suitable for consumption.

The GT and ST generators are connected to the step-up transformers via isolated phase bus ducts. The GT-circuit is equipped with generator breaker or a High-Integrity Generator Switchgear (HIGS) system. This set up enhances the power system, improves protection and an increase operating flexibility.

Electrical engineering basic design for Arawak Cay Power Plant considers the following within the scope:

- An electric generator rated at seventy mega volt-volt-ampere (70 MVA) at twenty kilovolts (20 kV), driven by a gas turbine.
- An electric generator rated at thirty mega volt-volt-ampere (30 MVA) at twenty kilovolts (20 kV), driven by a steam turbine.
- One (1) one hundred and thirty-two kilovolt (132 kV), step-up transformer connected to the gas turbine generator.
- One (1) one hundred and thirty-two kilovolt (132 kV), step-up transformer connected to the steam turbine generator.

The one hundred and thirty-two kilovolt (132 kV) transmission from the gas and steam turbine step-up transformers, is provided by one (1) or two (2) overhead lines, which interconnect with the new GIS 132 kV system.

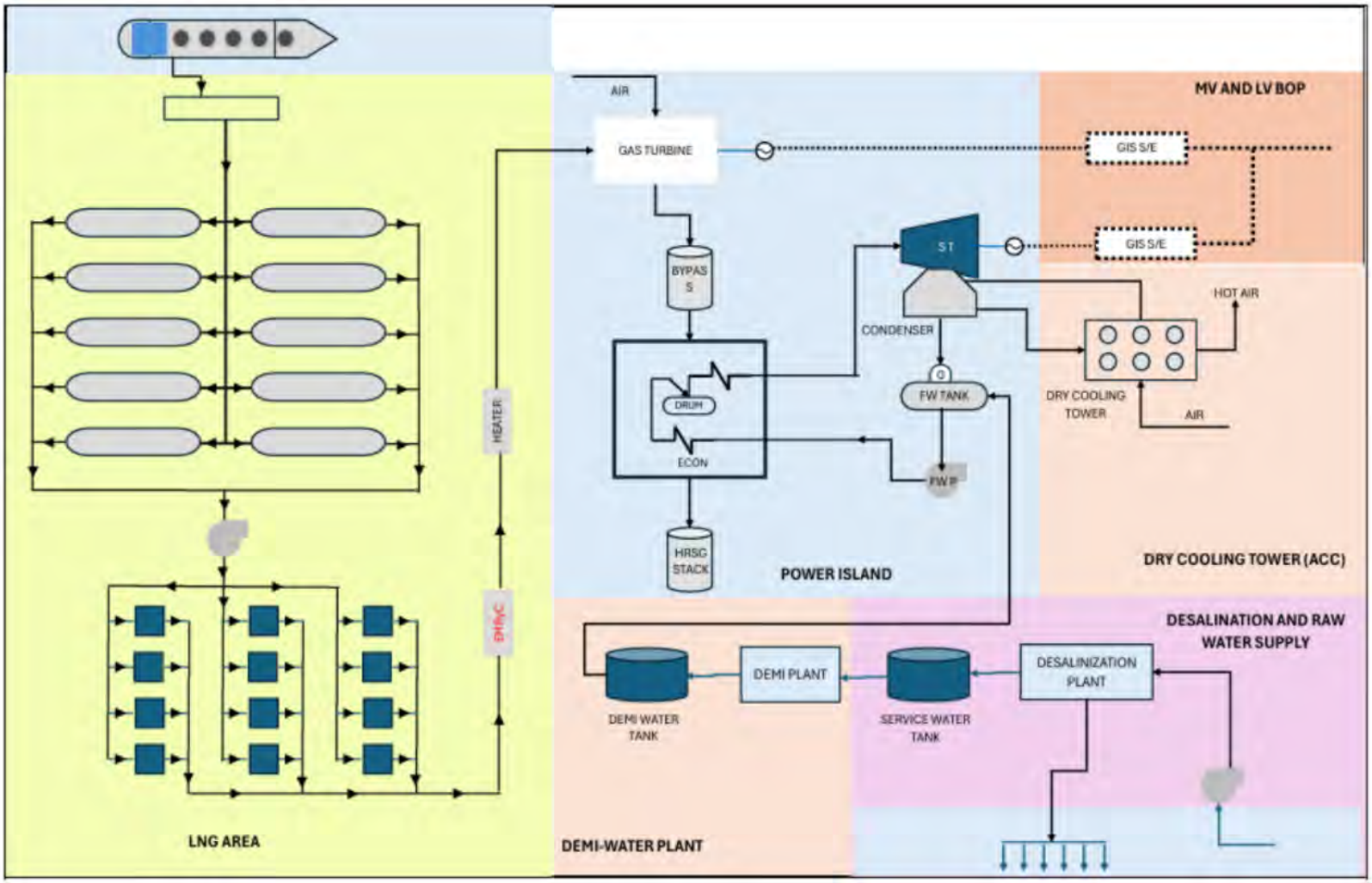


Figure 6: Block Diagram of Arawak Cay Power Plant project

2.2 Construction Methodology

Below is a summary of the methodology that will be utilized during the construction of The Project. Full construction methodology will be outlined in the Arawak Cay LNG Project Environmental Management Plan (EMP).

2.2.1 Site Preparation

The initial phase of construction at Arawak Cay will focus on preparing the site for the LNG plant. Any existing structures, debris, or vegetation must be removed, ensuring minimal disruption to the surrounding environment and the nearby marine system. Access roads and temporary facilities will be established to support construction and operation works, as well as the public. Utility mapping will be conducted to identify and relocate existing underground pipelines that may interfere with construction. Soil testing and geotechnical investigations will be conducted to ensure ground stability for heavy industrial vehicles and facility infrastructure.

2.2.2 Design and Engineering

The LNG plant and power transmission system were developed through architectural designs, structural engineering plans, mechanical and electrical systems, along with safety features such as fire suppression and emergency systems. The route mapped for the power transmission cable from Arawak Cay to Nassau Cruise Port has been planned considering factors like terrain, existing infrastructure, and environmental probabilities. Engineering plans will specify the type of cables, insulation, and installation methods suitable for both underground and underwater segments. The design phase will also involve obtaining all necessary permits and approvals from regulatory bodies.

2.2.3 Construction of the LNG Plant

The establishment of the foundation and structural support for the LNG storage tanks, processing facilities, and auxiliary buildings will initiate the construction process. Specialized equipment will be installed, including cryogenic tanks, compressors, vaporizers, and control systems. All construction activities will follow safety controls to handle hazardous materials and high-pressure systems. Quality assurance measures will be in place to ensure all components abide by specific design and industry standards. The local authorities and workers on site will coordinate logistics for transporting large equipment on The Project site, ensuring adherence to noise limits and work-hour requirements.

2.2.4 Backfilling and Compaction

Once the underground cables are laid, trenches will be backfilled with the appropriate materials (e.g., sand, fine gravel) to protect the cables and provide stability. The backfill material will be compacted in layers to prevent future ground settlement, which could compromise the integrity of the cables or surrounding infrastructure. This process will be conducted carefully to avoid damage to the cables and maintain the original contour of the

land. In areas where the cables crossroads or other paved surfaces, the final layer will be restored to match the existing pavement, ensuring a seamless repair.

2.2.5 Quality Control and Testing

Rigorous testing will be conducted on both the LNG plant and the power transmission system to verify that all components are functioning correctly and safely. This includes pressure testing of LNG storage tanks and pipelines, leak detection, electrical testing of cables, and system integration tests. Safety systems such as alarms, shutdown mechanisms, and fire suppression equipment will be tested under various scenarios. Inspections will be carried out by independent experts to certify compliance with all relevant standards and regulations. Any deficiencies identified will be addressed promptly before the commencement of operations.

2.3 Description of Project Alternatives

The purpose of discussing project alternatives in an EIA is to provide a reasonable range of potentially viable options that can avoid or significantly reduce any major environmental impacts of a project. This is even if these alternatives would impede to some degree the achievement of The Project objectives or incur higher costs. The range of alternatives describes those that could feasibly accomplish most of the basic objectives of The Project and could avoid or substantially lessen one or more of the significant effects.

2.3.1 Alternative Cable Routes

While Arawak Cay is the designated location for the LNG terminal, alternative routes for the cable connecting the LNG plant to Nassau Cruise Port were explored. Both a submersible cable alignment and underground cable alignment was considered with each route type having two (2) options:

Submersible Cable Alignment:

- Route 1: Nearshore Option
- Route 2: Offshore Option

Underground Cable Alignment

- Route 3: Commercial Option
- Route 4: Residential Option

Route 1: Nearshore Option

This route to the cruise port follows a submarine cable alignment. The Nearshore Option, outlined in orange (see Figure 7), consists of a one thousand, nine hundred and twenty meter (1,920 m.) cable line that starts on the southern side of the LNG Plant and heads east, running along the southern side of Arawak Cay to the Nassau Cruise Port.

Route 2: Offshore Option

This route to the cruise port follows a submarine cable alignment. The Offshore Option, outlined in yellow (see Figure 7), consists of a one thousand three hundred and fifty meter (1,320 m.) cable, running from the west side of the LNG plant to the Port.

Route 3: Commercial Option

This routes consist of an underground cable alignment that runs through the commercial areas. The underground cable, outlined in red (see Figure 7), will start from the southern side of the LNG plant. It will run south along Arawak Cay Drive, then head east onto West Bay Street, followed by a turn onto Marlborough Street. It will proceed onto Navy Lion Road, continuing onto Wood Rogers Wharf and to the cruise port.

Route 4: Residential Option

This routes consist of an underground cable alignment that runs through the predominantly residential areas. The underground cable, outlined in blue (see Figure 7), will start from the southern side of the LNG plant. It will run south along Arawak Cay Drive, then turn west onto West Bay Street. Next, it will turn onto Chippingham Road, proceeding south before turning onto Infant View Road heading east. The cable will then turn onto Nassau Street, heading north, followed by a turn onto Delancy Street, continuing east. After that, it will turn north onto West Street, then onto Marlborough Street. It will proceed onto Navy Lion Road, continuing onto Wood Rogers Wharf and to the cruise port.

Chosen Route for the Arawak Cay LNG Transmission Cable

The chosen route for the Arawak Cay LNG Project Transmission Cable is the offshore submersible cable route (yellow line in Figure 7). This route is being considered as the primary route because it has a shorter cable length, is further offshore, and is located in a more easily accessible area for cable placement and maintenance.

Route 1 was not chosen due it having a longer cable length and it being closer to the shore with can pose an concerns for locals and tourist using the area during the construction phase.

Route 3 and 4 were not chosen due to them consisting of numerous existing utility infrastructure which can potentially be disrupted during placement of the transmission cable. Also installation of a cable along either of the underground routes will cause unmanageable traffic disruptions in commercial areas (Route 3) or residential areas (Route 4).

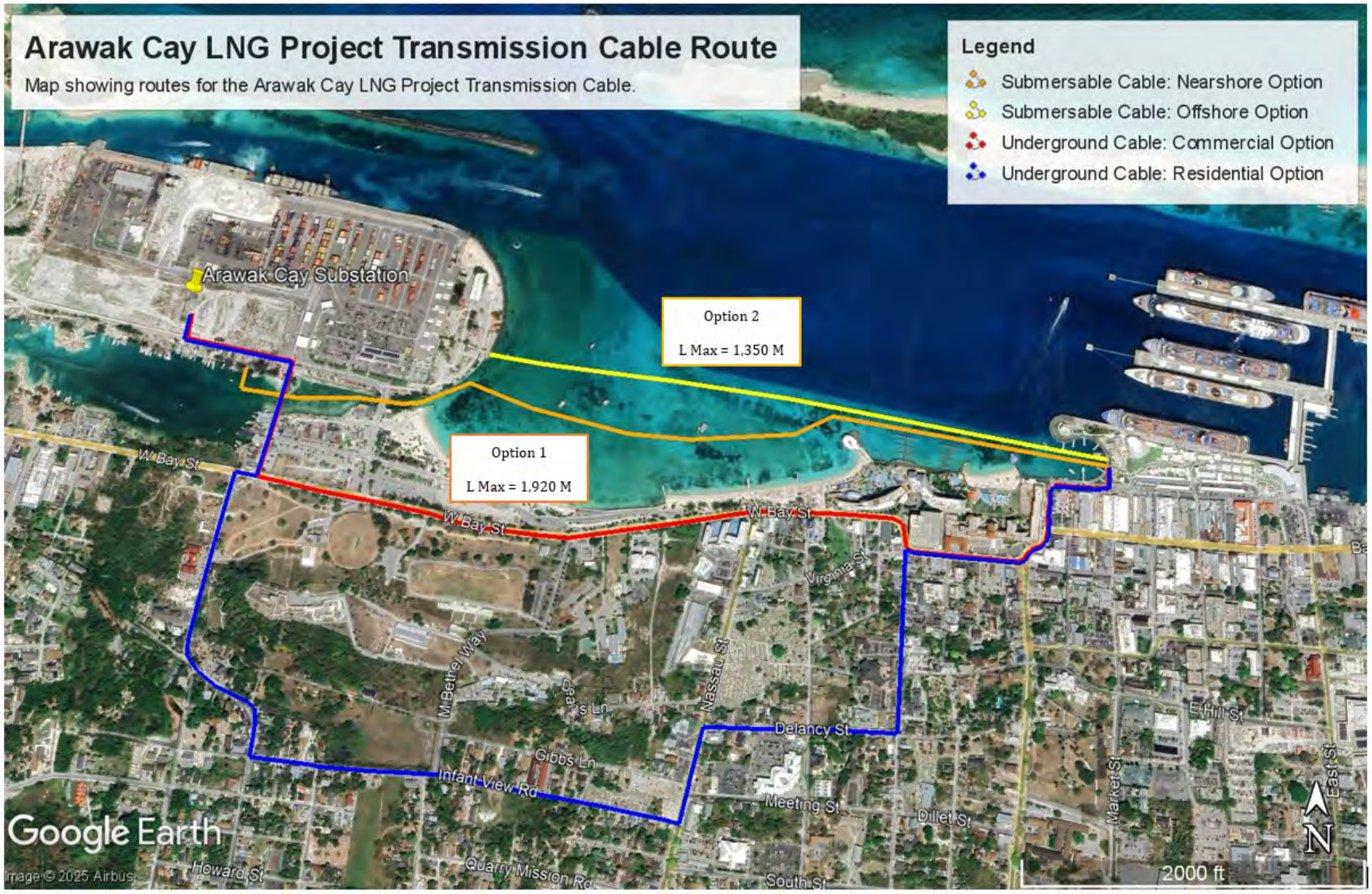


Figure 7: Arawak Cay LNG Transmission Cable Routes

2.3.2 The "No Action" Alternative

The "no-action" alternative would result in no impact on the marine and terrestrial component of this development, but would not necessarily prevent any or all future developments for the same area. No action may also limit the long-term growth of the area in comparison with similar places in The Bahamas and elsewhere in the Caribbean, which are larger and have a greater range of amenities. No additional significant impacts to the natural environment are likely to occur; however, the "no action" alternative would not provide the economic stimulus of the further development of Arawak Cay. With the significant level of expansion already approved, the "No Action" alternative has not been further considered.

3.0 Environmental and Social Baseline Assessment

A comprehensive baseline assessment has been conducted for the LNG plant and across the cable route, which starts at Arawak Cay and leads all the way to Nassau Cruise Port. The baseline assessment covers aspects of the physical, biological, and social environment.

This baseline evaluation covered key marine, botanical, and avian parameters, ensuring a thorough understanding of the existing flora, fauna, epifauna, and ecological conditions observed on The Project site. Physical aspects of the environment, such as ambient air quality, hydrology, geology, and soil types and ecotones, were also analyzed, providing detailed insights into the environmental characteristics of the sites, such as the presence of human-altered areas, coastal zones, and any other potential habitats.

Drone and satellite imagery were utilized to capture high-resolution data for the area, with the imagery providing critical information on topography, vegetation cover, and site conditions, aiding in the planning and management of current onsite conditions all the way through to construction activities.

3.1 Physical Aspects

The physical aspects of The Project site include non-living components such as climate, tides, topography, hydrology, air quality, noise quality, and bathymetry. These factors are crucial for assessing the environmental baseline and understanding how The Project may impact the surrounding area. All were evaluated and are essential for both construction and operational phases to ensure sustainable development.

3.1.1 Land Use

The current land use for The Project spans a brownfield site at Arawak Cay, which has been informally utilized as extra storage space for the adjacent port operations. This area, characterized by its industrial nature and proximity to existing maritime infrastructure, provides a strategic location for the LNG facility. From Arawak Cay, The Project route extends eastward, leading directly to the Nassau Cruise Port. The cruise port itself is a key driver of

Nassau's economy, supporting international tourism and maritime commerce. This existing land use context underscores the importance of integrating The Project into the area's economic framework, while ensuring that construction and operation are aligned with urban and industrial activities, thus minimizing disruption to this vital economic zone.

3.1.2 Climate

The Bahamas enjoys a subtropical climate of wet warm summers and cooler dry winters, identified by the Köppen climate classification as 'Aw'. Its geographical position in the Atlantic Ocean, off the southeast coast of Florida, allows it to enjoy warm temperatures and abundant sunshine, providing stunning scenic beauty throughout the year.

Average temperatures range between 75°F to 90°F, with cooler temperatures occurring in the northern islands and warmer conditions in the southern islands. The region is influenced by the trade winds, which moderate the heat, providing pleasant breezes. Rainfall is seasonal, with a wetter period from May to October, corresponding with the Atlantic hurricane season, which poses a significant risk to the islands. The entire Bahamas experiences tropical cyclones and is located in the Atlantic hurricane belt. The dry season typically lasts from November to April, with less frequent rainfall. Hurricanes and tropical storms are common during the summer and early fall, impacting the islands' weather patterns, infrastructure, and ecosystems.

When considering climate change as it relates to The Bahamas, it is important to note that the country is an archipelago of small islands, most of them uninhabited, and that more than eighty percent (80%) of the land surface is only a meter or less above mean sea level. The natural resources of the country are very limited, and the economy is built on tourism and services. Bahamians, like other island people, have historically had a close personal relationship with the land and the sea. Until the advent of modern tourism and banking industries, most Bahamians relied on these resources of both land and sea for survival.

3.1.2.1 Air Temperature

Throughout the year, there is a significant variation in different weather parameters. Temperatures fluctuate from 78.1°F in January to a tropical 89.8°F in August. Along with the temperatures, sea temperatures also see a similar variance, from 73.9°F in February to 86°F in August. The hours fluctuate marginally due to the country's location being close to the equator, resulting in relatively uniform daylight, between ten point six hours to thirteen point seven hours (10.6 hrs - 13.7 hrs). One can expect between six point nine hours to nine point two hours (6.9 hrs - 9.2 hrs) of sunshine throughout the year, with an ultraviolet index marking the range from eight to eleven (8 – 11), which signifies a high to extreme risk of harm from unprotected sun exposure.

