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Environmental Impact Assessment (EIA) for Bel Air Project, Eleuthera

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Contents

ENVIRONMENTAL IMPACT ASSESSMENT FOR BEL AIR PROJECT, NEW PROVIDENCE, THE BAHAMAS

Executive Summary

The objective of the Environmental Impact Assessment (EIA) for the Bel Air Project is three-fold:

1. To evaluate potential environmental impacts of the proposed project
2. To suggest potential mitigation measures that can be implemented to reduce or eliminate any negative environmental impacts
3. To evaluate whether the proposed project can be implemented in a manner that is environmentally sustainable

The Bel Air Project involves the construction of a resort and residential development near to Gregory Town on the island of Eleuthera in The Bahamas (see Map 1). The project is being executed by Bel Air Resort and Residences.

The proposed development consists of two parcels of land – a 50.73-acre parcel approximately 0.5 miles northwest of Gregory Town and a 5.41-acre parcel approximately 3.5 miles northwest of Gregory Town. The development will consist of

- A resort consisting of 70 cottages with a restaurant, bar, pool, gym and spa
- A small swimming access platform
- 44 residential houses
- A beach club with a bar bistro
- 20 – 30 cottages associated with the resort beach club

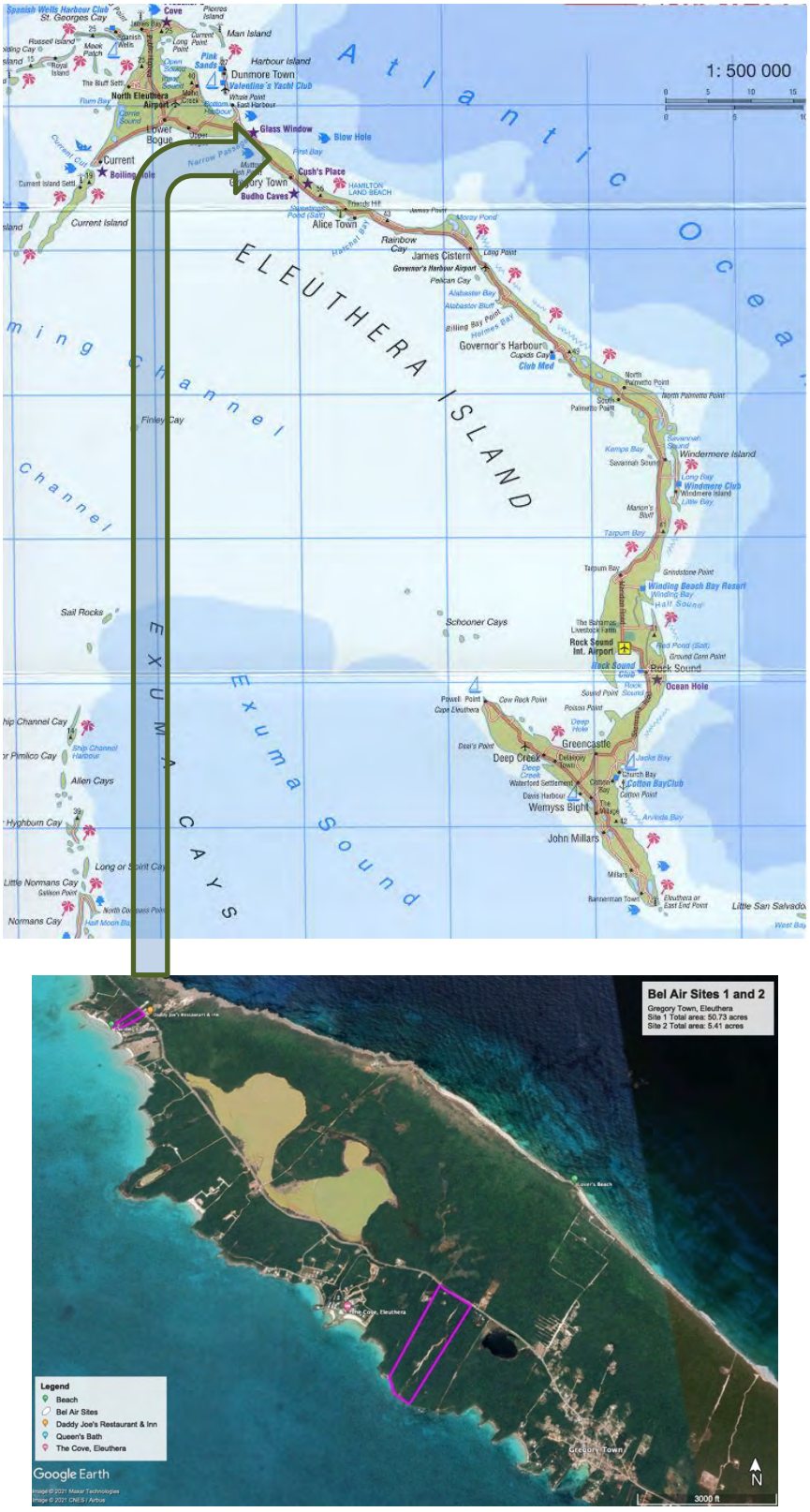
The development also includes green spaces, roads with verges and infrastructure.

There are no marinas or golf courses associated with the development.

Employment of appropriate construction methodologies can result in execution of the project site in a sustainable manner. Utilizing recommended mitigation measures can eliminate or minimize any negative environmental impacts resulting from project activities.

The developer has expressed his commitment to implementing the recommended mitigation measures and executing the project in a manner that respects neighbouring communities, the natural resources of the site and is environmentally sustainable.

Map 1: Bel Air Project, Eleuthera



1.0 Introduction and objectives

1.1 Objective of the EIA

The objective of the Environmental Impact Assessment (EIA) for the Bel Air Project is three-fold:

1. To evaluate potential environmental impacts of the proposed project
2. To suggest potential mitigation measures that can be implemented to reduce or eliminate any negative environmental impacts
3. To evaluate whether the proposed project can be implemented in a manner that is environmentally sustainable

1.2 Scope of the EIA

The EIA involved field surveys and research focused on the project site and its environs. Surveys conducted included:

- Terrestrial habitat survey (including avifaunal and wetland survey)
- Mapping of habitats on the site
- Hydrological assessment
- Socioeconomic assessment

2.0 Project description and alternatives

2.1 Description of proposed project

The Bel Air Project involves the construction of a resort and residential development near Gregory Town on the island of Eleuthera in The Bahamas (see Map 1). The project is being executed by Bel Air Resort and Residences.

Table 2-1 outlines the components of the proposed development.

Table 2-1: Bel Air Project Components

Component	Size (in acres)
Site 1	
Resort with 70 cottages plus restaurant, bar, pool, gym, spa and small dock	25
44 residential houses	25
Site 2	
Beach club with bar bistro plus 20 – 30 cottages	5.41

The project concept plan is shown below in Figures 2-1 (Site 1) and 2-2 (Site 2).

Once approved, the timeline for construction is as follows:

- Roads – 3 to 4 months;
- Resort with amenities and 15 cottages – 10 months.
- 15 resort cottages will be added each year until complete build out.
- The residential houses will be constructed as the lots are sold.

The resort cottages will range in size from 500 square feet to 750 square feet. Conceptual drawings of the resort cottages are provided in Figures 2-3 and 2-4.

The residential homes will range in size from 2,450 square feet to 5,000 square feet. A conceptual drawing of the residential homes is provided in Figure 2-5. A conceptual drawing of one of the residential homes is provided in Figure 2-6.

Figure 2-1: Bel Air Project Concept Plan - Site 1

Figure 2-2: Bel Air Project Concept Plan - Site 2

Figure 2-3: Bel Air Resort Cottage (500 sq ft, Site 2)

Figure 2-4: Bel Air Project Resort Family Cottage (600 sq ft, Site 1)

Figure 2-5: Bel Air Project Resort Ultra-Lux Cottage (750 sq ft, Site 1)

Figure 2-6: Residential Homes (Site 1)

Figure 2-7: Conceptual drawing of residential home (5,000 sq ft, Site 1)

2.2 Description of alternative to the proposed development

The selection for the project sites were made based on the following criteria:

- The land was available for acquisition;
- It is of sufficient size to accommodate the project components deemed economically feasible; and
- It is in an area that is projected to attract homeowners (Bahamian and foreign).

No alternative sites were considered.

2.3 "No action" alternative

With development, there is always an alternative of 'no action' which leaves the proposed sites untouched. If the project does not proceed, land parcel 1 will likely remain undeveloped unless sold to another buyer. Land parcel 2, which is not pristine, will remain as it is with some land clearing and a single residential house on it.

The EIA outlines mitigation measures that can be employed to minimize or eliminate any negative environmental impacts from the demolition. With these measures instituted, the project can be done in an environmentally sustainable manner.

3.0 Baseline description of the project site

Eleuthera is 187 square miles with a population of 8,202 and a population density of approximately 44 persons per square mile (Department of Statistics, 2010). For the national census, Eleuthera is divided into North Eleuthera, South Eleuthera, Harbour Island and Spanish Wells. The project is located in North Eleuthera.

3.1 Physical aspects

3.1.1 Climate

The Bahamas is located within the Atlantic Tropical Cyclone basin. This basin includes much of the North Atlantic, Caribbean Sea, and the Gulf of Mexico. On average, 6 to 8 tropical storms form within this basin each year. 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.

In 2019, significant areas of the islands of Abaco and Grand Bahama were devastated by Hurricane Dorian. Estimated damage for these islands is US$3.4 Billion (IDB, 2019). Abaco has shown a reduction in monthly economic activity of 54 per cent comparing September 2019 to September 2018, and Grand Bahama has shown a 34 per cent decrease (IDB, 2020).

The Bahamas was not impacted by hurricanes in 2020 and 2021. 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 December 1st.

3.1.2 Topography

Topographically, the islands of The Bahamas are typically flat with elevations of less than 32 feet (10 meters). A higher coastal ridge may occur, usually located along the exposed side of most islands. Islands of the southeast and central Bahamas are generally of higher elevation than in the northern Bahamas. The islands are usually long and narrow oriented from northwest to southeast with central ridges extending to a maximum height of 200 feet (60 meters).

New Providence is composed of a mixture of rocklands and ridges with coastal wetland areas. The project site is a part of a wetland system along the southwestern coast of New Providence that historically would have been connected to Corry Sound, Millars Sound and Bonefish Pond. Over time, much of the southwestern coast of New Providence has been developed for residential housing, tourism, industry and utility infrastructure.

Copies of the topographic surveys for the Sites 1 and 2 are provided in Appendix 1.

3.1.3 Geology

The Bahamas archipelago is situated in the western North Atlantic and is comprised of extensive carbonate islands and shallow banks. There are 29 large islands, over 600 small cays, and more than 2,000 rocks, all low-lying. The surface deposits of archipelago are of Late Quaternary limestones from a glacioeustatic sea-level highstand position; a depositional record of platform flooding and carbonate sediment production. Simply put, alternating glacial expansions and retreats created vast changes in sea levels across geologic time, allowing for the formation of the islands. The islands are tectonically stable, consisting of carbonate sediments with interspersed paleosols (Mylroie, 2016).

With geologic origins that are biogenic and completely carbonate, The Bahamas differs from other islands in the region. The islands rest on shallow water banks which are primarily composed of calcium carbonate sediments. These limestone sediments were created from rapidly growing marine life which extracted calcium carbonate from seawater creating voluminous depositions of sand and mud. The Bahamas consists of eight carbonate banks with the north and central islands resting on two of these banks. New Providence, centrally located, is part of the largest formation – the Great Bahama Bank.

Oolitic sands have also contributed to the geologic development of the islands, specifically during the last ice age when sea levels were significantly lower. It was then that oolitic sand dunes hardened and when sea levels rose, the rock ridges formed by these dunes became islands along the edges of the shallow banks.

Another source of islands in the archipelago are limestone rocklands, which were formed from the seabed when sea levels were at their highest. As sea level declined, the exposed seabed underwent erosion and weathering. The resulting formation was rocklands. Rocklands make up the broader islands in the archipelago (such as Andros and Grand Bahama) and oolitic sand dunes are represented in thin long islands (including Long Island and Cat Island).

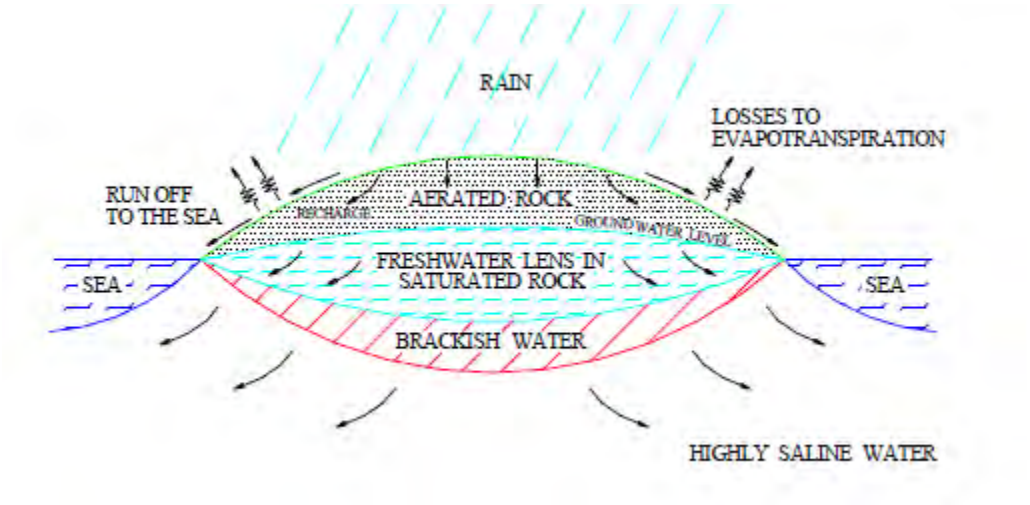
Soil composition in the archipelago consists of organic and inorganic materials and the young age of the soil is reflective of the geologic age (young) of the limestone. Soils layers are typically thin and usually arranged in one or two layers above bedrock. Three soil types are recognized throughout the islands: organic, red clay, and sedimentary soils. New Providence is primarily made up of organic soils, which is the most common soil type in the archipelago (Currie, 2019).

The substrate at the site is rocky, oolitic limestone, heavily pitted with solution holes throughout, typical of the area. The land is relatively flat, with slight variations in elevations no greater than 1-2 meters and the area is susceptible to inundation during wet (rainy) season.

3.1.4 Hydrology and hydrogeology

In The Bahamas, the physical geology, hydrogeology, and water resources are very directly linked as there are no true rivers in The Bahamas. The only natural means of recharge for the underlying freshwater resources is via rainfall. The groundwater resources of the Commonwealth of the Bahamas comprise the fresh, brackish, saline and hypersaline waters found in the subsurface and in the lakes and ponds that intercept the land surface. Most of the freshwater resources occur as three-dimensional lens-shaped bodies, which overlie brackish and saline water referred to as Ghyben-Hertzberg lenses.

Figure 3-1: Ghyben–Hertzberg Lens



Generally, there is nowhere on the islands of The Bahamas that groundwater cannot be met in holes that penetrate 10 feet (3 meters) below sea level. Water is always met in the range 0 to 3 feet (0 to 0.9 meters) above sea level. Tidal action induces an up and down movement to the entire groundwater table ranging from negligible amounts to about 3 feet (0.9 meters). The effect of tides usually decreases inland, but can be substantial if a well-established cavern or other large opening directly connects the area to the sea. In many places inland, rise and fall of the water table is less than 1 foot (0.3 meters).

