

# *Environmental Impact Assessment*

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*Blue Conch Holdings IV Ltd.,  
Grace Bay, Providenciales, TCI  
PR 15580*

Blue Conch Holdings IV, Ltd.  
Turks and Caicos Islands

*June 2022*



A Geosyntec Company

APPLIED TECHNOLOGY AND MANAGEMENT  
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## **1.0 Introduction and Overview**

### **1.1 Reference Page**

Environmental Impact Assessment

Environmental Impact Assessment for Blue Conch Holdings IV Ltd., PR15580

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Study Location:

The study location for this project is block number 60900, parcel 387. The site comprises 11.04 acres of land fronting Grace Bay to the west and Grace Bay Road to the east.

Submittal Version:

Version 1. Submittal to the Department of Planning; June 2022

### **1.2 Non-Technical Summary**

The proposed development consists of a full-service resort on the east end of Grace Bay, Grace Bay, Providenciales, Turks and Caicos Islands. The resort will consist of a one hundred fifty-nine (159) bed condo style hotel, comprised of sixty-six (66) condo units in three buildings having 4, 5, and 7 stories plus basement in each. Three (3) pools, poolside “Beach Bar”, reception area, restaurant & bar, gym, spa, tennis court, boardwalk, and kids center.

Four Beachfront Villas and (3) Townhomes. The development is proposed on 11.04 acres of land based on property boundaries.

The description of this resort development is as follows:

Sixty-Six Unit - Condo Style Hotel:

Basement – Building A, Building B and Building C

- 42 Covered Parking Spaces

First Floor – Building A, B and C

- 3 Bed Units
- 2 Bed Units
- Kitchen & Storage
- Restaurant
- Bar
- Reception/Lounge
- Retail Space
- Event Space
- Administration
- Restrooms

Second Floor - Building A, B and C

- 3 Bed Units
- 2 Bed Units
- Administration Office
- Health and Wellness Center (Spa & Gym)

Third Floor - Building A, B and C

- 3 Bed Units
- 2 Bed Units
- 2 Bed Unit (Rear)
- Studio

Fourth Floor

- 5 Bed Unit (PH)
- 3 Bed Units
- 2 Bed Units
- 2 Bed Unit (Rear)
- Studio

Fifth Floor

- 5 Bed Unit (PH)

- 3 Bed Units
- 2 Bed Units
- 2 Bed Unit (Rear)
- Studio

Sixth Floor – Building A

- 3 Bed Units
- 2 Bed Units
- 2 Bed Unit (Rear)
- Studio

Seventh Floor – Building A

- 4 Bed Units
- 2 Bed Unit (Rear)

Ancillary Facilities

- Swimming and Deck
- Laundry Facilities
- Maintenance Building
- Service Yard
- Parking (85 Uncovered)
- Sporting and Recreational Facilities
- Kids Club
- Garbage Enclosure
- Beach Bar
- Bocce Ball
- Beach Volleyball
- Boardwalk

Table 1-1. Direct Impacts on Landside and Marine Communities

Unit Type	Count	Keys		Beds		lock-out	
		per unit	total	per unit	total	per unit	total
Studio Type A1	1	1	1	1	1	0	-
Studio Type A2	3	1	3	1	3	0	-
1bed - type A	10	1	10	1	10	0	-
2 bed - type A1	4	2	8	2	8	1	4
2 bed - type A2	14	2	28	2	28	1	14
2 bed - type B1	1	2	2	2	2	1	1
2 bed - type B2	3	2	6	2	6	1	3
2 bed - type C1	2	2	4	2	4	1	2
2 bed - type C2	5	2	10	2	10	1	5
2 bed - type D1	1	2	2	2	2	1	1
2 bed - type D2	3	2	6	2	6	1	3
<i>2 bed - All</i>	<i>33</i>						
3 bed - type A1	2	2	4	3	6	1	2
3 bed - type A2	5	2	10	3	15	1	5
3 bed - type B1	3	2	6	3	9	1	3
3 bed - type B2	9	2	18	3	27	1	9
<i>3 bed - All</i>	<i>19</i>						
4 bed- type A1	1	1	1	4	4	0	-
4 bed- type A2	1	1	1	4	4	0	-
4 bed- type B	1	1	1	4	4	0	-
5 bed-type A	2	1	2	5	10	0	-
<b>TOTAL</b>	<b>71</b>		<b>123</b>		<b>159</b>		<b>52</b>

This is a resort development with a total of 159 beds within a condo style hotel consisting of 71 units and other amenities and recreational facilities, 4 Villas and 3 Townhomes. No beach

development or restorative works is associated with this development. The total beach frontage of the hotel site is approximately 425 feet (ft).

The developer was issued a Terms of Reference (TOR) for an environmental impact assessment to be conducted for the proposed development. Given the extensive TOR, professional expertise was engaged for terrestrial ecology, marine biology, civil engineering, structural engineering, economics, town and country planning, and environmental health. A summary of key study members and qualifications is provided within the study appendices.

### **Summary of Baseline Conditions and Impacts**

Overall, the site of the proposed project was found to be in Good to Fair condition. A brief description of each community present on the site follows, after which a more comprehensive description is provided.

The western boundary of the project was a sandy, unvegetated beach that was approximately 10 to 15 meters (m) (approximately 33 to 57 ft) in depth.

The beach was fairly steep in profile and appeared to have been subject to intermittent minimal to moderate levels of erosion. The broad exposure to winds from the west and north appeared to have exposed the nearshore areas to intermittent high levels of sand suspension, preventing establishment of high-quality epi-benthic communities.

Landward of the sandy beach, a narrow, shore perpendicular stretch of Sand Strand community was present. This backdune vegetative community was not intact, with most naturally occurring native vegetation having been replaced with invasive pest plants, primarily Australian pine (*Casuarina equisetifolia*) and inkberry (*Scaevola taccada*). No vertical seawalls or rip-rap shore protection structures were visible.

Landward of the invasive-dominated Sand Strand, a mosaic of Dry Broadleaf Evergreen Forest (DBEF) and Dry Broadleaf Evergreen Shrubland (DBES) communities extended to the eastern boundary of the site. Although no structures or hard-surfaced roads were present on the landside portion of the property, much of it had been significantly impacted by previous land alterations, which had reduced what appeared to have been DBEF to DBES with varying levels of encroachment by invasive pest plants.



No bluffs, blue holes, caves, dissolution holes or other particularly notable geologic formations were observed within the landside or marine assessment areas.

Five vegetative community types were found to be present within the assessment area and are summarized below.

***Unvegetated Sandy Beach***

Approximately 0.48 acre (4.5% of the assessment area) was found to consist of unvegetated sandy beach located landward of the estimated mean high water line (Photo 2-1).

***Invasive-Dominated Sand Strand***

Approximately 0.55 acre (5.2% of the assessment area), was found to consist of floral species that are not native to the Bahamian Archipelago, and which have replaced most native plants in the Sand Strand community. This habitat was present in a linear, shore-parallel corridor of variable width that was bounded on the northwest by the unvegetated sandy beach and on the southeast by a rapid change to a DBES community.

***Invasive Dominated Uplands***

Approximately 0.57 acre (5.4% of the assessment area), was found to consist of floral species that are not native to the Bahamian Archipelago. This non-native, invasive vegetation has replaced most native plants in habitat which was previously dry broadleaf evergreen communities. This vegetative community was present in the northwest portion of the property, along the boundary with the Coral Pavilion properties.

***Dry Broadleaf Evergreen Shrubland***

Approximately 5.41 acres (50.9% of the assessment area) was found to consist of DBES. Vegetation in this community and the DBEF were the most diverse of the communities present within the assessment area. Due to a combination of salt spray, the poorness of the soil, and previous human-related impacts, few trees were present in this community.

***Dry Broadleaf Evergreen Forest***

Approximately 3.62 acres of the approximately 10-acre site was found to consist of DBEF. Plant diversity was comparatively high, in some places exceeding 20 plant species in a single 3-m x 3-m vegetation analysis plot. Plant density varied considerably, from a single individual of one species to multiple trees and shrub-size individuals of other species.

The parcel will need to be raised with fill, so direct impacts are assumed across the entire parcel and are summarized in Table 1-1.

Impacts to native vegetative communities, in particular the DBES and Forest portions of the property, are the most significant impacts from the project.

**Table 1-2. Direct Impacts on Landside and Marine Communities**

Community Type	Existing Size (acres)	Area to be Impacted (acres)	Comments
Unvegetated Sandy Beach	0.48	0.05	Impacted by the western end of the boardwalk/beach access
Invasive-Dominated Sand Strand	0.55	0.55	Fill to be brought in to raise ground surface
Invasive-Dominated Uplands	0.57	0.57	Fill to be brought in to raise ground surface
Dry Broadleaf Evergreen Shrubland	5.41	5.41	Fill to be brought in to raise ground surface
Dry Broadleaf Evergreen Forest	3.62	3.62	Fill to be brought in to raise ground surface
Marine Impacts	10.63	0	No changes proposed

### Minimization and Mitigation

Potential activities that could be considered to minimize and/or offset ecological impacts could include the following.

1. Salvaging and relocating minimally motile organisms (e.g., *Cerion* and *Hemitrochus* snails) to suitable offsite receiver locations prior to land clearing.
2. Proactively planning to enhance plant abundance and biodiversity by planting site-appropriate native vegetation and/or integrating other species of native plants that are not presently on the property [e.g., Turk's cap cactus (*Melocactus intortus*)] into the landscape plan for the project.

3. Ensuring that field monitoring is conducted to avoid impacts to nesting birds during land clearing. Consideration of time of year for clearing to minimize impacts to nesting may also be considered.
4. Removing all non-native/invasive plants from the site and implementing a monitoring programme to prevent their re-establishment.
5. Incorporating state-of-the-art environmentally conscious design and management techniques into the project.
6. Considering development of educational materials notifying future residents of the presence of species of notable plants and that the collection and transport of endemic, endangered and/or threatened species is prohibited.
7. Ensuring coordination with the landscape team to ensure that no ornamental species that are on the list of invasive plants are introduced onto the property.
8. Consider development of educational materials notifying residents of the presence of critical marine species and the need for their protection.
9. Although no sand dollars, sea biscuits and other motile and/or sedentary marine organisms were observed during the marine investigation, species such as these are known to inhabit the sandy nearshore bottoms that will potentially be accessed by residents for recreational purposes. Collection of live specimens as souvenirs should be prohibited.
10. Notify the Department of Environment and Coastal Resources (DECR) if nesting marine turtles, nesting birds (e.g., nighthawks on coastal rock, plovers on sandy beaches), or piping plovers are observed within coastal portions of the property and implement appropriate countermeasures (e.g., prohibition on unleashed dogs) to eliminate or minimize adverse impacts on these resources.
11. Conduct periodic beach clean-ups to remove flotsam, jetsam and/or other solid waste or debris that may accumulate on the shore.
12. Resist beach management initiatives that would mechanically remove naturally occurring tidal wrack (e.g., seaweed) from the beach, since it harbours prey for foraging shorebirds

and is beneficial to the localized ecology, except when situations warrant more aggressive management.

13. Due to the natural curvature of the shoreline in the eastern portion of Grace Bay, recreational vessels pass closer to the shore adjacent to the project site than at other locations. To increase safety for future Resort residents and visitors who wish to swim, paddleboard, snorkel or participate in other water sports activities, it is recommended that navigational buoys be set/re-set to visibly mark the vessel operation area to prevent vessel operation any closer than 300 ft from shore.

### **1.3 Project Description**

This section provides a brief description of the proposed development and its relationship with other development in the area and adjacent development in the geographic area.

The project site is adjacent to small holiday rental homes (Coral House Villa and Coral Pavilion) at the east end of Grace Bay (Figure 1-1). Conceptual illustrations of the proposed development are provided in Figure 1-2 to Figure 1-6.



**Figure 1-1. Aerial Image of the Project Property.**





Figure 1-2. Site Plan Showing Overall Development.



Figure 1-3. Proposed Resort



Figure 1-4. Lobby Lounge.





Figure 1-5. Reception Lounge.



Figure 1-6. Typical Bedroom.

The description of this resort development is as follows.

**Sixty-Six Unit - Condo Style Hotel:**

Basement – Building A, Building B and Building C

- 42 Covered Parking Spaces

First Floor – Building A, B and C

- 3 Bed Units
- 2 Bed Units
- Kitchen & Storage
- Restaurant
- Bar
- Reception/Lounge
- Retail Space
- Event Space
- Administration
- Restrooms

Second Floor - Building A, B and C

- 3 Bed Units
- 2 Bed Units
- Administration Office
- Health and Wellness Center (Spa & Gym)

Third Floor - Building A, B and C

- 3 Bed Units
- 2 Bed Units
- 2 Bed Unit (Rear)
- Studio

Fourth Floor

- 5 Bed Unit (PH)
- 3 Bed Units
- 2 Bed Units
- 2 Bed Unit (Rear)
- Studio

Fifth Floor

- 5 Bed Unit (PH)
- 3 Bed Units
- 2 Bed Units



- 2 Bed Unit (Rear)
- Studio

#### Sixth Floor – Building A

- 3 Bed Units
- 2 Bed Units
- 2 Bed Unit (Rear)
- Studio

#### Seventh Floor – Building A

- 4 Bed Units
- 2 Bed Unit (Rear)

#### Ancillary Facilities

- Swimming and Deck
- Laundry Facilities
- Maintenance Building
- Service Yard
- Parking (85 Uncovered)
- Sporting and Recreational Facilities
- Kids Club
- Garbage Enclosure
- Beach Bar
- Bocce Ball
- Beach Volleyball
- Boardwalk

The resort development is proposed on Grace Bay Beach. The entirety of Grace Bay Beach is zoned for Tourism Related Developments. Notwithstanding the Land Use Zoning, many of the existing coastal developments to the east of the project are multimillion dollar residential homes, which are generally used as rental villas. To the west of the proposed resort, hotels such as The Tuscany, The Venetian, Ocean Club Resort, Club Med, and Royal West Indies Resort presently exist. In general, parcel density increases to the west of the study property.

## **1.4 Aims and Objectives of the Assessment**

This environmental impact statement (EIS) will provide the findings of the environmental impact assessment (EIA), the areas of which are detailed in the terms of reference (TOR). In doing so, the statement presents findings justifying why Detailed Development Permission and Building Permit should be granted for the proposed development.

The objectives are primarily as follows.

- For the developer(s) of the subject parcel to construct their development as approved in their Outline Development Permission.
- That the proposed development is economically beneficial to the developer, Turks and Caicos Islands Government (TCIG) and the citizens of the Turks and Caicos Islands.
- That the proposed development positively impacts the nearby and surrounding infrastructure and natural environment.
- That the development integrates and harmonizes/complements the Grace Bay community.
- That any potential environmental or developmental impacts are negligible and mitigated against.
- That the proposed development enjoys the same amenities that are presently enjoyed by all coastal developments.
- That the amenities and visitor experience provided by the development encourages visitors to return to the Turks and Caicos Islands.

In a few circumstances, the statement has derogated from the prescribed format of the generic TOR without compromising the integrity of reporting and while addressing all the concerns and requirements of the TOR. The specialists have been constantly reminded of what is proposed, i.e., a resort and ancillary facilities. There are no beach or marine developmental works associated with this development.

A literature search and field investigations were completed in order to accurately determine and document existing on-site conditions, including floral and faunal communities. The results of these investigations are to subsequently be used in order to determine the extent of ecological impacts that could result from the construction and long-term operation of the proposed residential and resort community.

## **1.5 Overview of the EIA**

This EIA report is organized in accordance with the guidelines provided in the TOR dated October 20, 2021 and provided in Appendix A. Section 1 provides an introduction to the study and offers a brief description of the project. Section 2 gives a detailed baseline assessment of the site and surrounding environment. Section 3 reviews the legislative and regulatory framework under which the proposed construction will be carried out. Section 4 provides a detailed description of the project design, construction, and operational alternatives. Section 5 is the impact assessment, which includes identification of various potential environmental and socio-economic impacts of the project. Section 6 provides a description of activities that will require mitigation, corrective, compensatory and other measures to be used to eliminate, minimize or mitigate adverse/significant impacts and includes the environmental management plan (EMP). Section 7 lays out recommendations and conclusions. References are provided in Section 8, and the appendices described in Section 9 are included at the end of the report.