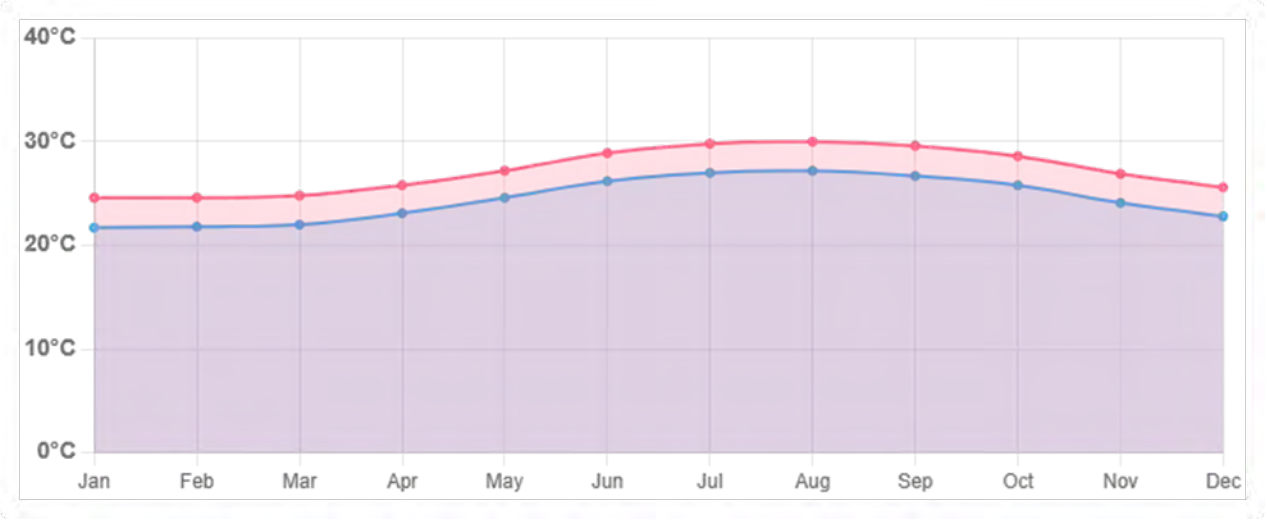


Figure 8: Nassau Average Temperature

3.1.2.2 Winds

Historically, the winds in The Bahamas are influenced by the Northeast trade winds and the occasional impact of tropical weather systems. The trade winds are relatively dry and yield fair weather cumulus clouds with long periods of sunshine. During late October into early May, the trade winds flow from the east and northeast, being interrupted by cold fronts which move south and southeast.

3.1.2.3 Rainfall

Rainfall in Nassau sees a dramatic variation with the turn of seasons, ranging from a moderate forty-seven millimeters (47 mm) in January to a heavy two hundred and thirty-six millimeters (236 mm) in August. Correspondingly, the number of rainfall days ranges from six (6) days in March and April to nineteen (19) days in August. The north and north central receive fifty to sixty inches (50-60 in) of rainfall annually.

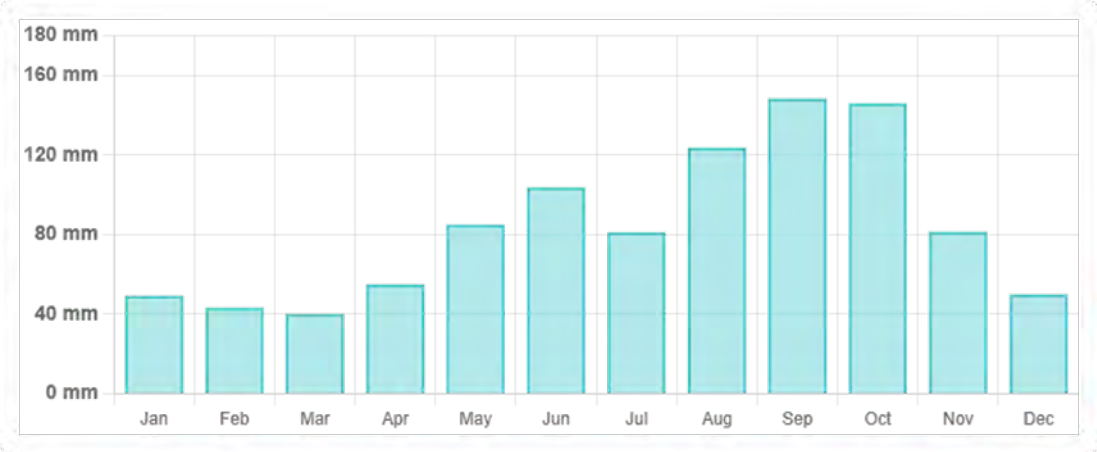


Figure 9: Nassau Average Precipitation

3.1.2.4 Hurricanes

The Bahamas is located within the Atlantic Tropical Cyclone basin. This basin includes much of the North Atlantic, the Caribbean Sea, and the Gulf of Mexico. On average, six to eight (6 - 8) tropical storms form within this basin each year. Low-lying islands and cays in The Bahamas are susceptible to high winds, heavy rainfall, storm surges, and flooding caused by these severe weather events, which can result in significant damage.

According to data from The Bahamas Department of Meteorology, a total of two hundred and twenty-four (224) hurricanes and one hundred and twenty-one (121) tropical storms passed within one hundred miles (100 mi) of The Bahamas from 1886 to 2022 (137 seasons). The majority of these storms occur in August, September, October, and November, with September being the most frequent month for hurricanes and October being the most frequent month for tropical storms. Recent data from the National Hurricane Center (NHC) shows that forty-seven (47) hurricanes, tropical storms, and tropical depressions affected The Bahamas between 2001 and 2022. Of these, six (6) were Category five (5) hurricanes on the Saffir-Simpson Hurricane Wind Scale, which categorizes hurricanes based on their sustained wind speed (See Table 17). In 2016, The Bahamas was impacted by Hurricane Matthew, with the islands of New Providence, Andros, and Grand Bahama receiving severe damage in some coastal areas. In 2017, The Bahamas was impacted by Hurricane Irma. Significant damage occurred on the island of Great Inagua; Crooked Island was impacted as well. The Bahamas was not hit by any hurricanes in 2018; however, in 2019, significant areas of the islands of Abaco and Grand Bahama were devastated by Hurricane Dorian. Hurricane Dorian was one of the strongest Atlantic hurricanes on record, with maximum sustained winds of one hundred and seventy-eight miles per hour (178 mph) and a minimum central pressure of nine hundred and ten millibars (910 mbar). Water levels reached up to two point one meters (2.1 m.) above ground level on the western end of Grand Bahama Island, with even higher levels reported farther east on Grand Bahama Island and on the Abaco Islands.

The Inter-American Development Bank estimated that Hurricane Dorian left over twenty-nine thousand (29,000) people homeless or jobless. The Bahamas has not been affected by any hurricanes from 2020 through 2023. The formation of these storms and possible intensification into mature hurricanes takes place over warm tropical and subtropical waters. Eventual dissipation or modification typically occurs over the colder waters of the North Atlantic or when the storms move over land and away from the sustaining marine environment. The official hurricane season lasts from June 1st to November 30th.

3.1.3 Tides

In the general vicinity of the island of New Providence, the tides are semi-diurnal with an average range of zero point seven five meters (0.75 m) and a tidal period of approximately twelve point four hours (12.4 hrs).

3.1.4 Topography

The topography of Arawak Cay is generally flat, with gently undulating limestone bedrock, human-altered environments, and industrial areas. The Cay is primarily characterized by reclaimed land with flat, compacted surfaces, making it suitable for industrial and commercial activities.

3.1.5 Hydrology

In The Bahamas, the physical hydrology and water resources are directly correlated due to the lack of true rivers. Generally, there is nowhere on the islands of The Bahamas where groundwater cannot be met in holes that penetrate three meters (3 m) below sea level. Water is always met in the range to zero-to-zero point nine meters (0 to 0.9 m) above sea level.

Hydrological Investigation

A water sample was collected on September 18th, 2024, from the coastal zone along the northern shoreline of Arawak Cay (see Appendix B). Samples were taken at a depth of one to two feet (1-2 ft.) Laboratory analysis indicated low nitrate levels, measured at 1.0 milligram per litre (mg/L) (see Table 1).

Table 1. Arawak Cay Project Hydrology Analysis Results

Arawak Cay Project Hydrology Analysis Results	
pH	7.90
Total Dissolved Solids (ppm)	32,800
Salinity (ppm)	12,600
Total Hardness (ppm)	1,197.7
Appearance	Clear

Odor	None
Nitrate (ppm)	1.0
Turbidity (FNU)	1.0

The results suggest that the area is not subject to significant nutrient loading, which is typically associated with pollution from wastewater or agricultural runoff. While the water quality does not meet the World Health_Organization (WHO) standards for human consumption, it remains suitable for supporting marine life.

There are no freshwater resources on the Arawak Cay site; however, care must be taken to avoid contamination of nearby marine ecosystems, especially during construction activities at the proposed LNG generation site. Groundwater in the area is brackish to saline, further confirming the absence of a potable water source and emphasizing the importance of managing surface runoff and construction-related discharges to protect coastal water quality.

3.1.5.1 Hydrological Recommendations

A hydrogeological and coastal survey of Arawak Cay confirmed no freshwater resources, with groundwater classified as brackish to saline. This is consistent with the site's artificial fill composition and coastal location, which limit the development of natural freshwater groundwater systems typically found on other parts of the island. Proposed structures are expected to have a low impact on water resources if built to match existing environmental conditions.

3.1.6 Geotechnical Studies

3.1.6.1 Geotechnical Investigation

The site exploration was carried out between December 20, 2024, and January 9, 2025 (See Appendix C). There were seven (7) boreholes and six (6) test pits drilled, revealing the presence of groundwater at about nine feet (9 ft.) below grade level. The subsurface contains varying levels of limestone and sandy limestone fill, with some layers exhibiting organic material and cavities.

The upper layer contains sandy limestone fill thirty-six to fifty-six inches (36-56 in.) thick with blow counts averaging forty-four blows per foot (44 bpf.). The intermediate layer contains less dense sandy limestone fill down to nine to ten feet (9-10 ft.), and beneath groundwater, there was a mixture of sand and limestone fill to thirty-two feet (32 ft.).

3.1.6.1.1 Foundation Recommendations

Shallow foundations – for footings placed at least four feet (4 ft.) deep, an allowable bearing capacity of three thousand pounds per square foot (3,000 psf.) is recommended.

Deep Foundations – Augered Cast-In-Place (ACIP) piles, twenty-four inches (24 in) in diameter and thirty-five feet (35 ft.) deep, are suggested to support the proposed structures. These piles should have an allowable compressive load of two hundred and fifty kips (250 kips).

3.1.6.1.2 Pavement and Drainage

Pavement areas should be constructed with at least six inches (6 in) of compacted fill, and proper surface drainage should be incorporated to avoid excessive moisture accumulation.

3.1.6.1.3 Building Pad and Earthworks:

All surface vegetation and unsuitable material should be removed, and imported limestone fill should be used for the engineered fill, compacted to ninety-five (95%) of the maximum Modified Proctor dry density.

3.1.6.1.4 Slope and Stability

No major concerns regarding slope stability were identified. However, for excavated slopes, a minimum 2H:1V ratio is recommended to avoid failure.

3.1.6.1.5 Lateral Design Parameters

For retaining walls and equipment pads, the recommended soil density is ninety-five pounds per cubic foot (95 pcf.), with a friction angle of twenty-seven degrees (27°).

3.1.6.1.6 Limitations and Recommendations

Additionally, soil during construction may differ from that observed during the investigation, and recommends further drilling to verify geophysical anomalies.

In conclusion, the site is deemed suitable for development, with specific recommendations for foundation types, earthworks, and further investigations into geophysical anomalies.

3.1.6.2 Ground Penetrating Radar (GPR) Survey

A GRP survey mapped anomalies with the fill, such as voids, boulders, and possible erosion features (see Appendix D). Most anomalies were small (less than three feet (3 ft.) wide) and were scattered throughout the site. There were thirteen (13) medium anomalies (three to five feet (3 ft.-5 ft.) wide) identified at around eight feet (8 ft.) deep, near the groundwater table. Two (2) larger anomalies, five to ten feet (5 ft-10 ft.), were identified with similar depth and proximity.

Most anomalies are believed to be due to heterogeneities in the limestone fill, like boulders or small voids. The medium and large anomalies, located near the water table, may indicate areas of erosion or the potential origin points for fill raveling.

These anomalies suggest the presence of larger voids or boulders within the fill that could affect future construction. However, further investigation of the larger anomalies is

recommended through borehole drilling to confirm their nature and determine the potential impacts on foundation design.

3.1.7 Air Quality

The existing ambient air quality in The Bahamas is affected by strong easterly trade winds for most of the year. General windy conditions during the year tend to transport emissions from sources located on the Islands out over the water, rather than allowing them to accumulate and concentrate in ambient air over areas of population.

3.1.8 Bathymetric Studies

The Bathymetric survey images illustrate detailed underwater topography using contour lines and depth measurements. These visuals are based on data collected via a single-beam echo-sounder technology and are referenced to Mean Lower Low Water (MLLW) for vertical measurements and WGS84 UTM Zone 18N for horizontal positioning. These maps help identify navigable and non-navigable zones, such as areas with depths of around two (2) feet, which are marked accordingly to guide marine operations and infrastructure planning.

Bathymetric data were gathered, providing a comprehensive spatial understanding of the seabed within the marine area, highlighting features like channels, shallow zones, and underwater gradients (See Appendix E).

3.2 Biological Environment

3.2.1 Botanical Survey

Field studies were conducted on the 1st of September 2025 to assess the terrestrial ecosystem of the site. A two (2) person team consisting of JSS Consulting team members conducted the assessment.

3.2.1.1 Methodology

Vegetation types were mapped and verified by walking along the site's interior and perimeter, utilizing established footpaths, roadways, and cleared pathways that navigated through vegetation. Vegetation Type taxonomy was based on Areces et al. (1999). Vascular plant species occurring in each vegetation type were recorded and used to compile a floral list (See Table 2). Plant taxonomy was based on Correll and Correll (1982). The presence, location, and abundance of vascular species listed under the National Invasive Species Strategy for The Bahamas (2013) and the Protected Trees Order (2021) were noted and tagged when encountered.

3.2.1.2 General observations

The weather conditions on September 1st, 2025, were partly cloudy with temperatures recorded to be in the low 90s. Field biologists noted the presence of trash surrounding The Project site and noise pollution caused by the trucks that frequent the area (See Photo 6). Heavy machinery and site workers were also observed on The Project (See Photo 7-8).

Photo 6: Trash observed on The Project site.

Photo 7: Heavy machinery on The Project site.

Photo 8: Site workers and heavy machinery observed on The Project site.

3.2.1.3 Result

3.2.1.3.1 Habitat Description

The terrestrial site contains one (1) terrestrial ecosystem, an Interior Upland. In addition to this, there was also one (1) vegetation class observed on the site, a Human Altered Environment.

Site topography can be described as relatively flat, with sandy limestone substrate. Vegetation growth can be described as secondary growth throughout the entirety of The Project site.

3.2.1.3.1.1 Interior Upland

There is one (1) interior upland vegetation type observed on The Project site, a human-altered environment.

3.2.1.3.1.1.1 Human-Altered Environment

Human-altered environments are those where the natural habitat has been altered or degraded by human involvement. These habitats are primarily composed of regenerative, pioneer, and invasive species. This vegetation type is observed surrounding the cleared

project area that is currently fenced off. It contains flora species such as Jumbay (*Leucaena leucocephala*), Jasmine Vine (*Jasminum fluminense*), and Morning Glory (*Ipomoea indica*).

3.2.1.3.2 Vegetation Map

Figure 10: Vegetation Class distribution map on the Arawak Cay LNG Facility.

3.2.1.3.3 Species List

Botanical and terrestrial fauna surveys were conducted to form a species list. The presence and location of vascular and fauna species observed were recorded.

Table 2: Botanical Species List

Family	Common Name	Botanical Name	Location (HAE)
Fabaceae	Jumbay	*Leucaena leucocephala*	✓
Asteraceae	Shepard Needle	*Bidens alba*	✓
Verbenaceae	Capeweed	*Phyla nodiflora*	✓
Oleaceae	Jasmine Vine	*Jasminum fluminense*	✓
Verbenaceae	Rat's Tail	*Stachytarpheta jamaicensis*	✓
Convolvulaceae	Morning Glory	*Ipomoea indica*	✓
Fabaceae	Monkey Tamarind	*Mucuna puriens*	✓
Asteraceae	Jack Ma D	*Koanophyllon villosum*	✓
Euphorbiaceae	Unknown	*Euphorbia hyssopifolia*	✓
Asteraceae	Rong Bush	*Wedelia bahamense*	✓
Fabaceae	Caribbean Stylo	*Stylosanthes hanata*	✓
Poaceae	Drop Seed Grass	*Sporobolus domingensis*	✓

3.2.1.3.3.1 Fauna

Terrestrial ecosystems support a variety of other fauna. These species depend on and aid in the overall health of the ecosystem. The proposed project site contains reptiles, molluscs (gastropoda), and a myriad of arthropods (arachnids, insects, and hymenopterans).

Table 3: Fauna Species List

Family	Common Name	Scientific Name
Pieridae	Lyside Sulphur	*Kricogonia lyside*
Apidae	Honeybee	*Apis mellifera*
Vespidae	Wasp	*Polistes major*

3.2.1.3.3.2 Invasive Species Survey

A total of four (4) invasive species were observed on The Project site. The occurrence, abundance, and suggested control measures for these species are listed below (See Table 4). It is advised to control species whose distribution and richness are too extensive to eradicate,

but whose spread can be inhibited by a variety of mitigation strategies. On the other hand, species that can be eradicated are those whose distribution and richness are relatively small.

Table 4: Invasive Species Summary and Recommendations

Species	Occurrence and Abundance	Recommendations
Jasmin Vine *(Jasminum fluminense)*	Vines in fruit were observed growing along the fence and vegetation within the HAE on The Project site.	Control
Monkey Tamarind *(Mucuna puriens)*	Vines observed growing along the fence within the HAE on The Project site.	Eradication
Jumbay *(Leucaena leucocephala)*	Two to three feet (2 ft. -3 ft.) tall seedlings observed growing around the perimeter of The Project site.	Control
Morning Glory (*Ipomoea indica*)	Vines observed growing along the fence within the HAE on The Project site.	Control

*Recommendations as per the National Invasive Species Strategy for The Bahamas, 2013.

Photo 9: Monkey Tamarind *(Mucuna puriens)*

3.2.1.3.3.3 Protected Species Survey

The Forestry Act Declaration of Protected Trees Order 2021 lists one hundred and twenty-seven (127) vascular plant species as protected, and eighty-six (86) species are listed as Endemic, Endangered, or Threatened. Endemic species are native and restricted to the archipelago, island groupings, or specific islands. Additionally, forty-one (41) are listed as

Cultural, Historical, or Economic. Cultural or historical species are species of historical or cultural importance, such as those utilized for boat building and straw work. One (1) species listed on the Forestry Act Declaration of Protected Trees Order 2021 was recorded at the site (See Table 5).

Endemic, Endangered, or Threatened Protected Trees

Rong Bush (*Wedelia bahamensis*) is the only protected species observed on site that is listed under the subsection of Endemic or Endangered, or Threatened Protected Trees (Schedule 1) in the Act.

Table 5: Protected species observed on The Project site.

#	Species Recorded		Location
	Common Name	Botanical Name	
1	Rong Bush	*Wedelia bahamensis*	Seven inches (7 in) herbaceous plants in flower observed growing within the HAE on The Project site.

Photo 10: Rong Bush (*Wedelia bahamensis*)

Cultural, Historical, and Economic Protected Trees

There were no species observed on site listed under the subsection of Cultural, Historical, and Economic Protected Trees in the Act.