The typical normal water table elevations are estimated at 3 to 5 feet (0.9 to 1.5 meters) below ground level. Seasonal high water table elevations can range from 1 to 3 feet (0.3 to 0.9 meters) below ground level. During certain storm periods, the water table elevation can be above ground for a period ("perennial wetland areas") but dissipates following the storm period.

Groundwater saturates the rock and all its pores, fissures and interconnected cavities. The size, shape and orientation of the island, the subsurface geology and the amount of rainfall control the shape size and thickness of the freshwater bodies. In excess of 90% of the freshwater lenses are within 5 feet of the surface.

Salinity levels of water are expressed in parts per million (ppm) or milligrams per litre (mg/L) of the chloride content in the water, which is a constituent of the total dissolved solids. Ranges of salinity in The Bahamas are typically:

Water Description	**Dissolved Solids**
Fresh	Less than 1,500 mg/L
Brackish	1,500 – 3,000-mg/L
Salt	More than 3,000-mg/L
Saline	More than 30,000-mg/L

The Commonwealth of The Bahamas consists of an archipelago of islands atop the Bahama Platform. The platform is comprised of a series of thick, shallow carbonate banks horizontally aligned that have built up along the subsiding continental margin of North America. The banks are separated by a series of deepwater channels upon which the islands occur unevenly usually on the margins of the larger and in the centre of the shallower banks. In The Bahamas: 'from sea level down to a depth of about 5 miles (8.0 kilometres), the geology is dominated by limestone and dolomite, with anhydride, salt and gypsum appearing at deeper horizons.' (Cant, 1992).

The upper portions of the land area have been exposed several times in the geologic past as a result of sea-level fluctuations of the Pleistocene age. The rocks in which the easily exploitable groundwater resources occur extend down to approximately 130 feet (39.6 meters) in the zones of the Pleistocene and Holocene lime-stones and lime-sands. These rocks formed as a result of wave action, the chemical precipitation of calcium carbonate and the deposition of oolitic and skeletal sands of marine origin.

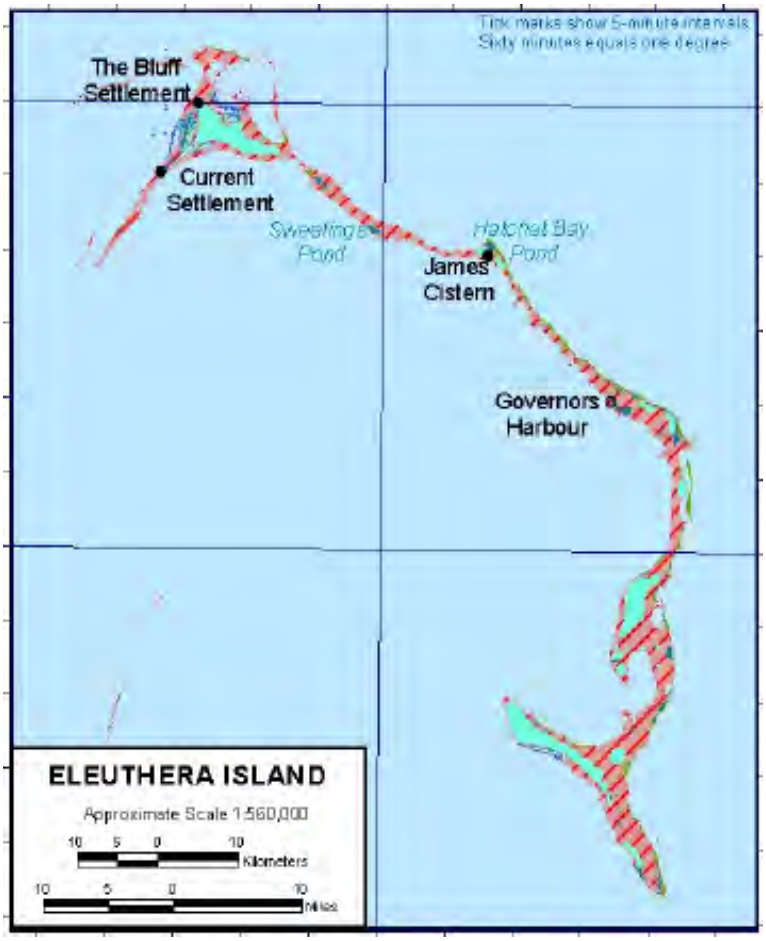
Pleistocene limestones in the form of shallow marine deposits, coral and wind-blown deposits dominate the surface geology. These deposits have been cemented by the solution of calcium carbonate in fresh rainwater during low sea level, followed by the re-precipitation within the inter-grain pores.

In The Bahamas, all freshwater comes from rainfall, which is in dynamic transit back to the ocean from which it came. It has been estimated that freshwater underlies some five percent (5%) of the total landmass of the Commonwealth of The Bahamas. About 75% of precipitation that reaches the land is lost to the atmosphere through evapotranspiration and as runoff from the surface back into the sea.

'The remaining amount of rainfall is estimated to form the lens (Sealey, 1994). Therefore, records of rainfall are pivotal in estimating the needed annual recharge of freshwater lenses from which water is extracted. The water in these lenses remains intact as long as the amount of water extracted does not exceed the amount of recharge through rainfall. "Over-extraction exceeding the amount of recharge leads to the shrinkage of freshwater lens and a rise in saline water" (Sealey, 1994).

Figure 3-2 below shows areas throughout Eleuthera where the fresh water (< 1,500-mg/l chloride) is "locally plentiful" with the water table within 0 to 6 meters (0 to 20 feet) of the surface (USACE, 2004) Thickness of most of the water lenses in Eleuthera range from 10 to 30 feet; the thickest lenses occur in North Eleuthera at 69 feet (USACE, 2004). There does not appear to be any groundwater on the project site, but if it is found, there is no intent to use any groundwater as potable water. Potable freshwater will be provided from municipal sources for project activities.

Figure 3-2: Diagram of Eleuthera Freshwater Lens



Map Legend	
Groundwater resources – Fresh water locally plentiful; unsuitable to large quantities of fresh water from shallow, freshwater lenses within poorly-stratified Pleistocene limestone aquifers. The water table is within 0 to 20 feet of the surface	
Ground water resources – Fresh water scarce or lacking; unsuitable quantities of fresh water from shallow poorly-stratified Pleistocene limestone aquifers.	
Surface water resources – Surface water features including ponds, lakes, creeks and blue holes; unsuitable to meager quantities of brackish to hypersaline water available.	

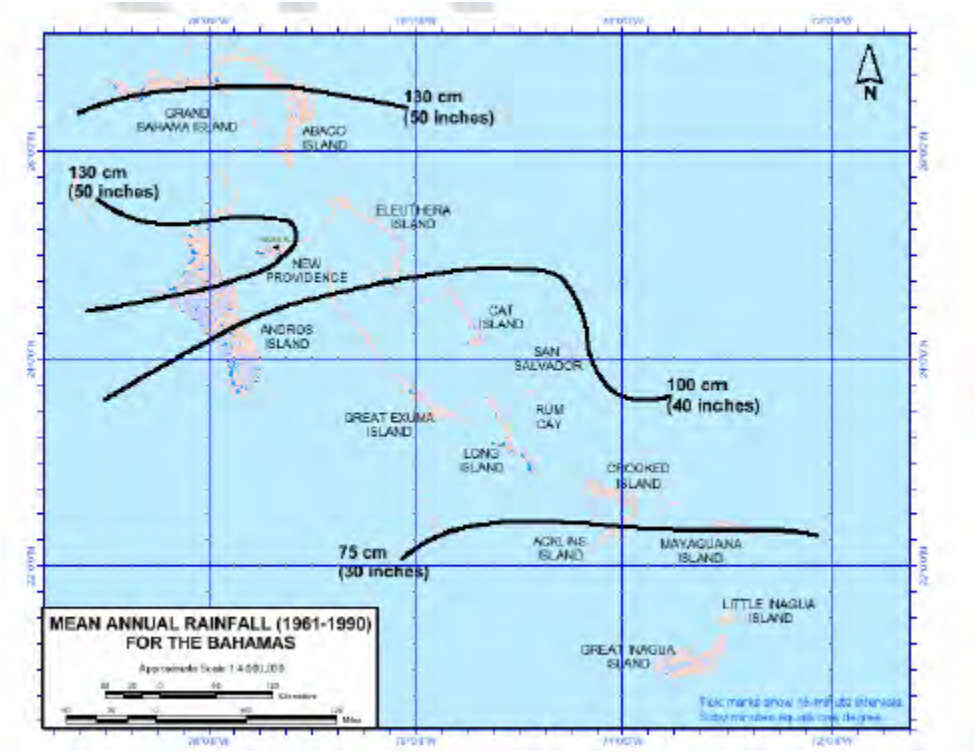
Source: USACE, 2004.

Rainfall

Rainfall is unevenly distributed across The Bahamas. Figure 3-3 below shows the distribution of rainfall for The Bahamas.

The north and north central Bahamas receives some 50 to 60 inches (1270 to 1524 millimeters) of rainfall annually while in the southeast Bahamas, the rainfall decreases to some 36 inches (914 millimeters) annually. There is a distinct dry season (November to April) and a pronounced wet season (May to October). The seasonal effects of tropical cyclones have a pronounced effect on annual rainfalls across The Bahamas. Additionally, winter storms flowing off the North American continent also impact rainfall during the normally dry period. This effect however rarely extends into the central and southern Bahamas.

Figure 3-3: Mean Annual Rainfall for The Bahamas



Source: USACE, 2004.

Surface Water

"Inland water bodies are, in most instances, places where the water table is at or near the same level as the land surface. These bodies are usually saline or brackish in nature. In other cases, ponding of water can occur after a heavy rainfall where the surface rock is impervious enough to retard infiltration. These intermittent freshwater pools may persist for a few hours or for the full length of the wet season. The two most prominent types of surface water bodies in The Bahamas are blue holes and salt ponds." (USACE Water Resources Assessment, 2004)

There are no wetlands or ponds on the parcels of land that comprise the project. There is a small wetland area adjacent to the smaller parcel referred to as Gaulding Cay parcel. A photo of the creek that is a part of that wetland is provided in Figure 3-4.

Figure 3-4: Wetland creek adjacent to Site 2

Climate and Sea Level Rise

Climate variability and change is expected to greatly influence the existing weather and environment of The Bahamas. Problems that may be exacerbated in response to climate variability and change are the frequency and intensity of hurricanes and the potential of rising sea levels. Changes in the position and the distribution of fresh, brackish and saline groundwater is anticipated due to any rising sea level, combined with possible reductions in groundwater recharge from changes in rainfall distribution.

It appears that the sea has been rising at a rate in the order of 6 to 10 inches (152 to 254 mm) per 100 years in The Bahamas, not taking account of possible differences in the rates of uplift or subsidence at these sites. The observations are consistent with the model predictions, and it is generally agreed that the rate of sea level rise in the next century will be 2 to 5 times that in the last 100 years.

In The Bahamas, rising sea levels will lead to considerably less fresh groundwater resources, accelerated erosion of coastal shorelines, and the deeper penetration of storm surges inland.

3.1.4 Air quality

There are no issues related to air quality impairment at the sites presently. Air quality is not expected to be impaired by the activities associated with this project.

3.1.5 Noise pollution

Noise pollution is not an issue at the sites. Noise levels during construction may be raised. This will be discussed in more detail in Section 4.0 on Impacts.

3.2 Biological aspects

3.2.1 Terrestrial habitats - Plants

In general, vegetative cover for Site 1 is predominantly Dry Broadleaf Evergreen Forest (Coppice) and Site 2 (Gaulding Cay) is predominantly disturbed habitat.

Figure 3-5: Aerial image of Site 1

Figure 3-6: Aerial image of Site 2

3.2.1.1 Site 1

Access to the site was via unpaved paths cleared from the northern boundary at Queen's Highway to the coast (Figure 3). These paths provided a continuous route through the site from the northeastern boundary to the southwestern boundary.

The topography at the site, rolling hills with high elevation and steep inclines, is typical of the surrounding landscape in Gregory Town. The profile starting at the shoreline is rocky cliffs, with elevations as low as 15 ft (4.5 m). Upland and into the interior coppice, the elevation ranges broadly from 15 feet to a peak elevation of approximately 82 feet, with median elevation of 27-56 feet throughout. The highest point on Eleuthera at 168 ft (51 m) is less than half a mile northeast of the site.

The substrate of this ridgeland area is Aluminous lateritic soils ('red soils', 'pineapple soils', 'Bahamas red loam'). The vegetative community at the site is dry broadleaf evergreen forest (Coppice), which consists of broadleaf shrubs and trees. It sits on high relief eolian ridges, with rolling hills and valleys.

Vegetative cover at the site is interspersed with native, non-native and invasive plant species. There appears to be an area previously farmed, with various mature trees, including mango, almond, coconut, and lime. Evidence of waste disposal on site was also observed, which too appears to be dated, and included old bottles, 1950's ceramics, tires and machinery.

Two private buildings/homes are in the northern part of the property, near the main road. These were the only buildings observed at the site. A concrete wall structure was also observed at approximately 250 m from the southwestern coastal boundary.

Classification of vegetation was adapted from Areces-Mallea et al. (1999) and the original numerical system is used for ease of reference. There are six classes of vegetation found in The Bahamas, each with subclasses and groups. Among these are numerous formations and associations. Four general classes were observed and documented at the project site are:

- Closed tree canopy (Forest),
- Open tree canopy (Woodland),
- Shrubland (Scrub), and
- Herbaceous vegetation.