## **1.6 Impact Assessment Methods/Analyses**

To determine floral and faunal species that could be affected by the project, both a literature search and field surveys were completed, as described hereafter.

### **1.6.1 Literature Search**

The literature search involved querying the databases used by TCIG for information pertinent to the site, including lists of terrestrial and aquatic flora and fauna that are designated as Endangered, Threatened and/or Endemic. It also included querying protected species lists maintained by international conservation organizations to which the Turks and Caicos Islands are signatories, including the International Union for the Conservation of Nature (IUCN) and the Convention on International Trade of Endangered Species (CITES).

### **1.6.2 Field Surveys - Methods**

The field assessments involved visual inspections of terrestrial and marine areas within the footprint of the proposed project and in adjacent areas that could be affected by the proposed project.

The landside assessment involved direct visual observation of conditions in the area between Grace Bay Road and Grace Bay.

Although no construction activities are proposed seaward of the mean high water line, pursuant to the TOR for the proposed project, the marine assessment involved direct visual observation of conditions extending from the water's edge to a minimum of 300 ft from shore.

A Canon EOS Rebel T3i, Olympus TG-870 and Nikon 3A digital cameras were used to photograph representative landside and marine areas and document notable flora and fauna. A hand-held Garmin GPSmap 62sc Global Positioning System (GPS) was used to record latitude and longitude waypoints at landside and marine investigation plots and at locations where notable flora and/or fauna or community boundaries were observed.

Nikon Monarch 10 x 42 binoculars were used during bird surveys, which included observations during early morning and late afternoon hours. Records were kept of observations of birds and other wildlife that were seen while qualitative and quantitative analyses of plots in landside transects were being conducted.

A recent Google Earth image of the site taken by on September 24, 2021, onto which the property lines were superimposed, was used as the base map for field investigations (Figure 1-7). In landside communities, a total of twenty-four 3-m x 3-m temporary vegetation plots along five approximately shore-perpendicular transects were established and analysed. A flexible, fiberglass tape measure was extended around the perimeter of each plot, and the flora and fauna within the plot were documented.

The abundance of all floral species (actual counts of individual species of trees and shrubs) and estimates of percent cover of groundcover and vine species), indications of faunal use and a qualitative assessment of conditions that occur within each plot were recorded.

Inventorying of flora and fauna also included documentation of observations along pedestrian transects that traversed other areas outside the transects but within various vegetative communities within the assessment area.

Within each plot, all plants were identified to species level, whenever possible. Cumulative percent cover of all vegetation within each plot was estimated. Trees (woody species greater than 2 m (about 7 ft) in height, and shrubs (woody species at heights between 0.3 m (about 1 ft) and 2 m were counted numerically. Plants less than 1 ft in height were considered to be "groundcover" species, even if they were young plants that could eventually grow to shrub or tree heights. The percent cover of individual groundcover species and vines was estimated. The

presence of fauna observed within the plot or in the vicinity, was recorded. Evidence of human-related and natural (e.g., hurricanes) impacts was recorded to assist in determining the quality of the vegetative community in each plot.

For marine communities, an underwater Olympus Stylus TG-870 digital waterproof camera was used to document existing marine conditions. A 50-centimeter (cm) by 50-cm polyvinyl chloride (PVC) grid was used as a scale reference to assist in estimating percent cover of benthic resources and as a size reference in underwater photographs. Notes of observations of marine life were recorded on waterproof paper.

Visual inspections of underwater conditions were assessed along the same five mostly shore-perpendicular transects that had been established for the landside assessment. The transects continued through the intertidal zone at the water's edge and extended in a generally northwesterly orientation. Benthic flora and fauna were documented for qualitative purposes along each transect within the project area, which extended to approximately 30 m (about 100 ft) from shore. Underwater photos were taken of representative and notable features and are included in the applicable section of the text and in Appendix M. Marine species observed are provided in Appendix L.

Plant names follow the *Flora of the Bahamas Archipelago*, by D.S. H.B. Correll, *Flowers of the Bahamas and Turks and Caicos Islands* by K. McNary Wood, with updates of plant names where warranted. Additional reference materials for landside flora and fauna included *The Birds of the Turks and Caicos Islands* (Ground, 2001), *Birds of the Bahamas and Turks and Caicos Islands* (Hallett, 2006), *Wildlife of the Caribbean* (Raffaele & Wiley, 2014) and *The Natural History of the Bahamas* (Currie, Wunderle et al., 2019).

Qualitative ratings were based on best professional judgement considering factors such as biodiversity, location-appropriate floral and faunal assemblages, the presence, absence and/or abundance of notable floral and/or faunal species (e.g., endangered, endemic etc.), and the extent to which the area appeared to have been subjected to damage as a result of human and/or natural processes. Note that Hurricanes Irma and Maria caused widespread damage in some areas of the TCI during October 2017, and this includes long-term influences to vegetation and habitat. The qualitative rankings vary from Poor (i.e., low biodiversity, absence of notable floral and faunal species, and impacted by human and/or natural processes) to Excellent (e.g., high biodiversity, abundant notable floral and faunal species, pristine condition).

The boundaries of the landside and marine assessment areas were mostly readily visible in the field, but pre-calculated GPS coordinates were programmed into the portable GPS unit that was used in the field.

Site-specific field studies were carried out to compile baseline data on the marine, coastal, terrestrial environments, and the built and natural environments. Quantitative and qualitative methods and processes have been used in data analyses. Photographs, including those using drones, were also taken. Based on the findings of the EIA, consultations will be conducted with nearby residents, the general public, and TCIG officials regarding any issues.

Desktop studies and other literary research were also carried out, including but not limited to research of the TCI National Parks Ordinance; Coastal Protection Ordinance; Planning Ordinance; TCI Building Code and Development Manual; TCI Land Use Zoning Plan for Providenciales; Turks and Caicos Islands National Vegetation Mapping Report; Review of aerial photographs; Providenciales Beach Access Policy and previous studies within the locality.

The analysis conducted in support of this study included, but was not limited to, desktop review of existing data, previous studies and reports, and direct and indirect surveys. Direct surveys included qualitative and quantitative environmental assessment within the terrestrial and marine environments, bathymetric surveys, and sand mechanical analysis. A numerical model of coastal sediment transport was developed and used as a basis for design development and alternative assessment.

During early April 2022, ecological assessments of landside and nearshore marine areas were conducted on the site on the northeast side of Providenciales where the resort project is proposed to be constructed along Grace Bay (Figure 1-7). The assessments were performed consistent with the TOR that had been issued by the TCIG's Department of Environment and Coastal Resources to determine the potential impacts that could occur as a result of the construction of the proposed resort facility. The assessments included qualitative and quantitative evaluations of the floral and faunal communities present on the site. The marine environment was investigated out to 100 m from the shoreline. The assessments were completed to determine potential environmental impacts of the project.

The investigations were conducted by staff of Applied Technology and Management (ATM) and Sustainable Ecosystems International, firms that have extensive experience in coastal and

terrestrial ecosystems in the Turks and Caicos Islands, the Bahamas, the Caribbean, and the southeast United States. The assessments involved visual inspections of terrestrial and marine areas within the footprint of the proposed activities and in adjacent areas that could be affected by the proposed activities.

The baseline ecological assessment for the Resort Project included both a literature search and field surveys, as described hereafter.

The literature search involved querying the databases used by the TCIG for information pertinent to the site, including lists of terrestrial and aquatic flora and fauna that are designated as Endangered, Threatened and/or Endemic. It also included querying protected species lists maintained by international conservation organizations to which the Turks and Caicos Islands are signatories, including IUCN and CITES.

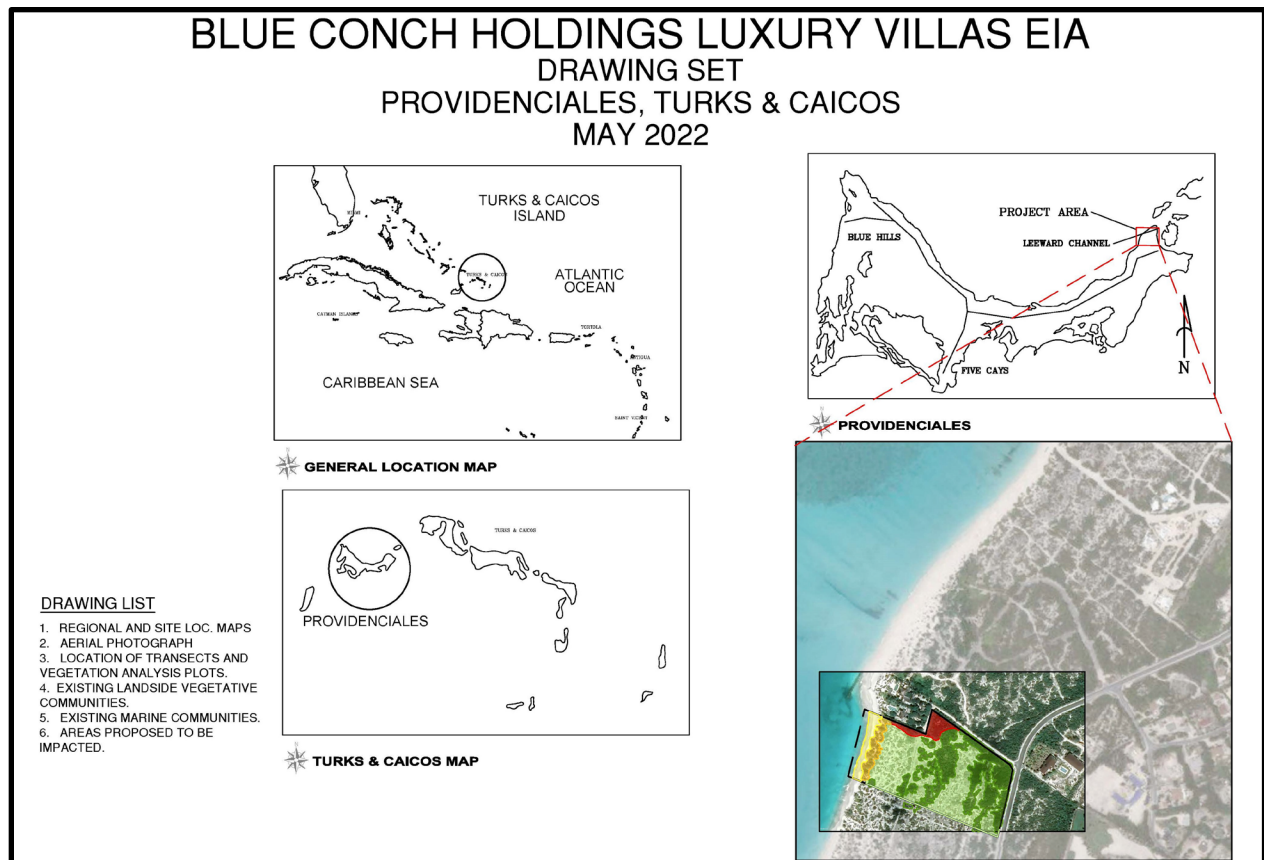


Figure 1-7. Location Map

The field assessments involved visual inspections of terrestrial and marine areas within the footprint of the proposed activity and in adjacent areas that could be affected by the proposed activity.

A Canon EOS Rebel T3i, Nikon Coolpix AW130, Olympus TG-870 and Nikon 3A digital cameras were used to photograph representative landside and marine areas and notable flora and fauna. A hand-held Garmin GPSmap 86sc GPS was used to record latitude and longitude waypoints at landside and marine investigation plots and at locations where notable flora and/or fauna or community boundaries were observed. Bushnell 10 x 42 binoculars were used during bird surveys, which included observations during early morning and late afternoon hours. Records were kept of observations of birds and other wildlife that were seen while qualitative and quantitative landside transects were being conducted.

In landside communities, a total of twenty-four 3-m x 3-m temporary vegetation plots along five transects were established and analysed. A tape measure was extended around the perimeter of each plot and the flora and fauna within the plot were documented.

The abundance of all floral species (actual counts of individual species of trees and shrubs and estimates of percent cover of groundcover and vine species), indications of faunal use, and a qualitative assessment of conditions that occur within each plot were recorded. Inventorying of flora and fauna also included documentation of observations along pedestrian transects that traversed other areas outside the transects but within the various vegetative communities within the assessment area. Within each plot, all plants were identified to species level, whenever possible. Cumulative percent cover of all vegetation was estimated. Trees (woody species greater than 2.1 m (7 ft) in height), and shrubs (woody species at heights between 0.3 and 2.1 m (1 to 7 ft) were counted numerically. Plants less than 0.3 m (1 ft) in height were considered to be “groundcover” species, even if they were young plants that could eventually grow to shrub or tree heights. The percent cover of individual groundcover species and vines was estimated. The presence of fauna observed within the plot or in the vicinity was recorded. Evidence of human-related and natural (e.g., hurricanes) impacts was recorded to assist in determining the quality of the vegetative community in each plot.

For marine communities, an underwater Nikon Coolpix AW130 and Olympus Stylus TG-870 digital waterproof cameras were used to document existing marine conditions. A 50-cm by 50-cm PVC grid was used as a scale reference to assist in estimating percent cover of benthic



resources and as a size reference in underwater photographs. Notes of observations of marine life were recorded on waterproof paper while snorkelling the site.

Visual inspections of underwater conditions were assessed along four shore-parallel transects that started on the uplands, continued past the water's edge and extended in a roughly east-west orientation to a distance of approximately 100 m (328 ft) from the shore. The groyne near the northern boundary of the project is in a shore-parallel orientation. Underwater photos were taken of representative and notable features and are included in the applicable section of the text and in Appendix M.

Plant names follow the *Flora of the Bahamas Archipelago*, by D.S. H.B. Correll, *Flowers of the Bahamas and Turks and Caicos Islands* by K. McNary Wood, with updates of plant names were utilized as primary reference documents. Additional reference materials for landside flora and fauna included *The Birds of the Turks and Caicos Islands* (Ground, 2001), *Birds of the Bahamas and Turks and Caicos Islands* (Hallett, 2006), *Wildlife of the Caribbean* (Raffaele & Wiley, 2014) and *The Natural History of the Bahamas* (Currie, Wunderle et al., 2019).

Qualitative ratings were based on best professional judgement considering factors such as biodiversity, location-appropriate floral and faunal assemblages, the presence, absence and/or abundance of notable and invasive floral and/or faunal species, and the extent to which the area appeared to have been subjected to damage as a result of human and natural processes. Note that Hurricanes Maria and Irma caused widespread damage in some areas of the TCI during October 2017. The qualitative rankings vary from Low (i.e., low biodiversity, absence of notable floral and faunal species, and impacted by human and/or natural processes) to High (e.g., high biodiversity, abundant notable floral and faunal species, pristine condition).

The boundaries of the landside and marine assessment areas were mostly readily visible in the field, but pre-calculated GPS coordinates were programmed into the portable GPS unit that was used in the field.

Field surveys were conducted from April 5 through 9, 2022.

## **2.0 Baseline Studies**

### **2.1 Historical Overview of the Site and Existing Development**

The proposed development site lies west of Leeward Settlement, which is located on the northeastern tip of the island of Providenciales in the Turk and Caicos Islands and includes many beachfront properties. To the west of the proposed development site are the many resort hotels on Grace Bay.

The site has approximately 450 ft of shoreline along Grace Bay, with a small, relatively protected beach downdrift from the beach stabilizing structure at Coral House. The frontage along Grace Bay Road is also approximately 450 ft, and the widest portion of the site is approximately 550 ft. The property shows evidence of partial land clearing, primarily for use as roads. The largest swath of cleared “road” extends from the east-west portion of the road leading to Coral House and bisects the parcel. Through review of Google Earth images, much of the clearing has occurred between 2003 and 2012, however, likely closer to 2012. The site was also use for staging and storage of material for the construction of Coral Pavilion between 2013 and 2015.

The site contains a low area that runs along the middle of the site (from northeast to southwest), which appears to collect runoff from storm water during rainy season. This area contains the greatest area of dense forest habitat, likely from the greater amount of water available due to its lower elevation. The highest elevations occur along Grace Bay Road, with elevations on average of approximately 6.5 ft, and along the dune, with elevations on average of 6.0 ft.