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES is a transnational treaty to conserve and protect endangered flora and fauna from the threats of international trade. CITIES have three (3) Appendices (I, II, III) that contain lists of species that are provided with distinct types of protection from overexploitation. There were no species observed on site listed on the CITES red list.

3.2.2 Avian Survey

An avian survey was conducted to identify the presence, abundance, and habitat utilization of avian species within the site boundaries.

3.2.2.1 Methodology

The assessment comprised of one (1) hour and twenty (20) minutes of active avian and ecological observations. Field studies consist of a fall avian survey conducted on September 1st, 2025, between 11:00 am and 12:20 pm. The avifauna of the area was assessed and recorded by walking along the perimeter of the site and within the interior of the site by utilizing established footpaths and roadways. Avifauna and fauna taxonomy is based on Currie et al (2019). Species numbers were recorded in the abundance categories: Single (1), Few (2-10), and Many (11-100). Species recorded were compiled for final abundance estimates. Status is based on the International Union for Conservation of Nature (IUCN).

3.2.2.2 Findings

3.2.2.2.1 Avian Species Diversity

Two (2) species were recorded during the avian survey (See Table 6).

Table 6: Avifauna observed

Table 6 Key:

Range	Status	Observations
PRB = Permanent Resident Breeding	LC = Least Concern (Conservation-IUCN)	Single = 1 individual
SRB = Summer Resident Breeding	NT = Near Threatened (Conservation-IUCN)	Few = 2-10 individuals
E =Endemic Species	IUCN = International Union of Conservation of Nature	Many = 11-100 individuals
UWR = Uncommon Winter Resident		

Family	Common Name	Scientific Name	Master Observation	Range/Conservation Status
Columbidae	Common Ground Dove	*Columbina passerina bahamensis*	Few	PRB/E/LC
Larinae	Laughing Gull	*Leucophaeus atricilla*	Few	PRB/LC

3.2.2.2.2 Range

A species' range can be defined as an area in which a particular species can be found. Migratory birds tend to have seasonal ranges, while species with restricted ranges spend their entire life on the same island or in the same geographical region.

3.2.2.2.2.1 Permanent Resident Breeding

Permanent Resident breeding (PRB) species refers to the resident species that live and breed year-round throughout the Bahama Islands. All avian species observed on site are PRB species.

3.2.2.2.2.2 Endemic Species and Subspecies

Endemic species and subspecies are birds that exist only in The Bahamas. There was one (1) endemic subspecies, Common Ground Dove (*Columbina passerine bahmensis*), observed on The Project site.

3.2.3 Marine Survey

On September 5th, 2025, field studies were conducted to assess the coastal environment of Arawak Cay. A four (4) person team consisting of JSS Consulting team members and one (1) boat captain conducted the assessment. The survey was conducted to record the existing conditions of the site and the diversity of benthic flora and fauna within the direct and indirect footprint of works. Scope of works includes:

- Assessment of the benthic composition of the coastal ecosystem.
- Assessment of the ecosystem's health, inclusive of corals for Bleaching, Stony Coral Tissue Loss Disease (SCTLD), and other diseases.
- Conducting a marine Survey of the flora and fauna abundance within the ecosystems.

3.2.3.1 Methodology

The survey area was assessed using the roving diver method (RDM). Divers assessed the benthic composition of the area using a Chasing F1 Surface Pro Drone and took representative and notable conditions. One (1) parallel roving transect to the shoreline was done in the area (See Figure 11). The roving transect was approximately one thousand forty-

two feet (1,042 ft.) from the shoreline and approximately four thousand feet (4,000 ft.) in length.

The Chasing F1 Surface Pro Drone was also used to complete spot checks along the transmission cable route (See Figure 12). Sixteen (16) spot checks were completed to note changes in benthic habitat and provide a general description of the area. GPS Coordinates (See Appendix F) were taken for each spot check using a Garmin Montana 680t.

Habitat Characterization and Mapping

Benthic habitats were identified by the substrate type (e.g., sand, hard bottom, macroalgae, seagrass bed, etc.). Important areas, along with any ecologically and commercially important species utilizing the areas, were noted, and representative photos were taken. Habitat types identified and recorded by divers were used along with satellite imagery to create a GIS benthic habitat map.

Species Diversity

Coral health was visually observed during the assessment for the presence of diseases such as Stony Coral Tissue Loss Disease (SCTLD) and coral bleaching. Representation photos were taken.

A record was taken of all flora and fauna species, and a species list was created. Biota was classified into genus and species using Humann et al, 2013, Reef Coral Identification, Humann et al., 2013, Reef Fish Identification, and Humann et al., 2013, Reef Creature Identification. Algae were identified to genus and species if possible, or to the functional group (e.g., turf algae, fleshy macroalgae, etc.). Data will be presented in a table with the species' scientific and common names and abundance. Species abundance was recorded as Single (1), Few (2-10), Many (11 -100), and Abundant (100+).

Figure 11: Transect Map

Figure 12: Spot Check Map

Water Quality Analysis

Surface water quality sampling was conducted to document baseline water quality conditions in The Project area. The following parameters were analyzed using the Horiba U-50 Multipara meter Water Quality Meter:

- Salinity
- Turbidity
- Temperature
- pH
- Dissolved oxygen
- Total dissolved solids

3.2.3.2 Depth Measurement

Depth measurements were taken using the depth finder on the Chasing F1 Surface Pro Drone. Depths were taken at the same location, spot checks and water quality readings were conducted (See Table 7).

3.2.3.3 Results

3.2.3.3.1 General Observation

The assessment started at approximately 11:34 am and concluded at approximately 12:53 pm. The weather conditions during this assessment were cloudy with nine miles per hour (9 mph) winds out of the southwest. Low tide was observed, and the water temperature was on average 30°C.

The surveyed site encompasses shallow water between three feet (3 ft.) and forty-five point five feet (45.5 ft.). Based on a range of one to ten (1-10), with one (1) being zero visibility and ten (10) being transparent, visibility was six (6) within the assessed areas.

3.2.3.3.2 Water Quality Analysis

Water quality samples were taken in the surveyed areas during the assessment. A total of sixteen (16) samples were taken and recorded (See Table 7). All readings were within normal range for a coastal environment.

Table 7: Arawak Cay Project Water Quality Analysis Results

Arawak Cay Project Water Quality Analysis										
Water Sample	**Latitude**	**Longitude**	**Time (am)**	**Depth (ft.)**	**Temperature(°C)**	**pH**	**Salinity (ppt)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/l)**	**Total Dissolved Solids (g/L)**
1	25°4'56.41"N	77°21'18.34"W	11:34	3.5	30.21	7.80	36.29	0.0	10.90	32.9
2	25°4'56.23"N	77°21'17.64"W	11:58	9	30.20	9.40	36.42	0.0	8.95	33.0
3	25°4'55.59"N	77°21'15.29"W	12:04	11	30.15	9.46	35.87	0.0	8.31	32.5
4	25°4'54.85"N	77°21'12.53"W	12:08	12	30.10	9.47	36.34	0.0	8.34	32.9
5	25°4'54.12"N	77°21'9.86"W	12:12	10.05	30.10	9.42	35.82	0.0	8.19	32.5
6	25°4'53.37"N	77°21'7.08"W	12:15	11.5	30.10	9.51	36.37	0.0	8.13	32.9
7	25°4'52.65"N	77°21'4.43"W	12:18	45.5	30.13	9.59	36.40	0.0	8.32	33.0
8	25°4'51.90"N	77°21'1.63"W	12:24	16	30.08	9.70	36.35	0.0	8.27	32.9
9	25°4'51.17"N	77°20'58.90"W	12:27	12.5	30.07	9.66	35.46	0.0	8.26	32.2
10	25°4'50.44"N	77°20'56.20"W	12:30	11.5	30.16	9.39	35.78	0.0	8.22	32.5
11	25°4'49.72"N	77°20'53.53"W	12:33	10	30.23	9.35	34.91	0.0	8.39	31.8
12	25°4'48.98"N	77°20'50.83"W	12:39	11	30.16	9.55	36.10	0.0	8.35	32.7
13	25°4'48.24"N	77°20'48.08"W	12:42	9	30.08	9.55	35.77	0.0	8.27	32.4
14	25°4'47.50"N	77°20'45.37"W	12:45	9	30.37	9.70	35.80	0.0	8.62	32.5
15	25°4'46.93"N	77°20'43.25"W	12:50	8	30.25	9.54	35.06	0.0	9.86	31.9
16	25°4'46.56"N	77°20'41.90"W	12:53	8.6	30.23	9.54	35.62	0.0	8.24	32.3

Figure 13: Water Quality Analysis Map

3.2.3.3.3 Benthic Description

The following section provides descriptions of the benthic habitat observed on The Project site. Due to the similarity in benthic habitat along the transect and spot checks, the habitats encountered are separated into three (3) generalized categories and five (5) variations:

- Sandy Bottom
    - Sandy Bottom with Macroalgae
    - Sandy Bottom with Seagrass
    - Silt with Macroalgae
- Hard Bottom
    - Hard Bottom with Macroalgae
    - Hard Bottom with Seagrass
- Seagrass Bed

3.2.3.3.3.1 Sandy Bottom

Sandy bottom habitats include sandy bottom with macroalgae, sandy bottom with seagrass, and silt with macroalgae.

3.2.3.3.3.1.1 Sandy Bottom with Macroalgae

Sandy bottom with macroalgae was observed extending from the hard bottom with macroalgae habitat on the western and eastern sections of the cable route. Dominant algae observed included Three Finger Leaf Algae (*Halimeda incrassata*), Flat-top Bristle Brush (*Penicillus pyriformis*) and Bristle Ball Brush (*Penicillus dumetosus*), Pinecone Algae (*Rhipocephalus phoenix*), and Laurencia (*Laurencia sp.*).

Fauna abundance and diversity were low in this area.

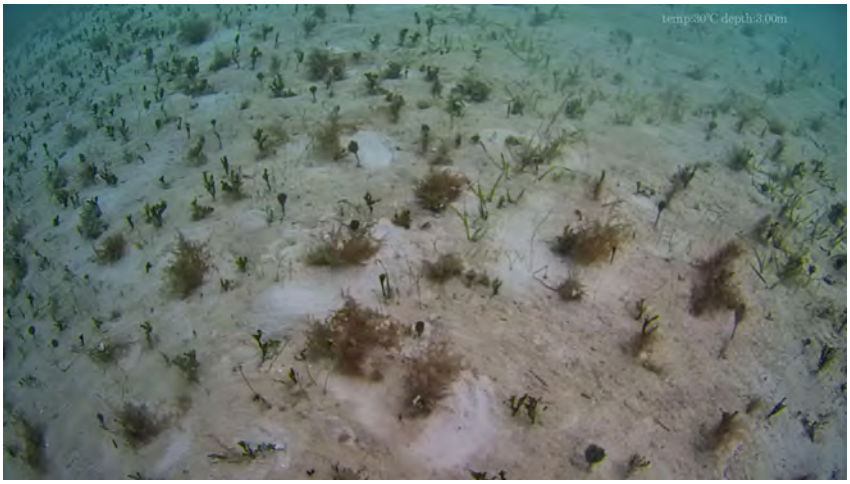


Photo 11: Hard Bottom with Macroalgae (*Sargassum fluitans)*

3.2.3.3.3.1.2 Sandy Bottom with Seagrass

Sandy bottom with seagrass was observed at the center and eastern region of the cable route. Turtle Grass (*Thalassia testudinum*) was the most dominant species observed in low to moderate density. Turtle Grass (*Thalassia testudinum*) was observed intermixed with Manatee Grass (*Syringodium filiforme*) and macroalgae such as Bristle Ball Brush (*Penicillus dumetosus*) and Pinecone Algae (*Rhipocephalus phoenix*), in varying amounts.

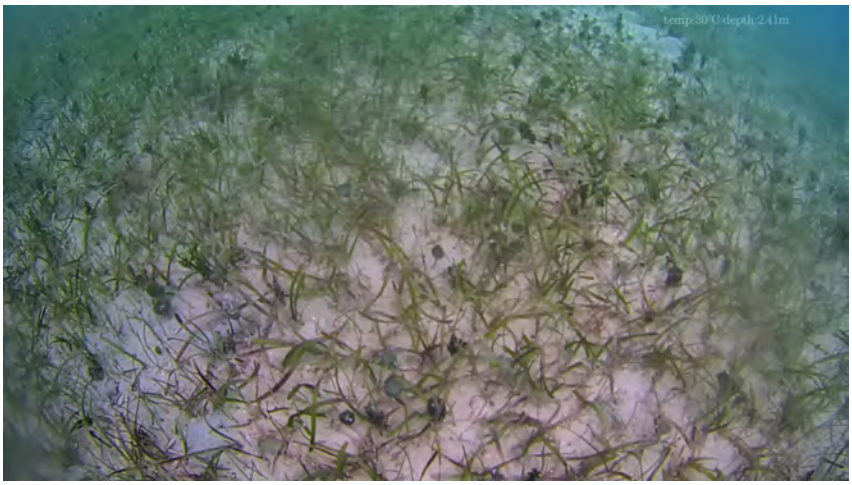


Photo 12: Sandy Bottom with Seagrass

3.2.3.3.3.1.3 Silt with Macroalgae

Silt with macroalgae was observed in the center of the cable route. Dominant macroalgae observed include Three Finger Leaf Algae (*Halimeda incrassata*), Bristle Ball Brush (*Penicillus dumetosus*), and Pinecone Algae (*Rhipocephalus phoenix*). Macroalgae were observed to cover areas in sparse to moderate density throughout this benthic habitat.

Fauna abundance and diversity were low in this area. Fish species observed included Blue Tang (*Acanthurus coeruleus*) and Banded Butterflyfish (*Chaetodon striatus*). Additionally, Queen Conch (*Aliger gigas*) was the predominant epifauna species observed.

Photo 13: Silt Sandy Bottom with Macroalgae

3.2.3.3.3.2 Hard Bottom

Hard bottom areas consisted of hard bottom with macroalgae and hard bottom with seagrass habitats.

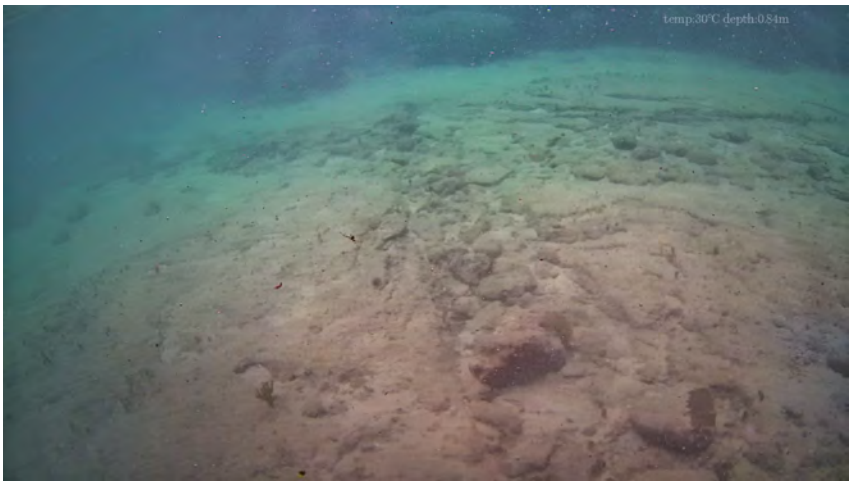


Photo 14: Hard Bottom

3.2.3.3.3.2.1 Hard Bottom with Macroalgae

Hard bottom with macroalgae habitats was observed at the start (western end) of the cable route extending from the hard bottom with seagrass habitat. Macroalgae were observed in sparse density. Dominant macroalgae included Bristle Ball Brush Algae (*Penicillus dumetosus*) and Pinecone Algae (*Rhipocephalus phoenix*). Fauna diversity and abundance were observed to be low in this habitat.

Photo 15: Hard Bottom with Macroalgae.

3.2.3.3.3.2.2 Hard Bottom with Seagrass

Hard Bottom with Seagrass was observed at both ends of the cable route. This area had low rugosity, and loose rubble was observed in pockets of the hard bottom. Seagrass was observed in sparse density, with the dominant seagrass observed being Turtle Grass (*Thalassia testudinum*). Coral species observed included the Mustard Hill Coral (*Porites asteroides*).

Fauna diversity and abundance were low in this area. The predominant epifauna observed included Black Ball Sponge (*Ircinia strobilina*), Branchlet Sponge (*Aplysina insularis*).

Photo 16: Hard Bottom with Turtle Grass (*Thalassia testudinum*)

3.2.3.3.3.3 Seagrass Bed

Seagrass beds were observed in patches extending from the sandy bottom with macroalgae, further to the east of the cable route. Turtle Grass (*Thalassia testudinum*) was the most dominant species. The density of the seagrass beds ranged from twenty to ninety percent (20% -90%) cover.

Fauna diversity and abundance were low in this area. Fish observed included: Houndfish (*Tylosurus crocodilus*) and Beaugregory (*Stegastes leucostictus*). The was also one (1) Green Turtle (*Chelonia mydas*) observed in this habitat.