Site 1
ZONE 1
Human Altered Layer (Disturbed Area)
As defined by Areces et al. (1999): Non-agricultural Disturbed Areas

ZONE 2 (Bottom of ridge 1)
Class: II. Open Tree Canopy (Woodland)
Subclass: II.A. Evergreen Woodland
Subgroup: II.A.1.C. Planted/Cultivated
Formations: II.A.1.C.a. Orchards

ZONE 3 (Large stand of Gumelemi (*Bursera simaruba))*
Subclass: II.A. Evergreen Woodland
Group: II.B.1. Tropical or subtropical drought-deciduous woodland
Subgroup: II.B.1.N. Natural/Semi-natural
Formations: II.B.1.N.a. *Bursera simaruba* Woodland Alliance

ZONE 4 (At the tops of ridges)
Subclass: II.A. Evergreen Woodland
Group: II.A.1. Tropical or subtropical broad-leaved woodland
Subgroup: II.A.1.N. Natural/Semi-natural
Formations: II.A.1.N.h. Solution-hole evergreen woodland

ZONE 5 (adjacent to coastal on Leeward side)
Class: III. Shrub land (scrub)
Subclass: III.A. Evergreen shrub land (scrub)
Group: III.A.1. Tropical and subtropical broad-leaved evergreen shrub land
Subgroup: III.A.1.N. Natural/Semi-natural

Formations: III.A.1.N.a. Tropical or subtropical broad-leaved evergreen shrub land (includes bamboos and tuft-trees)

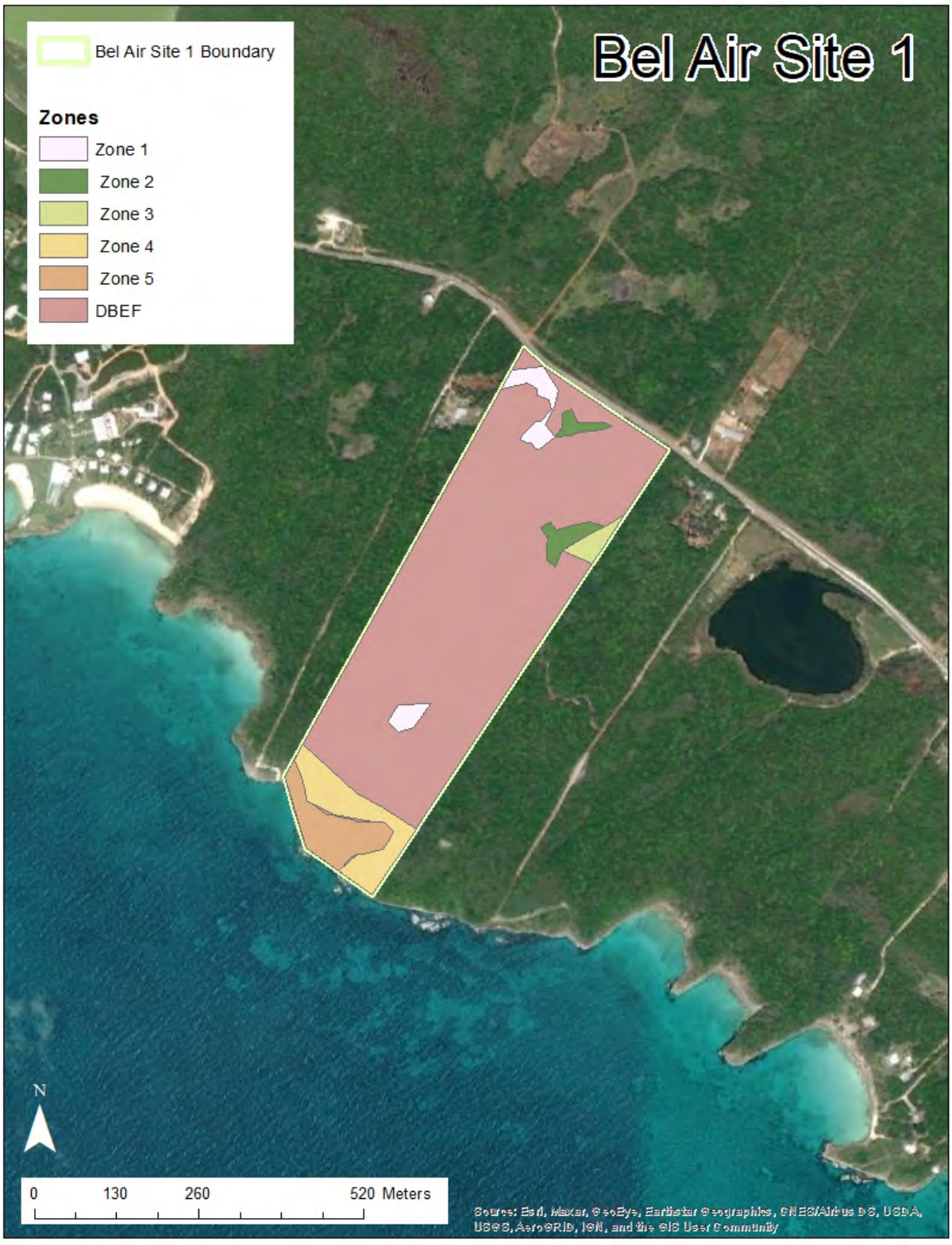
DBEF (general classification for the area and throughout property/site)
Order: Tree dominated
Class: I. Closed Tree Canopy
Subclass: I.A. Evergreen Forest
Group: I.A.3. Tropical and sub-tropical seasonal evergreen forest
Subgroup: I.A.3.N. Natural/Semi-natural
Formations: I.A.3.N.a. Lowland tropical or subtropical seasonal evergreen forest

Vegetative communities observed and documented on Site 1 are described in Table 3-1 and shown in Map 2.

Table 3-1: Vegetative communities and acreages

	Vegetative communities	**Approximate area (acres)**	**Vegetative formations**
Zone 1	Disturbed area – residence/landscaped	1.5	I.A.3.N.a. Lowland tropical or subtropical seasonal evergreen forest
Zone 2	Disturbed area – cultivated land	1.09	II.A.1.C.a. Orchards
Zone 3	Large stand of Gumelemi (*Bursera simaruba)*	0.58	II.B.1.N.a. *Bursera simaruba* Woodland Alliance
Zone 4	Solution holes	3.18	II.A.1.N.h. Solution-hole evergreen woodland
Zone 5	Shrubland (Coastal palm dominated)	2.62	III.A.1.N.a. Tropical or subtropical broad-leaved evergreen shrub land
Remainder of site	Dry Broadleaf Evergreen Forest (DBEF; also known as Coppice)	41.76	
	Total	**50.73**	

Map 2: Land cover types by Zone – Site 1



Plant species observed at Site 1 are listed in Table 3-2 below. These do not include protected species which are listed in Table 3-3.

Table 3-2: Plant Species observed at Site 1

Common Name	***Scientific Name***
Australian Pine	*Casuarina equisetifolia* (Invasive)
Bamboo Grass	*Lasiacis divaricata*
Blue Flower	*Stachytarpheta jamaicensis*
Brier Tree	*Bucida spinosa*
Butterfly Pea	*Centrosema virginianum*
Coconut Palm	*Cocos nucifera*
Coco Plum	*Chrysobalanus icaco*
Drop Seed Grass	*Sporobolus domingensis*
Five Finger	*Tabebuia bahamensis*
Golden Trumpet Vine	*Allamanda cathartica*
Golden Wild Fig	*Ficusaurea sp.*
Havana Cluster Vine	*Jacquemontia havanensis*
Hercules Club	*Zanthoxylum coriaceum*
Jumbay	*Leucaena leucocephala*
Love Vine	*Cassytha filiformis*
Milk Berry	*Sideroxylon americanum*
Morning Glory	*Ipomoea indica*
Paradise Tree	*Simarouba glauca*
Pigeon Plum	*Coccoloba diversifolia*
Seagrape	*Coccoloba uvifera*
Shepherd's Needle	*Bidens pilosa*
Southern Crab Grass	*Digitaria ciliaris*
Thatch Palm	*Thrinax morrissi*
White Sage	*Lantana involucrata*
Woman's Tongue	*Albizia lebbek*

Figure 3-7: Jumbay

Protected Trees

There are 1,371 plant species recorded for The Bahamas (Correll and Correll, 1982) and 89 of those recorded are endemic and unique to the Bahamian Archipelago. The 2021 Protected Trees Order ensures the protection of numerous species. Table 3-3 lists the protected species which were observed at Site 1.

Table 3-3: Protected tree species observed at Site 1

Common Name	***Scientific name***
Endemic, Endangered or Threatened Species	
Bahama Century Plant	*Agave bahamana*
Turtle Grass	*Thalassia testudinum* (Marine)
Cultural or Historical and Economic Trees	
Gum Elemi, Gumbo Limbo	*Bursera simaruba*
Cascarilla, Eleuthera Bark	*Croton eluteria*
Silver Top Palm, Silver Thatch Palm	*Cocothrinax argentata*
Buttonwood	*Conocarpus erectus*
Bahama Brasiletto	*Caesalpinia bahamensis*
Small-leaved Blolly	*Guapira discolor*

Beefwood	*Guapira obtusata*
Joe Bush, Iron Wood	*Jacquinia keyensis*
Thatch Palm, Buffalo Top Palm	*Leucothrinax morrisii*
Horse Flesh	*Lysiloma sabicu*
Wild Tamarind	*Lysiloma latisiliquum*
Mahogany	*Swietenia mahagoni*
Stinking Pea, Bahamas Senna	*Senna chapmanii*
No known common name	*Thrinax radiata*

Figure 3-8: Bahama Century Plant

Figure 3-9: Gum Elemi

3.2.1.2 Site 2

Access to the site was via unpaved road entrance at the northeastern boundary along Queen's Highway which led to the sandy shoreline at the southwest boundary of the site. A second unpaved road along the southeastern boundary was used for access, as well as cleared paths throughout the site. One private home is situated approximately 50 feet from the high water mark, at the southwestern boundary (Figure 5).

The topography at the site is low-lying. The profile starting at the shoreline is sandy beach, with elevations as low as 5 ft (1.5 m). Inland, the elevation varies slightly throughout, with a peak elevation of approximately 10 ft (3 m) The area surrounding the home is primarily landscaped grass, invasive species (Casuarina and Scaevola), and ornamental plants, unpaved roads and paths.

The vegetation classes were observed in various formations at Site 2 as:

- Beach/Sand Strand
- Dry Evergreen Formation (Coppice) – Coastal and Inland
- Disturbed Area

Figure 3-10: Sandy Beach/Strand

Site 2

A vegetation map (see Map 3) was developed with zones that include these formations. No geologic depressions or blue holes were observed at Site 2. There are five zones delineated on the vegetative cover map. Each of the zones and the estimated acreages are listed in Table 3-4. Zone 1 contains the beach/sand strand which includes the sandy area of the coast up to the sand strand. Zone 2 is the footprint of the private residence, including the landscaped area surrounding the home. Zone 3 is adjacent to the private residence and stretches from the sand strand upland into the coppice, an area with a substantial stand of invasive Casuarina. Zones 4 and 5 represents coppice communities, both coastal and inland.

ZONE 1
Order: Vegetation Not Dominant
Class: VII. Sparse
Subclass: VII.C. Unconsolidated Material Sparse Vegetation
Group: VII.C.1. Sparsely vegetated sand dunes
Subgroup: VII.C.1.N. Natural/Semi-natural
Formation: VII.C.1.N.a. Dunes with sparse vegetation

ZONE 2
Human Altered Layer (Disturbed Area)
As defined by Areces et al. (1999): Non-agricultural Disturbed Areas

ZONE 3
Class: II. Open Tree Canopy (Woodland)

Subclass: II.A. Evergreen Woodland
Group: II.A.3. Tropical or subtropical needle-leaved (or needle-stemmed) evergreen woodland
Subgroup: II.A.3.C. Planted/Cultivated
Formations: II.A.3.C.a *Casuarina equisetifolia* Woodland Alliance (Australian pine woodland plantations)
Association: II.A.3.C.a. Casuarina woodland plantation

ZONE 4
Class: I. Closed Tree Canopy
Subclass: I.C. Mixed evergreen-deciduous forest
Group: I.C.1. Tropical or subtropical semi-deciduous forest
Subgroup: I.C.1.N. Natural/Semi-natural
Formations: I.C.1.N.a. Lowland semi-deciduous forests

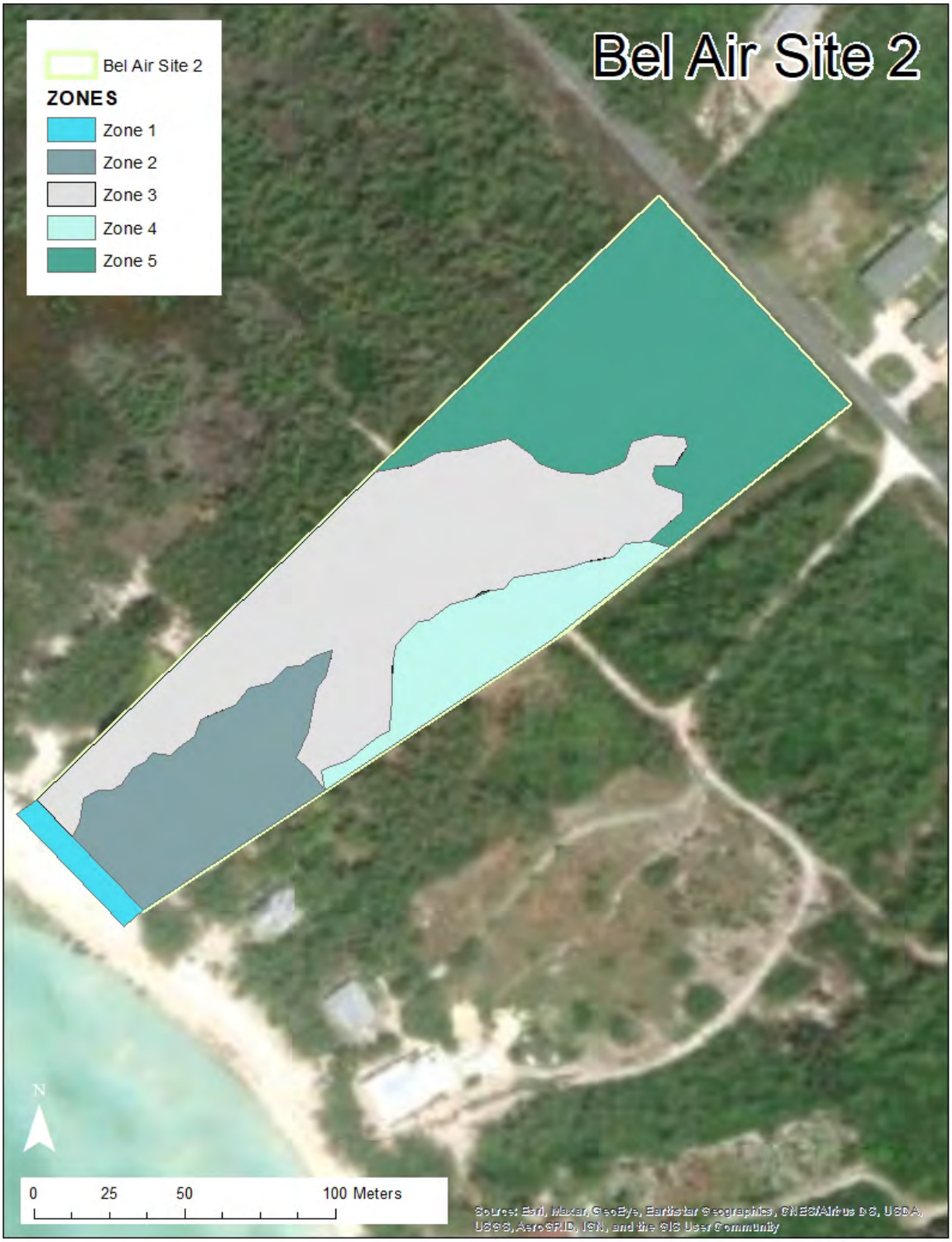
ZONE 5
Order: Shrub Dominated
Class: III. Shrub land (scrub)
Subclass: III.A. Evergreen shrub land (scrub)
Group: III.A.1. Tropical and subtropical broad-leaved evergreen shrub land
Subgroup: III.A.1.N. Natural/Semi-natural
Formations: III.A.1.N.a. Tropical or subtropical broad-leaved evergreen shrub land

Land cover types including vegetative communities observed and documented on Site 2 are described in Table 3-4 and shown in Map 3.