### **2.2 Biological Environmental Baseline Assessment**

During the week of April 4, 2022, ecological assessments of landside and nearshore marine areas were conducted on a vacant tract of land where the Resort is proposed to be constructed. The site, which is approximately 10.15 acres (4.1 ha) in size (as measured to the mean high water line) is located west of Grace Bay Road and extends northwestward to Grace Bay, on the northeast portion of Providenciales (Figure 2-1). The assessments were performed in compliance with the TOR that had been issued by the TCIG’s Planning Department prior to the proposed construction of a residential and resort project that is proposed to include four waterfront villas, three hotel buildings and townhouses. A wooden boardwalk over the primary dune is proposed for access to the beach by guests. No piers, docks or other in-water structures are proposed.

The assessments included qualitative and quantitative evaluations of the floral and faunal communities present in landside and marine areas within the project area and adjacent areas.



**Figure 2-1. Property Boundary**

The initial aim of the assessment was to accurately document floral and faunal communities present on the site and to apply standard scientific principles to assess the qualitative and quantitative conditions of the property. The results of the field investigations were to be used to determine the potential environmental impacts of the project. The spatial scope of the assessment area was to include all landside areas of the subject property that could be affected by the proposed project and to include nearshore marine areas to determine the extent of potential short-term and long-term impacts to the marine environment if the project were to proceed.

The investigations were conducted by staff of ATM and Sustainable Ecosystems International, two firms that have extensive experience in coastal and terrestrial ecosystems in the Turks and

Caicos Islands, the Bahamas, the Caribbean and the south-eastern United States, and whose credentials had been reviewed and approved as part of the acceptance of the EIA team for the Blue Conch Holdings IV Ltd. project. The assessments involved visual inspections of terrestrial and marine areas within the footprint of the proposed activities and in adjacent areas that could be affected by the proposed activities.

### 2.2.1 Baseline Terrestrial Environment

The Baseline Terrestrial Assessment (including areas that are cleared, bulldozed and disturbed/damaged) includes a quantitative description of terrestrial ecological assets (flora and fauna; habitats, rare, threatened, and endangered species) to be directly impacted by the project and a qualitative assessment of assets that may be indirectly impacted.

The baseline field surveys in both the landside and marine communities were conducted during the week of April 6, 2022, at which time, no construction of the project had been initiated. The results of the literature search and field assessments follow.

#### 2.2.1.1 Results of Literature Search

A 10-page undated list of flora and fauna that are designated as protected because they are endemic, rare and endangered entitled *The Schedules* (Appendix G) received from the DECR was used as the primary reference list for notable flora and fauna that could potentially be present on the site. The list is not specific to the project area, or even to Providenciales, but is applicable to all areas in the TCI.

A query of the database maintained by IUCN revealed the potential presence of 2,169 terrestrial and marine floral and faunal species that occur in the Turks and Caicos Islands, and which are designated, in descending order of vulnerability, as Critically Endangered, Endangered, Near Threatened, Vulnerable, Least Concern, and Data Deficient. The IUCN database does not allow for filtering by island, so the list (Appendix H) is for all the Turks and Caicos Islands.

Although the IUCN list includes many species that exist in habitats that are not present on the subject property (e.g., mangrove forests, coral reefs) or within the potential sphere of influence of the proposed project, it does include several species of terrestrial and marine flora and fauna that were observed during the assessment and/or have the potential to be affected by the proposed activities. Species that were observed and/or are likely to occur on the subject site and/or within the sphere of influence of the project have been highlighted in the appendices.

Additionally, columns have been added to the IUCN database to allow potential impacts to be identified as either “Direct” or “Indirect”. Direct impacts are primarily landside plants where fill is proposed. Impacts to individuals of these species could be ameliorated if plant salvage/relocation is undertaken. Potential indirect impacts are primarily to marine species, specifically several of the reef fish and corals that are present on/near the rock groyne that was constructed several years ago to protect the Coral Pavilion structure located on the adjoining property to the east. Although the rock groyne is not on the subject property, and no structures are proposed seaward of the mean high water line, potential impacts could occur as a result of increased visitation by snorkelers and other water recreationists.

None of the species that are designated by the IUCN and were observed on the subject property have designations of Endangered. The designation of 42 of these species is “Least Concern”. One species (i.e., *Coccothrinax inaguensis*) is designated by the TCIG as “Near Threatened”, and one species (i.e., *Vachellia coriophylla*) is designated as “Data Deficient”.

The Turks and Caicos Islands are not registered as a party to CITES, but a search of its database of listed species was conducted for this project because the TCI are a dependent territory of a signatory party and the DECR has been determined by CITES to be an “authority competent to issue comparable documentation” and “A scientific institution capable of advising that an export is not detrimental to the survival of the species concerned”. Similar to the IUCN and DECR’s “Schedules,” the CITES database does not allow for filtering by island, so the list (Appendix I) is for all the Turks and Caicos Islands. It identifies numerous species of terrestrial flora and fauna that have the potential to be affected by the proposed activities.

Species that were observed and/or are likely to occur on the subject site and/or within the sphere of influence of the project have also been highlighted in these appendices. Most of the species that are included on the CITES list for the TCI are also on the IUCN list.

#### 2.2.1.2 Results of Landside Assessment

The landside assessment involved direct visual observation of conditions in twenty-four 3-m x 3-m plots along five transects. It also included the recording of observations of additional species that were present on the site, but which did not occur in the plots or along the transects. Tracks of areas traversed during the assessment were recorded on a hand-held GPS system and are displayed on Figure 2-2.





Figure 2-2. Field Assessment

Lists of flora (Appendix J) and fauna (Appendix K) observed and identified during the landside and marine (Appendix L) assessment are provided in the appendices.

Overall, the site of the proposed project was found to be in Good to Fair condition. A brief description of each community present on the site follows, after which a more comprehensive description is provided.

The western boundary of the project was a sandy, unvegetated beach that was mostly approximately 10 to 15 m (about 33 to 57 ft) in depth.

The beach was fairly steep in profile and appeared to have been subject to intermittent minimal to moderate levels of erosion. The broad exposure to winds from the west and north appeared to have exposed the nearshore areas to intermittent high levels of sand suspension, preventing establishment of high-quality epi-benthic communities.

Landward of the sandy beach, a narrow, shore perpendicular stretch of Sand Strand community was present. This backdune vegetative community was not intact, with most naturally occurring native vegetation having been replaced with invasive pest plants, primarily Australian pine (*Casuarina equisetifolia*) and inkberry (*Scaevola taccada*). No vertical seawalls or rip-rap shore protection structures were visible.

Landward of the invasive-dominated Sand Strand, a mosaic of DBEF and DBES communities extended to the eastern boundary of the site. Although no structures or hard-surfaced roads were present on the landside portion of the property, much of it had been significantly impacted by previous land alterations, which had reduced what appeared to have been DBEF to DBES with varying levels of encroachment by invasive pest plants.

No bluffs, blue holes, caves, dissolution holes or other particularly notable geologic formations were observed within the landside or marine assessment areas.

A total of twenty-four 3 m x 3 m vegetative community plots were established along five transects that generally expanded outward in a shore-perpendicular orientation (Figure 2-2). Floral and faunal species observed in these plots are identified in Table 2-1.

Table 2-1. Landside Flora in Vegetation Analysis Plots

Scientific Name	Common Name	Transect 1 Plot A	Transect 1 Plot B	Transect 1 Plot C	Transect 1 Plot D	Transect 2 Plot A	Transect 2 Plot B	Transect 2 Plot C	Transect 2 Plot D	Transect 2 Plot E	Transect 3 Plot A	Transect 3 Plot B	Transect 3 Plot C	Transect 3 Plot D	Transect 3 Plot E	Transect 4 Plot A	Transect 4 Plot B	Transect 4 Plot C	Transect 4 Plot D	Transect 4 Plot E	Transect 5 Plot A	Transect 5 Plot B	Transect 5 Plot C	Transect 5 Plot D	Transect 5 Plot E	# Occurrences
<i>Ambrosia hispida</i>	Sweet Bay, Bay tansy, Soap-bush									0/0/1%																1
<i>Angadenia berteroi</i>	Lice-root										0/0/1%	0/0/1%									0/0/1%			0/0/1%		4
<i>Bourreria succulenta</i>	Strong-back			0/1/0																						1
<i>Byrsonima lucida</i>	Locust-berry	0/4/0	0/5/0						0/0/1%																	3
<i>Cassytha filiformis</i>	Woe-vine, Love Vine							0/0/1%		0/0/2%				0/0/1%	0/0/5%	0/0/1%			0/0/1%	0/0/1%	0/0/5%	0/0/01%		0/0/1	0/0/1%	11
<i>Casuarina equisetifolia</i>	Beefwood, Australian Pine									1/0/0					1/0/0					0/1/0					2/0/0	4
<i>Cenchrus incertus</i>	Sand Bur																									0
<i>Chamaecrista lineata</i>	Narrowpod Sensitive Pea																							0/1/1%		1
<i>Coccoloba uvifera</i>	Seagrape					0/1/0	0/1/0	0/2/0	0/5/0	0/5/0			0/6/0					0/3/0				0/4/0	0/2/0	0/5/0		10
<i>Coccothrinax inaguensis</i>	Thatch Palm	0/2/0	1/2/1%	0/0/1%		1/3/0	0/10/1%	0/5/0			1/3/1%	0/2/0	0/7/0	0/2/1%		0/1/0	0/1/0	0/4/0	0/2/0				0/2/1%			15
<i>Corchorus hirsutus</i>	Wooly Corchorus, Jack Switch								0/1/0							0/2/0										2
<i>Cordia sebestena</i>	Geiger Tree, Anaconda																									0
<i>Crossopetalum rhacoma</i>	Maiden Berry, Mating Berry		0/1/0				0/1/0				0/3/0	1/2/0	0/1/0			0/1/0	0/2/0		0/1/0		0/1/0	0/2/0				10
<i>Croton lucidus</i>	Fire-Bush		0/4/0	0/2/0		0/6/0	0/3/0		0/1/0		0/3/0	0/1/0	0/9/0	0/5/0		0/4/5%	0/4/0	0/4/0			0/1/0	0/6/0				14
<i>Dactyloctenium aegyptium</i>	Crowfoot Grass				0/0/1%																					1
<i>Dodonaea viscosa</i>	Dogwood, Swamp Bush			0/2/0				0/1/0	0/1/0		0/1/0	0/2/0	0/1/0					0/3/0								7
<i>Echites umbellata</i>	Devil's Potato	0/0/1%	0/0/1%	0/0/1%																						3
<i>Encyclia altissima</i>	Tall Orchid					22						15		15			15	15				90	22			7
<i>Encyclia rufa</i>	Spring Orchid																									0
<i>Erithalis fruticosa</i>	Black Torch, Candlewood	0/3/0	0/1/0			0/2/0	0/3/1%	0/2/0	0/1/0		0/3/0	0/3/0						0/1/0	0/1/0		0/1/0	0/1/0	0/1/0	0/5/0		14
<i>Ermodea littoralis</i>	Golden Creeper, Cough Bush		0/1/0				0/1/0				0/2/0	0/1/0	0/1/0		0/1/0	0/4/0	0/1/1%				0/0/1%					9
<i>Euphorbia (abbreviata) inaguensis</i>	Wild Thyme (aka E. inaguensis)										0/1/0	0/3/0		0/3/0			0/5/0		0/5/0			0/3/1%	0/1/0	0/8/1%		8
<i>Euphorbia angustifolium</i>	Spurge																									0
<i>Eustachys petraea</i>	Finger Grass							0/0/1%	0/0/1%																	2
<i>Evolvulus bahamensis (fka E. arbuscula)</i>	Broom Bush																									1
<i>Fimbristylis cymosa</i>	Limestone Turf Sedge							0/0/1%	0/0/1%		0/0/1%	0/0/1%	0/0/1%				0/0/1%	0/0/1%				0/0/1%	0/0/01%	0/0/1%		10
<i>Genipa (fka Casasia) clusiifolia</i>	Seven-year Apple		1/0/0			0/2/0	0/3/0										0/3/0		1/3/0			0/1/0	0/1/0	0/2/0		8
<i>Guaiacum sanctum</i>	Lignum vitae																									0
<i>Gyminda latifolia</i>	False Boxwood	0/3/0																								1
<i>Jacquemontia havanensis</i>	Jacquemontia																					0/0/1%	0/0/1%			2
<i>Jacquinia keyensis</i>	Joe-wood, Ironwood					0/1/0	0/1/0				0/2/0							0/2/0					0/1/0			5
<i>Lantana involucrata</i>	Sage Cop, Wild Sage			0/2/0				0/1/0	0/1/0		0/1/0			0/1/0							0/4/0					6
<i>Leucaena luecocephala</i>	Jumbie Bean, Jumbay (Cow Bush in TCI)				15/0/0						0/1/0										1/2/0					3



Scientific Name	Common Name	Transect 1 Plot A	Transect 1 Plot B	Transect 1 Plot C	Transect 1 Plot D	Transect 2 Plot A	Transect 2 Plot B	Transect 2 Plot C	Transect 2 Plot D	Transect 2 Plot E	Transect 3 Plot A	Transect 3 Plot B	Transect 3 Plot C	Transect 3 Plot D	Transect 3 Plot E	Transect 4 Plot A	Transect 4 Plot B	Transect 4 Plot C	Transect 4 Plot D	Transect 4 Plot E	Transect 5 Plot A	Transect 5 Plot B	Transect 5 Plot C	Transect 5 Plot D	Transect 5 Plot E	# Occurrences
<i>Lysiloma latisiliquum</i>	Wild Tamarind			1/0/0																						1
<i>Metopium toxiferum</i>	Poisonwood	1/0/0						1/0/0											0/1/0				1/0/0			4
<i>Myriopus volubilis</i>	Soldier-bush	0/0/1%																								1
<i>Passiflora pectinata</i>	Wild Apricot		0/0/1%			0/0/1%	1%												0/0/1%							4
<i>Piscidia piscipula</i>	Fish Poison, Jamaican Dogwood																									0
<i>Pithecellobium keyense</i>	Blackbead		0/1/0			0/1/0	0/1/0				1/0/0	0/1/0				0/1/0										6
<i>Pluchea odorata</i>	Marsh Fleabane																									0
<i>Poaceae - Unidentified grass</i>	Unidentified grass			0/0/5%					0/0/2%																	2
<i>Randia aculeata minor</i>	Box Briar						0/1/0																			1
<i>Reynosa septentrionalis</i>	Darling Plum																						0/1/0			1
<i>Rhynchospora floridensis</i>	Starrush Whitetop					0/0/1%						0/0/1%	0/0/1%			0/0/1%		0/0/1%			0/0/1%					6
<i>Scaevola plumieri</i>	Inkberry, Black-soap																							0/7/0		1
<i>Scaevola taccada</i>	Beach Cabbage, Ornamental Candlewood			0/1/0	0/25/0 - 85%										0/35/0					0/44/0					0/50/0	5
<i>Senna (fka Cassia) chapmanii</i>	Bahama Senna, Stinking Pea		0/4/0			0/1/0	0/2/0					0/1/0					0/1/0					0/2/01%				6
<i>Sesuvium portulacastrum</i>	Pondweed, Sea purslane																							0/0/2%		1
<i>Sideroxylon (Bumelia) americana</i>	Wild Saffron, Milk-berry						1/0/0										0/2/0									2
<i>Smilax havanensis</i>	Prickly Saw-brier	0/0/1%	0/0/1%	0/0/1%		0/0/1%	0/0/1%	0/0/1%	0/0/1%		0/0/1%	0/0/1%	0/0/1%	0/0/1%		0/0/1%			0/0/1%			0/0/01%	0/0/1%	0/0/1%		16
<i>Sporobolus domingensis</i>	Dropseed--grass									0/0/1%																1
<i>Sporobolus virginicus</i>	Seashore Rush-grass																									0
<i>Stachytarpheta jamaicensis</i>	Worry Vine, Blue rat-tail																									0
<i>Stenostomum (fka Antirhea) myrtifolia</i>	False Myrtle	0/1/0	0/2/0	0/1/0		0/1/0	0/1/1%	0/2/0	0/1/0		0/1/0	0/2/0	0/3/0	0/1/1%		0/1/0	0/1/0	0/1/0	0/6/0				0/6/0			16
<i>Strumpfia maritima</i>	Mosquito Bush, Candle Torch			0/4/0				0/1/0				0/1/0		0/3/0			0/1/0		0/4/0		0/1/0		0/1/0	0/3/0		9
<i>Stylosanthes hamata</i>	Sweet Weed, Pencil Flower																									0
<i>Tabebuia bahamensis</i>	White Cedar, Five Fingers																							0/1/0		1
<i>Thespesia populnea</i>	Seaside Mahoe, cork-tree																									0
<i>Tillandsia circinnata</i>	Silvery Wild Pine Air Plant					3	2				1	1	4	4			24	6				2	1	3		11
<i>Tillandsia flexuosa</i>	Flexuous Wild Pine											10					2	4				12		4		5
<i>Tillandsia utriculata</i>	Swollen Wild Pine		12				2				2	2				3	8									6
<i>Tumera ulmifolia</i>	Buttercups, Yellow Alder									0/1/0											0/1/0					2
<i>Uniola paniculata</i>	Sea Oats																									0
<i>Vachellia (fka Acacia) acuífera</i>	Pork and Doughboy, Rosewood	0/3/0	0/1/0						0/1/0							2/1/0					1/0/0					5
<i>Vachellia (fka Acacia) choriophylla</i>	Cinnecord							0/1/0			0/1/0		0/2/0													3
<i>Waltheria indica</i>	Sleepy Morning								0/1/0																	1