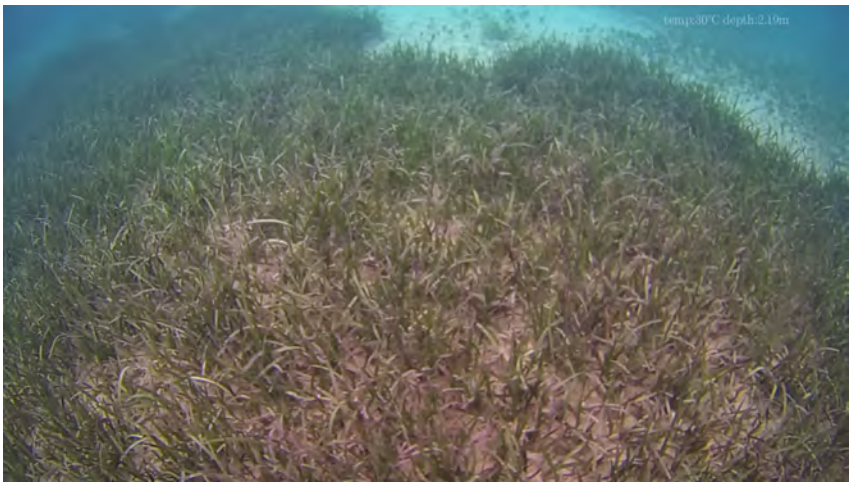


Photo 17: Seagrass Bed

3.2.3.3.4 Benthic Habitat Map

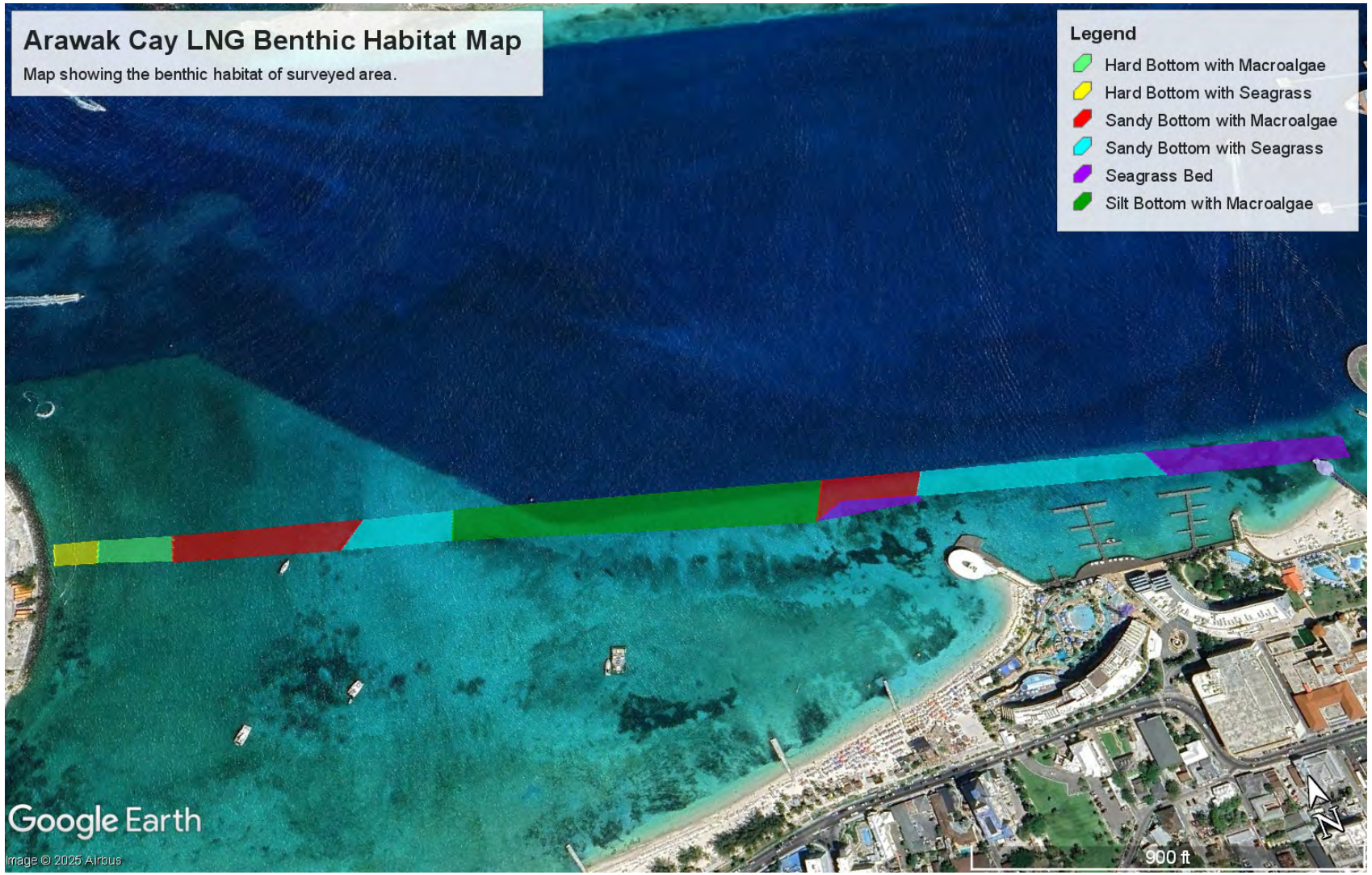


Figure 14: Benthic Habitat Map

3.2.3.3.5 Species List

Roving diver visual fish surveys were conducted to form the species list. Fish, coral, and other fauna and epifauna observed were identified and given a frequency rating (based on occurrence) of Single (1 individual), Few (2-10 individuals), Many (11-100 individuals), or Abundant (more than 100 individuals).

3.2.3.3.5.1 Fauna

3.2.3.3.5.1.1 Fish Species

Fish species were observed throughout the entire surveyed area, but were mainly observed in crevices of the hard bottom habitat. There were six (6) fish species observed during the assessment.

Table 8: Fish species observed during the assessment

Common Name	Scientific name	Abundance
Houndfish	*Tylosurus crocodilus*	Single
Banded Butterflyfish	*Chaetodon striatus*	Few
Blue Tang	*Acanthurus coeruleus*	Few
Silversides*	*Atherinidae, Clupeidae, Engraulididae Family**	Many
Beaugregory	*Stegastes leucostictus*	Few
Bluehead Wrasse	*Thalassoma bifasciatum*	Few

Photo 18: Blue Tang (*Acanthurus coeruleus*).

3.2.3.3.5.1.2 Coral Species

The majority of the coral species were observed in the hard bottom habitats. There was (1) coral species observed during the assessment.

Table 9: Coral species observed during the assessment

Common Name	Scientific name	Abundance
Mustard Hill Coral	*Porites astreoides*	Abundant

3.2.3.3.5.1.3 Other Fauna and Epifauna

One (1) other fauna species and five (5) epifauna species were observed during the assessment. The fauna species observed was a green turtle (*Chelonia mydas*), and the epifauna included Queen Conch (*Aliger gigas*), Black Ball Sponge (*Ircinia strobilina*), Branchlet Sponge (*Aplysina insularis*), and Southern Lungworm (*Arenicola cristata*). The majority of the non-coral invertebrate species were observed on the sea floor.

Table 10: Other Fauna and Epifauna observed during the assessment

Common Name	Scientific name	Abundance
Green Turtle	*Chelonia mydas*	Single
Queen Conch	*Aliger gigas*	Few
Black Ball Sponge	*Ircinia strobilina*	Few
Southern Lugworm	*Arenicola cristata*	Many
Branchlet Sponge	*Aplysina insularis*	Few

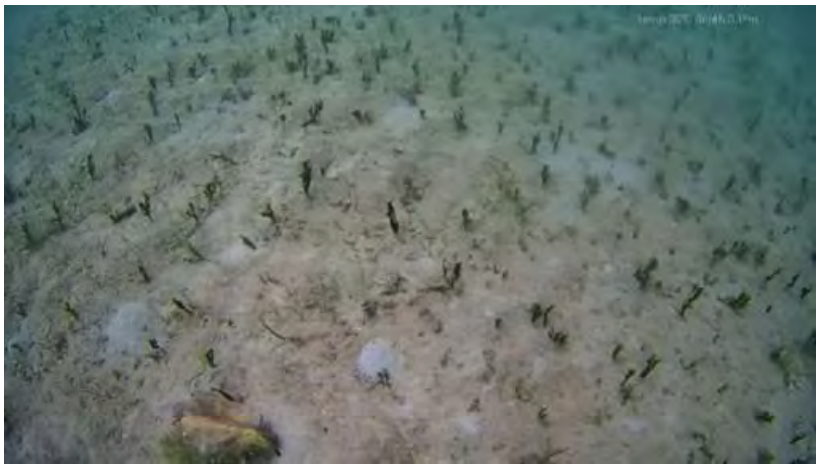


Photo 19: Queen Conch (*Aliger gigas)*

3.2.3.3.5.2 Flora Species

Flora Species were observed in abundance throughout The Project footprint. There were eight (8) flora species observed across the site.

Table 11: Flora species observed during the assessment

Common Name	Scientific name
Bristle Ball Brush	*Penicillus dumetosus*
Flat-Top Bristle Brush	*Penicillus pyriformis*
Pinecone Algae	*Rhipocephalus phoenix*
Macroalgae sp.	*Udotea sp.*
Three-Finger Leaf Algae	*Halimeda incrassata*
Laurencia	*Laurencia sp.*
Manatee Grass	*Syringodium filiforme*
Turtle Grass	*Thalassia testudinum*

Photo 20: Three Finger Leaf Algae (*Halimeda incrassata*), Bristle Ball Brush (*Penicillus dumetosus*), and Pinecone Algae (*Rhipocephalus phoenix*)

3.2.3.3.6 Commercially Important, Endangered, and Protected Species

There were six (6) marine species observed during this assessment that are listed on the Convention on International Trade of Endangered Species (CITES) list and/or the International Union for Conservation of Nature (IUCN) Red List (See Table 12). The CITES listing group species are in Appendices I, II, and III. There were no species observed during the assessment that are listed on the CITES list.

The IUCN Red List Categories and Criteria classify species at high risk of global extinction. It divides species into nine (9) categories: Not Evaluated, Data Deficient, Least Concern, Near Threatened, Vulnerable, Endangered, Critically Endangered, Extinct in the Wild, and Extinct.

Table 12: ICUN and CITES status for species observed

Common Name	Scientific Name	CITES Listing	IUCN Listing
Mustard Hill Coral	*Porites astreoides*	Appendix II	Least Concern
Green Turtle	*Chelonia mydas*	Appendix I	Endangered
Banded Butterflyfish	*Chaetodon striatus*	N/A	Least Concern
Beaugregory	*Stegastes leucostictus*	N/A	Least Concern
Blue Tang	*Acanthurus coeruleus*	N/A	Least Concern
Bluehead Wrasse	*Thalassoma bifasciatum*	N/A	Least Concern

There are some species of fauna and flora observed during the assessment that are important to the economy of The Bahamas and are important key stone species for the marine ecosystems. Other species are protected under The Bahamas Fisheries Resources (Jurisdiction and Conservation) Act 1977 (highlighting amendments 2006, 2010, 2011) and the Fisheries Act 2020.

Stony Corals, such as Smooth Flower Coral (*Eusmilia fastigiata*), help to build reef systems that become important habitats for a large variety of marine biodiversity. All Stony Coral species are listed in CITES Appendix II and are protected under the Fisheries Resources (Jurisdiction and Conservation) Regulations. Green Turtles (*Chelonia mydas*) are listed in CITES Appendix I and are protected under the Fisheries Resources (Jurisdiction and Conservation) Regulations. Additionally, Manatee Grass (*Syringodium filiforme*) and Turtle Grass (*Thalassia testudinum*) are protected under the Declaration of Protected Trees Order, 2021.

Commercially important refers to species that are sold for economic gain. Endangered species refer to species that are at high risk of extinction. Protected species refer to species safeguarded by laws. Ecologically important species refer to species that perform crucial roles in maintaining a healthy ecosystem. Regulated Species refer to species whose trade, movement, or use is governed by laws, regulations, or international conventions. Table 13 below outlines these key species.

Table 13: Commercially important, endangered, and protected species of The Bahamas

Table key: **CI** = Commercially Important, **ES** = Endangered Species, **PS** = Protected Species, **EI** = Ecologically Important, **RS** = Regulated Species

Common Name	Scientific Name	Status
All Coral Species	*Scleratinia spp.*	PS/EI
Green Turtle	*Chelonia mydas*	ES/PS
Turtle Grass	*Thalassia testudinum*	PS

Manatee Grass	*Syringodium filiforme*	PS

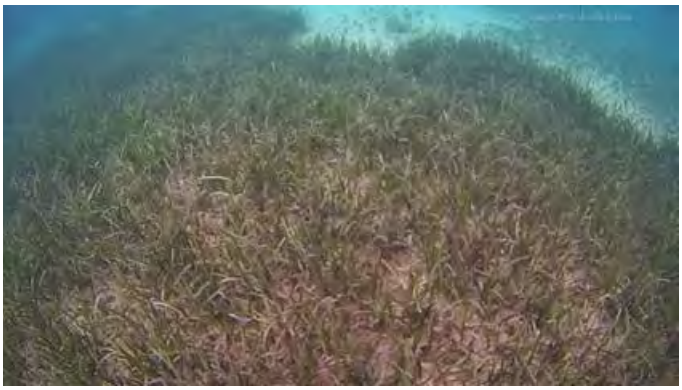


Photo 21: Turtle Grass (*Thalassia testudinum*)

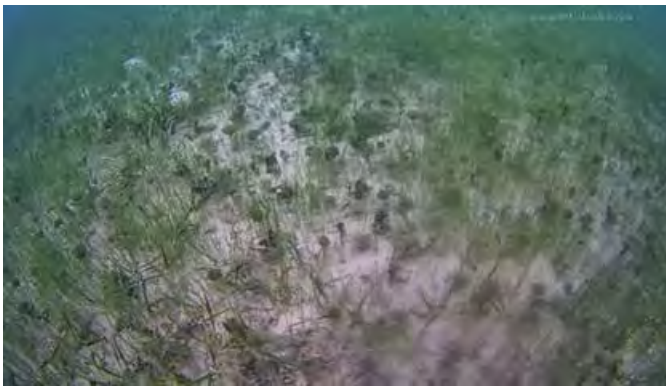


Photo 22: Turtle Grass (*Thalassia testudinum*) intermixed with Manatee Grass (*Syringodium filiforme*) and Macroalgae (*Macroalgae sp.*)

3.2.3.4 Discussion

The assessed area consisted of a coastal marine ecosystem. The Project work includes the construction of a Combined Cycle Power Plant on Arawak Cay and a cable that leads from the power plant to Nassau Cruise Port.

The descriptions of benthic habitat observed are a fair representation of the vegetation cover and biodiversity on the site, as the site was most recently dredged approximately three (3) years ago. The benthic habitats appear to be healthy and consist of typical flora and fauna populations for the area. There was also no evidence of degraded water quality.

While it is likely that additional species would be recorded with further field studies this is not likely to impact the results of this study for the purposes it is intended.

Benthic Composition

The benthic composition of the assessed area consisted of hard bottom habitats (hard bottom with macroalgae and hard bottom with seagrass), that extended from the coastline and transitions to sandy bottom habitats (sandy bottom with macroalgae, sandy bottom with seagrass and silt with macroalgae) to the center of the assessed area. Seagrass habitats was observed further east and extended from the sandy bottom habitats.

Fish Diversity

Fish diversity and abundance was considered to be low for the site. Majority of fish species were observed to be transitioning from one habitat to the next. This is to be expected as there were limited crevices in the habitats to provide shelter for the species.

Seagrass

Seagrass was observed on the western and eastern sides of the assessed area. Seagrass density was often observed to be moderate to dense. Turtle grass (*Thalassia testudinum*) was the dominant seagrass species observed. Seagrass species were observed to be monotypic in some areas, with Turtle Grass (*Thalassia testudinum)* being observed with no Manatee Grass (*Syringodium filiforme*). Turtle grass (*Thalassia testudinum*) and Manatee Grass (*Syringodium filiforme*) are now listed on the updated 2021 Bahamas Protected Tree Order.

Efforts will be made to avoid the seagrass beds where possible.

Overall, these findings were expected for the assessed ecosystem. The impact that The Project will incur is considered to be low risk to the surrounding environment. It is suggested that all environmental best practices be implemented throughout the development of The Project.

3.2.4 National Parks

The Arawak Cay LNG Project is not located within any National Park or declared Marine Protected Area; however, it lies approximately three point four miles (3.4 mi) from the Southwest New Providence Marine Managed Area (SWNPMMA). The eighteen thousand two hundred and twenty-two point five-acre (18,222.5 ac) site is proposed to regulate human activity and protect diverse marine ecosystems, though not designated to a specific agency. While there are no National Parks or Protected Areas directly on or surrounding Arawak Cay, the island of New Providence contains four parks managed by The Bahamas National Trust: Bonefish National Park, Harold and Wilson Ponds, Primeval Forest National Park, and The Retreat Gardens, in addition to the Southwest Marine Park.

Figure 15: Map of the nearest National Park to The Project Site

3.3 Socio-economic Aspects

Sustainable energy solutions, including renewable energy, are sometimes perceived as involving significant trade-offs, particularly in terms of socio-economic development. This perception often arises from concerns over potential disruptions to traditional industries, the upfront cost of new technologies, and the challenges of transitioning away from well-established energy systems. Such concerns may lead to resistance from stakeholders who fear negative impact on employment, costs, and economic stability. However, this view overlooks the long-term socio-economic advantages of sustainable energy.

As governments around the world work to implement the 2015 Paris Climate Agreement, they face the complex task of balancing the urgency of the energy transition with broader socio-economic goals. The shift towards sustainable energy sometimes requires careful planning to ensure social and economic disruptions are minimized, particularly for vulnerable communities. Governments must consider a range of factors, including the impact of energy costs on low-income households, the need for new infrastructure investments, and the provision of equitable access to clean energy.

Fortunately, renewable energy solutions not only address climate change but also bring a wide range of socioeconomic benefits, including:

- Security and diversification of energy supply,
- Increase self-reliance,
- Job creation in emerging green sectors,
- New income sources and economic opportunities,
- Income diversification for households and communities,
- Benefits for rural and remote areas, stimulating local economies,
- Improvement of local skills and education, fostering human capital development,
- Better Public health through cleaner air and reduced environmental impacts,
- Enhanced social cohesion and stability, as communities become more resilient to energy price fluctuations.

The Bahamas is currently reliant on imported diesel and gas, with a high electricity cost of US$0.28 per kWh, above the Caribbean average of US$0.24 per kWh. These elevated costs erode disposable income, with rising oil prices directly impacting inflation through higher transportation costs. Moreover, the country's low efficiency and limited adoption of renewable technologies make it increasingly vulnerable to global energy price shocks, reducing its overall competitiveness in the global market.

In 2024, The Bahamian government announced plans to reduce its dependence on heavy oil and gas imports by transitioning to LNG. BPL will play a central role in integrating LNG into the National Energy Production System, leading to rate adjustments aimed at benefiting low-income households. This shift towards LNG is expected to enhance energy affordability and

sustainability for the Bahamian population, contributing to broader socioeconomic development goals.

3.3.1 Demographics

As of July 1st, 2024, the population of The Bahamas is estimated at four hundred one thousand nine hundred and ninety-eight (401,283). According to the latest projections by the United Nations (UN). More recent estimates place the total population at approximately 401,998. Of this number, the island of New Providence, which includes the capital city Nassau, accounts for the majority, with a reported population of two hundred ninety-six thousand seven hundred thirty-two (296,732).

While there are no permanent residents on Arawak Cay, the area plays a significant role in the daily socioeconomic activity of New Providence. It is located adjacent to the Downton area and serves as a major transportation and commercial hub, home to numerous businesses, government offices, schools, and both local and tourist attractions. As such, any developments or environmental changes in the Arawak Cay area may indirectly impact a significant portion of the surrounding population through traffic, employment, public services, and tourism-related activities.

3.3.2 Utilities and Services

3.3.2.1 Electricity

The electrical power for the site will be provided by BPL. Detailed construction plans accompanying the electrical distribution system will be prepared before the commencement of construction activities.

3.3.2.2 Water Supply

The Bahamas Water and Sewerage Corporation (WSC) is a government organization under the jurisdiction of the Ministry of Works. The Corporation is entrusted with managing, maintaining, distributing, and developing the water resources of The Bahamas. Process water for infrastructure, such as office buildings, will be connected to the WSC network. Sewage for the Site will be disposed of via WSC municipal lines.

In addition to existing utility connections, The Project also intends to implement a seawater reverse osmosis (SWRO) system to supply fresh water for both the plant operations and office facilities. The SWRO system will produce two thousand cubic meters (2000 m^3) of water per day. This system will enhance The Project's water sufficiency and reduce dependence on the municipal water supply. The integration of SWRO technology reflects The Project's commitment to sustainable resource management, particularly given the sensitivity of freshwater resources in island environments.

All potable water supply and sewerage disposal will be managed by the Corporation.

3.3.3 Ship Transportation

Vessel transportation will be impacted due to the installation of the cable from the Nassau Cruise Port to The Project site. During construction activities, commercial shipping, commercial and recreational fishing, and boating, all of which occur around The Project site, will be temporarily delayed or redirected. The Port Department will be notified at the commencement of cable installation to coordinate navigational advisors and traffic management plans.

Disruptions to maritime transportation may result in delays in cargo delivery, affecting local businesses that rely on timely shipments of goods and supplies. Fishermen and tour operators may also face temporary losses in income due to restricted access to traditional fishing grounds or tourism routes. These impacts could disproportionately affect small-scale operators and independent livelihoods, which are often more vulnerable to even short-term disruptions.