Table 3-4: Vegetative communities and acreages

	Vegetative communities	**Approximate area (acres)**	**Vegetative formations**
Zone 1	Beach/Sand Strand	0.56	Dunes with sparse vegetation
Zone 2	Disturbed area – residence/landscaped	0.83	Human Altered Layer (Disturbed Area)
Zone 3	Disturbed area - Invasive Species	2.08	II.A.3.C.a *Casuarina equisetifolia* Woodland Alliance
Zone 4	Coastal Coppice	0.11	III.A.1.N.a. Tropical or subtropical broad-leaved evergreen shrub land
Zone 5	Shrubland	1.83	I.C.1.N.a. Lowland semi-deciduous forests
	Total	**5.41**	

Map 3: Land cover types by Zone – Site 2



Classification of vegetative communities following Areces et al (1999) is described below for Site 2.

Zone 1: Beach/Strand

At less than an acre, the shoreline of the project site stretches across the southwestern boundary and is low lying sandy beach (elevation approximately 3ft). The sandy substrate extends from the high water into the remainder of the site. Vegetation is sparse along the beach, with mainly invasive species present including Hawaiian Seagrape, also known as White Inkberry (*Scaevola taccada*) and Australian Pine (*Casuarina spp*) (Figure 3-11). Invasive seedlings and established stands dominate this zone with sparse patches of Sea Purslane (*Sesuvium portulacastrum*); see Figure 3-12.

Figure 3-11: Invasive Casuarina and Hawaiian Seagrape seedlings

Figure 3-12: Dune plant species – Sea Purslane and Hawaiian Seagrape

Zone 2: Human Altered Layer (Disturbed Area)

Zone 2 represents the developed/disturbed area at the site, which has a private residence and a well-established landscaped lawn and garden area. In the area surrounding the residence, vegetative cover consists of primarily of introduced and landscaped species including numerous grasses, palms, trees and shrubs. Small groupings of Casuarina sp. are present throughout this zone, with accompanying matted pine needles covering nearby sandy substrate. Other vegetative species present include Seagrape (*Coccoloba uvifera*), Coconut (*Cocos nucifera),* Coco Plum (*Chrysobalanus icaco*) Bay Cedar (*Suriana maritima*), Sea Lavender (*Mallotonia gnaphalodes*) and semi-succulent shrubs like the Bahama Century Plant (*Agave Bahamana*). Numerous non-native ornamental species were also observed in this zone, including Orchids and Hibiscus sp. *Agave cacozela*, a double island endemic was also observed in this zone.

Figure 3-13: View of Zone 2

Figure 3-14: Mix of palm and shrubs behind the private residence on Site 2

Figure 3-15: Bay Cedar

Figure 3-16: *Agave bahamana* and *Agave acozela*

Zone 3: Human Altered Layer (Disturbed Area)

Zone 3 represents a substantial stand of invasive Casuarina trees, adjacent to the private residence along the northwest boundary of Site 2. It stretches from the sand strand upland into the coppice community. This zone is dominated by well-established stands of Casuarina, uniformed in height/age. As a result, the diversity of species in the understory consists of little to no shrub, grasses and herbaceous species. The topography is relatively flat with open canopy habitat and low-lying vegetative community (see Figure 3-17). Species abundance and richness is relatively low, likely due to the historical clearing of land for the residence at the site. The creek systems adjacent to this site is found in this zone.

Figure 3-17: Stands of Casuarina trees

Zone 4: Coastal Coppice

Zone 4 is a very thick coppice community with larger trees and shrubs forming a dense closed canopy. The canopy ranges from 15-20 feet for most of the large trees, while low-lying shrubs and smaller trees are regulated to the edges along unpaved paths and roads. The coppice is thick and dense throughout this zone. The elevation increases slightly in this zone, to about 10-12 feet and is relatively flat.

Many tree and shrub species were observed in the low canopy area including, Sea Grape (*Coccoloba uvifera*), White Torch *(Amyris elemifera*), Stoppers (*Eugenia spp*), Satin Leaf *(Chrysophyllum oliviforme)*, Thatch Palm (*Thrinax morrisii*), and Silver Thatch Palm (*Coccothrinax argentata*).

Zone 5: Coastal Coppice

Zone 5 is adjacent to the main road and is comprised of a low-lying coppice community dominated by shrubs and herbaceous vegetation. The vegetation in this zone is shrubbier than Zone 4 with a lower canopy height, ranging from 1-3 feet, with few large trees dispersed throughout, mainly Casuarina. The elevation increases slightly in this zone, to about 15 feet and is relatively flat throughout. Given its proximity to the main road and the adjacent inland coppice community, this low-lying coastal coppice may be the result of historical clearing of vegetation, with regrowth as coppice species attempt to regenerate.

Species observed in this zone include Piss-a-bed (*Vallesia antillana*) low groundcover herbaceous species, vines, some shrubs and grasses including Bahama love grass (*Eragrostis bahamensis),* Love Vine (*Cassytha filiformis*) and Railroad Vine (*Ipomoea pes-caprae).*

Plant species observed at Site 2 are listed in Table 3-4 below. These do not include protected species which are listed in Table 3-5.

Table 3-4: Plant Species observed at Site 2

Common Name	***Scientific Name***
Australian Pine	*Casuarina equisetifolia* (Invasive)
Bay Cedar	*Suriana maritima*
Boat Lily	*Tradescantia spathacea*
Coconut Palm	*Cocos nucifera*
Drop Seed Grass	*Sporobolus domingensis*
Five Finger	*Tabebuia bahamensis*
Hercules Club	*Zanthoxylum coriaceum*
Jumbay	*Leucaena leucocephala*
Morning Glory	*Ipomoea indica*
Physic Nut	*Jatropha curcas*
Sea purslane	*Sesuvium portulacastrum*
Seagrape	*Coccoloba uvifera*
Shepherd's Needle	*Bidens pilosa*
Slender Nut-rush	*Scleria lithosperma*
Snake Root	*Picramnia pentandra*
Southern Crab Grass	*Digitaria ciliaris*
St. Augustine Crab Grass	*Stenotaphrum secundatum*
Thatch Palm	*Thrinax morrissi*
White Ink Berry (aka Hawaiian Seagrape)	*Scaevola taccada* (Invasive)

Protected Trees

Table 3-5 lists the protected species which were observed at the project site.

Table 3-5: Protected tree species observed at Site 2

Common Name	***Scientific name***
Endemic, Endangered or Threatened Species	
Bahama Century Plant	*Agave bahamana*
Bamboo, Manilla	*Agave cacozela*
Cultural or Historical and Economic Trees	
Silver Top Palm, Silver Thatch Palm	*Cocothrinax argentata*
Buttonwood	*Conocarpus erectus*
Bahama Hibiscus	*Hibiscus clypeatus*
Railroad Vine, Goats Foot, Bay Hop, Bay Winders	*Ipomoea pes-caprae*

Black Ebony	*Pera bumelifolia*
Sabal Palm	*Sabal palmetto*
No known common name	*Thrinax radiata*

Approximately 20 specimens of Bahama Century Plant (*Agave bahamana*) were observed on Site 1 and 4 specimens on Site 2. There were less than 30 specimens collectively of threatened and endemic species on both sites. The historic and economic trees are found throughout the coppice on Site 1. Turtle grass is all along the coast bordering Site 1. The latter is difficult to count as it is a marine plant that grows by an underground rhizome with several offshoots. Since the project has no marina component, the turtle grass is not expected to be negatively impacted.

3.2.2 Terrestrial Habitats - Birds

Avian surveys were conducted on the project site on December 13 and 14, 2021. The assessment comprised 11 hrs and 30 min of active avian surveys including 6.96 miles of transects on both sites. Morning and afternoon surveys were conducted.

The bird species observed on the property were identified using taxonomy based on the Clements Checklist of Birds of the World, August 2019 edition. These results are based on a small sample size and may not represent the total diversity at the site. In particular, Site 1 had been recently disturbed by clearing for survey tracts which may have affected the presence of birds. Similarly, summer nesting seabird species were not detected, but may use the sites during the summer months.

The birds are described based on their range of occurrence, and their conservation or management status. Range is described as Permanent Resident Breeding (PRB) for birds that remain in the Bahamas throughout the year and reproduce. Resident Non-Breeding (RNB) birds occur within The Bahamas throughout the year with the exception of their breeding period. Summer Resident Breeding (SRB) birds only occur in The Bahamas during their breeding season which is during the summer; Winter Resident (WR) birds occur in The Bahamas throughout the winter months from October to May and leave to breed in North America. Endemic birds (E) occur only within The Bahamas or Caribbean. Migrant species (MI) pass through The Bahamas during migration, but do not stay for extended periods.

Conservation status is based on the International Union for the Conservation of Nature (IUCN) classifications and specific regulations of the species in the Laws of the Bahamas. IUCN classifications include:

- Species of Least Concern (LC) for whom no conservation intervention or management is required and the species is not expected to decline or be lost in the foreseeable future;
- Near Threatened (NT) species whose populations may decline drastically without significant protection or constant management;
- Vulnerable (VU) species are likely to become endangered if the risks facing the species in the wild are not addressed;
- Unassessed (UA) species have not received a formal evaluation from the IUCN and are generally not considered species of conservation concern.

In addition to the IUCN categories, Species that are specified in the Wild Birds Protection Act Chapter 249 of the Statute Laws of the Bahamas are designated as Managed (MA).

A total of 18 species were observed during the survey period (see Table 3-6). Most (n=13) of the recorded species were permanent resident species which breed in the islands of The Bahamas and are of low conservation concern.

The Osprey was detected flying over Site 2. The Thick-billed Vireo and Greater Antillean Bullfinch were very vagrant on both sites and these species are common permanent residents. The American Kestrel was present every day of the surveys. The Grey Catbirds were detected on Site 1 and are there in abundance. The Western Spindalis was also very vagrant in the trees on Site 2; it is considered to be a common permanent resident through The Bahamas and Cuba with its habitat being pine trees and coppice. A Banaquit pair was also spotted on Site 2. Nests were observed, both occupied and unoccupied. The latter may be utilized by migratory species which return to them year after year. Bird species observed are listed in Tables 3-6 and 3-7.

Table 3-6: Bird species observed at Site 1

Common Name	Scientific Name	Range	Status
American Kestrel	*Falco sparverius*	PRB	LC
Palm Warbler	*Setophaga palmarum*	PRB	LC
Grey Catbird	*Dumetella carolinensis*	MI	LC
Bahama Woodstar	*Nesophlox evelynae*	RNB	LC
Thick-billed Vireo	*Vireo crassirostris*	PRB	LC
Northern Mockingbird	*Mimus polyglottos*	PRB	Invasive
Prairie Warbler	*Setophaga discolor*	MI	LC
Black and White Warbler	*Mniotilta varia*	MI/RNB	LC
Greater Antillean Bullfinch	*Melopyrrha violacea*	PRB	LC
Bananquit	*Coereba flaveola*	PRB	LC
White-crowned Pigeon	*Patagioenas leucocephala*	PRB	LC
American Redstart	*Setophaga ruticilla*	RNB	LC

Table 3-7: Bird species observed at Site 2

Common Name	Scientific Name	Range	Status
American Kestrel	*Falco sparverius*	PRB	LC
Palm Warbler	*Setophaga palmarum*	PRB	LC
Common Ground Dove	*Columbina passerina*	PRB	LC
Bahama Woodstar	*Nesophlox evelynae*	RNB	LC
Thick-billed Vireo	*Vireo crassirostris*	PRB	LC
Osprey	*Pandion haliaetus*	PRB	LC
Belted Kingfisher	*Megaceryle alcyon*	RNB	LC
Cuban Pewee	*Contopus caribaeus*	PRB	LC
Smooth-billed Ani	*Crotophaga ani*	PRB	LC
Western Spindalis	*Spindalis zena*	PRB	LC
Black and White Warbler	*Mniotilta varia*	MI/RNB	LC
Greater Antillean Bullfinch	*Melopyrrha violacea*	PRB	LC

Figure 3-18: Thick-billed Vireo

Figure 3-19: Western Spindalis

Figure 3-20: Greater Antillean Bullfinch

Figure 3-21: Banaquit nest

Permanent Resident Breeding

Permanent Resident Breeding (**PRB**) species refers to the resident species that live year-round in the Bahama Islands and breed. A total of 12 species were found in this category during the avian surveys. Palm Warblers and White-crowned Pigeons are relatively common native species which use forests and forest edges throughout The Bahamas. Common Ground Doves are ubiquitous small doves that feed on seeds and occasional small fruit. The Cuban Pewee is a flycatcher, endemic to The Bahamas and Cuba. The resident Osprey breeds commonly in the southern Bahamas and north to Exuma and Cat Island.

Summer Resident Breeding

Summer Resident Breeding refers to migrant species that breed in The Bahamas during summer months from April to October and spend the rest of the year in other regions. No birds were found in this category during the survey period.

Winter Resident Non-Breeding

Winter Resident Non-breeding species refers to the annual non-breeding fall/winter migrants which pass through the Bahama Islands from North America en route to southern regions and may remain in the Bahamas. No birds were observed in this category.

Winter Resident Breeding

Winter Resident Breeding birds visit The Bahamas to mate and breed during the winter months. No species was detected in this category.

Resident non-breeding species

Resident non-breeding birds spend most of their lives in The Bahamas, but leave to breed in another location or have not been recorded breeding in The Bahamas. Four (4) species in this category were detected at the sites.

Endemic Species

Endemic species are found only in a restricted geographic area. Endemism must be described at scale. Some species are only found in a small area, on a particular island, or within a region like the Caribbean. The Cuban Pewee was the endemic observed.

Conservation Status

Protected Species

All of the bird species observed are protected under the Wild Birds Protection Act (Statute Law of The Bahamas, Chapter 249). In addition to the local laws, all migratory birds listed above are protected under international treaties and conventions such as the Migratory Bird Treaty Act of the United States.

Species of Concern

Endangered Species (**EN**) according to the IUCN are species which are at a high risk of extinction in the near future due to habitat loss, species invasions, loss of prey or pollution. Other categories include the more severe "Critically Endangered" and the less severe "Vulnerable". The White-crowned Pigeon is in the "Near Threatened" category. This means that if not managed, it can become endangered. All the other species are in the category "Least Concern". This means their populations are not considered at risk of any significant decline in the near future.

Habitat Utilization

Most of the species observed were located in the trees. They utilize the trees for food and shelter. The Osprey was the only seabird detected.

3.2.3. Terrestrial habitats – Other animals

Other animal species observed on the site included dragonflies, anoles, spiders, butterflies and a brown racer snake. Species that could be identified are listed in Table 3-8.

Table 3-8: Terrestrial animal species observed at the project sites

Common Name	Scientific Name
Brown Racer	*Alsophis vudii picticeps*
Honey Bee	*Apis mellifera*
Mexican Fritillary	*Euptoieta hegesia*
Cloudless Sulphur	*Phoebis sennae*
Tropical Buckeye	*Junonia evarete*
Florida Duskywing	*Ephyriades brunnea*
Wasp	*Polistes bahamensis*

Figure 3-22: Tropical Buckeye

Figure 3-23: Mexican Fritillary

3.2.4 Marine Habitats

The marine habitats adjacent to Sites 1 and 2 were surveyed.

The marine habitats adjacent to Site 1 consisted patch reefs and sandy bottom. There were little to no live corals on the patch reefs with most of the corals dead and covered in algae. The few corals that were living included Mustard hill coral, Fire coral and Star coral. There were soft corals observed. Table 3-9 lists marine species observed adjacent to Site 1.