Scientific Name	Common Name	Transect 1 Plot A	Transect 1 Plot B	Transect 1 Plot C	Transect 1 Plot D	Transect 2 Plot A	Transect 2 Plot B	Transect 2 Plot C	Transect 2 Plot D	Transect 2 Plot E	Transect 3 Plot A	Transect 3 Plot B	Transect 3 Plot C	Transect 3 Plot D	Transect 3 Plot E	Transect 4 Plot A	Transect 4 Plot B	Transect 4 Plot C	Transect 4 Plot D	Transect 4 Plot E	Transect 5 Plot A	Transect 5 Plot B	Transect 5 Plot C	Transect 5 Plot D	Transect 5 Plot E	# Occurrences
Fauna		<i>Cerion Hemitrochus Gasteracantha</i>	<i>Cerion Hemitrochus Leiocephalus</i>	<i>Cerion Hymenoptera</i>		<i>Cerion Hemitrochus</i>	<i>Cerion Hemitrochus</i>	<i>Cerion Hemitrochus Gasteracantha</i>	<i>Cerion Hemitrochus</i>	Shorebirds visible on beach	<i>Cerion Hemitrochus Odonata</i>	<i>Cerion Hemitrochus</i>	<i>Cerion Psychidae</i>	<i>Cerion Psychidae</i>	<i>Sanderlings &amp; R. Turnstones</i> to west on bch	<i>Hemitrochus</i>	<i>Cerion Hymenoptera</i>	<i>Cerion Hemitrichus Curculionoidea</i>	<i>Cerion Psychidae</i>		<i>Cerion Hemitrichus Acrididae</i>	<i>Fritillary</i> in vicinity <i>Leiocephalus</i>	<i>Cerion</i>	<i>Cerion Psychidae</i>		
Comments		Adj to Rd (debris, noise, lights etc.)			Disturbance from adjacent prop	Adj to Rd (debris, noise, lights etc.)					Adj to Rd (debris, noise, lights etc.)					Adj to Rd (debris, noise, lights etc.)					Adj to Rd (debris, noise, lights etc.)			trash		
Percent Cover:		85	65	95	95	85	85	95	85	75%	85	55	75	85	85	85	Good	60	70		90	80	95	60	90	
Quality:		Good	Fair	Poor	Poor	Good	Good	Good	Good	Poor	Good	Poor	Fair	Good	Poor	Good	85	Good	Good		Fair	Good	Good	Good	Poor	

Legend and Notes:

plot size = 3 m x 3 m

Trees = > 7 ft tall

Shrubs = 1 to 7 ft tall

Groundcovers = less than 1 ft; % groundcover shown

Numbers = #Trees / # shrub size / % cover for groundcovers & vines, & seedlings less than 1 ft in height

% Groundcover provided when individual was less than 1 ft tall, regardless of height when mature

% Groundcover listed as 1% includes those present at less than 1%

For species which have had name changes since they were designated as protected or invasive, the following apply: *Vachellia acuiifera* (pork and doughboy) formerly known as *Acacia acuiifera*, *Vachellia choriophylla* (cinnecord) formerly known as *Acacia choriophylla*.

Encyclia orchid # based on avg of 15 peseudobulbs/cluster, unless otherwise counted.

Species shown as having 0 occurrences were observed on the site during the assesssment, but did not occur in the vegetation monitoring plots.

Five vegetative community types were found to be present within the assessment area. The location of each community type is shown on Figure 2-3, and the corresponding size of each area, its percentage of the overall assessment area, relative quality and comments are identified in Table 2-2.

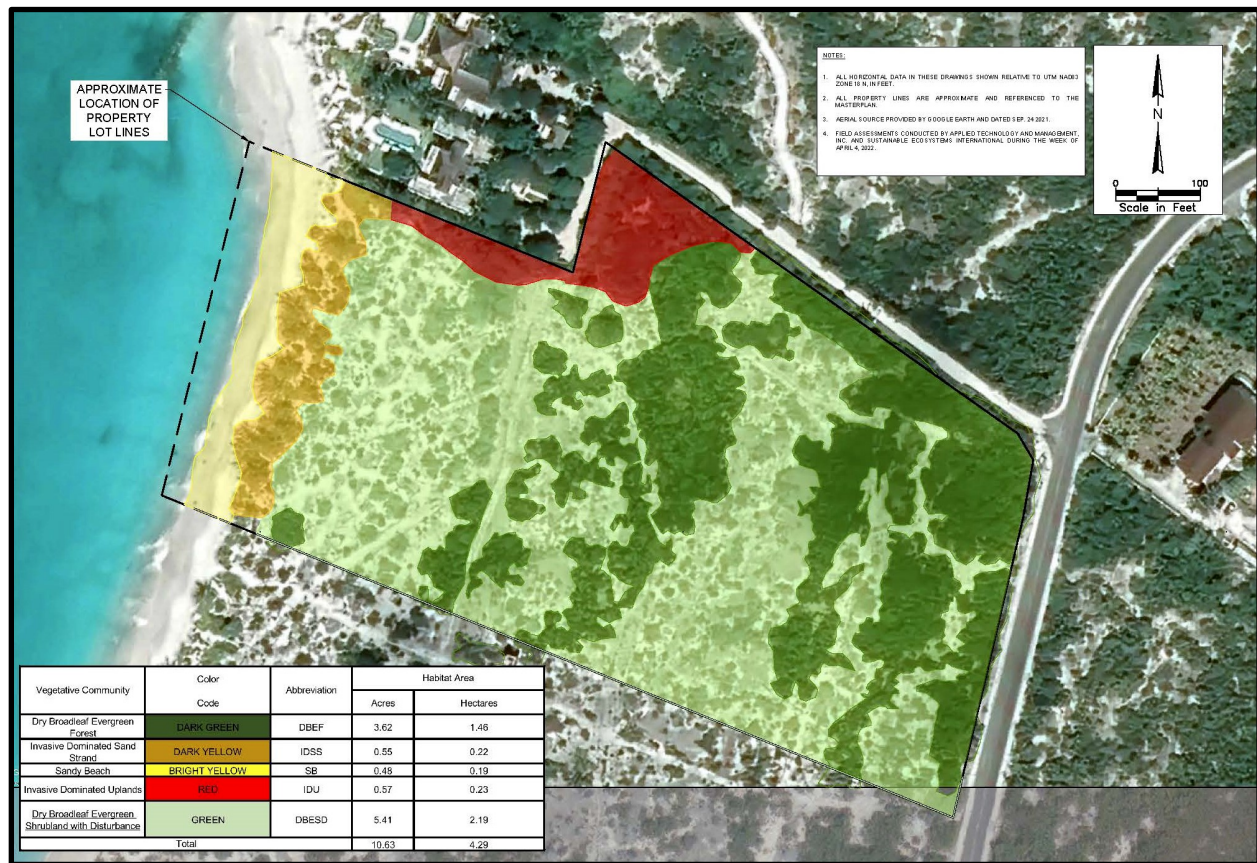


Figure 2-3. Landside Habitat Map

**Table 2-2. Existing Landside Community Types**

Community Type	Size w/in Assessment Area Acres	Percentage of Area w/in Assessment Area	Qualitative Rating <sup>1</sup>	Comments
Unvegetated Sandy Beach	0.48	4.5	Good	Naturally less biodiverse than other habitats; beneficial as natural shield for sea level rise/coastal resiliency. No groynes or other manmade structures
Invasive-dominated Sand Strand	0.55	5.2	Poor	Back-dune community mostly taken over by invasive pest plants.
Invasive-Dominated Uplands	0.57	5.4	Poor	Native vegetative communities in the northwestern portions of the property were mostly non-existent, having been replaced by invasive pest plants on what appeared to have been the previously occurring soils and topographic conditions
Dry Broadleaf Evergreen Shrubland	5.41	50.9	Good	Native geologic & vegetative community substantially impacted by previous human activities & non-native vegetation.
Dry Broadleaf Evergreen Forest	3.62	34.0	Good	Native geologic & vegetative community mostly intact, but habitat fragmentation and edge effect adjacent to impacted areas have resulted in moderately degraded habitat.
Total:	10.63	100		

### Unvegetated Sandy Beach

Approximately 0.48 acre (4.5% of the assessment area) was found to consist of unvegetated sandy beach located landward of the estimated mean high water line (Photo 2-1).





**Photo 2-1. Unvegetated Sandy Beach, View Looking North**  
**Date of Photo: April 6, 2022**

Openings of ghost crab (*Ocypode quadrata*) burrows or other typical beach-dwelling species were occasionally observed.

Migratory shorebirds, including sanderlings (*Calidris alba*) and ruddy turnstones (*Arenaria interpres*) were observed. Other bird species (e.g., sandpipers (Scolopacidae), plovers (Charadriidae), and oystercatchers (*Haematopus palliatus*)) are well-documented to be occasionally present and/or to forage in this habitat. Wilson's plovers (*Charadrius wilsonia*) have been known to nest on open sandy beaches in other areas of Grace Bay, but the stretch of beach on the subject property appeared to be too heavily used to be suitable for nesting by this species. Laughing gulls (*Larus atricilla*) and least terns (*Sterna antillarum*) were observed and heard aerially over the sandy beach and nearshore areas. No evidence of nesting of these species was observed. Sanderlings, ruddy turnstones and laughing gulls were observed at rest on rocks that were exposed at low tide on a groyne located on the adjoining property to the north (see photo in Appendix I).

Marine turtles also are known to nest on sandy beaches. No data was found that indicate that this area is known for sea turtle nesting. No evidence of turtle nesting (or hatching of young) was observed.

No portions of this community were heavily eroded, but a scarp of 1 to 2 ft, where roots of adjacent vegetation were exposed, suggested that shifting sands and storms may result in intermittent periods of erosion.

This community was ranked as being in Good condition. Beach width was somewhat narrow, mostly between 10 and 15 m (about 33 ft to 57 ft). The upper limit of this community transitioned into Sand Strand community described hereafter.

### **Invasive-Dominated Sand Strand**

Approximately 0.55 acre (5.2% of the assessment area) was found to consist of floral species that are not native to Bahamian Archipelago, and which have replaced most native plants in the Sand Strand community. This habitat was present in a linear, shore-parallel corridor of variable width that was bounded on the northwest by the unvegetated sandy beach and on the southeast by a rapid change to a DBES community.

Dominant vegetation included mature Australian pine (*Casuarina equisetifolia*) trees in the canopy, and beach cabbage (*Scaevola taccada*) in the sub-canopy. In much of this area, these two pest plants constituted more than 90% of the biomass. Native salt-tolerant and drought-tolerant shrubs and groundcovers in this community included species that are able to tolerate the build-up of acid-rich *Casuarina* duff, including sea grape (*Coccoloba uvifera*), love vine (*Cassytha filiformis*), seapurslane (*Sesuvium portulacastrum*), burr-grass (*Cenchrus* sp.), bay hops (*Ambrosia hispida*) and others. Photo 2-2 is representative of conditions in this area.





**Photo 2-2. Invasive-Dominated Sand Strand, View Looking North**  
**Date of Photo: April 6, 2022**

### ***Qualitative Condition of the Un-vegetated Sandy Beach***

This community was ranked as being in Poor condition. This qualitative assessment was based on the nearly total absence of native plant species.

The presence of a few native shrub and groundcover species suggests that, if the invasives and the *Casuarina* needles were to be removed, native species could recover. Supplemental planting with sea oats (*Uniola paniculata*), bay cedar (*Suriana maritima*), beach iva (*Iva imbricata*) could enhance restoration, and the use of dune walk-over structures could help reduce the likelihood of continued impacts by trampling.

### **Invasive Dominated Uplands**

Approximately 0.57 acre (5.4% of the assessment area) was found to consist of floral species that are not native to Bahamian Archipelago and which have replaced most native plants in what was formerly likely dry broadleaf evergreen communities. This vegetative community was present in



the northwest portion of the property, along the boundary with the Coral Pavilion properties. Review of historical Google Earth images suggests that this area was cleared in approximately 2015, and that opportunistic vegetation became established after the area ceased being used as a construction staging area (see photo in Appendix I).

Dominant vegetation included mature cow bush (*Leucaena leucocephala*) and seaside mahoe (also known as cork tree – *Thespesia populnea*) in the canopy and beach cabbage (*Scaevola taccada*) in the sub-canopy. In much of this area, these three pest plants constituted more than 90% of the biomass (Photo 2-3).

Native salt-tolerant and drought-tolerant shrubs and groundcovers in this community were minimally present.



**Photo 2-3. Invasive Dominated Uplands, View Looking North toward NW Property Boundary  
Date of Photo: April 8, 2022**



### **Qualitative Condition of the Invasive Dominated Uplands**

This community was ranked as being in Poor condition. This qualitative assessment was based on the nearly total absence of native plant species.

Restoration of the area to an assemblage of native plants would take a considerable effort.

### **Dry Broadleaf Evergreen Shrubland**

Approximately 5.41 acres (50.9% of the assessment area) was found to consist of DBES. Vegetation in this community and the DBEF were the most diverse of the communities present within the assessment area. Due to a combination of salt spray, the poorness of the soil, and previous human-related impacts, trees were infrequently present in this community. Those that exceeded 7 ft (about 2.1 m) in height were primarily poisonwood Inagua silver top palms (*Coccothrinax inaguensis*) and poisonwood (*Metopium toxiferum*).

Shrubs were the dominant land cover in this community, and included black torch (*Erithalis fruticosa*), Cinnecord (aka Leatherleaf Casha) (*Vachellia choriophylla*), pork and dough boy (*Vachellia acuífera*), *Euphorbia inaguaensis*, darling plum (*Reynosa septentrionalis*), sea grape (*Coccoloba uvifera*), fire bush (*Croton lucidus*), seven-year apple (*Genipa clusiifolia*), hardhead (*Phyllanthus epiphyllanthus*), and others. In areas where rock substrate was at the ground surface, mosquitobush (*Strumpfia maritima*) was common.

Herbaceous/groundcover species and vines included *Rhynchospora floridensis*, and *Cassytha filiformis*, *Smilax havanensis*, wild apricot (*Passiflora pectinata*), and others.

Vegetation was mostly less than 10 ft (about 3 m) in height. No wetlands were present within the assessment area. Photo 2-4 is representative of conditions in this vegetative community.

Native epiphytic orchids, primarily tall orchid (*Encyclia altissima*) (Photo 2-5) but also *Encyclia rufa* were abundant.



**Photo 2-4. Dry Broadleaf Evergreen Shrubland - Plot 3B, View Looking West**  
**Date of Photo: April 7, 2022**





**Photo 2-5. *Encyclia altissima***  
**Date of Photo: April 6, 2022**

As described further in the Section 2.2.1.3, Notable Landside Resources, and Table 2-3, several plant species that are designated by the TCIG as Turks and Caicos Endemic Plants, Lucayan Archipelago Endemic Plants and/or native Plants of Special Conservation Concern were present in this community.