In addition, construction-related marine traffic could contribute to increased congestion in the harbor area, posing navigational risk and increasing operational costs for vessel operators. There may also be public concern or dissatisfaction if construction causes significant delays or restricts access to popular marine or coastal recreational areas.

3.3.4 Tourist and Recreational Areas

Located in proximity to Arawak Cay is the “Fish Fry,” a popular community of Bahamian restaurants renowned for their seafood delicacies and vibrant cultural atmosphere. Along the coast, within the designated cable route, there are several tourist and recreational areas, such as Junkanoo Beach and Long Wharf Beach. Additionally, the cruise port serves as a major hub for tourists, offering a range of recreational facilities and visitor attractions.

Once construction commences, certain tourist and recreational areas may become temporarily inaccessible to ensure the safety of the general public. Access restrictions, noise, and visual disturbances may impact the overall visitor experience, especially in high traffic zones.

During the operational phase, noise levels are expected to exceed 60 dB (decibels). Elevated noise generated by the operation of the LNG plant may affect the comfort and appeal of surrounding recreational areas. As a result, visitors and nearby residents may be deterred from frequenting these locations, potentially leading to a decline in foot traffic and a corresponding impact on local businesses that rely on tourism and leisure activities.

3.3.5 Aesthetics and Visual Quality

While managing public opinion through aesthetic design features is important, it does not override other valid public concerns, such as the selection of the site or the significant construction costs associated with the proposed LNG facility. The current land use at Arawak Cay is primarily industrial, and its proximity to the newly constructed Nassau Cruise Port enhances its strategic appeal, making it the preferred location for The Project from a logistical and operational standpoint.

One of the key factors influencing the visual impact of the proposed facility is its visibility from various vantage points, which will be affected by viewing distance, elevation, and line of sight obstructions. Given the high visibility of Arawak Cay from key public tourist areas, such as the cruise port and Junkanoo Beach, visual impacts must be carefully considered in the facility's design.

4.0 Legal Aspects

All development projects are carried out within a framework of national regulations, international conventions, corporate policies, procedures, and recognized third-party guidelines, all of which have different applications, remits, requirements, and implications.

4.1 Domestic Legislation

The Developer will comply with the legal requirements of the Government of the Bahamas, topic-specific conventions to which The Bahamas is a signatory, and The Developer's own internal standards. The Developer will also consider, when relevant, the establishment of mitigation measures and the application of applicable international standards, including the International Finance Corporation (IFC) guidelines and the World Bank's Environmental, Health, and Safety (EHS) Guidelines.

Twenty (20) legislations are relevant and applicable to the management of the physical and natural environment of the proposed Project as outlined in Table 14.

Table 14: A Summary of National Laws and Regulations

Act Title	**Year Enacted**	**Comments**
Bahamas National Maritime Policy	2015	This Policy was established in 2015 and updated in 2017 to ensure the sustainable development of the Maritime sector, protection of the marine environment, and to utilize the valuable resources efficiently and effectively within The Bahamas.
National Invasive Species Strategy	2013	The goal of the strategy is the protection of the environment, genetic diversity of flora and fauna, and ecosystem services of The Bahamas, through the prevention of introduction, as well as management and eradication, of invasive species.
Forestry Act	2010	Provides a regulatory framework for the management of forest lands and protected

Act Title	Year Enacted	Comments
		species of trees and other plants which are either threatened, endangered, or endemic to The Bahamas.
Environmental Health Act	1987	Provides the framework for environmental regulations that will ensure compliance for The Project. The Act authorized the Department of Health Services (DEHS) to develop regulations that prevent and control air pollution, soil contamination, and preserve water quality.
Wild Animals Protection Act	1968	Prohibits the taking, capturing, or hunting of any animal without a permit.
Wild Birds Protection Act	1952	Prohibits the taking, capturing, or hunting of any animal without a permit. Protects birds and eggs during closed season.
Marine Mammal Protection Act	2005	This Act sets forth provisions to protect marine mammals, including prohibiting the import of marine mammals and barring illegal taking, harassing, and otherwise harming marine mammals, among other guidelines.
Conservation and Protection of the Physical Landscape of The Bahamas Act	1997	Protects the physical landscape from environmental degradation, flooding, and removal of hills; regulates filling of wetlands, drainage basins, or ponds; prohibits digging or removing sand from beaches and sand dunes; prevents harvesting or removing protected trees. In order to perform activities that may affect the physical landscape of The Bahamas, permits must be obtained for these activities. The Department of Physical Planning issues the permits and enforces the regulations.
Coast Protection Act	1968	This Act makes provision for the protection of the coast against erosion and encroachment

Act Title	Year Enacted	Comments
		by the sea and for purposes connected therewith.
Port Authorities Act	2006	This Act sets forth provisions appointing port authorities to all ports and harbors of The Bahamas to better regulate and control port operations.
The Environmental Planning and Protection Act	2019	The Act provides for the prevention or control of pollution, the regulation of activities, and the administration, conservation, and sustainable use of the environment, and for connected purposes.
The Environmental Protection (control of plastic pollution) Act	2019	This Act prohibits single-use plastic foodware and non-biodegradable and biodegradable single-use plastic bags; prohibits the release of balloons; regulates the use of compostable single-use plastic bags, and provides for connected matters.
The Ministry of the Environment Act	2019	This Act establishes the Ministry of the Environment to oversee the integrity of the environment of The Bahamas, to make the minister responsible therefore a corporation sole, to establish the environmental administration fund and the environmental trust fund, and for matters connected thereto.
Health and Safety at Work Act	2002	This Act makes provisions relating to health and safety at work and for connected purposes. It details the general duties of employers and employees at work.
Environmental Impact Assessment Regulations	2020	To provide procedures for a Certificate of Environmental Clearance (CEC). The Regulations provide procedures for the review of proposed projects, inclusive of monitoring and compliance requirements. The Regulations dictate the requirements for a

Act Title	Year Enacted	Comments
		Certificate of Environmental Compliance (CEC).
Natural Gas Act	2024	Regulates the import, storage, transport, and retail of natural gas, establishes licensing for facilities and terminals, and sets safety standards. The Utilities Regulation and Competition Authority (URCA) oversees compliance, issues licenses, monitors activities, and protects consumer interests to ensure efficient, safe, and sustainable operation of the natural gas industry in The Bahamas.
The Merchant Shipping (Oil Pollution) Act	1976	The Act provides for the proper registration of ships, the control, regulation, and orderly development of merchant shipping in The Bahamas, the proper qualification of seamen, and the regulation of employment conditions for seamen. These provisions advocate ship safety and competency, which prevent shipping accidents that can be detrimental to the marine environment as well as human casualties.
Disaster Preparedness Response Act	2006	This Act provides for a more effective organization of the mitigation of, preparedness for, response to, and recovery from emergencies and disasters.
Fisheries Resources (Jurisdiction and Conservation) Act and Regulations	1977	This Act regulated the conservation and management of fishery resources and allows for the extension of jurisdictional limits of those resources. The accompanying regulations define the use, possession, sale, and other activities associated with various fisheries, including hard and soft corals, as

Act Title	Year Enacted	Comments
		well as the means to acquire permits to harvest or sell certain marine fauna.
Planning and Subdivision Act	2010	This Act provides for: A land use planning-based development control system led by policy, land use designations and zoning. Prevention of indiscriminate division and development of land. Promotion of sustainable development in a healthy natural environment. Maintenance and improvement of the quality of the physical and natural environment. Protection and conservation of the natural and cultural heritage of The Bahamas. Planning for the development and maintenance of safe and viable communities.

4.2 International Legislation

There are twenty-four (24) international protocols and conventions that The Bahamas is a part of, as outlined in Table 15.

Table 15: International Legislation Applicable to The Project.

Convention/Protocol	Entry in Force/ Accession	Objectives
Convention on Wetlands of International Importance (Ramsar Convention), 1971	June 1997 (entry in force)	The Convention aims to maintain the ecological characteristics of wetlands of international importance and to plan the "wise use", or sustainable use, of all wetlands on the territory of the countries which have ratified the Convention. It aims to protect wetlands to stem the progressive encroachment on and loss of wetlands now and in the future.

Convention/Protocol	Entry in Force/ Accession	Objectives
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973	March 1979 (entry in force)	This convention regulates international trade in certain animal and plant species. Depending on the annex in which they are listed, the species are subject to export conditions (with systems of permits and special authorizations). The States must set up the necessary institutions for controlling trade in the species and issue export permits.
Convention of Biological Diversity	September 1993 (entry in force)	This convention has three main objectives: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Implementation of this convention entails drafting national strategies for the conservation and sustainable utilization of biological diversity. It is considered to be the key document for sustainable development.
United Nations Framework Convention on Climate Change, 1992	June 1992 (entry in force)	The United Nations Framework Convention on Climate Change was adopted in Rio de Janeiro in 1992 by 154 States, in addition to the European Community. It entered into force on 21 March 1994 and in 2004 had been ratified by 189 countries. This convention is the first attempt by

Convention/Protocol	Entry in Force/ Accession	Objectives
		the UN to more clearly identify what climate change actually is and how to remedy it.
Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks	January 1997 (entry in force)	To encourage cooperation between States to ensure conservation and promote the objective of optimum utilization of fisheries resources both within and beyond the exclusive economic zone.
Kyoto Protocol, 1997	April 1999 (entry in force)	The protocol stipulates legally binding commitments on industrialized countries, obliging these countries to reduce the annual average emissions of greenhouse gases by about 5.2% over the period 2008-2012.
United Nations Convention to Combat Desertification, 1994	February 2001 (entry in force)	This convention aims to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies. *Not directly relevant to this project.*
Stockholm Convention on Persistent Organic Pollutants	January 2006 (entry in force)	To protect human health and the environment from persistent organic pollutants.
Basel Convention Controlling Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), 1989	August 1992 (accession)	Conscious of the damage that could be caused to human health and the environment by hazardous and other wastes and the trans-boundary movements of these wastes, the States

Convention/Protocol	Entry in Force/ Accession	Objectives
		undertake to employ strict controls to protect human health and the environment against the harmful effects of the production and management of hazardous and other wastes.
Montreal Protocol on Substances that Deplete the Ozone Layer, 1989	May 1993 (accession)	The Montreal Protocol on Substances that Deplete the Ozone Layer was designed to reduce the production and consumption of ozone-depleting substances to reduce their abundance in the atmosphere and thereby protect the Earth's ozone Layer.
Vienna Convention for the Protection of the Ozone Layer, 1985 (Vienna Convention)	April 1993 (accession)	This convention served as a framework for efforts to protect the globe's ozone layer. The objectives of the Convention were for Parties to promote cooperation by means of systematic observations, research, and information exchange on the effects of human activities on the ozone layer and to adopt legislative or administrative measures against activities likely to have adverse effects on the ozone layer.
International Convention for the Prevention of Pollution from Ships (MARPOL), 1973	May 2011	The purpose of this convention is to regulate pollution by hydrocarbons, chemical products, packaging, garbage, sewage, and atmospheric emissions. It is the reference text in the field of marine pollution prevention. The

Convention/Protocol	Entry in Force/ Accession	Objectives
		convention is primarily based on the specification of and compliance with technical rules, e.g., requirements for double-hulled oil tankers and tankers carrying chemical products, requirement for oil-water separators and to maintain documentation. The Wider Caribbean Region (WCR) (Caribbean Sea and Gulf of Mexico) became a designated Special Area under Annex V of the MARPOL Convention, which prohibits the discharge of all garbage by ship.
International Convention on Civil Liability for Oil Pollution Damage, 1969 and 1992	October 1976 (accession)	International maritime treaty adopted to ensure adequate compensation where oil pollution damage is caused by maritime accidents.
Convention for the Unification of Certain Rules of Law Relating to Assistance and Salvage at Sea Protocol of 1967	February 1913 (accession)	To provide a uniform set of rules governing assistance and salvage at sea.
International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1992 (1992 Fund Convention)	July 1976 (accession)	To supplement the International Convention on Civil Liability for Oil Pollution Damage, 1969; to ensure that adequate compensation is available to persons who suffer damage caused by pollution resulting from the escape or the discharge

Convention/Protocol	Entry in Force/ Accession	Objectives
		of oil from ships; and to ensure that the oil cargo interests bear a part of the economic consequences of such oil pollution damage, to the relief of the shipping industry.
Convention on Facilitation of International Maritime Traffic, as amended (FAL)	May 1998 (accession)	To prevent unnecessary delays in maritime traffic, to aid co-operation between Governments, and to secure the highest practicable degree of uniformity in formalities and other procedures.
Convention on the International Regulations for Preventing Collisions at Sea (COLREGS)	July 1997 (entry in force)	To update and replace the International Regulations for Preventing Collisions at Sea, 1960, to maintain a high level of safety at sea.
International Convention for the Safety of Life at Sea (SOLAS), 1974	February 2000 (entry in force)	The convention aims to ensure that ships of signatory countries comply with a series of safety standards and practices.
Caribbean Challenge Initiative, 2013.	May 2013	An agreement made between 9 Caribbean governments and territories committing them to accelerate and expand efforts to safeguard the Caribbean region's marine and coastal environment, further promote the sustainable use of natural resources through new commitments to conservation.
The Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region (WCR) or	June 2010	Focused on the protection of the marine environment from pollution within the Caribbean, it includes a series of specific protocols on oil spills, specially

Convention/Protocol	Entry in Force/ Accession	Objectives
Cartagena Convention. 1983		protected areas, and wildlife and land-based sources of marine pollution.
United Nations Convention on the Law of the Sea (UNCLOS) (Montego Bay Convention), 1982	July 1983 (entry in force)	This convention defines the powers of enforcement available to the states affected by an illegal act of marine pollution.
International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) 1990	January 2002 (accession)	Article 3 of this convention requires that ships and installations at sea have an oil pollution emergency plan. The Developer must develop an Oil Spill Response Plan.
ILO Conventions	May 1976 (entry in force)	International labor standards are legal instruments drawn up by the ILO's constituents (governments, employers, and workers) and setting out basic principles and rights at work. They are either conventions, which are legally binding international treaties that may be ratified by member states, or recommendations, which serve as non-binding guidelines.

4.3 Government Institutions

Government ministries and departments that will be involved with aspects of approval and permitting of this Project include:

The Ministry of the Environment and Housing (MOEH)

The MOEH's area of responsibility includes:

- To manage, protect and conserve all land, water, air and living resources of The Bahamas, having regard to the environmental, economic, and social benefits they may confer on The Bahamas,

- To undertake, commission, and coordinate environmental studies and research relating to the environment of The Bahamas,
- Advising as to public or private sector proposals that would significantly affect the environment of The Bahamas,
- Providing advice as to procedures for the assessment and monitoring of environmental impacts,

The departments, agencies, and authorities under the responsibility of the MOEH are:

a. The department responsible for environmental health services,
b. The agency responsible for national geographic information services,
c. The authority responsible for public parks and public beaches,
d. The body responsible for forestry,
e. The body responsible for scientific research, reviewing Environmental Impact Assessments, advising on environmental projects, and administering multilateral environmental agreements.

The Department of Environmental Planning and Protection ("the DEPP")

The Department of Environmental Planning and Protection (DEPP) is under the responsibility of the MOEH. The duty of the DEPP is to promote best practices in environmental management and to minimize harm to the environment. DEPP is comprised of the Director, Deputy Director, Assistant Directors, and appointed environmental officers. The functions of the Department include the regulation, oversight, and review of Environmental Management Plans (EMP) and Environmental Impact Assessments (EIA), promoting and enforcing compliance with the Environmental Planning and Protection Act, 2019 ("the Act") and any regulations made under that Act. The Act makes it a requirement to obtain a Certificate of Environmental Clearance in accordance with prescribed regulations before commencing work on a project, and it provides that any person who commences work on a project without first obtaining a Certificate of Environmental Clearance commits an offence.

DEPP will focus on environmental issues and compliance, leading to the issuance of a Certificate of Environmental Clearance (CEC). DEPP will review and approve the Environmental Impact Assessment (EIA) and Environmental Management Plans (EMP) for The Project.

Bahamas Investment Authority

The Bahamian government's proactive economic growth and development policies are guided by The Bahamas Investment Authority (BIA), established to reduce bureaucratic delays for domestic and international investors.

The BIA operates from the Office of the Prime Minister and is a part of the National Economic Council and Investment Board.

The BIA has the following areas of responsibility:

- Develop investment policies,
- Promote investment,
- Evaluating project proposals,
- Monitor and co-ordinate project implementation,
- Administer the government's investment concessionary legislation.

All non-Bahamians or Permanent Residents seeking to do business in The Bahamas must obtain prior approval from the BIA. The application for BIA approval must be in the form of a comprehensive Project Proposal and include all of the requirements set forth in the BIA Project Proposal Guidelines. Bahamian legal counsel usually submits the formal application to the BIA along with the required supporting documents.

Depending on the nature of the proposed business activity, the relevant Government Ministry or Agency would be consulted for input:

- Ministry of the Environment.
- Ministry of Works and Transport.
- Ministry of Housing.
- Respective Family Island Local Government
- Department of Environmental Planning and Protection

Once a determination has been made, the BIA will communicate to the applicant in writing. If the determination is favorable, the BIA will issue a "project approval in principle," subject to any stipulated conditions and to satisfying the requirements of the relevant government agencies.

Ministry of Public Works

The Ministry of Public Works will authorize and provide permits for activities and maintain physical infrastructure in the country.

Department of Physical Planning

The Department of Physical Planning will authorize and provide permits for activities such as excavation, filling, roadworks, and all construction activities.

Port Department

The Port Department is responsible for inspection and licensing of boats and boat masters, as well as the collection of all revenue from commercial and private docks, mooring, groins,

causeways, etc. The Port department will authorize any permits and/or registration requirements needed for the operation of the docking facilities.

Forestry Unit

The Forestry Unit will authorize and provide permits for harvesting and removal of protected trees.

5.0 Register of Significant Aspects and Impacts

Environmental impacts of The Project are impacts to the natural communities and wildlife in the area that can be reasonably inferred, considering the footprint of impacts and known habitats on-site. Other expected impacts are those related to normal construction and operation, such as waste generation and disposal, fueling, use of potentially hazardous materials, as well as other accidents or malfunctions, which may entail an environmental component. The Register of Significant Aspects and Impacts (The Register) considers potential impacts that may be due to construction activities. The Register will be used in the development of method statements to proactively manage and mitigate potential impacts of The Project. The Register evaluates the potential impacts and assigns risk and magnitude scores. Risk Scores measure the likelihood of the impact occurring and are measured on a scale of 1-10, with 1 being unlikely to occur and 10 being highly likely to occur. Magnitude scores measure the scale of the impact if it occurs. Magnitude ranges are parameters are Low, Medium, and High. Low Impact refers to short-term localized impact reversible in 1 year. Medium Impact refers to moderate-term implications reversible in 5 years. High Impact refers to long-term impacts that are not reversible within 5 to 10 years or are irreversible.