The marine habitat adjacent to Site 2 was sandy bottom. The only species observed here during the marine survey was Keeltail needlefish (*Platybelone argalus*).

Table 3-9: Marine species observed at the project sites

Common Name	**Scientific Name**
Lionfish (Invasive)	*Pterois volitans*
Gray Angelfish	*Pomacanthus arcuatus*
Porkfish	*Anisotremus virginicus*
Princess Parrotfish	*Scarus taeniopterus*
Dusky Damselfish	*Stegastes adustus*
Yellowtail Damselfish (intermediate)	*Microspathodon chrysurus*
Stoplight Parrotfish	*Sparisoma viride*
Foureye Butterflyfish	*Chaetodon capsitratus*
Spotfin Butterflyfish	*Chaetodon ocellatus*
Caribbean Spiny Lobster	*Panulirus argus*
Gray Snapper	*Lutjanus griseus*
Silversides	*Atherinidae sp.*
Cushion Sea Star	*Oreaster reticulatus*
Common Sea Fan	*Gorgonia ventalina*
Tiger Grouper	*Myteroperca tigris*
Blue Tang	*Acanthurus coeruleus*
Jellyfish	*Species unknown*
White Margate	*Haemulon album*
Queen Angelfish	*Holacanthus ciliaris*
Yellowtail Snapper (juvenile)	*Ocyurus chrysurus*
Fire coral	*Millepora alcicornis*
Mustard hill coral	*Porites astreoides*
Boulder Star coral	*Montastrea annularis*

Figure 3-24: Yellowtail Damselfish (intermediate)

Figure 3-25: Sea fans covering coral heads

3.2.5 Caves and blue holes

There were no caves or blue holes observed at the project site.

3.2.6 National parks and protected areas

There are no national parks on Eleuthera. The only protected area is the Leon Levy Native Plant Preserve managed by the Bahamas National Trust (BNT) which is a non-governmental, non-profit organization established by an Act of Parliament in 1959 and mandated with the development and management of the National Parks System of The Bahamas. The 25-acre Preserve is located in Governor's Harbour. The Preserve functions as a research center for traditional bush medicine, a facility for the propagation of indigenous plants and trees, and an educational center focused on the importance of native vegetation to the biodiversity of The Bahamas (BNT, 2016).

There is an Important Bird Area (IBA) located on Eleuthera. The South Tarpum Bay Reserve (BS018) extends from Tarpum Bay and Winding Bay in the north for about 35 kilometers through Rock Sound to Bannerman Town. The IBA includes agricultural and fishing areas as well as mature broadleaf coppice, shrubland, coastal coppice and beach habitats. The IBA was created to support the largest known concentration of wintering Kirtland's Warbler (*Deondroica kirtlandii*), which is classified as Near Threatened. Other bird species also found in this IBA include the Near Threatened White-crowned Pigeon (*Patagioenas leucocephala*), Bahama Woodstar (*Calliphlox evelynae*), Bahamas Yellowthroat (*Geothlypis rostrata*), Thick-billed Vireo (*Vireo crassirostris*) and Bahama Mockingbird (*Mimus gundlachii*); these last 4 species are Bahamas restricted-range birds (Moore and Gape, 2009).

Wild bird reserves on Eleuthera include Bottle, Cedar, Finlet, Water and Wood Cays.

The Government declared a number of new protected areas in 2015. Among these was the South Eleuthera Marine Protected Area (MPA). While the MPA has been declared, its boundaries still need to be gazetted before this protected area is officially a part of The Bahamas National Protected Area System. The South Eleuthera MPA includes important inshore areas for conch, juvenile lobster and juvenile reef fish (e.g. snappers and groupers). It also contains habitats such as sand, tidal creek systems, seagrass and low-relief hardbottom.

Areas proposed for protection in 2018 by the Bahamas National Trust and other NGOs include (BNT et al, 2018):

- West Schooner Cays Marine Managed Area
- Egg Island
- Seahorse National Park
- Savannah Sound and Plantation Reef
- Half Sound, North and South
- Deep Creek
- Lighthouse Point Marine Area
- Corrie Sound

The Bel Air project will not impact existing or proposed protected areas.

3.3 Socioeconomic aspects

3.3.1 Communities, demography and economic base and status

According to the 2010 Census, Eleuthera has a population of 8,202. The people of Eleuthera remain closely connected to the land and sea, which serves as the basis of the local economy and culture.

Predominant industries in Eleuthera include fishing, tourism, and farming. Economic sectors on the island are mainly related to agriculture, tourism, fishing and general development, with some employment by the Government of The Bahamas. Bonefishing occurs on a limited basis on the island. Year-to-date air and sea arrivals to Eleuthera up to November 2021 was 57,433. As of 2016, mainland Eleuthera had 28 registered hotels with 340 hotel rooms (Ministry of Tourism, 2016).

The total number of occupied households in The Bahamas is 102,862, with an average household size of 3.4. Eleuthera has approximately 2,440 occupied households and the average household size is 3.3.

The economy of The Bahamas has been in perpetual rebound mode in recent years due to several catastrophic events. In October 2016, Hurricane Matthew swept through The Bahamas, followed in September 2019 by the most destructive extreme weather event in modern Bahamian history, Hurricane Dorian. Estimated damages and losses attributed to Dorian totaled in excess of $3.4 billion dollars, representing one third of the country's GDP (IDB, 2019). The country is currently in the midst of the COVID-19 pandemic which has significant negative impacts on the economy.

Enrollment in school is mandatory in The Bahamas for youth between the age of 5 and 16. Approximately 75,120 students are enrolled at the preschool school to secondary school levels and between 8,000 - 9,000 enrolled at the tertiary level. Gregory Town Primary School is the closest school to the project sites.

There are no hospitals on Eleuthera. Persons have to be flown to Grand Bahama, New Providence or the United States if they require hospitalization. The closest medical facility to the project sites is the Gregory Town Community Clinic, a public facility.

3.3.2 Transportation and other infrastructure

Infrastructure and services on the island of Eleuthera include:

- Roads – constructed by the Ministry of Public Works
- Potable water - provided by the Water & Sewerage Corporation or private wells
- Telecommunications - provided by the Bahamas Telecommunications Corporation
- Cable television and Internet - provided by Cable Bahamas
- Electricity - provided by Bahamas Power and Light
- Medical clinics - managed and operated by the Department of Public Health
- Docks/ports – public docking facilities are managed by the Port Department and Local Government; Government docks, ports and private docking facilities occur at North Eleuthera, Harbour Island, Rock Sound, Spanish Wells, Davis Harbour and Cape Eleuthera
- Airports - These are located in the settlements of Governor's Harbour, Rock Sound and North Eleuthera

3.4 Historical and cultural aspects

There are no known historical or archaeological resources at the project sites.

3.5 Provision of services

Services will be provided during construction as follows:

- Potable water – supplied by the Water and Sewerage Corporation (WSC).
- Sewerage and wastewater – These will be through use of septic tanks to WSC specifications.
- Electricity – supplied by Bahamas Power and Light.
- Roads – Site 1 is adjacent to Queen's Highway. Access roads into the site and throughout the site will have to be built. At Site 2, there is an unpaved dirt road leading to the property. An access road will have to be built to this site. Roads will be constructed to Ministry of Public Works standards with a 40-foot right-of-way.
- Solid waste disposal – will be done as per guidance from the Department of Environmental Health Services utilizing a licensed contractor.

3.6 Legal and regulatory

Relevant laws and regulations that will need to be considered for the demolition project include:

Conservation and Protection of the Physical Landscape of The Bahamas Act 1997

This Act prohibits all significant excavation, landfill operation, quarry mining or mining of physical natural resources (such as sand) without permission of the Director of Physical Planning.

Environmental Health Services Act 1987

This Act promotes conservation and maintenance of the environment and also addresses the control of contaminants and pollutants that may adversely affect the environment and human health. The Act also outlines regulations with respect to water supplies, solid and liquid waste, beaches, seaports, harbours and marinas.

Environmental Health Services (Collection and Disposal of Waste) Regulations 2004

These regulations provide for the collection and disposal of domestic, commercial and construction waste. Commercial waste includes ashes, refuse and rubbish. Construction waste includes any waste materials from construction, renovation, repairs and demolition.

Environmental Impact Assessment Regulations 2020

These regulations were developed under the Environmental Planning and Protection Act 2019. They provide guidance on the EIA process for The Bahamas including the Certificate of Environmental Clearance (CEC) application and review process and what information should be included in an EIA and an EMP.

Environmental Planning and Protection Act 2019

This Act provides a legal framework for the protection, enhancement and conservation of the environment. It also provides for the prevention and mitigation of pollution in order to maintain the quality of the environment. It establishes a Department of Environmental Planning and Protection to regulate and oversee the review of Environmental Impact Assessments and Environmental Management Plans.

Forestry Act 2010

This Act provides for the:

- Setting of royalty fees, permits, leases, and licence fees for utilization of forest produce and non–timber forest produce from the forest estate;
- Management, conservation, control and development of forests, and the promotion and regulation of forest industries;
- Promotion of the conservation and management of wildlife and wildlife habitat in forest reserves, protected forests and conservation forests; and
- Protection of trees that are rare and of historical significance.

Health and Safety At Work Act 2002

The Act provides for:

- Securing the health, safety and welfare of persons at work;
- Protecting persons other than persons at work against risks to health or safety arising out of the activities of persons at work; and
- Controlling the keeping and use of explosive, highly flammable or other dangerous substances and preventing the unlawful acquisition, possession and use of such substances.

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;
- Efficient and orderly provision of infrastructure and services to the built environment;
- Planning processes that are fair by making them open, accessible, timely and efficient;
- Recognition of the decision-making authority and accountability of the Government in land use planning; and
- Planning for the development and maintenance of safe and viable communities.

The Act provides for regulating activities such as quarrying, mining, road construction and subdivision development.

Water and Sewerage Corporation Act 1976

This Act establishes the Corporation. Functions of this organization include the application of appropriate standards and techniques for investigation, use, control, protection, management and administration of water. The Corporation is also mandated to oversee waste disposal, water treatment and water quality.

Wild Animals (Protection) Act 1968

This Act prevents the taking, capture or export of any wild animal without the permission of the Minister of Agriculture & Fisheries. These animals include wild horses, the hutia and iguanas.

Wild Birds Protection Act 1952

This Act provides for the protection of wild birds. The Act lists several species including the White-Crowned Pigeon, Whistling Duck and Yellow-Crowned Night Heron.

3.7 Government agencies

Government agencies that will be involved with aspects of approval and permitting of this component of the project include:

Department of Environmental Planning and Protection (DEPP)

Formerly the BEST Commission, the Department of Environmental Planning and Protection (DEPP) is responsible for developing the Government of The Bahamas' (GOB) environmental and natural resource management policies. As mandated under the 2019 Environmental Planning and Protection Act and 2020 EIA Regulations, DEPP is responsible for the administration of the EIA process, overseeing the technical review of EIAs, coordinating the public review of EIAs, and various national plans for natural resource management.

DEPP is responsible for various environmental matters, including biodiversity, climate change, wetlands, land degradation, and persistent organic pollutants. In this role, DEPP has established committees, drawing on appropriate staff from different government agencies, for promoting actions to implement the specific requirements of the various multilateral environmental conventions of which The Bahamas is a Party.

Department of Environmental Health Services (DEHS)

Under the *Environmental Health Act* of 1987, and the Environmental Health Regulations, the DEHS mandate is to promote and protect public health and ensure conservation and maintenance of the environment. One role of the DEHS is to regulate, monitor, and control actual and likely contamination and pollution of the environment and establish minimum standards required for a clean, healthy, and pleasing environment.

For proposed projects, the DEHS evaluates the effectiveness of pollution control measures and initiatives to protect the health and safety of workers, and the natural environment. DEHS also issues the necessary effluent discharge and emissions permits.

Department of Labour

The Department of Labour oversees labour relations and occupational health and safety. The Department is the lead agency for regulating occupational health and safety under the *Health and Safety at Work Act* (2002). Through its Inspection Unit, the Department also conducts inspections to ensure adequate worker safety and compliance with regulations.

Department of Physical Planning

The Department authorizes activities such as dredging, filling, harvesting or removal of protected trees, and any work that will affect coastlines. It also administers the new Planning and Subdivision Act of 2010, which includes ensuring the preparation of land use plans and other physical planning activities.

Ministry of the Environment and Natural Resources

The Ministry of the Environment and Natural Resources oversees conservation of wild animals, birds, and plants, as well as forests. It administers the Wild Birds and Wild Animals Protection Acts.

Ministry of Public Works

The Ministry oversees and maintains physical infrastructure in the country. It is entrusted with the administration of the Building Control Act (BCA) and Regulations.

Water and Sewerage Corporation (WSC)

The WSC, with its Water Resources Management Unit (WRMU), has responsibility for optimal development of the country's water resources and the control of water quality. It shares (with DEHS) the responsibility for monitoring water quality. WSC issues water supply franchises to developers in areas where the supply of water is impractical for the GOB or its agencies to undertake.

3.8 Non-governmental organizations

Non-governmental organizations (NGOs) that are active on Eleuthera include:

Bahamas National Trust (BNT)

The BNT was established by an Act of Parliament in 1959, which makes it unique in the NGO community. It represents a unique collaboration of governmental, private sector and scientific interests dedicated to the conservation of the natural and historic resources of The Bahamas for the enjoyment and benefit of the Bahamian people. The major mandate of the Trust is management of the National Parks System of The Bahamas.

Bahamas Reef Environment Educational Foundation (BREEF)

The Bahamas Reef Environment Educational Foundation (BREEF) is concerned primarily with coral reef education and fund-raising for the protection of marine resources of The Bahamas through education. Its mission is to strengthen the symbiosis between the Bahamian people and the reefs, which protect, nourish, and enrich us, by focusing Bahamian and allied minds on this relationship. The Foundation's raison d'etre is the restoration of the reefs of The Bahamas to their former glory and abundance.

One Eleuthera Foundation (OEF)

One Eleuthera Foundation is a member-based organization established in Eleuthera in 2009. The group works on several issues including protection of Eleuthera's natural resource as a part of their wider mission of sustainable economic, environmental and social development for the island. They have developed A Shared Vision for South Eleuthera which looks as definitive ways that this region of the island can develop utilizing principles of cooperative community activities, urban planning and green design.

4.0 Environmental impacts

The severity of an environmental impact is a measure of the magnitude of impact an event has on the environment. Severity is measured by such factors as toxicity to humans, the negative effect on flora and fauna, impact on wildlife habitat, the reduction of natural resources, contamination of air and water, the potential for reversible versus irreversible environmental damage, and short-term versus long-term recovery of the environment. Other factors such as noise, heat, odour, and visuals are also used to determine severity.

Severity is given a numerical rating of 1 for low impact, 3 for medium impact and 5 for high impact:
1. Low Impact (score 1) - There is little or no impact on the environment.
2. Medium Impact (score 3) - There is impact on the environment that falls within regulatory guidelines. The impact is considered short-term and reversible.
3. High Impact (score 5) – There is high and lasting impact on the environment.

Table 4-1 below summarizes the environmental impacts that can result from the Bel Air Project.