Faunal species were observed in this habitat, and included mollusks [e.g., seagrape and peanut snails (*Hemitrochus* sp. and *Cerion* sp., respectively)], reptiles, including curly-tailed lizards (*Leiocephalus psammodromus*) and Turks and Caicos anoles (*Anolis scriptus scriptus*) and arachnids, including silver argiope (*Argiope argentata*) and crablike spiny orb weaver (*Gasteracantha elipsoides*) spiders and Fritillary butterflies (*Agraulis vaniallae*).

Bird species observed during bird surveys or while the vegetative analyses were being conducted in this area were primarily birds in flight and included least terns, laughing gulls, and Antillean nighthawks. Resident birds included thick-billed vireos and common ground doves. One active bird nest was observed, common ground-doves, with several nestlings (Photo 2-6).



**Photo 2-6. Common Ground-Dove Nestlings**  
**Date of Photo: April 8, 2022**

#### ***Qualitative Condition of the Dry Broadleaf Evergreen Shrubland***

Most of this habitat was ranked as Good, in spite of a lack of diverse forest, because it appeared to be in a mostly natural state, although scars from previous land clearing activities were present, primarily in the northern portion of the property (Photo 2-7). This community did not appear to have been significantly impacted hydrologically or as a result of previous development on the site and/or on adjacent properties. It also did not exhibit any evidence of previous storm-related impacts.





**Photo 2-7. Previously Cleared Area - View Looking South**  
**Date of Photo: April 7, 2022**

Eight plant species that are notable because they are on DECR's *The Schedules* list were encountered in the DBES community: broom bush, *Evolvulus bahamensis* (formerly known as *E. arbuscula*), rufous encyclia (*Encyclia rufa*), sea sage (*Lantana involucrata*), Inagua silvertop palms (*Coccothrinax inaguaensis*), wild thyme (*Euphorbia inaguaensis*), tall encyclia (*Encyclia altissima*), leatherleaf casha/cinnecord – *Vachellia* (formerly *Acacia*) *choriophylla*), and pork and doughboy (*Acacia acuiifera*). A single lignum vitae (*Guaiacum sanctum*) specimen was encountered. It was along the far north property line (at 21° 48' 37.09" North, 72° 09' 48.69" West) just south of Coral House Drive and was close enough to the property line that a survey would be needed to determine if it was on the subject property or on the adjoining property to the north.

Fauna observed in this vegetative community was limited but included brown anoles (*Anolis sagrei ordinatus*) curly-tailed lizard (*Leiocephalus psammodromus*, peanut snails (*Cerion* sp.), Cicadas (*Proarna* sp.), and fritillary butterflies (*Agraulis (Dione) vanilla*). Birds observed overhead included brown pelicans, royal terns and an osprey. Other birds known to use this habitat during



various times of the annual cycle, but which were not observed during the assessment included gull-billed terns, gray kingbirds and Antillean nighthawks.

Overall, this habitat was ranked in Good condition, but some areas were rated Poor. It was Good in areas where the vegetative community was intact and was Poor in areas where previous land clearing had taken place.

### **Dry Broadleaf Evergreen Forest**

Approximately 3.62 acres of the approximately 10-acre site was found to consist of DBEF. Plant diversity was comparatively high, in some places exceeding 20 plant species in a single 3-m x 3-m vegetation analysis plot. Plant density varied considerably, from a single individual of one species to multiple trees and shrub-size individuals of other species. Photo 2-8 (Plot 3-D) is representative of the frequent transition zones between DBES and DBEF.



**Photo 2-8. Typical Transition between Dry Broadleaf Evergreen Forest (left) and Shrubland (right)**  
**Date of Photo: April 7, 2022**

Tree species of note in the DBEF included silver top palms, poisonwood (*Metopium toxiferum*), lysiloma (*Lysiloma latisiliquum*), and blackbead (*Pithecellobium keyense*), but even the tallest were typically less than 20 ft in height.

Shrubs included the same species previously identified in the DBES, including black torch, cinnecord, pork and doughboy, darling plum, sea grape, fire bush, seven-year apple and others.

*Epiphytes included Encyclia* orchids and *Tillandsia* air plants, including *T. utriculata*, *T. flexuosa*, and *T. circinnata*. Vines included wild apricot, love vine and *Smilax havanensis*. Groundcovers were mostly non-existent or minimally present due to the effects of shading.

Birds present in this habitat included thick-billed vireos, woodstar hummingbirds, Bahama mockingbirds and gray kingbirds and various species in flight. A kestrel was repeatedly heard, and the subject property may be in its home range territory, but its activity pattern suggested it may nest on the adjoining vacant property on the south side of Grace Bay Road.

#### **Qualitative Condition of the Dry Broadleaf Forest.**

This vegetative community was mostly rated “Good” in quality and condition. Floral and faunal diversity was comparatively high, and several plant species that are designated as endemic or protected by international treaties were present. Native coppice vegetation was naturally regrowing in corridors that had previously been cleared. No residences, dwellings, other structures or areas that had been used for agriculture or other human-related purposes were encountered.

##### **2.2.1.3 Notable Landside Resources**

As identified on Table 2-3, several faunal and floral species that are listed in *The Schedules* were observed on the site. Brief descriptions of each species’ presence on the subject property follow.

The only non-bird animal species observed within the assessment area that is listed for conservation is the curly-tailed lizard (*Leiocephalus psammmodromus*). This species is fairly common on Providenciales and is not one of the less common subspecies that is found on the smaller out islands of the TCI. Several adults and juveniles of this species were observed in areas of the Coastal Rock and Sand Strand communities.

**Table 2-3. Notable Species of Flora and Fauna Designated by the Turks and Caicos Government that were Observed on the Site<sup>1</sup>**

Scientific Name	Common Name	Designating Entity	Designation	Abundance within the Assessment Area
Fauna				
<i>Nyctanassa violacea</i>	Yellow-crowned Night Heron	DECR	Common year-round resident	Uncommon, not likely to nest on the property
<i>Arenaria interpres</i>	Ruddy Turnstone	DECR	Migratory shorebird; nests in northerly latitudes. Typically in TCI fall-spring	Several observed along sandy shoreline and nearby groyne
<i>Calidris alba</i>	Sanderling	DECR	Migratory shorebird; nests in northerly latitudes. Typically in TCI fall-spring	Several observed along sandy shoreline and nearby groyne
<i>Leucocephalus atricilla</i>	Laughing Gull	DECR	Common summer and winter resident	Several heard & observed aerially. Nesting on property unlikely
<i>Terna antillarum</i>	Least Tern	DECR	Summer resident	Nests in TCI, nesting unlikely to occur on subject property
<i>Zenaida macroura</i>	Mourning Dove	DECR	Common year-round resident	No evidence of nesting observed, but suitable nesting habitat exists on subject property



Scientific Name	Common Name	Designating Entity	Designation	Abundance within the Assessment Area
<i>Columbina passerina</i>	Common Ground Dove	DECR	Native resident bird	Nest w/ young observed on site
<i>Crotophaga ani</i>	Smooth-billed Ani	DECR	Native resident bird	Observed on nearby property in habitat that is present on the subject site
<i>Chordeiles gundlachii</i>	Antillean Nighthawk	DECR	Summer resident	Nests in TCI, potentially suitable nesting habitat present on subject property
<i>Falco sparverius</i>	American Kestrel	DECR	Native resident bird	Heard repeatedly; behaviour suggested potential nesting on nearby tract of vacant land
<i>Dumetella carolinensis</i>	Gray Catbird	DECR	Migratory species; nests in northerly latitudes; typically in TCI fall-spring	Heard several individuals in Dry Broadleaf Evergreen Shrubland
<i>Vireo crassirostris</i>	Thick-billed Vireo	DECR	Common year-round resident	No evidence of nesting observed, but suitable nesting habitat exists on subject property
<i>Flora</i>				

Scientific Name	Common Name	Designating Entity	Designation	Abundance within the Assessment Area
<i>Evolvulus bahamensis</i> (fka <i>E. arbuscula</i> )	Broom Bush	DECR	Turks and Caicos Endemic	Only encountered one
<i>Encyclia rufa</i>	Rufous Encyclia	DECR	Lucayan Archipelago Endemic	Only encountered one cluster
<i>Lantana involucrata</i>	Sea Sage, Wild Sage	DECR	Lucayan Archipelago Endemic	Common
<i>Coccothrinax inaguensis</i>	Inagua Silver-top Palm	DECR	Lucayan Archipelago Endemic	Common
<i>Euphorbia inauensis</i>	Wild Thyme	DECR	Lucayan Archipelago Endemic	Abundant
<i>Encyclia altissima</i>	Tall Orchid	DECR	Native Plant of Special Conservation Concern	Abundant
<i>Guaiacum sanctum</i>	Holy Lignum Vitae	DECR	Native Plant of Special Conservation Concern	One saw one; along northern boundary. May be offsite
<i>Vachellia</i> (formerly known as <i>Acacia</i> ) <i>acuifera</i>	Pork-and-doughboy	DECR	Native Plant of Special Conservation Concern	Occasional
<i>Vachellia</i> (formerly known as <i>Acacia</i> ) <i>choriophylla</i>	Leatherleaf Casha, Cinnecord	DECR	Native Plant of Special Conservation Concern	Occasional

<sup>1</sup> Lists of species of flora and fauna that are designated by the International Union for the Conservation of Nature and the Convention on International Trade in Endangered Species of Wild Fauna and Flora are included as Appendices H and I, respectively.

Species that are included on the IUCN and CITES lists for the Turks and Caicos Islands are included in Appendices J and K. Species that were observed during the site investigation are highlighted in these appendices.

Individuals of 12 species of protected birds (Table 2-3) were observed during the assessment. The only species confirmed to nest on the site was common ground dove. Several unoccupied nests were observed that appeared to be from nesting in previous years. The nest size and shape suggested that they were potentially made by common ground doves or thick-billed vireos. Potential suitable nesting habitat for Antillean nighthawk, least terns, mourning doves, smooth-billed anis, kestrels and thick-billed vireos also appeared to be present on the property. Additional species of migratory birds (e.g., plovers, sandpipers, warblers) may also use portions of the property seasonally but were not observed during the April 2022 investigation.

Nine species of plants that are designated by TCIG and/or international treaties as endangered, threatened or endemic were observed within the assessment area. Brief descriptions of the presence and abundance of these species within the assessment area follow.

*Evolvulus bahamensis* (broom bush) (Photo 2-9), designated by DECR as a Turks and Caicos Endemic Plant was uncommon on the subject property. It was not present in any of the 24 vegetation analysis plots. Three populations were encountered, all in the DBES community. Two populations were in close proximity to one another, at 21° 48' 37.09" North latitude; 072° 09' 48.69" West longitude; the other at 21° 48' 34.67" North latitude; 072° 09' 52.04" West longitude. None were in bloom during the April 2022 (dry season) investigation.

*Encyclia rufa* (Rufous *Encyclia*) (Photo 2-10 a and b), designated by DECR as a Lucayan Archipelago Endemic Plant, was uncommon on the subject property. It was not present in any of the 24 vegetation analysis plots, and only a single population was encountered, at 21° 48' 35.87" North latitude: 072° 09' 52.22" West longitude. It was present in the DBES community. It had a bloom spike during the April 2022 (dry season) investigation, but the flowers had not yet opened.

*Lantana involucrata* (sea sage) (Photo 2-11), designated by DECR as a Lucayan Archipelago Endemic Plant, was fairly common on the subject property, so common that it was not practical to record GPS coordinates for each location. It was present in 6 of the 24 (25%) vegetation analysis plots, all in the DBES community. None were in bloom during the April 2022 (dry season) investigation.



**Photo 2-9. *Evolvulus bahamensis* (Broom Bush)**  
**Date of Photo: April 8, 2022**





Photo 2-10. a and b *Encyclia rufa* (Rufous *Encyclia*)  
Date of Photo: April 7, 2022



Photo 2-11. *Lantana involucrata* (Sea Sage)  
Date of Photo: April 8, 2022



*Coccothrinax inaguensis* (Inagua silver-top palm) (Photo 2-12), designated by DECR as a Lucayan Archipelago Endemic Plant, was so common on the subject property that it was not practical to record GPS coordinates for each plant. It was present in 15 of the 24 (about 63%) vegetation analysis plots, in both the DBEF community and the DBES community. None were in bloom during the April 2022 (dry season) investigation, but several had fruits



**Photo 2-12. *Coccothrinax inaguensis***  
**Date of Photo: April 8, 2022**

*Euphorbia inaguaensis* (no common name) (Photo 2-13), designated by DECR as a Lucayan Archipelago Endemic Plant, was so common on the subject property that it was not practical to record GPS coordinates for each plant. It was present in 8 of the 24 (about 33%) vegetation analysis plots, mainly in the DBES community, but occasionally persisting as an understory species in the DBEF community.





**Photo 2-13. *Euphorbia inaguaensis***  
**Date of Photo: April 6, 2022**

The tall orchid, (*Encyclia altissima*) (Photo 2-14) is designated as a Lucayan Archipelago Endemic by the DECR. It was abundant as an epiphyte on the subject site, being present in 7 of the 24 (about 29%) plots. They were in the DBEF and DBES communities.

*Guaiacum sanctum* (holy lignum vitae) (Photo 2-15) is designated as a Lucayan Archipelago Endemic by DECR. It was uncommon on the subject property and was not present in any of the 24 (about 0%) vegetation analysis plots. The only individual of this species that was encountered during the assessment was along the very north property line, along the south edge of Coral House Drive. A boundary survey may be necessary to determine whether this small tree was on the subject property, or the adjoining property to the north.

*Vachellia* (formerly *Acacia*) *acuifera* (pork and doughboy) shrubs were mostly less than 3 m (about 10 ft) in height (Photo 2-16) and were encountered in DBES community. It was present in 5 of the 24 (about 21%) of the vegetation analysis plots. Many had seed pods from last year's blooming.





Photo 2-14. *Encyclia altissima*  
Date of Photo: April 6, 2022



Photo 2-15. *Guaiaacum sanctum*  
Date of Photo: April 8, 2022





**Photo 2-16. *Vachellia acuiifera***  
**Date of Photo: April 8, 2022**

*Vachellia* (formerly *Acacia*) *choriophylla* (Leatherleaf Casha, Cinnecord) plants mostly less than 3 m (about 10 ft) in height (Photo 2-17) were encountered in the DBES community. It was present in 3 of the 24 (about 13%) of the vegetation analysis plots. One individual tree has both this year's flowers and seed pods from last year.

Lists of flora and fauna observed within the assessment areas are provided in Appendices J and K, respectively. These include both the species present within the vegetation analysis plots and other species that were encountered on the property during the assessment.

### **Invasive Plants**

Individuals of three of the six species of non-native plants that are designated by the TCIG as invasive were observed on the property: beefwood (*Casuarina equisetifolia*), (also known as Australian pine, *Casuarina*), cow bush (*Leucaena leucocephala*) and beach cabbage (*Scaevola taccada*). The presence of each of these is described hereafter.



**Photo 2-17. *Vachellia choriophylla***  
**Date of Photo: April 6, 2022**

Mature *Casuarina* trees (Photo 2-18) were abundant just landward of the unvegetated sandy beach, extending in a shore-parallel corridor from the north property line to the south property line. They were present in all four of the waterward-most vegetation plots. They have been present (and dropping needles) for so long that the accumulated duff layer was several inches thick and had acidified the surface soils to such an extent that few native plants were present under their canopy. They were mature, seed-producing plants.





**Photo 2-18. Mature *Casuarina equisetifolia* Trees**  
**Date of Photo: April 6, 2022**

Mature cow bush trees (Photo 2-3) were present in 3 of the 24 (about 12.5%) vegetation analysis plots and were abundant in the northwestern part of the property, where they appear to have become established after that area had been cleared for the construction of the Coral House villas. They were mature, seed-producing plants.

Beach cabbage plants (Photo 2-2 from plot 5E) were present in 5 of the 24 (about 21%) of the vegetation analysis plots. They were present mostly in the invasive-dominated Sand Strand community, however in this community, they and *Casuarina* trees were the dominant vegetation. The native *Scaevola* (*S. plumieri*) was occasionally present on the property [1 of 24 (about 4%) of the vegetation monitoring plots], but it was considerably less abundant than the invasive species.