Table 16: Register of Significant Aspects and Impacts

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
CONSTRUCTION PHASE					
Water Quality	Heavy Equipment	Oil Spills	•No hazardous substances will be permitted to escape into the exposed groundwater at the work site. •All fuel and oil spills will be cleaned up as per the Fuel Spill Prevention Plan. •Spill Kits will be located on all machinery and at designated areas on-site. •Equipment on site will be well-maintained. All leaking equipment will be removed from the site and repaired before being brought back on-site.	5	Medium
Erosion and Sedimentation	Utility Installation	Turbidity	•Limit trench size. •NO dewatering directly into existing vegetation or exposed groundwater.	6	Medium

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
			•Installation of turbidity curtains where applicable. •Turbidity monitoring should be done during marine works to ensure that turbidity does not exceed twenty-nine Nephelometric Turbidity Units (29 NTU).		
Erosion and Sedimentation	Land clearing, excavation and grading	Turbidity and water contamination	•Sediment and erosion control methods (such as silt fences) will be in place prior to and during construction.	3	Low
Air Quality	Earthworks and Material Stockpile. Use of heavy machinery.	Dust pollution and airborne pollution	•Water to be used as a dust retardant. •Fencing will be installed to shield surrounding areas from dust and aggregates. •Do not accumulate and burn waste on site. •All dump trucks will be required to use tarpaulins when transporting material to and from the site. •All machines will be well maintained	4	Medium

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
Noise and Light Quality	Construction	Increase in noise and light pollution.	•Avoid usage of equipment with extra noise. •Machines should be turned off when not in use. •The Contractor will inform the surrounding offices and community, prior to operations, of works that bear the risk of nuisance and accidents. •Strategic placement of lights away from residential and commercial areas. •Tilting lights downwards. •Using shielding to restrict the glare of lights. •Construction activities to be restricted to daylight hours between 0700 hrs. and 1900 hrs	9	Medium
Solid Waste	Construction Activities	Construction Waste	•Waste bins should be placed strategically around site. Bins should have signs posted on them listing or showing symbols of items	8	Medium

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
			that can be disposed of into each bin. •Refuse and wastes should be removed from the site regularly by a licensed Contractor. •Waste materials will be disposed of at the New Providence Ecology Park (NPEP). •Construction waste should be recycled and reused on site were feasible before being transported to NPEP. •All construction waste that cannot be recycled or reused on site should be stored in a lidded container in the laydown area. •Creation of a concrete washout station.		
Hazardous Waste	Heavy Equipment Operation	Hazardous Waste (Equipment Fuel spills, Used Oil concrete washout	•Proper usage and disposal of oil spill material. •Hazardous waste to be stored in lidded containers	7	Medium

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
		and asphalt handling)	in a safe place that is lined and bermed, and away from environmentally sensitive areas. •Provisions should be made for management and disposal at NPEP. Material should be removed as its created. •Pollution prevention practices should be implemented. A Furl Spill Prevention plan will be outlined in the Arawak Cay LNG Project Environmental Management Plan (EMP).		
Solid Waste	Land Clearing (minimal)	Vegetative Waste	Proper disposal of invasive species according to the Invasive Species Management Plan .	10	Low

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
Sewage and Refuse Disposal	Installation of Portable Potties	Water Quality	•Portable toilets and handwashing stations will be used during construction. •Portable potties will be secured to prevent falling over. •There should be adequate numbers of portable potties placed portable potties. •Facilities to be stationed away from trenches and waterbodies. •Sewerage to be collected by a licensed Contractor.	8	Medium
Marine and Terrestrial Ecosystem	Utility Installation Land Clearing	Habitat Loss	•Cable installation to follow the proposed route. •LNG plant to be constructed in an human altered area. •Biodiversity in this zone is considered low, with native flora and fauna largely	10	Low

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
			displaced or restricted to isolated pockets. •Removal of invasive species. •Seagrass beds will be avoided where feasible.		
Traffic and Transport	Construction Activities	Navigation hazard, collisions, and road congestion	•The transportation of the waste and other materials should be in a safe manner considering road traffic and boating regulations. •All crane barges should be kept within the LNG cable line construction area. •The schedule for the transportation should be made not to coincide during peak traffic hours. •Flagmen will be station at the site's entrance. •Signage will be placed to alert the community of	6	Low

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
			ongoing construction activities.		
Safety for Workers	Construction activities	Accidents and Injuries	•The mandatory use of PPE (helmets, safety vest, PFDs, masks, gloves, life vest, and safety boots) by workers depending on nature of work. •All workers are familiar with site emergency response plan and safety procedures. •All workers are familiar with material handling procedures. •First responders identified and present on site.	5	High
OPERATIONAL PHASE					

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
Flooding	Increased in paved surfaces	Increase in standing water in The Project site.	•Grading will be done to elevate the site. •Development of an adequate drainage system. •Drainage retention ponds or swales will be designed to collect and drain water at a rate fast. •Buildings will be elevated. •Regular cleaning and maintenance of the drains. •Paved surfaces should be constructed using permeable material to increase absorption rated and reduce runoff.	9	Medium
Sewage and Refuse Disposal	Installation of Sewage system	Water Quality	•During the operational phase, sewage and wastewater will be disposed of via WSC municipal lines.	4	Low

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
Air and Noise Quality	Emissions from and Vehicles and equipment such as generators	Pollution	•Operating equipment must have preventive maintenance in compliance with applicable environmental regulations to prevent air pollution. •Generates, turbines, and other operating equipment should have catalytic converters in good condition. •Air-filtration systems will have regular inspections and maintenance. •Soundproof housings will be installed around noisy equipment such as turbines, and pumps. •Silencers and mufflers will be installed on exhaust systems, and gas release points.	8	Medium

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
			•Equipment designed for quiet operation will be selected. •If equipment is maintained on site, any maintenance or testing programs will be done during daytime working hours to prevent any discomfort or nuisance to neighbouring communities.		
Water Quality	LNG Transport and Storage. Storage of cryogenic, toxic, or flammable fluid.	Water Contamination Pollution	•For safer storage and transport, natural gas can be cooled down to its liquid form. •All storage tanks will be doubled walled. •LNG Storage and Regasification Facility will be automated, controlled by PLC with SCADA workstation with provision for remote monitoring.	6	High

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
			•All valves and hoses used in the transport of LNG will be regularly inspected to ensure they are in good condition. •All broken or worn equipment should be replaced promptly.		
Solid Waste	Operational Activities	Increase in Domestic Waste	•Implement an Operational Solid Waste Management Plan. •Removal of waste from the site by a licensed company regularly. •Materials will be disposed of at the New Providence Ecology Park (NPEP). •Waste should be recycled and reused where feasible before being transported to NPEP.	7	Low

Significant Aspect and Impact	Activity	Potential Impact	Environmental Management Strategy	Risk Score	Magnitude Score
			•All domestic waste that cannot be recycled or reused on site should be stored in a lidded container until it can be removed by a licensed Contractor.		
Hurricane Risk	Coastal Location Facility Operations	Storm surge, flooding, high winds, and fire ignition. Leaks and explosions due to storm-related features.	•Measures outlined in the Emergency Response Plan should be followed. See the Arawak Cay LNG Project EMP. •Elevate critical infrastructure above surge levels. •Use hurricane-resistant designs and materials. •Maintenance of the drainage system, which will consist of oil interceptors in places such as the parking lot.	8	High

6.0 Potential Environmental Impacts and Mitigation Measures

Environmental impacts are changes in the natural environment caused by development that can adversely affect the surrounding community, air, freshwater, marine, and terrestrial environments. Direct and indirect actions can cause environmental impacts, and take into consideration the footprint of impacts and known habitats on-site. Impacts detailed below are determined by activities associated with normal construction and operation, which can negatively affect the natural environment and/ or may entail an environmental component.

Site-specific management tools have been developed for the site, tailored to address the unique environmental conditions and challenges of each area. These management tools will be implemented to ensure consistency in environmental protection and project execution.

These tools, derived specifically for The Project, will guide the development in minimizing environmental impacts, preserving local ecosystems, and supporting sustainable development by integrating tailored management strategies. The Project is well-positioned to achieve the pre-set goals while maintaining environmental integrity.

6.1 Impacts on the Physical Environment

6.1.1 Erosion and Sediment Impacts

Erosion and sedimentation can be harmful to the environment, as they can cause water contamination. Activities that can potentially increase erosion and sedimentation include land clearing and earthwork activities, as the movement of heavy machinery can lead to the displacement of soil. Given the coastal location of The Project, eroded materials could be transported directly into the marine environment, leading to increased sedimentation and decreased water quality. Extreme rainfall or hurricane events may exacerbate these risks if disturbed soils are not stabilized.

During the construction phase, site clearing will be minimal as the area is already a heavily human-altered environment. An Erosion and Sediment Control Plan will be developed and outlined in the Arawak Cay LNG EMP to help mitigate against erosion impacts. It may include the use of silt curtains for the exclusion of sediment into trenches or coastal environments, any retained during times of clearing and earthwork activities. These barriers should be actively maintained throughout construction.

6.1.1.1 Turbidity

During the construction activities, impacts to the marine environment would include an increase in turbidity during the placement of the LNG transmission cable. Control measures to reduce turbidity in the marine environment are extremely important as suspended sediments can block light to aquatic plants such as seagrass, smother aquatic organisms, and carry contaminants and pollutants, and pathogens, such as lead and bacteria.

Mitigation measures to be implemented to reduce turbidity monitoring. Turbidity monitoring should be done during any marine works to ensure that turbidity does not

exceed the threshold of twenty-nine Nephelometric Turbidity Units (29 NTU). In the event turbidity exceeds the threshold, work will stop to allow sediment particles to settle, after which work will resume.

6.1.2 Air Quality Impacts

The construction activities, such as material handling and the use of heavy equipment, can impact the air quality.

Land clearing, grading, excavations, and other construction activities all have the potential to increase dust accumulation on the site. Dust can be a hazard to human health and can cause eye irritation and respiratory issues. To reduce the impact of dust, the following activities should be implemented:

- Water is to be used as a dust retardant as needed.
- Screening and fencing should be used to reduce wind, improve aesthetics, and mark the limit of works.
- The use of Proper Protective Equipment (PPE), including dust masks and eyewear or safety glasses.
- Dump trucks moving loose material are to be covered with tarpaulins.
- Minimizing the height when dumping or transferring.

Air-borne pollution

The minimization of air-borne pollution is a key component of environmental management of the site. Construction phase air quality impacts shall be minimized or avoided by the incorporation of air quality control measures. The installation and application of air quality controls during the construction phase shall be in accordance with the following principles:

- All equipment used and all facilities erected on site are to be designed and operated to control the excessive emission of dust, fumes, and any other air impurity into the atmosphere;
- Contractor and Sub-contractors will maintain all construction equipment to reduce exhaust emissions;
- The Engineer will visually monitor levels of dust deposition and air quality, the effectiveness of dust emission controls, and the construction site and the impacts of any nuisance on adjoining properties.

6.1.3 Noise Quality Impacts

Construction Phase

The Project construction activities have the potential to affect nearby businesses and residences. Noise nuisance during the construction phase is expected to be low as the site is located next to a busy port. To ensure that noise generated by activities remains low and does not disturb the surrounding environment, construction operations should be restricted

to daylight hours between 0700 hrs. and 1900 hrs. Any reason to work outside these hours to speed up the progress of work, advance notice will be given, and specific requests will be reasonably accommodated.

To manage noise impacts during construction hours, contractors shall utilize accepted noise control techniques, such as:

- Maintaining equipment in good working order,
- Implement the use of best available control technologies to reduce noise, such as mufflers and silencers,
- Implement a speed limit to slow vehicles and limit noise generation,
- Turn off idling equipment when not in use.

Operational Phase

An increase in noise level during the operation of an LNG plant can be significant due to the use of large turbines, compressors, and pumps, and other equipment needed to run the plant. LNG plants can produce noise levels above eighty-five decibels (85 dB), which is commonly recognized as the threshold for potentially harmful exposure that may cause hearing damage over time.

While harmful noise level is not expected to cause significant discomfort for nearby recreational tourism activities or to nearby residential communities, there is a potential for noise nuisance, especially during the evening and night hours.

To mitigate against this, the following mitigation measures will be incorporated where feasible:

- Soundproof housings will be installed around noisy equipment such as turbines and pumps.
- Silencers and mufflers will be installed on exhaust systems and gas release points.
- Equipment designed for quiet operation will be selected.

6.1.4 Solid and Hazardous Waste Impacts

Waste generated during the construction and operation phases can negatively impact the site, surrounding ecosystems, and the neighboring community. Solid waste, especially materials that take a long time to degrade, can have numerous harmful effects on wildlife and marine ecosystems, often due to improper waste management.

Solid waste poses a moderate risk during construction activities. The project should aim to minimize waste production and maximize recycling of materials. Waste bins should be placed strategically around the site. Bins should have signs posted on them listing or showing symbols of items that can be disposed of. Any debris that enters open water should be

removed as quickly as possible, and all hazardous waste spilled into the environment must be reported.

6.1.4.1 Waste Disposal during Construction

Improper disposal of waste can attract pests such as flies, mosquitoes, and rodents, which may spread disease and pose risks to worker health and nearby communities. The risk of pest infestation increases when human presence and food sources are concentrated at a project site without proper controls. Additionally, unmanaged waste has the potential to enter the marine environment through wind or stormwater runoff, contributing to pollution, harming marine life, and degrading water quality.

To mitigate these risks, a comprehensive Solid Waste Management Plan will be implemented throughout the construction phase. The plan will emphasize waste minimization, segregation, safe handling, and timely removal from the site. Waste will be collected regularly by a licensed Contractor and transported to the New Providence Ecology Park (NPEP) or other Government-approved facilities for final disposal.

The appointed waste Contractor will be required to comply with all applicable legislation and best management practices, including provisions under the Environmental Health Services Act. Construction personnel will receive training in proper waste handling and disposal to ensure consistent implementation of the plan.

6.1.4.2 Vegetative Waste

Vegetative waste will be created during clearing and grubbing activities on site. All vegetative waste will be transported to NPEP. Invasive species encounters should be sorted separately and should not be used as mulch to prevent spread throughout the site. The entire tree and root system of the invasive species should be carefully removed manually or by heavy equipment.

6.1.4.3 Hazardous Waste

There is the potential for hazardous waste impacts associated with the construction and operational phases.

Construction Phase

Hazardous materials such as concrete, paint, solvents, and other chemicals may be high in pH and are considered harmful to the surrounding environment and neighbouring communities.

Protection of open water and any other sensitive environments is of most importance; therefore, there shall be no contact of hazardous material with water bodies through spillage, hosing off surfaces, rain, cleaning of tools, or concrete washout.

The following mitigation measures will be employed:

- A concrete and equipment washing site will be bunded, lined to contain any concrete and chemicals. All accepted washing locations must be cleaned up before demobilization. Any excess material shall be removed upon The Project's completion and transported to NPEP.
- All hazardous materials brought on-site should be accompanied by Safety Datasheets (SDS).
- All equipment and hazardous material (such as used absorbent pads) will be stored in a designated waste bin to reduce the risk of spills and pollution events into the environment. Storage facilities should be free from obstruction, structural defects, and covered storage to prevent the potential of mixing with water, and only used to store hazardous waste.
- Appropriate signage should be used to depict hazards in the area, as well as a "NO Smoking" sign.
- Storage facilities will be inspected at least once a day by designated staff to check for leaky containers. Access should be limited to these designated persons.
- Hazardous waste storage facilities at the site will have disposal containers that are covered, sealed to prevent leaking, and positioned on an impervious surface as far from any water as possible. Secondary containment for all disposal containers should be one hundred and ten percent (110%) of the maximum volume of the container.
- Appropriate spill containment and clean-up equipment will be easily accessible near hazardous waste storage facilities.
- Disposal of all hazardous waste utilized or generated during construction will occur off-site by a licensed contractor at a licensed facility as per DEHS requirements.

Operational Phase

An LNG plant involves complex industrial processes that can generate various forms of hazardous waste, which must be carefully managed to avoid environmental and health impacts. Common types of hazardous waste found on an LNG plant include:

- Chemical solvents,
- Paints and coatings,
- Sludge from treatment systems,
- Used filters and rags,
- Batteries and e-waste, and
- Spent catalyst.

Improper hazardous waste management and disposal can lead to environmental and health risks for workers and surrounding communities. Hazardous waste can potentially cause soil and groundwater contamination from spills, and increase air pollution due to evaporation of

volatile compounds. Potential health risks include exposure to toxic substances, inhalation of chemicals, and accidental fires and explosions.

A proper Operations Waste Management Plan and Operational Hazardous Waste Management should be established for the management of waste at the plant. The plan should meet the standards set by DEHS and include the Environmental Health Service Act regulations for the domestic, hazardous, and chemical waste disposal. The plan should include the measures outlined in the construction phase as well as proper handling, transfer, and transport of LNG and any other substances used.

6.1.5 Sewage and Waste Refuse

During the construction phase, portable potties will be distributed throughout the site and will require weekly maintenance. Portable toilets should be serviced bi-weekly by a licensed company. To prevent leaching of wastewater into the groundwater or surface bodies, any portable toilet(s) that are on-site should be secured to avoid vandalism and to prevent them from tipping in windy conditions. Toilets must be located more than one hundred and fifty feet (150 ft.) from any trenches, and open water bodies.

During the operation of the LNG plant, waste generated will be directed down the WSC municipal pipelines.

6.1.6 Fire and Hurricane Risks

The Bahamas is located within the Atlantic Tropical Cyclone basin. This basin includes much of the North Atlantic, the Caribbean Sea, and the Gulf of Mexico. Due to the geographic location, the entire Bahamas experiences tropical cyclones during hurricane season from June 1st to November 30th. The Saffir-Simpson Hurricane Wind Scale is a one (1) to five (5) rating based only on a hurricane's maximum sustained wind speed (see Table 17). All hurricanes can cause wind damage and significant loss of life due to the strength of their winds.

Table 17: Hurricane Categories

Category	Sustained Winds (mph)	Types of Damage due to Hurricane Winds
1	74-95	Very dangerous winds will produce some damage
2	96-110	Extremely dangerous winds will cause extensive damage
3	111-129	Devastating damage will occur
4	130-156	Catastrophic damage will occur
5	157-higher	Catastrophic damage will occur

Based on Historical data, Category 3-5 hurricanes have caused widespread damage to infrastructure, ecosystems, and communities across the islands. The coastal proximity of The Project site increases vulnerability to storm surge, flooding, and winds. Buildings, utilities,

and access roads may be compromised by wind damage. Coastal species in The Project's area may suffer from sedimentation, erosion, and salinity changes. Mitigation measures include:

- Elevate critical infrastructure above storm surge levels.
- Use hurricane-resistant construction materials and designs.
- Establish emergency evacuation routes and shelters.
- Implement coastal buffer zones with native vegetation to reduce erosion and absorb storm energy.

Fires

The Project site is vulnerable to fire risk during the construction and operational phase. Fires can endanger the lives of personnel on site, as well as destroy the infrastructure. During construction, machinery use, and waste disposal methods could introduce ignition sources, increasing the likelihood of fires or explosions.

During the operational phase, a significant risk in LNG facilities is the uncontrolled release of cryogenic, toxic, or flammable fluids. The handling and accidental release of LNG (in its gas form) can also make LNG plants prone to fire and explosions. These releases can happen in different areas of the processing system. The impact of these releases varies based on what they encounter and whether they are ignited. In summary, the main hazards associated with LNG facilities can be divided into seven categories:

1. **Temperature Hazards:**
    a. Cryogenic liquids can lead to material embrittlement if that material is not designed to handle them, and freeze burns if the personnel come into contact with them.
    b. Burns may also occur from hot vapor released from turbines, boilers, and engines.
2. **Toxic Hazards:** Releases of hydrogen sulfide (H_2S) or ammonia are toxic and pose serious health risks.
3. **Asphyxiation Hazards:** The plant can release gases that can displace oxygen in an area, creating a risk of suffocation.
4. **Pool Fire:** Accidental releases and immediate ignition of a pool of liquid can result in a long-lasting fire on the ground or on the surface of the water.
5. **Jet Fire:** Accidental releases of pressurized gases that are immediately ignited can lead to a high-heat flux jet fire.
6. **Flammable Vapor Dispersion:** If a hazardous liquid is released, but there is delayed ignition, a flammable cloud can be created. If this cloud ignites, it can result in a brief but intense flash fire that endangers personnel.
7. **Vapor Cloud Explosion (VCE):** If a hazardous liquid is released in an enclosed space, but there is delayed ignition, it can cause an explosion and generate a pressure wave.