The most significant environmental impacts from the project will be:

- Clearing of land; and
- Construction that will impact how birds and other animals utilize Sites 1 and 2

Table 4-1: Summary of Environmental Impacts

	Severity of Impact	**Environmental Impacts**
Materials	1	Construction materials can potentially be toxic or hazardous to the environment and human health if not managed properly.
Air quality and dust	3	Illegal construction activities, such as burning of waste, can negatively impact air quality. Poorly maintained construction equipment can also impair air quality, such as diesel fumes emissions. Construction activities can generate significant quantities of dust that impair air quality and negatively impact human health if proper management techniques are not employed.
Waste management	1	Improperly managed waste, particularly hazardous waste, can negatively impact the environment and human health, through attracting pests which are disease vectors, introducing toxic/hazardous substances into the air, soil or groundwater and posing safety hazards to small children.
Landscape and visual	5	Construction will result in removal of trees and plants during land clearing.

	Severity of Impact	Environmental Impacts
		If construction waste is not disposed of in a timely manner, this can impair visual aspects of the site for long periods of time.
Water resources	3	Groundwater resources can be polluted by fuel or chemical spills at the project site as well as improper disposal of hazardous waste from demolition. Over-extraction of groundwater resources can result in salt-water intrusion, thus destroying these resources.
Ecology	5	The project is expected to change the habitats that exist on Sites 1 and 2.
Avifauna	3	The noise levels generated by the project have the potential to deter birds from utilizing Sites 1 and 2 during construction activities. Birds may return to the area once construction is complete if sufficient vegetated areas remain.
Noise and vibration	3	Construction activities can raise noise to levels that disturb bird and animal species at the project site and in its vicinity where these species nest or find shelter. This can result in displacement of these species which may leave the area. Prolonged, elevated noise levels from construction activities can also negatively impact human health. Prolonged exposure to noise levels above 70dB may cause hearing damage. Loud noises above 120 dB can cause immediate damage (CDC, 2019).
Traffic and transport	3	Traffic and transport during construction can introduce invasive species to a project site and result in spills/accidents at the site if proper care and precaution are not taken inclusive of safe handling of equipment and vehicles. Disruption to traffic flow can create nuisances for neighbouring residents and businesses.
Contaminated land	5	During construction, there is the potential to contaminate lands from improper disposal of hazardous materials.
Occupational health and safety	5	Workers can be put at risk during construction phase through failure to wear protective personal equipment (PPE), improper handling of equipment and materials, and not adhering to standard safety

	Severity of Impact	Environmental Impacts
		procedures. These failures can result in loss of life or permanent physical damage. COVID-19 virus poses a health risk to workers if they are in close proximity to each other.
Impacts on neighbouring communities	3	Construction activities can impact neighbouring communities through disruption of traffic, increased noise levels, impairment of air quality, and contamination of land and groundwater. Depending on the severity of impacts, such as noise, air pollution and groundwater contamination, they can impair health in the long-term.

5.0 Proposed mitigation measures

Table 5-1 below summarizes the mitigation measures that are recommended to minimize or eliminate any negative environmental impacts from the project.

Table 5-1: Summary of Environmental Mitigation Measures

	Mitigation Measures
Materials	Any toxic or hazardous chemicals to be utilized on site can be done so according to Material Safety Data Sheet (MSDS) guidance and safety protocols can be established by project management. Construction materials containing hazardous substances, such as paint, will be safely removed and properly disposed of to prevent any risks to human health.
Air quality and dust	Impairment to air quality can be reduced when no illegal construction activities occur during this project. Construction equipment will be properly maintained to ensure they do not impair air quality. Construction methodologies and best practices will be employed to minimize generation of quantities of dust that can impair air quality including watering of the site.
Waste management	All waste will be properly disposed of according to regulations and standards of the Department of Environmental Health Services (DEHS) and the Water and Sewerage Corporation (WSC). Waste management will need to include proper disposal of any hazardous waste from construction activities.
Landscape and visual	An effort will be made to minimize clearing of land to the footprint of any planned new buildings. Landscaping of the development will utilize native and endemic plants and trees. No invasive plant species will be utilized in landscaping. Waste will be properly disposed of in a timely manner.
Water resources	Chemical and fuel management of the site will ensure that groundwater and freshwater resources are not negatively impacted. Spill response protocols will be established for effectively dealing with spills in the event of an accident to minimize any pollution of water resources. Hazardous waste from construction will be properly disposed of. Potable or fresh water will be provided by the Water and Sewerage Corporation so there will not need to be extraction of groundwater resources.
Ecology	Efforts can be made to minimize negative impacts to all remaining vegetation by preserving as much of it as possible

	Mitigation Measures
	during land clearing for construction. This can be achieved through selective clearing of the site rather than bulldozing the entire area. Native trees and plants will be maintained wherever possible, especially where they are clustered so that they can continue to function as wildlife corridors. Native and endemic plants will be utilized in landscaping.
Avifauna	While noise levels during construction may deter birds from the area, it is expected that once construction is complete that birds will return. There are sufficient vegetated areas neighbouring the project site that can be utilized by birds during active construction. Every effort will be made to maintain protected trees on the project site to be utilized by birds when construction is not occurring. Protected trees will be marked prior to construction so they can be retained, where feasible. Staff will be advised on the importance of not interfering with or harming bird species which are all protected under Bahamian law.
Noise and vibration	Construction activities will be for a limited time period to minimize disturbance to birds and other animals at the project site. Once construction is completed in as short a timeframe as possible, the animals should return to habitats they normally utilize. Construction workers will wear appropriate PPE (i.e. earplugs or ear muffs). Nearby residents are not expected to be exposed to high noise levels as there will be no work occurring during the evening and night. Nearby businesses are a sufficient distance away to reduce their exposure to high noise levels.
Traffic and transport	All workers utilizing vehicles and equipment will have adequate training and skills in their proper and safe handling. Equipment to be utilized for this project moving from other sites will be inspected and cleaned, as necessary, to ensure they do not introduce invasive plant material, such as seeds. Flagmen will be utilized to safely direct traffic if there is a need to move heavy equipment or construction materials on Queen's Highway. Such movements will be avoided during peak traffic house, i.e. 7:30 am – 9:00 am and 3:00 pm to 5:00 pm.
Contaminated land	Any toxic or hazardous chemicals to be utilized on site will be done so according to Material Safety Data Sheet guidance and

	Mitigation Measures
	safety protocols as established by project management. Staff will be trained in spill response measures to effectively handle such incidents. Hazardous waste will be safely handled and properly disposed of.
Occupational health and safety	Workers will be provided with appropriate protective personal equipment (PPE) for the assigned tasks. All workers will receive training in proper handling of equipment and materials as a part of their orientation before being admitted to the site during construction and before starting work on site. There will be regular reinforcement of occupational health and safety procedures during weekly meetings. Information on health and safety procedures (e.g. Material Safety Data Sheets) will be accessible to staff during working hours. At least one staff member will be assigned to ensuring health and safety procedures are being followed during demolition activities. Workers will adhere to COVID-19 safety protocols inclusive of wearing masks and social distancing.
Impacts on neighbouring communities	Regular communication with neighbouring businesses and communities will occur so they are informed of any potential disruptions to traffic and can plan accordingly. They will also be advised when noise levels may be elevated so they can choose to leave the area or wear appropriate protective equipment, such as noise-cancelling headphones. Elevated noise levels during construction will be limited to the hours of 10 am to 5 pm so as not to disturb residents during sleeping hours. The site will be managed following best management practices to reduce or eliminate impacts related to air pollution as well as land and groundwater contamination, so there are no long-term health impacts on communities. A mechanism for neighbouring residents to contact project management will be established to ensure communication is facilitated.

6.0 Public consultation

To be completed following public meeting chaired by DEPP.

7.0 Environmental management plan

An EMP will be prepared for the proposed project that covers mitigation measures and monitoring. An outline of the EMP and its planned components are provided below. The EMP will be fully developed after No Objection to the EIA. Once the No Objection of the EMP is received, the project will be issued a Certificate of Environmental Clearance by DEPP to enable construction to begin on the project site.

Executive Summary

A summary of the project and proposed mitigation measures.

1.0 Introduction

An overview of the project and its location. This section will also include the objectives of the EMP and its scope with respect to mitigation measures.

2.0 Project Description

A description of the project and its location inclusive of a project site plan.

3.0 Proposed mitigation measures

Details on the mitigation measures as outlined in the project EIA specifically as it relates to the following:

3.1 Materials
3.2 Air quality and dust control
3.3 Waste management
3.4 Landscape and visual
3.5 Water resources
3.6 Ecology
3.7 Avifauna
3.8 Noise and vibration
3.9 Traffic and transport
3.10 Contaminated land
3.11 Occupational health and safety – Details on safety measures for worker health and safety inclusive of handling materials contaminated with mold and measures to be taken to adhere to COVID-19 Emergency Orders.
3.12 Impacts on neighbouring communities – inclusive of public awareness and communication measures that will be taken to keep the public, particularly neighbouring businesses and residents of construction activities that may impact them.
3.13 Environmental and social monitoring – Description of monitoring activities that will occur inclusive of scheduled site inspections.

4.0 Conclusions

Concluding remarks on implementation of recommended mitigation measures.

References

Any reference materials utilized in preparation of the EMP.

Appendices

The EMP will include the following appendices to support the main text of the document:

- Appendix I: Hazardous Material Management Plan
- Appendix II: Emergency Response Plan
- Appendix III: Hurricane Preparedness Plan
- Appendix IV: Complaint Form
- Appendix V: Inspection Form

8.0 Conclusions

Employment of appropriate design and planning methodologies can result in execution of the Bel Air Project in a sustainable manner. Utilizing the recommended mitigation measures can eliminate or minimize any negative environmental impacts from construction activities.

Bel Air Resort and Residences has expressed its commitment to implementing the recommended mitigation measures and executing the project in a manner that respects neighbouring communities, the natural resources of the site and is environmentally sustainable.

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Appendix 1: Topographic Survey

POLARIS SURVEYING

Registered Land Surveyor

Phone # (242) 809 - 1127

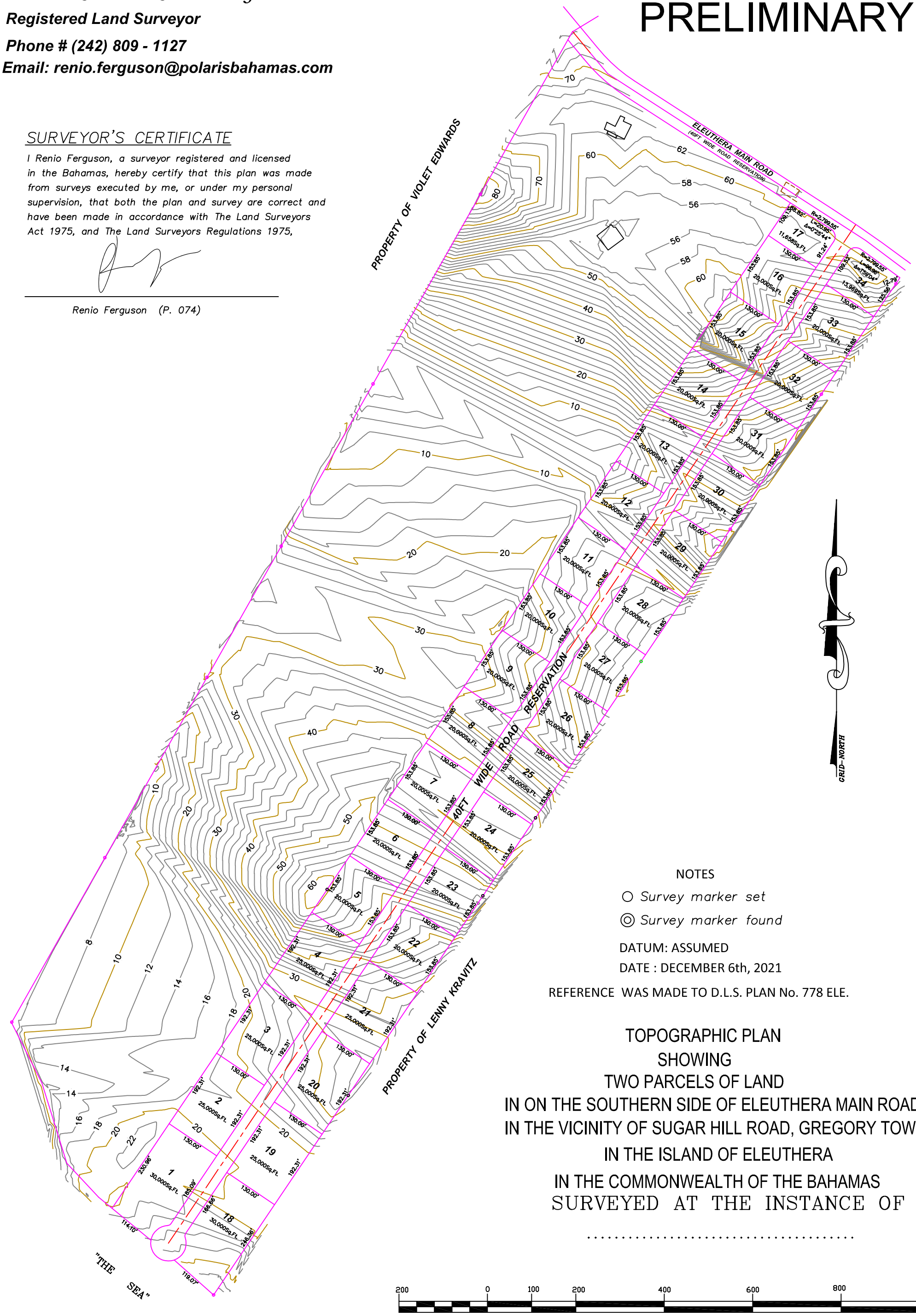
Email: renio.ferguson@polarisbahamas.com

PRELIMINARY

SURVEYOR'S CERTIFICATE

I Renio Ferguson, a surveyor registered and licensed in the Bahamas, hereby certify that this plan was made from surveys executed by me, or under my personal supervision, that both the plan and survey are correct and have been made in accordance with The Land Surveyors Act 1975, and The Land Surveyors Regulations 1975,

Renio Ferguson (P. 074)



NOTES

○ Survey marker set

◎ Survey marker found

DATUM: ASSUMED

DATE : DECEMBER 6th, 2021

REFERENCE WAS MADE TO D.L.S. PLAN No. 778 ELE.

TOPOGRAPHIC PLAN
SHOWING
TWO PARCELS OF LAND
IN ON THE SOUTHERN SIDE OF ELEUTHERA MAIN ROAD
IN THE VICINITY OF SUGAR HILL ROAD, GREGORY TOWN
IN THE ISLAND OF ELEUTHERA
IN THE COMMONWEALTH OF THE BAHAMAS
SURVEYED AT THE INSTANCE OF

.....

200 0 100 200 400 600 800 1000

1 inch = 200 ft.

POLARIS SURVEYING

Registered Land Surveyor

Phone # (242) 809 - 1127

Email: renio.ferguson@polarisbahamas.com

SURVEYOR'S CERTIFICATE

I Renio Ferguson, a surveyor registered & licensed in the Bahamas, hereby certify that the information provided on this plan is true & correct, and was obtained from a survey executed by me, or under my personal supervision.