### 2.2.2 Baseline Marine Environment

Visual inspections of underwater conditions were assessed along the continuation of the landside transects and along a shore-parallel transect. Because the project does not propose to make any changes to the marine environment (i.e., no docks, piers, boat channels, dredging, etc.), the TOR limited the marine assessment to a qualitative assessment, so no epi-benthic plots were established or analyzed.

The five generally shore-perpendicular transects extended from the uplands, across the sandy beach, and into the water for a distance to approximately 100 m from shore (Figure 2-4).

A cumulative list of the marine flora and fauna identified in the project area and the qualitative assessment area is included as Appendix L. Marine habitats are identified on Figure 2-4.

No coral reefs, mangroves, blue holes, underwater vents, elkhorn (*Acropora palmata*), staghorn (*Acropora cervicornis*) or other notable reef-building corals, or other particularly notable marine features were observed within the assessment area.

The assessment area was found to include approximately 140 m (about 460 ft) of primarily northwest-facing water frontage in the eastern portion of Grace Bay, part of the 6,532-acre (2,643 hectares) Princess Alexandra National Park.

The results of the marine investigation are shown on Table 2-4. The only epi-benthic communities present in the assessment area were sandy bottoms (Photo 2-19), and a variety of marine life that had colonized the rock groyne that was installed several years ago to provide protection for the Coral Pavilion House and Villa.

Except for a small area of *Thalassia testudinum* (turtle grass) that was present in the vicinity of the Coral Pavilion groyne, no rooted seagrasses were observed, but in different portions of the assessment area, some vegetation was present. Accumulations of dead seagrass blades and sargassum (a brown algae) were suspended in the water currents just above the bottom in a substantial portion of the assessment area. This suspension varied in thickness from non-existent or minimal in some areas, to several inches in other areas (Photo 2-20).



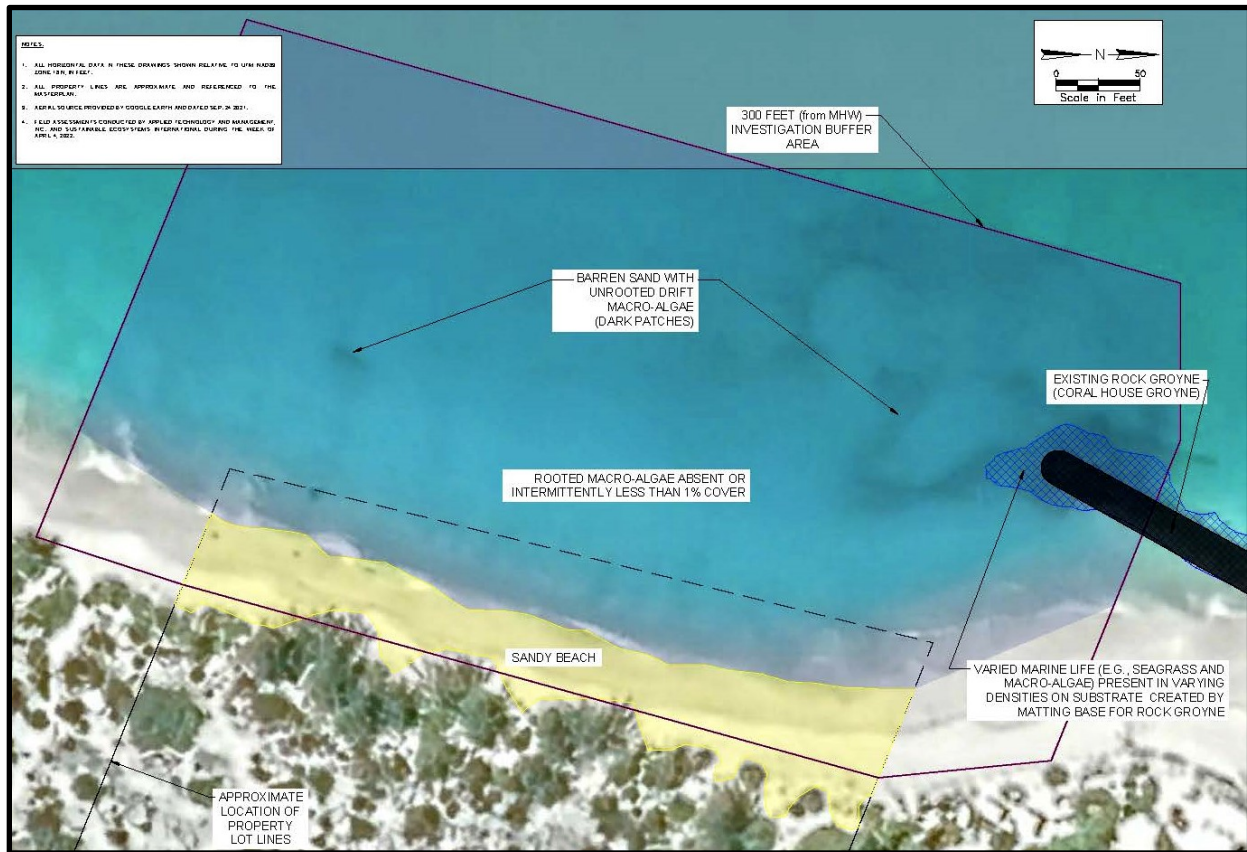
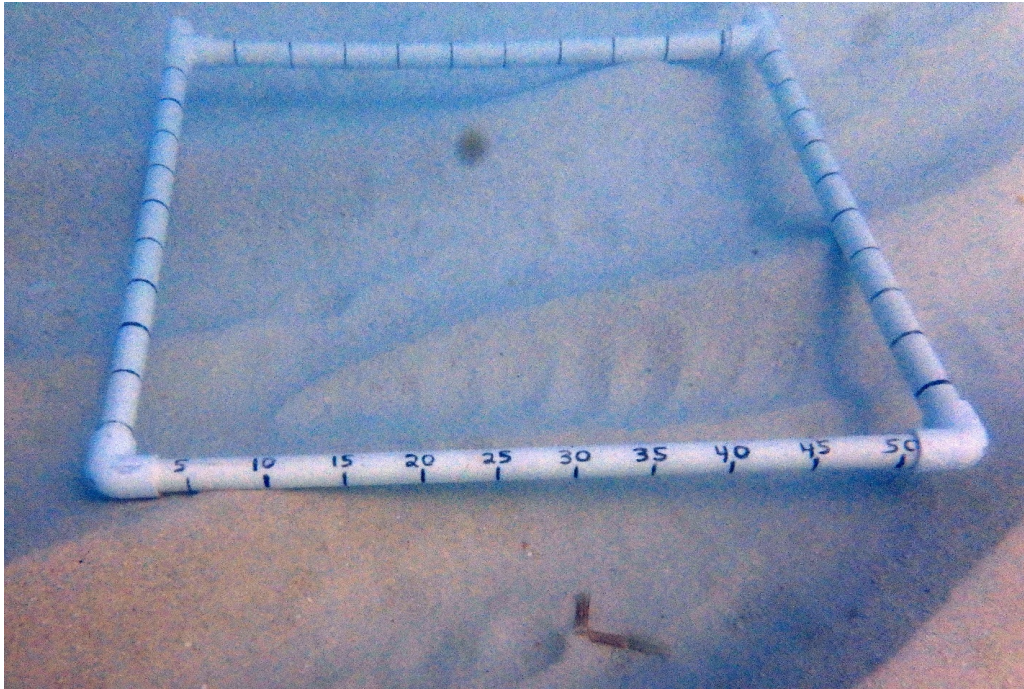


Figure 2-4. Marine Habitat Map



**Photo 2-19. Barren Sandy Bottom**  
Date of Photo: April 7, 2022



**Photo 2-20. Accumulation of Dead Seagrass Blades and Sargassum Suspended just above the Barren Sandy Bottom**  
Date of Photo: April 7, 2022

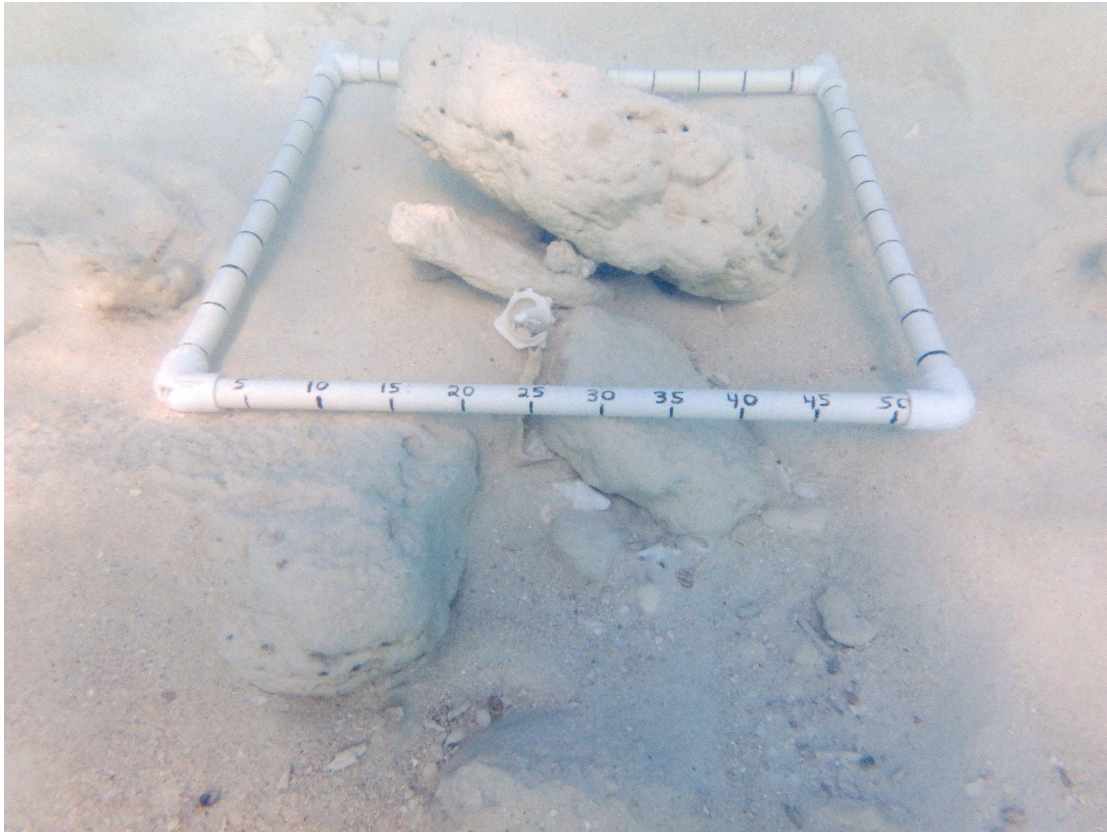


In the southwest portion of the marine assessment area, a few small *Halimeda incrassata* (a Chlorophyta - green algae) plants were rooted into the sandy bottom. With maximum algae cover less than 1%, this area remains appropriately mapped as barren. Individuals were mostly less than 2 inches (about 5 cm) in height, which suggests that they (and potentially other epi-benthic resources) could be intermittently and alternately covered with sand and/or exposed.

Although coral reefs, hardbottom and seagrass communities are well-documented for the habitat they provide for a variety of marine life, barren sandy bottoms are not as completely devoid of marine life as they initially appear. A stingray (Photo 2-21) and mantis shrimp were observed during the investigation. Additionally, although none were observed in this community during this assessment, shallow sandy bottoms are well-documented as preferred habitat for bonefish (*Albula vulpes*) and other fishes that are typically associated with this habitat (e.g., stingrays, jawfish, etc.). Protrusions of native limestone rock (Photo 2-22) were intermittently encountered during the marine investigation.



**Photo 2-21. Stingray in the Nearshore Waters adjacent to the Resort Property**  
**Date of Photo: April 7, 2022**



**Photo 2-22. Limestone Rocks Protruding above the Sandy Bottom in the Nearshore Waters adjacent to the Resort Property.**  
**Date of Photo: April 7, 2022**

The nearshore marine system is highly dynamic. Sands are likely continually being moved around by prevailing currents. The absence of epi-lithic marine life (i.e., algae, corals, sponges etc.) on the rocks in Photo 2-22 suggest that the rocks have fairly recently become exposed. Where rocks have been exposed for longer periods, they had been colonized by algae, primarily brown algae (Phaeophyta).

An existing rock groyne was present approximately 70 m (about 225 ft) from shore at the northwestern-most corner of the property. Analysis of Google Earth images suggests that this groyne was constructed sometime between 2003 and 2012, likely as a countermeasure to protect the Coral House and Coral Pavilion from beach erosion. A few corals (including *Siderastrea radians*, *S. sidera*, *Porties porties*, *Porites astreoides*), and sponges, and many juvenile reef-fish (e.g., sergeant majors, blue tangs, etc.) were observed in this algae-dominated area of hardbottom during a cursory investigation. This area was inspected because it falls within the 100-m assessment area as measured from the property line.



The condition of the sandy bottom community within the assessment area was rated as Poor: This low ranking is as a result of low species diversity, intermittently rough seas and the abundance of suspended sediment that appears to have prevented the establishment and long-term survival of epi-benthic resources.

Review of Google Earth images taken intermittently over the last several years suggests that the beds of non-rooted grassblades and sargassum move around considerably, as they are readily apparent in some years, and have “moved” in other years.

At the time of the field investigation, Sargassum was almost non-existent along the beach landward of the mean high water line within the project area. Sargassum is a non-rooted drift algae that gets transported by winds and waves and has become an increasingly common problem in the Caribbean in recent years. Its lack of presence at the time of the assessment is not an indication that it will not become a problem in the future. The property's location near a natural curve of the land may make it vulnerable to the accumulation of sargassum, particularly when winds are from the west and northwest.

It was noted that recreational vessels frequently travel fairly close to shore in this area (Photo 2-23).



**Photo 2-23. Recreational Vessel in the Nearshore Waters adjacent to the Resort Property**  
**Date of Photo: April 7, 2022**

Table 2-4. Marine Plot Species

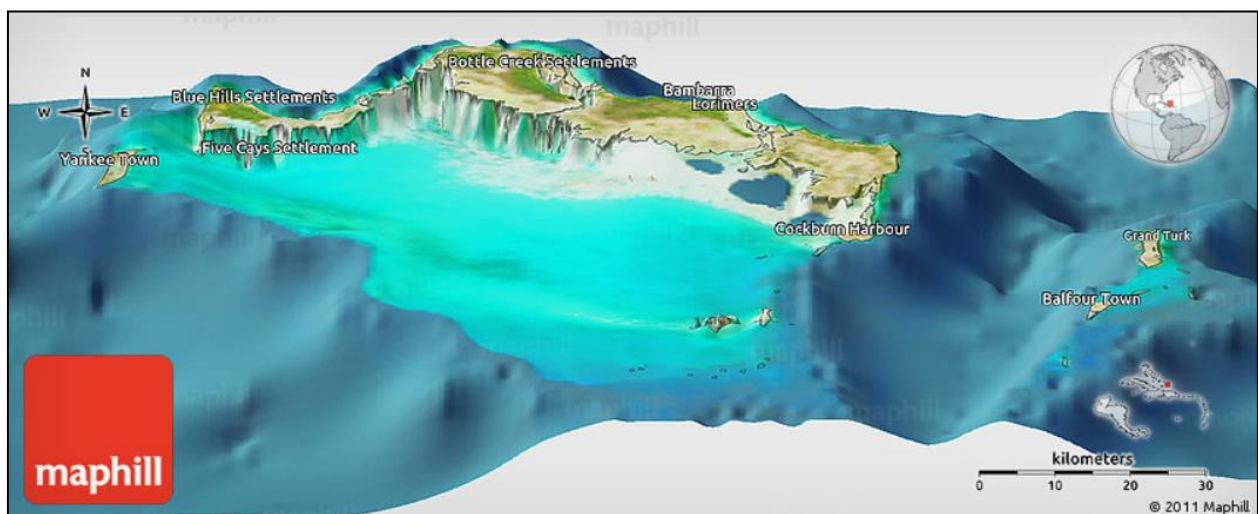
Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
<b>MARINE PLANTS</b>							
SEAGRASSES							
<i>Thalassia testudinum</i>	Turtle grass	Seagrass	Typically shallow bays	Occasional	Mostly drift, some rooted near groyne		✓
MACROALGAE							
Rhodophyta							
<i>Chondria sp.</i>		Red Algae	On hard substrates	Occasional	On exposed rock outcrops		
<i>Neogoniolithon spectabile</i>		Red Algae	On hard substrates	Occasional	Only on groyne		
Phaeophyta							
<i>Dictyota sp.</i>		Brown Algae	On hard substrates	Occasional	Only on groyne		
<i>Sargassum sp.</i>	Sargassum Weed	Seaweed	Drift, sometimes rooted	Abundant	Mostly drift, some rooted on rubble		
Chlorophyta							
<i>Dictyosphaeria cavernosa</i>		Green Algae	Hardbottom		Only on groyne		
<i>Halimeda incrassata</i>	Three-Finger Leaf Algae	Green Algae	Grassbeds and reefs	Occasional	Occasional individuals rooted on sandy bottom		
<b>CRUSTACEANS</b>							
Lysiosquillidae	Mantis Shrimp	Shrimp	Sandy bottoms	Occasional	Only noticed one		
<b>ECHINODERMS</b>							
<i>Tripneustes ventricosus</i>	West Indian Sea Egg Urchin	Sea urchin	Seagrass beds, reefs	Occasional	Only on groyne		
<b>CORALS</b>							
<b>Stony Corals</b>							
<i>Porites astreoides</i>	Mustard Hill Coral	Coral	Reefs, hardbottoms	Occasional	Only on groyne	✓	✓
<i>Porties porites</i>	Finger Coral	Coral	Reefs, hardbottom	Occasional	Only on groyne	✓	✓
<i>Siderastrea radians</i>	Lesser Starlet Coral	Coral	Hardbottom, sand, reefs	Occasional	On groyne	✓	✓
<i>Siderastrea sidera</i>	Massive Starlet Coral	Coral	Hardbottom, reefs	Occasional	On groyne	✓	✓
<b>FISH</b>							
<i>Acanthus caeruleus</i>	Blue Tang	Fish	Reefs	Occasional	Near groyne		
<i>Acanthurus chirurgus</i>	Doctorfish	Fish	Reefs	Occasional	Near groyne		