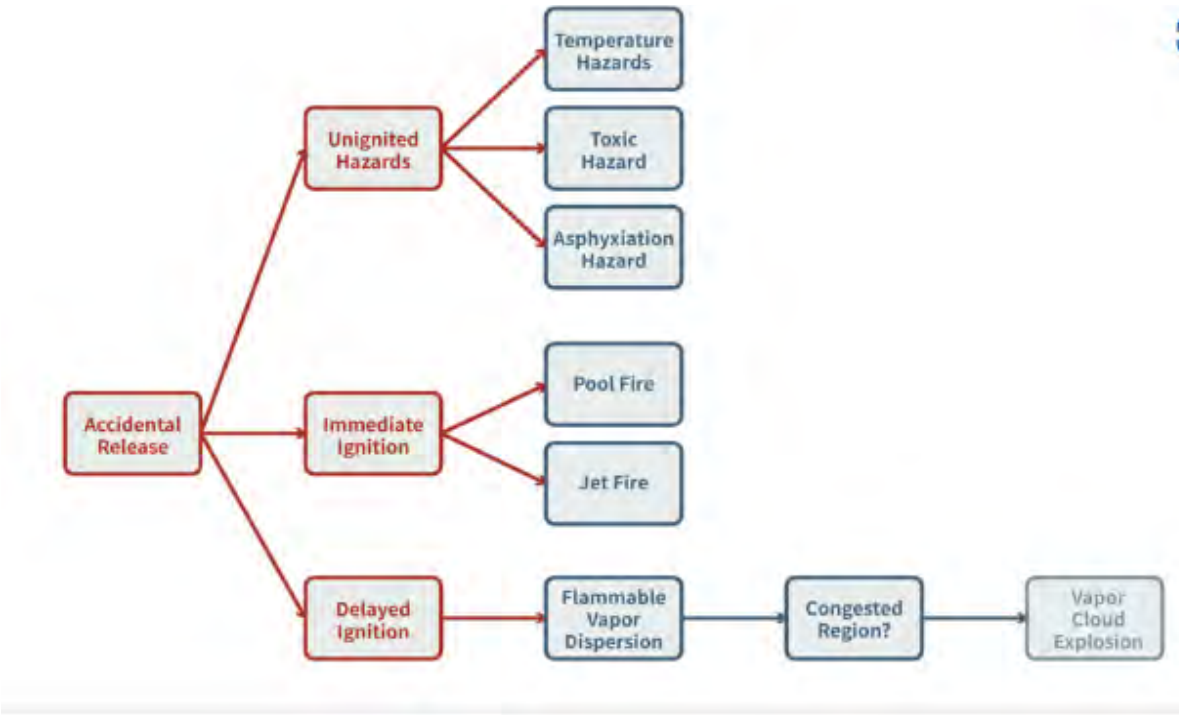


Figure 16: LNG Facility Hazards

Mitigation measures include:

- Maintain defensible space around structures by clearing flammable vegetation.
- No Smoking will be permitted on the site.
- Equip the site with fire extinguishers, water tanks, and trained personnel. Fire extinguishers of each class should be on site, and all extinguishers should be inspected regularly.
- Coordinate with local fire services for rapid response planning.
- Conduct fire drills regularly.

A full Fire Control Plan will be outlined in both the Arawak Cay LNG Project Construction and Operations EMP.

6.1.7 Economic Impacts

Small Island developments face economic challenges due to factors such as small population size, remoteness from international markets, high transportation costs, vulnerability to exogenous economic shocks, and sensitive land and marine ecosystems. These challenges make access to sustainable and feasible sources of energy unreliable.

According to a publication from The Oxford Institute for Energy Studies, the cost breakdown by LNG plant area (LNG liquefaction plant) can be estimated. Pre-operational cost drivers

include the range and complexity of The Project itself, but marine facilities, including jetties and extensive dredging (CAPEX directly connected to the building of a jetty), are also highlighted as a major cost-generating item of the budget.

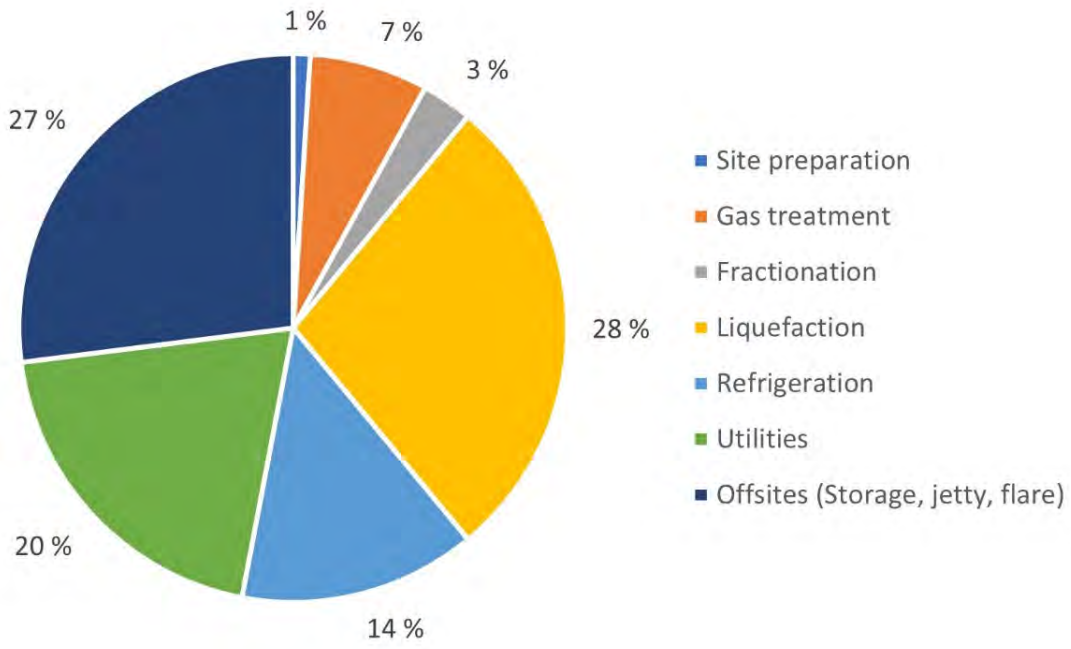


Figure 17.A Cost Breakdown by Plant Area (The Oxford Institute for Energy Studies).

CAPEX for regasification plants typically consists of costs associated with vessel berthing, storage tanks, regasification equipment, send-out pipelines, and metering of new facilities. Hence, this link in the value chain highlights cost drivers connected to the interface between LNG ships and onshore facilities.

Construction costs (CAPEX) account for a substantial part of a project investment, but also considering the sum of operational costs (OPEX) across the entire supply chain is key to identifying potential sources of financial risk. Combined figures from PwC and a publication from the journal Industrial and Engineering Chemistry Research (I&EC) break down the operating cost for a general value chain as follows:

- Upstream development: 10-11% of costs.
- Refrigeration and liquefaction: 40-42% of costs.
- Shipping/Transportation: 20-30% of costs.
- Regasification and distribution: 20-27% of costs.

The Project is poised to stimulate the local economy through cheaper and more reliable sources of energy. The Project is also expected to generate economic benefits for the local

community, including job creation and increased business opportunities. The construction phase will create numerous job opportunities for residents, and the influx of construction work will benefit local suppliers. In order to maximize the positive economic impacts, priority will be given to hiring locals for both construction and operational jobs.

During the operational phase, the facility will employ a significant number of skilled and unskilled staff, and local businesses may benefit from increased demand for goods and services.

6.1.8 Hydrologic Impacts

6.1.8.1 Water Quality

Construction activities can result in potential contamination impacts as a result of petrochemicals from heavy equipment, hazardous chemical spills, hazardous material storage, and increased turbidity.

6.1.8.1.1 Fuel, Oil, and Chemical Spills

To help preserve the site and reduce the risk of water contamination, identifying the main source of potential releases during the construction phase is important. No hazardous substances will be allowed to escape into the open water at the work site. All hazardous products should be disposed of by a licensed Contractor. A receipt should be produced and attached to the hazardous waste reporting. The following measures will assist in preventing water contamination.

- Proper Fuel Management to prevent spills.
- Use biodegradable (non-mineral) hydraulic oils when working over water.
- Spill Kits will be placed on all operating machinery, boats, and barges.
- The construction heavy equipment used on-site must be well-maintained. Equipment shall be inspected and repaired, if necessary, by the contractor before site mobilization. All leaking or broken machinery should be moved off-site and repaired.
- Idling must be kept to a minimum. Any equipment not in use for extended periods of time must be switched off safely.
- All hazardous material storage areas must be located away from storm drains, shorelines, or sensitive habitats, and within contained areas.

6.1.8.1.2 LNG Transport and Storage

During the operational phase, a significant risk in LNG facilities is the uncontrolled release of hazardous fluids. The handling and accidental release of LNG can cause contamination of the marine environment.

The Arawak Cay Power Plant project will receive twelve thousand five hundred cubic meters (12,500 m3) of LNG, approximately twice a month, at Arawak Cay. The vessel has a maximum draft of eighteen feet (18 ft.), which provides ten feet (10 ft.) of clearance alongside Arawak Cay.

The accidental and uncontrolled release of LNG will be managed by the following:

- For safer storage and transport, natural gas can be cooled down to its liquid form.
- All valves and hoses used in the transport of LNG will be regularly inspected to ensure they are in good condition.
- All broken or worn equipment should be replaced promptly.
- All storage tanks will be double-walled. Tanks should be regularly inspected to ensure there are no leaks.
- LNG Storage and Regasification Facility will be automated, controlled by a Programmable Logic Controller (PLC) with Supervisory Control and Data Acquisition (SCADA) workstation with provision for remote monitoring.

6.1.8.1.3 Reverse Osmosis (RO)

The waste brine from the seawater RO desalination plants is high in salt concentration. If discharged into open water, the high concentrations of salt can affect the salinity of the marine environments and impact marine life. To manage contamination, the brine seawater will be disposed of down a deep well.

6.1.9 Flooding and Storm Water Management

Stormwater management for The Project will address both the quality and quantity of runoff generated during construction and operations. The objective is to minimize flooding risks, reduce erosion and sedimentation, and prevent the transport of pollutants into adjacent coastal and marine environments. Given New Providence's low-lying topography and exposure to intense rainfall events, effective management is essential to safeguard natural water bodies and public infrastructure.

Several activities during the construction phase have the potential to create flooding, including dewatering of trenches for utilities and the removal of any ground material. These activities have the potential to cause a reduction in the absorption, evaporation, and infiltration rates of water into the soil. This will increase in standing water around the site and increase the risk of flooding during significant rains, extreme weather conditions, including effects from climate change, and hurricane season.

As The Project nears completion, the increase in impervious surfaces for buildings, roads, roofs, and gutters can increase the amount of water entering the proposed drainage system.

A Storm Water Management Plan will be developed and outlined in the Arawak Cay LNG Project EMP to outline mitigation measures to prevent and control flooding. The Storm Water Management Plan will include measures such as:

- The construction of drainage retention ponds or swales designed to collect and drain water at a fast rate.
- Buildings should also be elevated to reduce the risk of flooding in the event of extreme weather and flooding conditions.

- Establishment of flood control ditches to allow to reduce the risk of rain-induced flooding.
- Regular cleaning and maintenance of the drains.
- Revegetation of areas to reduce erosion and slow the rate of stormwater runoff.
- Constructing sedimentation basins to temporarily store stormwater.

6.2 Biological Impacts

6.2.1 Habitat Degradation Impact

Habitat degradation refers to the process by which a natural habitat becomes incapable of supporting native species due to human activities or natural events.

The construction and operation of the LNG facility at The Project site will result in minimal alteration of terrestrial habitats, as the site is already human-altered. Biodiversity in this zone is considered low, with native flora and fauna displaced or restricted to isolated pockets.

The installation of the transmission cable on the seafloor will lead to minimal displacement of benthic organisms and the alteration of the benthic habitats.

To mitigate further habitat degradation, the following will be implemented:

- Construction activity to be limited to the site footprint.
- Fencing to be installed where applicable.
- Turbidity will be monitored during all marine works.

6.2.2 Wildlife Impacts

Emphasis will be placed on observing the presence and management of all wildlife on site.

Land clearing can cause a decrease in native wildlife due to habitat loss and habitat fragmentation. Avian species observed on site and various invertebrates may be displaced due to direct disturbance or degradation of ecological conditions essential for foraging, nesting, or shelter. The proper management of wildlife, specifically nesting birds, is extremely important.

Impacts on avian species are expected to be low, as species observed have adapted to or have become accustomed to Human-Altered Environments.

During construction, if wildlife is encountered (e.g., nesting birds, injured fauna, juvenile animals), construction should be halted immediately and that information reported. Before clearing vegetation or cable installation, the environmental manager or wildlife specialist will schedule inspections for wildlife, installation of protective fencing, pre-stressing, and onsite briefings for contractors.

During the operational phase, an Employee Wildlife Management education training programme should be designed and implemented. This programme should include

prohibiting hunting and harassment of wildlife within The Project vicinity and protocol in the event of a wildlife encounter.

A Wildlife Management Plan will be outlined in the EMP detailing measures for preventing harm to wildlife present on site, and the steps staff should take by staff should they encounter any wildlife on site.

6.2.3 Impacts to the Marine Environment

Emphasis will be placed on observing the presence and management of all wildlife on-site.

Impacts to marine fauna and epifauna include habitat loss for sessile marine life and displacement for motile species. Prior to placement of the pipeline, the area will be assessed to ensure that there are no motile epifauna present within the direct footprint. Any identified motile epifauna will be removed from the area and relocated to a similar habitat. Turbidity should be carefully monitored to ensure that wildlife (sessile and motile) in the area to be indirectly impacted are not significantly affected.

As seagrass habitats are ecologically important as well as protected in The Bahamas, the transmission cable will avoid disturbing seagrass where possible.

6.3 Socio-Economic Impacts

6.3.1 Visual and Aesthetic Impact

The Project will impact the aesthetics of Arawak Cay, as the visibility of the LNG facility from various locations could result in a negative public opinion. However, managing public opinion with aesthetic designs does not account for the appropriate requirements needed for an efficient facility. Therefore, it is essential to consider the visual impact but within reason, to ensure The Project facility can still complete its aim.

6.3.2 Impacts on Neighborhoods and Communities

The Arawak Cay LNG Project is anticipated to affect the local neighborhoods and communities. This section evaluates the potential impacts during both the construction and operational phases of The Project.

Construction Phase Impacts

During the construction phase, The Project is expected to generate several impacts on the local neighborhoods and communities:

- **Noise and Vibration:** The use of heavy machinery and construction activities will generate noise and vibrations, which may disturb residents and businesses. Measures such as noise barriers and restricted working hours will be implemented to mitigate these impacts.
- **Air Quality:** Dust and emissions from construction vehicles and equipment may affect air quality in the surrounding areas. Dust control measures, such as water spraying, will be employed to minimize these impacts.

- **Public Safety:** The presence of construction sites and heavy machinery may pose safety risks to the local community. Safety measures to be implemented include fencing of construction areas and clear signage outlining construction zones.

Operational Phase Impacts

Once operational, the LNG facility will generate regular impacts associated with its daily operations:

- **Ambient Air Quality:** The operation of the LNG facility may result in emissions that could affect air quality. The facility will be equipped with advanced emission control technologies to minimize these impacts.
- **Noise:** The operation of the facility, including the movement of LNG tankers and other vehicles, may generate noise that could disturb the local community. Noise mitigation measures, such as soundproofing and operational restrictions during night hours, will be implemented.

Additional measures to be implemented to minimize impacts on neighborhoods and communities include:

- **Community Engagement:** Regular communication with the local community will be maintained to keep them informed about The Project and address any concerns. Public meetings and information sessions will be held to ensure transparency and community involvement.
- **Environmental Monitoring:** Continuous monitoring of air quality and noise levels will be conducted to identify and address any emerging issues promptly. Adjustments to mitigation measures will be made, as necessary.

6.3.3 Traffic Impacts

The Project is anticipated to have impacts on local traffic patterns and infrastructure, as it is currently serviced by a network of local roads that connect to major roads through Nassau (e.g., West Bay Street). The existing traffic volume is moderate, with peak hours typically occurring around the morning and afternoon commutes.

An influx of construction vehicles, including trucks and machinery, will lead to higher traffic volumes, resulting in temporary congestion, particularly during peak hours. The increased load from heavy vehicles could also accelerate the deterioration of road surfaces, necessitating more frequent maintenance and repair. To mitigate these impacts, a comprehensive traffic management plan should be developed. This plan will include.

- Designated haul routes.
- Scheduling deliveries during off-peak hours.
- Notice should be given to the community of the commencement of work and possible traffic inconveniences.

- Signage will need to be placed at the site entrance and exit, and the main thoroughfare.
- Heavy machinery should have a banksman to assist in manoeuvring on and off site.
- Flagmen should be placed strategically at key intersections.

Once operational, the facility will generate regular traffic associated with its daily operations.

6.3.3.1 Boating Traffic Impacts

Project activities have the potential to negatively affect marine traffic flow due to the movement of the barge to and from The Project site. The increase in movement of heavy machinery can cause impacts to the safety of other boaters in the area and cause discomfort to the community.

To prevent any boating accidents during construction, the following strategies should be employed:

- The transportation of the waste and other materials should be in a safe manner, considering boating regulations.
- The Port Department should be made aware of all movements of the barge.
- All barges to be kept within the marina construction area.
- All navigational hazard lights should be checked daily.
- Ensure goal posts and warning signs have been erected in appropriate areas before commencement of works.

7.0 Environmental Management Plan

The Environmental Management Plan (EMP) is a document designed to assist with achieving the Health, Safety, Social and Environmental (HSSE) Policy to ensure that all its activities during both the construction and operational phase of The Project are conducted in a manner that results in minimum adverse impacts on the environment.

The EMP will outline potential impacts associated with project activities and contain detailed mitigation measures and best management practices that will be employed by management, staff, and sub-contractors during construction to reduce, avoid, or mitigate against impacts. The EMP will also outline national and international legislative requirements, site-specific procedures, detailed monitoring plans, and training guidelines to ensure environmentally responsible project execution. An outline of the EMP can be found in Appendix G.

Potential Impacts associated construction of The Project that will be included in the EMP are:

Table 18: Environmental Impacts of The Project.

Physical Impacts	Biological Impacts	Socio-Economic Impacts
● Air, dust, Noise Pollution	● Habitat Degradation ● Impacts on Wildlife	● Traffic Impacts ● Community Impacts

• Noise Pollution • Waste Impacts • Sewage and Refuse Disposal. • Erosion and sedimentation • Fire and Hurricane Risk • Hydrological Impacts • Flooding and Storm Water Impacts	• Impacts on Marine Environment.	• Economic Impacts • Visual and Aesthetic Impact.