Renio Ferguson (P. 074)

NOTES

VERTICAL DATUM: ASSUMED

SURVEY MARKER SET ○

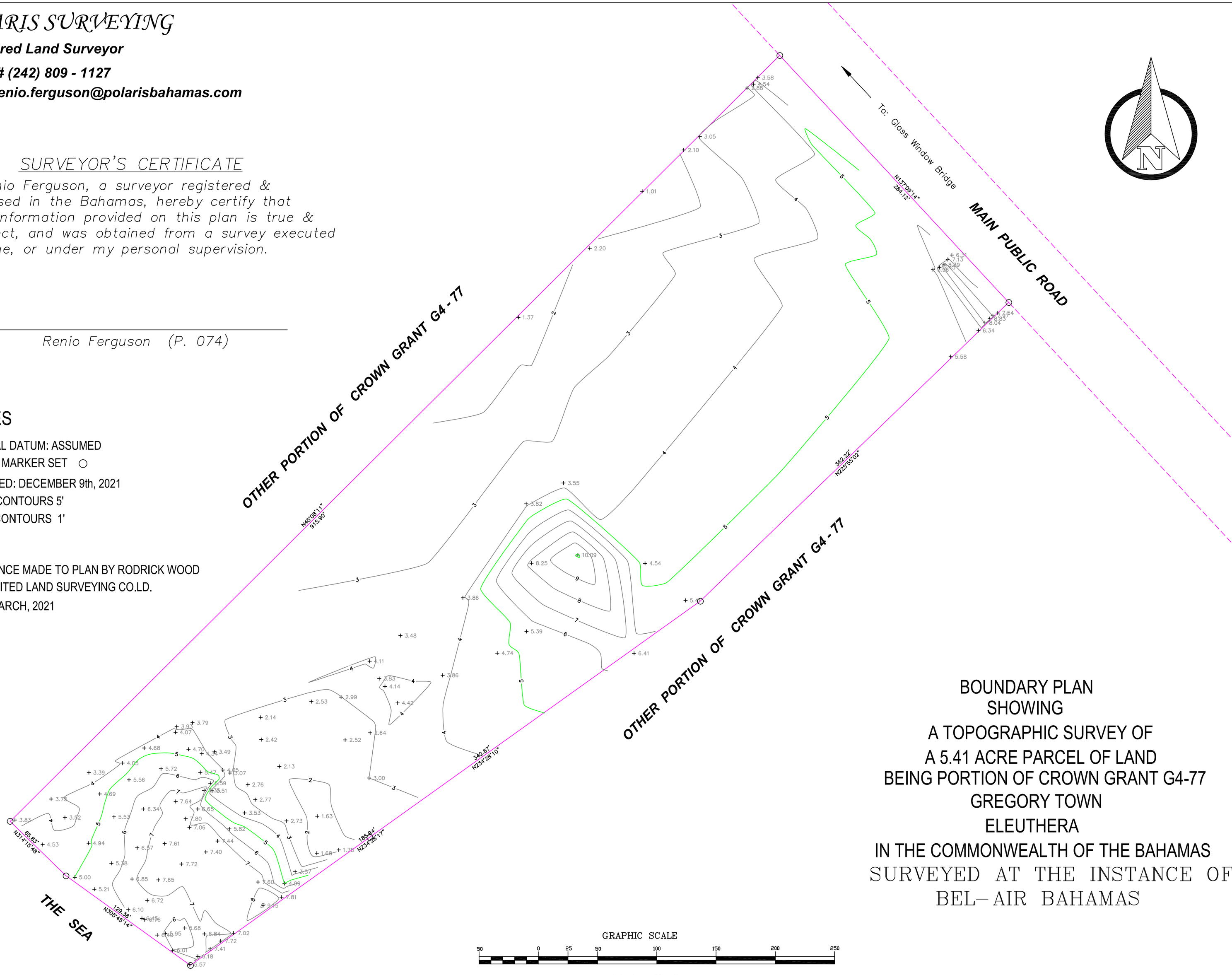
SURVEYED: DECEMBER 9th, 2021

MAJOR CONTOURS 5'

MINOR CONTOURS 1'

REFERENCE MADE TO PLAN BY RODRICK WOOD ACCREDITED LAND SURVEYING CO.LD.

DATE: MARCH, 2021



GRAPHIC SCALE

50 0 25 50 100 150 200 250

1 inch = 50 ft.

BOUNDARY PLAN
SHOWING
A TOPOGRAPHIC SURVEY OF
A 5.41 ACRE PARCEL OF LAND
BEING PORTION OF CROWN GRANT G4-77
GREGORY TOWN
ELEUTHERA
IN THE COMMONWEALTH OF THE BAHAMAS

SURVEYED AT THE INSTANCE OF

BEL-AIR BAHAMAS

Appendix 2: Curriculum Vitae for Environmental Consultants

Stacey Helena Moultrie

Position:	Lead Environmental Consultant
Nationality:	Bahamian
Certifications and Membership in Professional Societies:	GHG Inventory Expert, UNFCCC Roster of Experts Chartered Institution of Water and Environmental Management (CIWEM), United Kingdom Chartered Scientist, Science Council, United Kingdom Member, American Planning Association (APA) Lifetime Member, Delta Epsilon Iota Academic Honor Society

Education

2016	University of Florida (USA), Master of Urban Planning – Sustainability
1998	Dalhousie University (Canada), Master of Marine Management
1995	University of the West Indies (Mona Campus, Jamaica), B.Sc. (*Upper Second Class Honours*) Zoology – Marine Science & Fisheries

Certificates

2020	IDB INDES (USA), Behavioral Economics for Better Public Policies
2020	SCRUMstudy (USA), Scrum Master Certified (SMC) in Project Management
2020	SCRUMstudy (USA), Scrum Fundamentals Certified (SFC) in Project Management
2020	GHG Management Institute (USA), Proficiency Certificate in UNFCCC Online IPCC Guidelines
2007	Conservation Strategy Fund, Stanford University (USA), Economic Tools for Conservation

Countries of Work Experience

The Bahamas
Regional projects involving Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Venezuela.

Languages

	Speaking	*Reading*	*Writing*
English	Excellent	Excellent	Excellent

Key Qualifications

Mrs. Moultrie is an environmental planner. Her employment history in the environmental arena spans more than 25 years, including 18 months with the Department of Environmental Health Services and 7 years with the BEST Commission. Her experience involves work in project management, international negotiations, tourism, development of environmental education materials, environmental policy development, project proposal development for international funding, assessing environmental impacts of development projects, and environmental management and planning. Her role at the BEST Commission included advising the Government of The Bahamas on the environmental impacts of large private development projects, Government-led development projects, and policy decisions. She negotiated on behalf of the Bahamas Government in the following fora – Convention on Biological Diversity, Cartagena Protocol on Biosafety, Stockholm Convention on Persistent Organic Pollutants, United Nations Framework Convention on Climate Change, Rotterdam Convention on Prior Informed Consent and United Nations Convention on Desertification and Drought. She also provided policy guidance to the Ministry of Foreign Affairs on the Law of the Sea Convention and its various protocols.

Born and raised in The Bahamas with considerable work experience in the environmental sector, Mrs. Moultrie is well versed in the regulatory and policy aspects of natural resource management.

Employment Record

From 2007	**To Present**
Employer	SEV Consulting Group (Nassau, The Bahamas)
Position Held and Description of Duties	Environmental Planner Mrs. Moultrie is responsible for business development, project management, staff management, and client service delivery in the areas of environmental policy, planning and management as well as EIA and EMP development, coordination of internationally funded projects and development of environmental education, awareness and training materials.
From 2019	**To Present**
Employer	The Islands Laboratory, University College London (London, United Kingdom)
Position Held and Description of Duties	Researcher Mrs. Moultrie is a researcher with the Islands Laboratory which focuses on innovative solutions to tackle climate change and assess scenarios for disaster risk reduction and resilience for islands globally. Her research focuses on sustainability indicators, resilience, resource nexus and energy reform.

From 2000	**To 2007**
Employer	Bahamas Environment, Science and Technology (BEST) Commission (Nassau, The Bahamas)
Position Held and Description of Duties	Senior Environmental Officer Mrs. Moultrie was responsible for project management, staff management and advice to the Government of The Bahamas in the areas of biodiversity conservation, environmental impacts from development, mitigation for development activities, policy development, international negotiations, drafting environmental legislation, developing national strategies for environmental issues (included development of National Environmental Policy and National Environmental Management and Action Plan) and securing international funding for environmental projects. She was also responsible for management of environmental aspects of development of the islands of New Providence, Exuma, Eleuthera, Abaco, Long Island and Paradise Island.

Work Experience in Environmental Planning and Management

- **Degree of Integrated Water Resources Management Implementation (SDG 6) in The Bahamas – The Bahamas,** October 2020 – November 2020 (National Consultant)
  Funded by the Economic Commission for Latin America and the Caribbean (ECLAC), the project involved an analysis of institutional arrangements for integrated water resources management (IWRM) in The Bahamas and the country's progress in implementation of SDG 6 of the 2030 Agenda. Mrs. Moultrie served as the national consultant for The Bahamas. The consultancy also involved analysis of the effectiveness of national cross-sector coordination mechanisms, identification of gaps, the identification of successful mechanisms and development of lessons learned or identification of success factors that could be replicated in other countries. Tasks included consultation with several Government and non-Government agencies, including the Water and Sewerage Corporation (WSC). The final deliverable was a national report submitted to ECLAC to form a part of the Caribbean regional report.

- **Department of Environmental Planning and Protection, Preparation of the Third National Communication (TNC) and First Biennial Update Report (BUR1),** September 2020 – Present (National Consultant, joint consultancy with the Islands Laboratory at University College London)
  Funded by the Global Environment Facility (GEF) and the Bahamas Government, the project will involve development of the TNC and BUR1 reports to the UNFCCC Secretariat. SEV in cooperation with UCL Islands Laboratory will develop chapters on National Circumstances, Integration of Climate Change into National Development Priorities, Education, Training and Public Awareness, Information and Networking, and Capacity-Building. The work will entail data collection, data analysis, stakeholder consultations and training workshops on policy development and climate change integration into development planning.

- **Bahamas Power and Light, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas,** March 2020 – Present (Consultant)
  Project involves construction of a power plant in New Providence. Mrs. Moultrie is responsible for development of an EIA and EMP for the project inclusive of coordinating all field teams, data collection, preparation of reports and liaising with BEST Commission and other Government agencies as necessary prior to construction works commencing.

- **Central Bank of The Bahamas, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas,** February 2020 – May 2021 (Consultant)
  Project involved demolition of several buildings in New Providence. Mrs. Moultrie was responsible for development of an EIA and EMP for the project inclusive of coordinating all field teams, data collection, preparation of reports and liaising with BEST Commission and other Government agencies as necessary prior to construction works commencing. She also served as Lead Environmental Monitor for the project through completion of demolition activities.

- **Nassau Cruise Port, Environmental Management Plan and Environmental Monitoring – New Providence, The Bahamas,** January 2020 – Present (Consultant)
  Project involves construction of cruise port facilities in New Providence. Mrs. Moultrie is responsible for development of an EMP for the project inclusive of development of detailed mitigation measures, a hurricane preparedness plan and an environmental, health and safety training manual for construction staff. She is also Lead Environmental Monitor on the project responsible for managing on-site monitors and liaising with DEPP.

- **Bill Simmons Construction, Environmental Monitor – New Providence, The Bahamas,** December 2018 – June 2019 (Consultant)
  Project involved provision of potable water infrastructure and road reinstatement for western New Providence. Mrs. Moultrie was responsible for development of environmental checklist and biweekly environmental inspections to ensure compliance with Ministry of Works and Water and Sewerage Corporation standards. She also provided environmental, health and safety training for all construction staff prior to construction works commencing.

- **Shell Bahamas LNG Project, Environmental Permitting and Environmental Impact Assessment – New Providence, The Bahamas,** December 2018 – May 2021 (Consultant)
  Project involved development of an LNG pipeline and power plant by Shell in cooperation with Bahamas Power and Light (BPL). Mrs. Moultrie was responsible for providing guidance on environmental, health and safety legislation, regulations and standards the project will need to adhere to as well as assisting with liaising with the Department of Environmental Planning and Protection (DEPP). Mrs. Moultrie's responsibilities also involved field work and chapter creation for developing an EIA for the project.

- **By The Ocean Development, Environmental Impact Assessment – Eleuthera, The Bahamas,** April 2018 – December 2018 (Team Leader)
  Project involved development of an EIA hotel and luxury home development with an organic farm component. Preparing the EIA involved terrestrial and hydrological surveys to assess the impacts of the development. The EIA also recommends mitigation measures to be undertaken to eliminate or

minimize negative environmental impacts. Mrs. Moultrie was responsible for preparing of the EIA, coordinating the team of consultants, and liaising with Government agencies during the EIA review to obtain no-objection for the development to proceed.

- **Caribbean Community Climate Change Centre, Capacity Building of National Designated Authority (NDA) and Preparation of Country Strategic Framework – The Bahamas**, February 2018 – December 2018 (National Consultant, team member with Acclimatise)
  Funded by the Green Climate Fund (GCF), Caribbean Community Climate Change Centre (CCCCC) and the Bahamas Government, the project sought to strengthen the capacities of the Ministry of Environment and Housing as the National Designated Authority for the GCF, develop operational guidelines for engagement of the NDA with the GCF, and prepare a Country Strategic Framework for The Bahamas (including a portfolio of climate change projects). Mrs. Moultrie is responsible for stakeholder engagement and assisting with development of project reports and the Country Strategic Framework along with communication materials about the GCF.

- **Caribbean Development Bank, Water Supply Improvement Project – The Bahamas,** December 2016 – April 2018 (Socio-Environmental and Climate Specialist)
  Funded by the Caribbean Development Bank (CDB) and the Bahamas Government, the project sought to improve existing and develop new infrastructure for water supply on six islands in The Bahamas. Mrs. Moultrie was responsible for developing ESMPs for five of the islands and monitoring compliance with the ESMPs during construction. A key component of the project was ensuring infrastructure is resilient to climate change.

- **Inter-American Development Bank, Environmental and Social Analysis and Management Plan – The Bahamas,** July 2016 – September 2016 (Socio-Environmental and Climate Specialist)
  Funded by the Inter-American Development Bank (IDB) and the Bahamas Government, the Skills for Current and Future Jobs in The Bahamas project involved finding a location for the Department of Labour. Mrs. Moultrie was responsible for advising on the environmental and social impacts of three scenarios – repair of Clarence A. Bain building, demolition of the building and construction of a new building at the same site, and rental of space in an existing building. She developed an Environmental and Social Analysis (ESA) of related demolition, construction and operation activities for the various scenarios. She also developed an Environmental and Social Management Plan (ESMP) to guide demolition, construction and operation, depending on the scenario selected.

- **Inter-American Development Bank, Feasibility Studies for a Climate Risk-resilient Coastal Zone Management Investment Program in The Bahamas – Preparation of a National ICZM Policy Framework,** February 2016 – October 2016 (SEV Team Leader)
  Funded by the Inter-American Development Bank, the project sought to prepare a national integrated coastal zone management (ICZM) policy framework for The Bahamas, support the Government of The Bahamas in communicating with the public on relevant issues and enhance knowledge and capacities in innovative aspects of ICZM for the Government and other key stakeholders. SEV Consulting Group, along with Caribbean Coastal Services, was selected to support the project through development of technical briefs on thematic areas including policy, governance and planning, environment and climate change adaptation as well as develop a draft ICZM National Policy Framework. Mrs. Moultrie was responsible for ensuring all SEV team members completed their tasks in a timely manner and served

as liaison with other consulting teams on the project as well as Government and IDB staff. She led all tasks related to policy development, including drafting of the ICZM Policy Framework and participation as a presenter in the training workshop, and assisted with other tasks.