Family/Scientific Name	Common Name	Life Form	Habitat	Abundance	Comments	CITES	IUCN
<i>Atherinidae, Clupeidae</i>	Silversides, Herrings, Anchovies	Fish	Reefs, mangroves	Occasional	Encountered one large school in shallows		
<i>Haemulon</i> sp.	Grunt	Fish	Reefs	Occasional	Near groyne		✓
<i>Lutjanus griseus</i>	Gray/mangrove Snapper	Fish	Reefs	Occasional	Near groyne		✓
<i>Lutjanus apodus</i>	Schoolmaster	Fish	Reefs	Occasional	Near groyne		✓
<i>Lutjanus</i> sp.	Snapper (juv)	Fish	Reefs	Occasional	Near groyne		
<i>Ocyurus chrysurus</i>	Yellow-Tail Snapper	Fish	Reefs	Occasional	Near groyne		
<i>Stegastes fuscus</i>	Dusky Damselfish	Fish	Reefs	Occasional	Near groyne		
<i>Stegastes leucostictus</i>	Beaugregory	Fish	Reefs, hardbottom	Occasional	Near groyne		✓
<i>Abudefduf saxatilis</i>	Sergeant Major	Fish	Rocks, shorelines	Occasional	Near groyne		
<i>Thalassoma bifasciatum</i>	Bluehead Wrasse	Fish	Reefs	Occasional	Near groyne		
<i>Dasyatis americana</i>	Southern Stingray	Fish	Sandy areas	Occasional	Over sandy bottom		

## **2.3 Physical Environmental Baseline Assessment**

### **2.3.1 Topography of the Area**

The topography of the Turks and Caicos Islands is generally very low-lying (Figure 2-5). Higher terrain for each island is normally near the outside (seaside) of each island. Areas near the Caicos Bank are lower in elevation, with many sections of North Caicos, East Caicos and Middle Caicos being low-lying swamp/marsh areas. The highest points in the country are Blue Mountain on Providenciales and Flamingo Hill on East Caicos, each with a height of approximately 48 m.



**Figure 2-5. General Topography and Bathymetry of Turks and Caicos**

The topography of the project site primarily consists of a narrow beach that extends from the shoreline landward to a dune system, with an average elevation of 2 m above mean sea level. The beach along the project site is fairly protected by a manmade T-groyne structure built where Pelican Beach ends and the east end of Grace Bay Beach.

### **2.3.2 Bathymetry for Site Shoreline**

The Caicos Islands (Providenciales, North Caicos, West Caicos, Middle Caicos, East Caicos) are located on the Caicos Bank. This area is shallow with depths between 2 m and 4 m. The Turks Islands are located to the east of the Caicos Islands. The joint state has a deep underwater canyon called the Turks Island Passage (34 kilometres long) between the set of islands.



The overall bathymetry of the area is quite varied. From the land to the reef that surrounds most of the Caicos Islands, the water depths are quite shallow, with an average depth of 2.5 m. However, just outside of the reef is a steep drop off. Water depths outside of the reef quickly dive to 20 m. The reefs provide good protection for coastal areas in the state and help to provide defence against larger waves and swells. This helps to counteract the overall low topography of the islands.

Survey data from September-October 2021 were collected adjacent to the proposed resort property, and the contours from that data are presented in Figure 2-6.



**Figure 2-6. Survey Contours**

### 2.3.3 Geology

A subsurface investigation of the site was conducted which included the excavation of twenty (20) trial pits using a hydraulic excavator to expose and evaluate bearing strata with sampling depths of approximately 10 feet below the existing ground surface (Tolleson, 2019). Within each trial pit, Proving Ring Penetrometer and sampling were performed. Trial pits were extended to depth of ten feet or refusal. Proving ring penetrometer tests provide a rapid means for determining the

penetration resistance of soils in shallow exploration work. Geotechnical laboratory testing of soil samples were performed per ASTM standard methods. In the execution of the geotechnical studies the field investigation and geotechnical trial pit logs provided factual geotechnical characterization of the shallow bearing soils, which was interpreted for geotechnical analysis of static and seismic conditions. The analysis included assessment of the performance of total and differential settlement analysis, allowable bearing calculations, and seismic site classification.



**Photo 2-24. Trail 60-degree cone tip resistance at- 2ft is 12kg/cm<sup>2</sup>. Oolitic white sandstone uniformly underlines  
(Tolleson, 2019)**

In summary, the following foundation design recommendations and soil properties are indicated:

- a) Site Suitability. The geotechnical properties of the shallow on-site soils are suitable for supporting structures and the intended land uses. The project development parcel was studied in this preliminary geotechnical investigation. Analyses were performed using site specific geotechnical conditions as applied to the conceptual land use plan. Results of the geotechnical analysis confirm the subsurface conditions are suitable for construction and support of villas and structures.
- b) Geologic Framework. Subsurface soils throughout the property are predominantly granular and are generally very dense with cemented bedding at increasing depth.

The soils are of marine origin and are composed predominantly of calcium carbonate sandstone. The predominant formation consists of a partially to fully cemented sandstone referred to locally as “caliche sandstone.”

- c) **Subsurface Consistency.** Subsurface consistency (point resistance) was uniformly hard to dense. Proving Ring Penetrometer tip resistance ranged from 8 to 15 kg/cm<sup>2</sup> in the upper three feet. In deeper zones, tip resistance increased to a range from 20 to 30 kg/cm<sup>2</sup> from -3 to -11 feet below grade.
- d) **Groundwater and Subsurface Cavities.** Groundwater formation extends beneath the entire parcel and was encountered in all trial pits that extended to msl elevation. Groundwater strike generally correlated to +1 to +2ft-msl at depths of 4 to 7 feet below existing grade. No surficial exposed sinkhole features or subsurface cavities were noted in our visual reconnaissance.
- e) **Trial Pit Excavations.** A total of twenty (20) geotechnical trial pit excavations were extended to depths of up to 11 feet below existing grade. Of the twenty, Trial pits 7 (TP-7) encountered auger refusal at a depth of seven (7) feet below the ground surface and the remaining were performed to bucket refusal depths as indicated in the trial pit logs.
- f) **Geotechnical Testing.** A preliminary geotechnical laboratory testing program was performed on the representative soil samples collected in the geotechnical trial pit excavation program. ASTM test method and number of tests performed is as follows:

<b>ASTM TEST METHOD</b>	<b>Test Name</b>	<b>Number Test Performed</b>
ASTM D-422	Grain Size Analysis	15
ASTM D-698	Standard Proctor Moisture- Density Test	2
ASTM D-2478	USCS Soil Classification Test	15

- g) **Granular/Non-cohesive Soil Type.** The predominant soil types on the property are granular and non-cohesive. The stratum with depth is equivalent to “soft-rock”. The behavioral characteristics are governed by individual sorting of soil grain size and shape coupled with degree of cementing. The Caicos Islands are formed as a



carbonate platform that rises from the seafloor and is exposed above sea level as it exists now. The surficial soil exposure on the project site is composed of partially to fully cemented Oolitic sandstone. Locally, the exposed white to tan colored sandstone is referred to as caliche sandstone. The sandstone is friable, and the mechanical properties can be correlated to mean particle diameter. (D10, D50 and D90) taken from the ASTM- D422 grain size testing. The average D10 value from all bulk samples is a very fine sand with diameter on order of  $\sim 0.075\text{mm}$ . The D50 value is a fine sand with an average diameter of  $0.18\text{mm}$ . The D90 value is a medium sand with a diameter of  $1.8\text{mm}$  (after redacting cobble size fragments).



**Photo 2-25. Trial pit excavation. Note Clean open pit. Excellent bearing capacity. (Tolleson, 2019)**

- h) Soil Strength. Laboratory density testing of remolded caliche sandstone bulk samples exhibited excellent fill and base course strength. Standard Proctor values exhibited maximum dry density (MDD) of 105.4 to 114.1 pcf (1,682 kg/m<sup>3</sup> to 1,826 kg/m<sup>3</sup>).
- i) Foundation Recommendation may utilize a structurally reinforced shallow foundation bearing on the competent soils, or on compacted select engineering fill placed on native soils. The footing foundations should be founded at least one foot (0.3 m) below

- existing grade and one foot (0.3m) above ground water strike. Applying recognized bearing capacity equations by Modified Terzaghi and Meyerhof methods results in an allowable bearing capacity of 4,000 psf (~195 kN/m<sup>2</sup>). The net allowable soil bearing pressured presented was selected using the Terzaghi and Meyerhof bearing capacity equations for foundations considering a minimum factor of safety of 3.0 and based on anticipated static settlements noted in this report. IBC Seismic Site Class C is applicable for design based on correlation of the assumed deeper formation characteristics to shear wave velocity profiles (i.e., between 1,200 and 2,500 ft/sec) in the vicinity and a calculated PGA of 0.144g.
- j) Foundation Recommendation may utilize a structurally reinforced shallow foundation bearing on the competent soils, or on compacted select engineering fill placed on native soils. The footing foundations should be founded at least one foot (0.3 m) below existing grade and one foot (0.3m) above ground water strike. Applying recognized bearing capacity equations by Modified Terzaghi and Meyerhof methods results in an allowable bearing capacity of 4,000 psf (~195 kN/m<sup>2</sup>). The net allowable soil bearing pressured presented was selected using the Terzaghi and Meyerhof bearing capacity equations for foundations considering a minimum factor of safety of 3.0 and based on anticipated static settlements noted in this report. IBC Seismic Site Class C is applicable for design based on correlation of the assumed deeper formation characteristics to shear wave velocity profiles (i.e., between 1,200 and 2,500 ft/sec) in the vicinity and a calculated PGA of 0.144g.

#### 2.3.4 Hydrology

Given the low general elevation of the property and its location adjacent to the sea, no evidence of appreciable freshwater resources was observed during the field investigations. Freshwater resources appear to be limited to surface water inputs. The site surface substate consists of a limestone base layer overlain by a very limited carbonate sediment. This limits the ability of the site to retain freshwater from surface sources.

#### 2.3.5 Sediment Analyses

The sediment present on a coast may be used to provide insight when assessing the coastal processes and is an important component of the aesthetics and comfort of the beach or coastal zone. During a 2018 study (Smith Warner, 2018), four samples were taken along the Leeward coastline as shown in Figure 2-7. These samples were sent to a geotechnical lab to be visually

inspected, air dried and subjected to a standard dry sieve analysis to determine their grain size distribution as well as other characteristic parameters. The results are summarized in Table 2-5.



Figure 2-7. Sand Sample Locations

Table 2-5. Sediment Sample Sieve Analysis Results

Specimen	Type	D50	D60	D30	D10	% Gravel	% Sand	% Silt	% Clay
SS1	Poor Graded Sand	0.27	0.30	0.211	0.1655	0.0	98.7	1.3	
SS2		0.28	0.32	0.206	0.1532	0.0	96.8	3.2	
SS3		0.29	0.33	0.217	0.1609	0.0	96.6	3.4	
SS4		0.22	0.25	0.178	0.1112	0.0	96.9	3.1	

The analysis indicates that the samples are poorly graded sand, composed on average of 97% sand, and less than 3% silt and clay, which coincides with observations made during site visits. These results were used in beach response modelling to identify sediment transport patterns.

### 2.3.6 Climate and Meteorology

The climate of the Turks and Caicos Islands is tropical, with a year-round average temperature of 78.9 degrees Fahrenheit (°F) and an average rainfall of 30.0 inches. The wettest months tend to occur in late summer and early autumn, and the driest months occur in the winter. Hurricanes and tropical storms may occur typically between June and November.



## 2.4 Baseline Aesthetics

The aesthetics of the shoreline will remain natural. The client intends to remove the non-native invasive shoreline species and replace them with non-invasive and endemic dune plantings common to the Turks and Caicos Islands.

A formal landscaping plan is included in this project, the Developer should be encouraged to plant beach stabilizing native species in the upper part of the beach and remove invasive exotic species (**Error! Reference source not found.**).



Photo 2-26. *Casuarina equisetifolia* and *Scaevola taccada* in the Dune

## 2.5 Baseline Coastal Processes and Dynamics

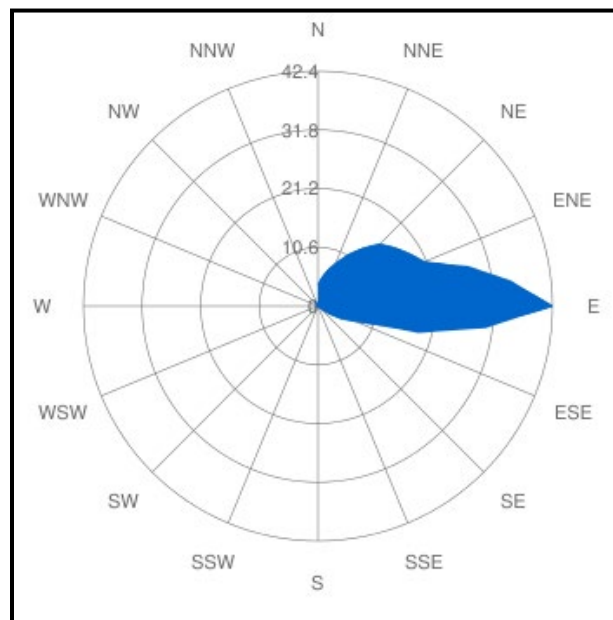
### 2.5.1 Currents and Tides

Local tides are semi-diurnal (i.e., two high tides and two low tides per day), with an inequality between successive highs and lows. A tide range of 1.8 ft (0.55 m) between mean higher high water (MHHW) and mean lower low water (MLLW) values (ATM, 2012) have been observed along this area of Grace Bay. This is in line with the U.S. National Oceanic and Atmospheric

Administration (NOAA) tide predictions for Hawk's Nest Anchorage, Grand Turk (1988), which reports a mean tide range of 2.1 ft and a spring range of 2.6 ft. The site can also be subject to potential storm surge due to tropical storm systems that could produce higher water levels. Surge potential in this region is limited and typically less than 1 m for most storm events.

### 2.5.2 Sediment Transport

The construction of the groyne in the vicinity of Coral House (to the west of this project) and renourishment associated with its construction has resulted in the establishment of a relatively stable beach profile to the west and within the project area. Further, it does not appear that long term, the groyne structure has resulted in an appreciable downdrift impact or interruption of the natural supply of sand to beaches to the west. In general, the sediment transport of material along the shore is from east to west, as is observed in the accretion of sand along the eastern side of sand structures along the coast (Figure 2-8).