8.0 Stakeholder Engagement

Stakeholders can be defined as individuals or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project or the ability to influence its outcome, either positively or negatively. To ensure a meaningful and successful project, the proper identification of stakeholders is essential (See Appendix H).

8.1 Types of Stakeholders

Stakeholders in a project can generally be divided into internal and external groups.

Internal stakeholders are those directly associated with or involved in The Project and who operate within its organizational structure. For The Project, they include:

- The Project Sponsor,
- The Government of The Bahamas,
- The Ministry of Energy and Transport as the Executing Agency,
- Bahamas Power and Light (BPL),
- Water and Sewage Corporation (WSC),
- Department of Physical Planning,
- Department of Environmental Planning and Protection (DEPP),
- Port Department,
- Arawak Port Development,
- The Project team,
- Consultants,
- Contractors,
- Sub-Contractors, and
- construction employees.

External stakeholders, on the other hand, are not directly involved in the project's operations but are still impacted by its actions and outcomes. These may include:

- Government agencies such as Bahamas Ministry of Tourism, Investments, and Aviation,
- Bahamas Maritime Authority
- Customers,
- Suppliers,
- Advocacy groups and Non-Profit groups - Bahamas Chamber of Commerce and Employer's Confederation, and Waterkeepers Bahamas,
- NGO's – Bahamas National Trust (BNT), The Nature Conservancy (TNC), and Bahamas Reef Environment Educational Foundation (BREEF), Bahamas,
- Cruise Operators,
- Local Businesses – Transportation providers, vendors,
- Tourist, and
- The public.

8.1.1 Vulnerable Groups

Throughout The Bahamas in general, there are several identifiable disadvantaged or vulnerable groups who, because of their prevailing characteristics, face the risk of being excluded from the benefits of this project if not adequately engaged. These include low-income communities, women, people with disabilities, and immigrant communities. To ensure that The Project does not further exacerbate existing exclusion errors, special efforts will be made to engage persons from these vulnerable groups and mitigate risks of social exclusion and elite capture (whereby public resources are biased for the benefit of socially advantaged groups to the detriment of disadvantaged groups). See Appendix H for the full Stakeholder Engagement Plan.

8.2 Stakeholder Engagement Plan

An engagement and consultation plan will be developed for this Project, which will guide how stakeholders are engaged throughout The Project life cycle. Methods of engagement will be tailored for stakeholders, including but not limited to the aforementioned (see Table 19).

8.2.1 Stakeholder Analysis

Stakeholder analysis via stakeholder mapping is an important assessment tool that will aid The Project team in assessing how stakeholders can collaborate with or hinder the realization of what has been planned, and to begin identifying good ideas for defining strategies to work with these actors.

The Stakeholder Analysis Matrix below (see Table 19) helps in the assessment and prioritization of the identified stakeholders and allows The Project team to design strategies

addressed to the different groups. The result of the interaction of the factors in this matrix suggests the type of management to be done with each group.

Table 19. Stakeholder Analysis Matrix

Stakeholder	Objectives or Targets	Level of Interest	Level of Influence	Possible Stakeholder Actions	Strategies for Engagement
The Government of The Bahamas	Sponsoring The Project	High	High	Can approve The Project; can act as internal and external "champion" of The Project. Withdrawing support/funding for project; stopping or pausing The Project.	Should be managed closely. Frequent communication.
Ministry of Energy and Transport	Approving The Project; Executing The Project	High	High	Can approve The Project; can act as internal and external champion of The Project	Should be managed closely. Frequent communication.

				Can withdraw support of The Project; or cause Project delays.	
Bahamas Power and Light	Facilitating The Project	High	High	Can facilitate The Project Can cause Project delays	Engaged as a core partner through regular strategy meetings, technical assessments, and capacity planning
Ministry of Tourism, Investments and Aviation	Ensure The Project supports sustainable tourism goals, and aligns with national tourism strategy	High	Medium	Can delay or withdraw support if The Project negatively impacts tourism revenue	Frequent communication

Department of Environmental Planning & Protection (DEPP)	Approving The Project	High	High	Can approve The Project Can stop or pause The Project, causing project delays	Should be managed closely. Frequent communication.
Other Government Agencies/	Facilitating The Project	Medium	Medium	Can facilitate The Project	Should be kept informed of The Project
Utility Corporations/ Municipal Authorities	Provision of utilities			Can cause project delays	Progress, changes, and risks
Project Team (Contractor, Project Manager, etc.)	Manages The Project. Responsible for The Project's technical, administrative, and operational	High	High	Positive: Meet project objectives Negative: Project delays	Should be managed closely. Frequent Communication.

	management, etc.				
NGOs, Community Groups, Neighboring Communities		High	Low	Show public support for The Project. Public opposition to The Project	Should be kept informed of project progress Organize meetings and awareness events Should mitigate any negative stakeholder actions

8.2.1.1 Method of Engagement

There are a variety of engagement techniques used to build relationships with stakeholders, gather information from stakeholders, consult with stakeholders, and disseminate project information to stakeholders. Engagement will be conducted in a variety of ways in a manner that is accessible and culturally appropriate.

The following criteria should be taken into consideration in determining the appropriate and most effective form of communication to be used for a stakeholder:

- Stakeholder proximity to The Project.
- Number of persons impacted.
- Degree of impact (positive or negative).
- Significance of impact.
- Extent of stakeholder influence on The Project
- Purpose of engagement.
- Audience to be addressed.

The following methods will be used to consult with stakeholders:

- Surveys.
- Phone calls, emails, text, and WhatsApp messages.
- Print media, social media, and radio announcements.
- One-on-one Interviews.
- Focus Groups.
- Workshops.
- Public Consultations.

8.3 Public Consultation

Public Consultation is critical to ensure proper stakeholder engagement. Public Consultation with relevant stakeholders is important in helping decision-makers understand the views, values, interests, issues, and concerns held by the community regarding the proposed development and incorporate them into decisions. The public consultation outlines the EIA and presents the Project's purpose, objective, scope of works, baseline data, and monitoring program, and outlines the possible impact and mitigation measures. The meeting should be in a public location during a designated time and include stakeholders such as tourists, surrounding businesses, nearby residents, relevant Government Agencies, Non-Governmental Agencies, and any other groups mentioned above.

Once the logistics of the meeting are determined, the general public should be made aware of when and where the meeting is occurring. Ads should be placed in media sources such as the newspaper, on television, on the radio, and on social media platforms at least fourteen (14) days in advance.

During the meeting, minutes should be taken, and an email should be provided where stakeholders can submit their comments, questions, and concerns regarding The Project. The Project should incorporate the answers to these comments and concerns in the final draft of the EIA.

9.0 Conclusion

The Project area in New Providence encompasses a route that lies within a heavily human-altered ecological zone dominated by urban development, road networks, and industrial infrastructure. This area has undergone extensive transformation due to past and ongoing construction activities, leaving little to no intact natural habitats. Consequently, the biodiversity in this zone is low, with native flora and fauna displaced or restricted to isolated pockets.

The Environmental Impact Assessment (EIA) for the LNG plant and submarine power transmission cable project from Arawak Cay to the Nassau Cruise Port underscores a commitment to sustainable development, environmental stewardship, and community well-being. The Project aims to minimize its ecological footprint while enhancing critical infrastructure for New Providence by addressing key environmental considerations, implementing robust mitigation measures, and ensuring rigorous monitoring.

10.0 References

Areces-Mallea, A. E., Weakley, A. S., Li, X., Sayre, R. G., Parrish, J. D., Tipton, C. V., & Boucher, T. (1999). A Guide to Caribbean Vegetation Types: Preliminary Classification System and Descriptions. The Nature Conservancy.

Bahamas, T. G. (2021). Forestry (Declaration of Protected Trees) Order 2021. Nassau: The Government of The Bahamas.

Charpin, F. (n.d.). Caribbean reefs. Caribbean Reefs - Angelfishes - Surgeonfishes - Butterflyfishes. Retrieved February 7, 2023, from https://reefguide.org/carib/index1.html

Correll, D., & Correll, H. (1982). The Flora of the Bahama Archipelago: Including Turks & Caicos Islands. J. Cramer.

Currie, D., Wunderle, J. M., Fried, E., Ewert, D. N., & Lodge, D. J. (2019). The Natural History of The Bahamas: A field guide. Cornell University Press.

Charpin, F. (n.d.). Caribbean reefs. Caribbean Reefs - Angelfishes - Surgeonfishes - Butterflyfishes. Retrieved September 23, 2025, from https://reefguide.org/carib/index1.html

Humann, P. Deloach, N. (2014). Reef Fish Identification: Florida, Caribbean, Bahamas (4th ed.). New World Publications

Humann, P. Deloach, N. (2013). Reef Coral Identification: Florida, Caribbean, Bahamas (3rd ed.). New World Publications

Humann, P. Deloach, N. (2013). Reef Creature Identification: Florida, Caribbean, Bahamas (3rd ed.). New World Publications

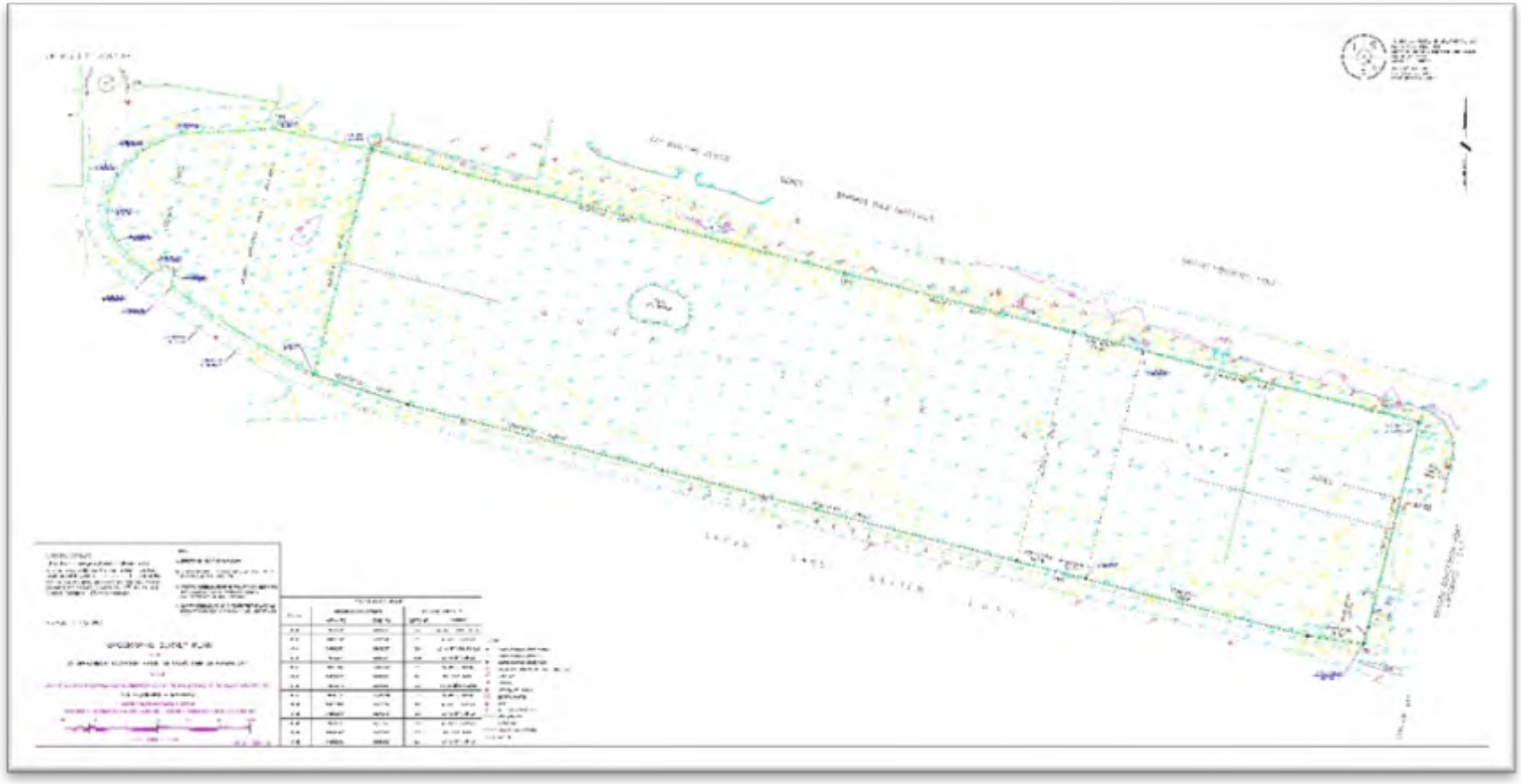
Ministry of the Environment. (2021). Forestry (Declaration of Protected Trees) Order 2021. Nassau: The Government of The Bahamas.

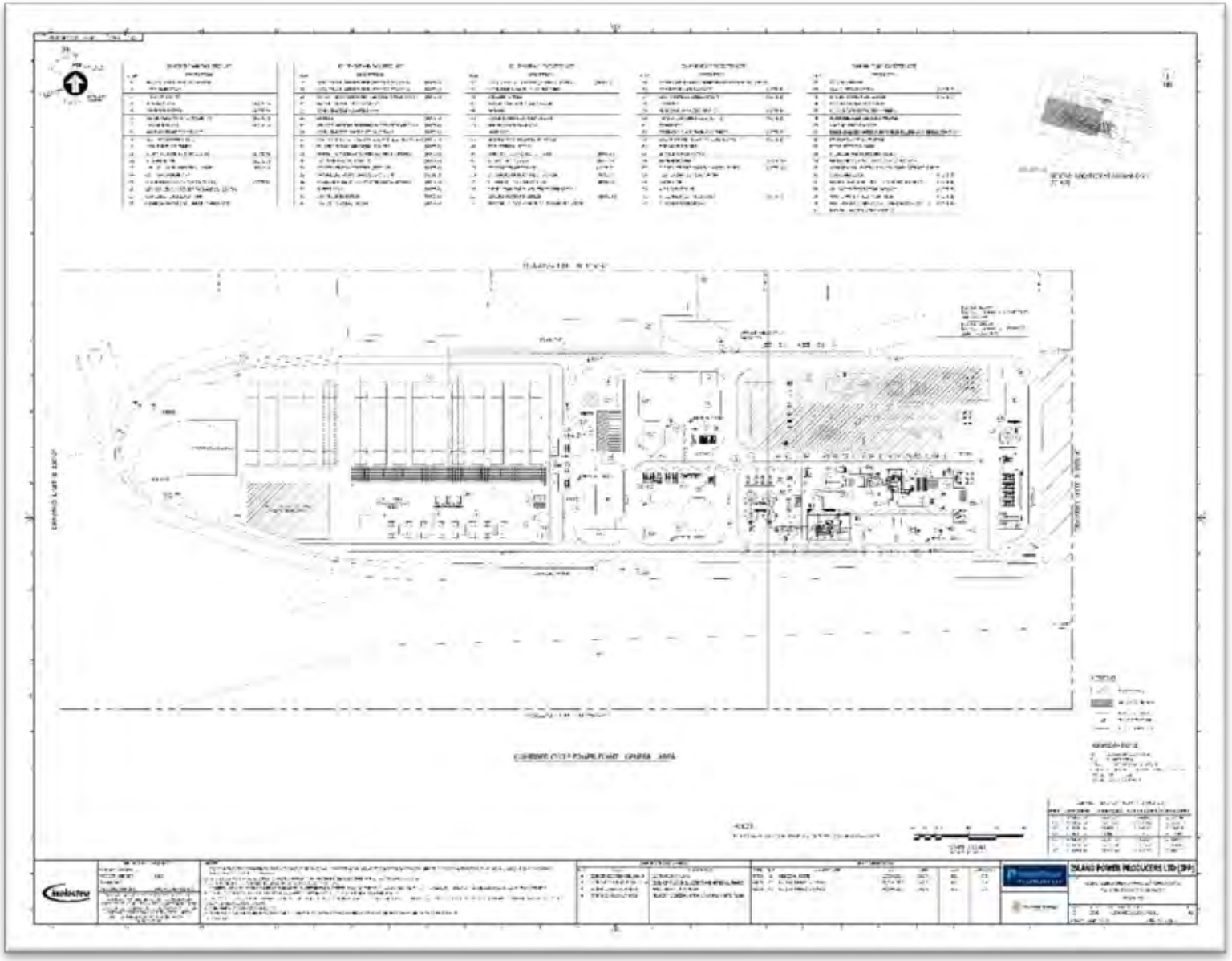
Moultrie, S. (2013). The Bahamas Invasive Species Strategy 2013. Nassau: Department of Marine Resource

United States Environmental Protection Agency. (2025) Power Plants and Neighboring Communities. Retrieved September 22, 2025, from https://www.epa.gov/power-sector/power-plants-and-neighboring-communities

Appendices

Appendix A: Site Plan





Appendix B: Hydrological and Eco-Hydrological Assessment

Appendix C: Geotechnical Studies

Appendix D: Ground Penetrating Radar (GPR) Survey

Appendix E: Bathymetry Studies

Appendix F: Marine Spot Checks GPS Coordinates

Spot Check	Date	Latitude	Longitude	Depth (ft)	Habitat Description
1	9/5/2025	25°4'56.41"N	77°21'18.34"W	3.5	Hard Bottom with moderate Turtle Grass, Mustard Hill Coral, patches of Sandy Bottom with loose rubble
2	9/5/2025	25°4'56.23"N	77°21'17.64"W	9	Hard Bottom with Macroalgae and Black Ball Sponges
3	9/5/2025	25°4'55.59"N	77°21'15.29"W	11	Hard Bottom with Macroalgae
4	9/5/2025	25° 4'54.85"N	77°21'12.53"W	12	Sandy Bottom with Macroalgae and Southern Lugworm Mounds
5	9/5/2025	25°4'54.12"N	77°21'9.86"W	10.05	Sandy Bottom with Macroalgae, Southern Lugworm Mounds and Black Ball Sponge
6	9/5/2025	25°4'53.37"N	77°21'7.08"W	11.5	Sandy Bottom with Macroalgae and Southern Lugworm Mounds
7	9/5/2025	25°4'52.65"N	77°21'4.43"W	45.5	Silt with Macroalgae
8	9/5/2025	25°4'51.90"N	77°21'1.63"W	16	Silt with Macroalgae
9	9/5/2025	25°4'51.17"N	77°20'58.90"W	12.5	Silt with Macroalgae
10	9/5/2025	25°4'50.44"N	77°20'56.20"W	11.5	Sandy Bottom with moderate Turtle Grass, and sparse Macroalgae
11	9/5/2025	25°4'49.72"N	77°20'53.53"W	10	Sandy Bottom with sparse Macroalgae
12	9/5/2025	25°4'48.98"N	77°20'50.83"W	11	Sandy Bottom with sparse Macroalgae and Seagrass
13	9/5/2025	25°4'48.24"N	77°20'48.08"W	9	Moderate to Dense Turtle Grass
14	9/5/2025	25°4'47.50"N	77°20'45.37"W	9	Sandy Bottom with Manatee Grass and sparse Macroalgae

15	9/5/2025	25°4'46.93"N	77°20'43.25"W	8	Sandy Bottom with Macroalgae and Southern Lugworm Mounds
16	9/5/2025	25°4'46.56"N	77°20'41.90"W	8.6	Sandy Bottom with Southern Lugworm Mounds

Appendix G: Environmental Management Plan Outline

Appendix H: Stakeholder Engagement