- **Cotton Bay Development Golf Course, Eleuthera – Environmental Impact Assessment Addendum and Environmental Management Plan**, July 2015 – September 2016 (Project Lead)
  Project involved development of an EIA Addendum for the golf course component under Phase 2. Preparing the Addendum involved terrestrial and hydrological surveys to assess the impacts of the golf course construction. The Addendum also recommends mitigation measures to be undertaken to eliminate or minimize negative environmental impacts. Subsequent to the approval of the EIA Addendum, an EMP was developed to guide construction and operation.

- **Inter-American Development Bank, Ecosystem-based Development for Andros Island, The Bahamas – Outreach and Capacity-Building,** July 2015 – March 2017 (Team Leader)
  Funded by the Inter-American Development Bank and Office of the Prime Minister, the project sought to complete an analysis of ecosystem services and future development scenarios as well as development of a master plan for the island of Andros. SEV was selected to support the project through development of outreach and capacity building activities including development of a communications strategy, facilitation of public consultations, assessment of technical capacity of decision-making agencies and delivery of a training workshop on several topics including ecosystem services and economic valuation. Mrs. Moultrie was responsible for ensuring all team members completed their tasks in a timely manner and served as liaison with other consulting teams on the project as well as the IDB staff. She led the tasks on stakeholder consultations and training workshop.

Publications

- Wells-Moultrie, S. (2020). Assessing sustainability in small island developing states: A comparative analysis of sustainability assessment tools and their applicability to small island developing states. Chapter 10. In *Tourism Development, Governance and Sustainability in The Bahamas*. Abingdon, Oxon; New York, N.Y: Routledge.
- Silver, J.M. et al. (2019). Advancing Coastal Risk Reduction Science and Implementation by Accounting for Climate, Ecosystems, and People. In *Frontiers in Marine Science*, 6(556).
- Arkema, K. et al. (2019). Integrating fisheries management into sustainable development planning. In *Ecology and Society*, 24(2):1.
- Wells-Moultrie, S. (2016). *Assessing Sustainability in Small Island Developing States" A comparative analysis of sustainability assessment tools and their applicability to Small Island Developing States*. Gainesville: University of Florida.
- Moultrie, Stacey. (2013). *Bahamas Invasive Species Field Guide: Identification of Plant and Animal Invasives.* Nassau: Department of Marine Resources.
- Moultrie, Stacey. (2013). *The Bahamas National Invasive Species Strategy 2013.* Nassau: Department of Marine Resources.
- Sherman, K., Dahlgren, C., Moultrie, S., and Arnett, F. (2013). *Building a Sustainable National Marine Protected Area Network: Controlling Lionfish Populations in Marine Protected Areas*. PSBP Conference Paper.
- Moultrie, Stacey. (2012). *Everyman's Guide to Protected Areas.* Nassau: HD Wells.

- Moultrie, Stacey. (2012). *Master Plan for The Bahamas National Protected Area System*. Nassau: The Nature Conservancy.
- The Nature Conservancy (2010). *Land and Sea Use Plan for the island of Andros.* Nassau: The Nature Conservancy.
- The Nature Conservancy (2009). *Master Plan Summary for The Bahamas National Protected Area System*. Nassau: The Nature Conservancy.
- Moultrie, S. (2009). *Sustainable Financing for Protected Areas*. In The Bahamas Investor, Nassau, The Bahamas.
- The BEST Commission. (2007). *National Environmental Policy* and *National Environmental Management and Action Plan.* Nassau, The Bahamas: The BEST Commission.
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- The BEST Commission. (2003). *National Invasive Species Strategy for The Bahamas*, Nassau: The BEST Commission.
- The BEST Commission. (2002). *Bahamas Environmental Handbook.* Nassau, The Bahamas: Media Enterprises.
- Wells, Stacey. (1998). *A Marine Environmental Policy Proposal for The Bahamas*, Halifax, Canada: Dalhousie University.

Sharrah Moss-Hackett

Position: Environmental Scientist & GIS Technician
Profession: Environmental Planning Specialist
Nationality: Bahamian

Education

2013 Miami University (USA), Master of Environmental Science – Environmental Management
2001 University of Arkansas (USA), Bachelor of Science –Environmental Soil and Water Science

Countries of Work Experience

The Bahamas
Regional projects involving Grenada, Saint Lucia, St. Kitts and Nevis, and St. Vincent and theGrenadines.

Languages

	Speaking	*Reading*	*Writing*
English	Excellent	Excellent	Excellent

Key Qualifications

Mrs. Moss-Hackett specializes in project management, geographic information systems andmapping, and technical support for environmental impact assessments. Her professional history inthe environmental field spans 16 years, having held positions with the BEST Commission, The Bahamas National Trust and The Nature Conservancy. Her work experiences include coordinatingmultilateral funded projects, engaging local communities in conservation, documenting land and sea use throughout The Bahamas. She has worked throughout The Bahamas and in the region. She has spent her entire professional career in The Bahamas, working for government and non- profit entities. Mrs. Moss-Hackett was born and raised on the island of New Providence.

Employment Record

From December 2016 **To February 2019, April 2021 - Present**
Employer SEV Consulting Group (Nassau, The Bahamas)
Position Held Environmental consultant (Project Management and GIS)
Description of Duties
Mrs. Moss-Hackett serves as a project coordinator forenvironmental projects, analyses GIS for planning purposes,conducts terrestrial and marine surveys, engages localcommunities, and develops materials for public awarenessand education.

From 2014 **November 2016**
Employer Ministry of Environment and Housing, Government of The Bahamas (Nassau, The Bahamas)
Position Held Project Coordinator, Feasibility Studies for a Climate Risk Resilient Coastal Zone Management Program.
Description of Duties
Mrs. Moss-Hackett was responsible for the launch and successful execution of the ICZM Program. Her duties included the technical review of project documents and reports, preparation, execution, and management of contract and contractors, coordination of the technical advisory committee,liaison between the Ministry of Environment and Housing andthe Inter-American Development Bank (IDB), and management of the financial recording and reporting to the IDB and the Ministry of Environment and Housing. Additionally, Mrs. Moss-Hackett worked with the Technical Advisory committee to identify potential priority sites for future ICZM projects and communicate member feedback to consultants and the IDB.

From 2009 **June 2011**
Employer The Nature Conservancy (Northern Caribbean Program, Nassau, The Bahamas)
Position Held Conservation Planner
Description of Duties
Mrs. Moss-Hackett was responsible for supporting the management of the TNC GIS database for The Bahamas and the execution of the GEF-funded Integrated Watershed and Coastal Areas Management project. She engaged key stakeholders on Andros Island, promoted the GEF-funded IWCAM project to the public, and visited every community on Andros. Mrs. Moss-Hackett also managed contracts for experts conducting assessments of existing land (and sea) useand evaluating the economic impact of natural resources on the economy of Andros. She coordinated and facilitated over 30 stakeholder consultations (public meetings) numerous interviews, surveys, and field research team activities. Mrs. Moss-Hackett was responsible for submitting all financial andproject reports to the GEF. Additionally, she compiled geodatabase of existing spatial data for the island of Andros, mapped the distribution of marine and terrestrial habitats and species across The Bahamas, and worked with colleagues to develop the Andros Web map, a first of its kind for The Bahamas.

From 2005 **To 2006**
Employer Bahamas National Trust (Nassau, The Bahamas)
Position Held Community Liaison and Planning Officer
Description of Duties
Mrs. Moss-Hackett planned and facilitated workshops designed to engage stakeholders in management planning forprotected areas, developed the first draft of the San Salvador National Park proposal based on stakeholder input and worked with a variety of local and international experts to establish resource management goals. She was also responsible for making presentations about conservation and important species to schools and community groups, andassisted in the development and revision of managementplanning documents for National Parks.

From 2004 **To 2005**
Employer Exuma Resource Centre (Exuma, The Bahamas)
Position Held Community Education and Outreach Officer
Description of Duties
Mrs. Moss-Hackett provided guidance for the Exuma Foundation on the development of its newly established Environmental Education Program. She assisted teachers withincorporating the newly developed science curriculum into teaching plans, planned and conducted environmental activities for students and the public, and provided support andexecuted presentations, about the Bahamian environment, to the public.

From 2002 **To 2004**
Employer Bahamas Environment, Science and Technology (BEST) Commission (Nassau, The Bahamas)
Position Held Technical Officer
Description of Duties
Mrs. Moss-Hackett was responsible for the technical review of Environmental Impact Assessments for major developments across The Bahamas and on liquefied natural gas projects. Additionally, she was responsible for the organization and implementation of the contamination assessment for all corridors near Service Stations within The New Providence Road Improvement Project (NPRIP). Mrs. Moss-Hackett assisted with the development and implementation of National Programs related to InternationalEnvironmental Agreements and Conventions.

Work Experience

Bahamas Power and Light, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas, March 2020 – Present (Consultant)
Project involves construction of a power plant in New Providence. Mrs. Moss-Hackett is responsible for contributing to the development of an EIA and EMP for the project inclusive of terrestrial and socioeconomic data collection, preparation of reports and liaising with DEPP and other Government agencies as necessary.

Central Bank of The Bahamas, Environmental Impact Assessment and Environmental Management Plan – New Providence, The Bahamas, February 2020 – May 2021 (Consultant)
Project involved demolition of several buildings in New Providence. Mrs. Moss-Hackett was responsible for protected tree surveys and socioeconomic data collection for the development of an EIA and EMP for the project.

Caribbean Development Bank, Water Supply Improvement Project – The Bahamas,December 2016 – April 2018 (Assistant to Socio-Environmental and Climate Specialist) Funded by the Caribbean Development Bank (CDB) and the Bahamas Government, theproject seeks to improve existing and develop new infrastructure for water supply on sixislands in The Bahamas. Mrs. Moss-Hackett was responsible for monitoring compliancewith the ESMPs during construction.

Inter-American Development Bank, Feasibility Studies for a Climate Risk-resilient Coastal Zone Management Investment Program in The Bahamas. September 2014 – November 2016 (Project Coordinator). A technical cooperation between the Government of The Bahamas and the Inter-American Development Bank (IDB). The Programme was executed by the Ministry of Environment and Housing and guided by the Technical Advisory Committee. As Project Coordinator, Mrs. Moss-Hackett was responsible for thedevelopment of the project implementation plan, which included the workplan, schedule, and procurement plans for the life of the program. Financial management of all aspects ofthe project, including financial reporting, disbursement requests and day-to-day finances as per the IDB Procurement Policy we also the responsibility of the Project Coordinator. Additionally, Mrs. Moss-Hackett served as the point of contact between the IDB and the Ministry of Environment and Housing and managing communications on behalf of the executing agency. She organized meetings and documented minutes for the Technical Advisory Committee, and was responsible for identifying linkages and potential synergies between the ICZM Program and other national and international programmes and initiatives.

Integrated Watershed and Coastal Areas Management Project (IWCAM) – Andros Demonstration Site. 2009-2010 (Project Manager). Funded by the Global Environment Facility, the project goal was to demonstrate active groundwater recharge area protection through the development of a Land and Sea Use Plan. Andros Island was one of 10 demonstration sites selected throughout the Caribbean Region. As project lead, Mrs. Moss-Hackett was responsible for coordinating the successful completion of numerous duties including the successful execution of 10 contracts with consultants responsible for data collection, field work, report writing, habitat mapping and data management, the planningand execution of capacity building workshops (on GIS and Economic Valuation) for national stakeholders, the financial management of all aspects of the project, including preparation of the budget, financial reporting, disbursements and day-to-day finances. Mrs. Moss-Hackett was also responsible for the coordination and facilitation of stakeholder consultations (over 30 public meetings, interviews, surveys and presentations), meetings with local government and field research team activities (birds, blue holes and plant surveys). She served as the focal point for the project, effectively communicating with stakeholders in the public and private sector, the media and the general public, was responsible for the production of appropriate GIS maps, utilizing and interpreting GIS datafor Andros Island, development of a GIS web map tool for the habitat mapping data for Andros, and preparation and submission of timely technical and financial reports to be submitted to the BEST Commission, in accordance with GEF standards and requirements.

FAO Strengthening Fisheries and Aquaculture Governance in The Bahamas, November 2014 – November 2016 (National Consultant)
Funded by the United Nations Food and Agriculture Organization (FAO), the project involved the analysis of stakeholders in the fisheries and aquaculture industry in The Bahamas. Mrs. Moss-Hackett was responsible for identifying all stakeholders (governmental, private sector, NGOs, civil society at national and local levels) relevant forthe fisheries and aquaculture sector, highlighting the roles of various stakeholder groups, gaining insight into stakeholders' willingness to participate in decision making, documenting the level of influence stakeholders have on the decision making; and the levelat which they are affected by decision-making.

Ecological Gap Analysis for the Bahamas National Protected Area System, 2012 - 2015 (Team Member)
Project was one of the components under the GEF Full-Sized Project on sustainability of marine protected areas in The Bahamas. This component resulted in revision of the 2003 Ecological Gap Analysis and identification of priority areas for conservation. Mrs. Moss-Hackett was responsible for using the GIS analysis tool, MARXAN to identify priority areas and the development of maps to aid in the visualization and interpretation of the results. Additionally, Mrs. Moss-Hackett's responsibilities included presenting results andgaining feedback from expert consultations, and providing written and visual content for the Gap Analysis reports.

Development of Management, Communication and Zoning Plans for the South Berry Islands Marine Reserve, June 2012 – March 2013 (Team Member)
Project resulted in development of management, communication and zoning plans for a marine reserve in the South Berry Islands in The Bahamas. Mrs. Moss-Hackett developedthe maps included in the management plan, which incorporated feedback from stakeholderson New Providence and South Berry Islands.

Other Work Experience
Interim National Project Coordinator, GEF-funded Pine Islands - Forest/Mangrove Innovation and Integration (Grand Bahama, New Providence, Abaco and Andros) Project

Publications
Fifth and Sixth National Reports to the Convention on Biological Diversity (Mapping). DEPP, 2021.
Bahamas Ecological Gap Analysis. BEST Commission, 2014.
Land and Sea Use Plan for the Island of Andros. The Nature Conservancy, 2010.
Andros: Living of the Land and Sea. DVD. The Nature Conservancy, 2010.

Bahamas Environment Science and Technology Commission (2006). *Road Map forScience and Technology in The Bahamas.* BEST, Nassau, The Bahamas, 40pp.
Lasker, H.R. 2006. High Fertilization Success in a Surface-Brooding Caribbean Gorgonian. *Biology Bulletin* 2006 210: 10-17.
Bahamas Environment Science and Technology Commission (2003), *The National Invasive Species Strategy for The Bahamas.* BEST, Nassau, The Bahamas, 35pp.
Bahamas Environment Science and Technology Commission (2005), *National Capacity Needs Self-Assessment (NCSA) Project*. BEST, Nassau, The Bahamas, 145pp.
Bahamas Environment Science and Technology Commission, *National Biodiversity Enabling Activities to the Convention on Biological Diversity - Third National Report* (2003). BEST, Nassau, The Bahamas, 142pp.