**Figure 2-8. Annual Predominant Wave Direction.**  
Source: <https://wisuki.com/statistics/936/long-bay>

### 2.5.3 Erosion and Accretion

In review of historical imagery for the property, the shoreline has remained predominantly stable to accretionary. The construction of the Coral House groyne to the east around 2006 does not appear to have had a significant downdrift impact into this property, and long term, the shoreline has experienced a slight advance. Planned restoration projects with Leeward (to the east) are

not anticipated to have an adverse impact on this shoreline since the planned beach nourishment in concert with structures will provide a net flow of sand to the west towards this property.

## **2.6 Water Quality**

Baseline water quality testing was conducted to document existing water quality conditions prior to project construction. A sample of sea water collected within the project area was tested to determine concentrations of iron, nitrate and nitrite, sulphate and sulphide, phosphate, total dissolved solids, pH and salinity. The results are provided in Appendix F. The sample is representative of sea water, and the results did not reveal any measured constituents of concern, including constituents indicative of nutrification from upland (terrestrial) sources.



### **3.0 Legislative and Regulatory Context**

#### **3.1 TCI Development Plan/Master Plan**

The Leeward Master Land Use Development Plan (to the east of this parcel) is zoned for mixed-use, with the majority of the area developed predominantly with low-density residential development. The Leeward coastal parcels have a mixed-use commercial development designation – hotels, marina and retail store units and dive shop operations. This parcel is within the Tourism Related Development Zone to the west of Leeward which includes Gray Bay, the Bight and Turtle Cove. This area is zoned for resort development as proposed.

#### **3.2 Physical Planning Ordinance and Subsidiary Legislations**

All physical development aspects of the proposed project must be in conformance with the most recent version of the Physical Planning Ordinance and Subsidiary Legislation. This ordinance delineates the procedures required for the oversight, review and approval of development by the Department of Planning. The Physical Planning Ordinance established the Physical Planning Board, which is empowered to review proposed development and determine if it is consistent with the various requirements of this ordinance.

The Ordinance gives the Director of Planning the authority to request that a developer (at the expense of the developer) provide an environmental impact or economic feasibility study for developments falling within certain categories where the impact on the environment and/or the economy of the Turks and Caicos Islands may be affected. This is the basis for the requirement for an EIA for this project.

#### **3.3 Turks and Caicos Islands Development Manual**

The Turks and Caicos Development Manual provides the basis for development requirements including property setbacks and development and construction requirements. All development must be consistent with the Development Manual for approval by the Department of Planning. The proposed development is consistent with the setbacks delineated within the Development Manual, specifically with regard to the property boundary and coastal setbacks.

### **3.4 TCI Building Code**

The proposed development includes a variety of physical structures and infrastructure that must be in compliance with the TCI Building Code. For the purposes of this EIA, it is assumed that all development will be in conformance with the TCI Building Code.

### **3.5 Coast Protection Ordinance and Subsidiary Legislations**

The National Parks Ordinance (1975) provides for the establishment of National Parks, Nature Reserves, Sanctuaries and Historic Sites and for the imposition of restrictions on development in such areas. It is noted that the proposed development is along the shoreline boundary of the Princess Alexandra National Park. While no activities are proposed seaward of the park boundary (which is delineated by the mean high water shoreline), the project has the potential to impact the park through secondary impacts or activities during the operational phase of the development, however, through proper management of the resort these impacts are expected to be minimal.

### **3.6 Mineral**

Under the Minerals Ordinance, all minerals beneath Turks and Caicos Islands territorial waters and contained within the subsoil are the property of the Crown (§s 3 and 4). Therefore, the exploration for and exploitation of minerals are governed under the Minerals Ordinance, and any such exploration and exploitation of minerals may take place only with the issuance of a license (Section §7) and a grant of development permission from the Department of Planning (Section §5).

All materials should be obtained from a proprietor who is legally licensed under the Minerals Ordinance and the applicable royalties on said materials shall be paid.

### **3.7 Marine Pollution Ordinance and Subsidiary Legislations**

The Marine Pollution Ordinance governs all vessels and activities within the territorial waters of the Turks and Caicos Islands and the discharge of pollutants therein. It also governs pollutants that may be discharged on land but enter the marine environment (§s 4 and 5). Therefore, the operation of construction equipment for the project is subject to conformity with the Ordinance.

Under this Ordinance, it is unlawful to discharge oil (§9), noxious liquid substances (§12), harmful substances as defined by MARPOL (§15), garbage (§21), and/or hazardous waste (§30) into the marine environment.

### **3.8 Fisheries Protection Ordinance and Subsidiary Legislations**

Part III of the Fisheries Protection Ordinance contains provisions for conservation, including restrictions relating to the seabed (Regulation 10), including prohibitions against employing activities or devices that are harmful to marine life, removing, shifting or in any way disturbing coral, seagrass, sand, rock or other substances forming part of the seabed. In principle this legislation further requires the protection of critical marine habitats associated with fisheries. With regard to this project, direct impacts to the marine environment are not proposed, although secondary impacts, including those associated with behaviour of those using the development, could have bearing under this ordinance.

### **3.9 International Treaties and Conventions**

While the Turks and Caicos is not a formal signatory to either the IUCN or CITES, the Turks and Caicos does acknowledge, regulate and protect multiple species that are addressed through these international agreements. Of particular note regarding this project is the presence of several listed species under these international frameworks within the project vicinity. Where appropriate, these species are discussed in addition to the particular governing designation within the body of this study.

The Turks and Caicos is a signatory to the United Kingdom Overseas Territories (UKOT) Environmental Charter, which formally states the commitment to integrate environmental conservation into all sectors of governmental planning and policy. TCI also recently signed the Climate Change Charter, which formalizes a commitment to the adoption of policy to reduce carbon emissions.

While not specific to this proposed development, these international agreements further reiterate the requirements under TCI rules and regulations for development to accepted environmental standards.



## **4.0 Project Description and Construction and Operation and Alternatives**

### **4.1 Description of the Proposed Project**

The proposed development consists of the full-service resort on the east end of Grace Bay, Grace Bay, Providenciales, Turks and Caicos Islands. This resort is intended to consist of a hotel, villas, and townhomes, with amenities such as pools, gym, spa, tennis court, bar and restaurant. The development is proposed on 11.04 acres of land.

The description of this resort development is as follows.

The proposed development consists of a full-service resort on the east end of Grace Bay, Grace Bay, Providenciales, Turks and Caicos Islands. The resort will consist of a one hundred fifty-nine (159) bed condo style hotel, comprised of sixty-six (66) condo units in three buildings having 4, 5, and 7 stories plus basement in each. Three (3) pools, poolside “Beach Bar”, reception area, restaurant & bar, gym, spa, tennis court, boardwalk, and kids center.

### **4.2 Project Justification**

There are no justifiable planning and/or environmental grounds on which development permission should be withheld for the following reasons.

- Established Precedents: The Coral House, Tuscany, Venetian Ocean Club Resort, Club Med, and many rental villas already exists within the immediate vicinity.
- Development Plan Policy: Consistent with the policies and plans of the Draft National Physical Sustainable Development Plan, pp. 165 and 177, it is encouraged that development of the type proposed be sited within the area.
- Tourism Product and Planning: The proposed development will add to the existing high-end, Turks & Caicos Islands experience on Grace Bay.
- This is the type of development that is envisaged by TCIG and the Hotel and Tourism Association to maintain the delicate balance between economic growth and environmental protection. Along with eco-initiatives being implemented within the proposed hotel itself, the proposed hotel is consistent with TCI's land use and growth strategies.

- **Ecological:** The proposed site on which the building is proposed was previously degraded by potential development. Areas where roads were cleared are evident in aerial images and physical inspection. The site will be elevated above the flood level and compacted by bringing in suitable material from an outside source.
- **Economic and Social:** Apart from job creation during the construction and operational phases of the development, the proposed resort and other tourism-related developments in the locality have already caused properties values, especially those owned by indigenous Turks and Caicos Islanders, to increase. TCIG will receive the Stamp Duty and accommodation tax upon the sale of the units that will be purchased and put into a rental pool for hotel use. Other economic ripples will be incurred from visitor spending, taxis, tours, entrepreneurial opportunities.
- **Impacts of the Development:** The benefits to be derived to the Turks and Caicos Islands from having the proposed development far outweigh the minimal environmental impacts. Any unforeseen impacts from the proposed development will be minimal, mitigated and monitored. In conclusion, there are no substantial environmental impacts associated with the proposed development and justifications are given for it being allowed.

#### **4.3 Effects on Erosion or Accretion**

There are no anticipated effects to erosion or accretion associated with this project because all development is sited landward of the primary dune, and the shoreline in this area has been long-term stable to accretionary.

#### **4.4 Coastal Engineering Plans**

The subject planning application does not involve any development outside the confines of the applicant's parcel boundaries and does not involve any coastal structures, beach restorative, or rehabilitation work. If these are proposed in the future, they will be part of separate and subsequent planning applications.

The marine sediments within the area fronting the property are characterized as fine to medium grained sand similar to that found on most all other north-facing beaches on Providenciales. While no specific geotechnical analysis was performed at this site, sand characteristic along the

northern shorelines of Providenciales typically have a mean grain size ranging from 0.25 to 0.35 millimetre.

The net sediment transport (i.e., the net movement of sand or littoral drift) is from east to west along this coastline. This is evidenced by the impoundment of sand on the eastern side of the existing coastal structures in the area, most notably the Coral House groyne to the east of this property.

#### **4.5 Coastal/Beach Development and Management**

The entire section of Grace Bay where the proposed resort is to be located is accessible via beach accesses that are located at Sunset Beach to the east and one located to the west of the Ocean Club Resort.

A suspended boardwalk is proposed for pedestrian access to the beach. Other than that, only moveable structures such as umbrellas and reclining sun loungers will be placed daily for the use of guests. Revegetation with sea oats (*Uniola paniculata*) where possible is included in the landscape plan.

Garbage receptacles will be strategically located within the boundaries of the parcel along the beach access pathways for collection of garbage. Beach attendants will also be available to ensure that there is no pollution of garbage into the marine environment.

All the building materials to be used in the construction of the proposed resort will be in maximum possible extend sourced through local suppliers and contractors on the Island. There are no coastal structures associated with the proposed development.

#### **4.6 Source and Quality of Beach Sand and Fill**

This planning application does not involve any development outside the confines of the applicant's parcel boundaries and does not involve any coastal structures or beach restorative or rehabilitation work. If these are proposed in the future, they will be part of separate and subsequent planning applications.

#### **4.7 Solid Waste Management During Construction and Operation**

All solid waste generated by the construction and the operation of the facility will be handled by environmentally sustainable collection and disposal. During construction, contractors will provide

enough portable toilets for the number of employees onsite. Trash bins will be placed within the work zones for collecting localized employee and work-related trash. Bins will be collected and properly disposed of on a regular basis.

#### **4.8 Surface Runoff Management/ Storm Water Runoff and Treatment**

Stormwater runoff will be controlled on site through the use of deep injection wells. No evidence of any direct discharge to the beach was observed during field studies, and stormwater management for the area is primarily associated with existing development and infrastructure. The project will have minimal impacts to existing stormwater management on adjacent upland properties. The maintenance of nominal dune vegetated with appropriate native vegetation within the project area will reduce the potential for stormwater discharge (including nutrient migration) into the nearshore environment.

#### **4.9 Traffic Flow and Safety**

The project will have no long-term direct impact on existing or future vehicular traffic within the study area. Impacts will be limited to project construction phases and will be primarily associated with the ingress and egress of equipment and material to the project site. Impacts will be minimized through the implementation of appropriate Maintenance of Traffic (MOT) plan to ensure safe vehicle ingress and egress. Vehicle and material ingress and egress will only occur during daylight hours with appropriate safety measures.

Safety perimeters/fences will be established around the site to limit access to active construction, and dedicated security resources will be implemented to secure the property perimeter.

#### **4.10 Water and Electrical Demand and Source**

Electricity, telecommunications, and cable television services will be placed underground in conduit and to the standards and requirements of the relevant suppliers. These services are already fully supplied to the existing area and will supply the operational phase of the development. Underground piped water, provided by Provo Water Company is currently provided for the existing area and will supply the operational phase of the development.



#### **4.11 Landscaping**

A landscape plan included in the project design contains many native species of trees, palms, shrubs and ground covers. The landscape plan proposes the planting of 272 tree species with heights ranging from 12 ft to 25 ft, and 308 palm species ranging in heights from 10 to 16 ft.

On this site, despite it being previously impacted, great effort will be taken to ensure retention of a substantial number of the native trees and other vegetation existing on the site.

The proposed development will not impact upon the coastal dune and dune vegetation. A boardwalk will be built to lessen the impact on the natural environment by preventing alteration of the coastal dune's formation, which could be caused by trampling. In addition, this will allow for undergrowth of grasses, vines and other types of strand vegetation. As the plan shows, the proposed development is inland from the coastal boundaries.

Once constructed, the boardwalk will direct and control pedestrian access to the beach and prevent widespread trampling of the primary dune. All these measures are intended to protect and enhance the natural environment and ecology of the development site.

#### **4.12 Construction Phase Activities**

##### **4.12.1 Construction Methods and Program**

The proposed development will be constructed as a single-phase development over a maximum 30 month timeframe.

##### **4.12.2 Site Security and Hoarding**

The entire parcel will be enclosed with fencing with limited access points during construction and will be removed prior to an occupancy certificate being sought and obtained. There will be measures taken to cover the security of the site, materials, and equipment.

##### **4.12.3 Sources of Sand for Beach Nourishment**

Beach nourishment is not included as part of the proposed development.

##### **4.12.4 Storage of Materials and Equipment**

Materials and equipment will be stored within the confines of the parcel boundaries. Consideration will be given to the unsightly storage of equipment and/or machinery, which may appear injurious and/or unsightly. Effort will be made to store equipment and/or machinery away from the

boundaries of adjoining properties. Stockpiling of any materials will require regular wetting to prevent any dust nuisances to the adjoining properties. Construction hours will be limited to starting not earlier than 7:30 a.m. for noise-generating equipment and/or machinery and finishing not later than 6:30 p.m.

#### **4.12.5 Beach Traffic Impact and Safety**

All development is proposed landward of the primary dune, therefore, impact to beach traffic is not anticipated to be significant other than the potential increase in beach usage associated with the development. The beach will be patrolled and monitored by facility staff, so beachside safety concerns are not anticipated to increase from the development.

#### **4.12.6 Temporary Sanitary Facilities**

Temporary sanitary facilities will be established onsite. Portable latrines, the number to be determined by the contractor, will be provided and maintained by an approved provider on the property for liquid waste disposal. The contractor will be required to maintain acceptable environmental health and safety standards during construction.

#### **4.12.7 Access and Staging**

Access to the construction site will be via Grace Bay Road. No staging will be outside the premises of the construction site. All worker parking will be within the property boundary and will not affect the traffic flow of Grace Bay Road. This will be managed to prevent any obstructions, congestions, visual impacts or nuisances to the existing residents.

#### **4.12.8 Placement and Spreading of Sand**

Suitable material from onsite excavation will be utilized to raise low-lying, flood-prone portions of the property. Imported material will need to be brought in to attain the lines and grades of the development. No nourishment of the beach is proposed.

#### **4.12.9 Protection of Sand from Erosion during Swells**

The proposed development does not involve any development of the coastal and/or marine environment, and all proposed development is landward of the existing primary dune. This provides sufficient setback and beach/dune buffer to allow for natural variability within the beach and dune system, including short-term impacts to the beach and dune face from swell events.

#### 4.12.10 Solid Waste Management during Construction

All waste generated during construction, whether from daily food and beverage consumption by those working at the site or construction waste, will be containerized and disposed of at the public landfill site on a regular basis. A lidded refuse bin will be provided and easily accessible to workers with clear instructions for immediate disposal. Inspections will be made at the end of the day by the contractor to ensure that no waste remains behind on the jobsite, including near the shoreline. Solid waste debris is often problematic on construction sites and of particular concern when working close to the marine environment due to the increased incidence of debris either blowing or floating away. Not only is it not aesthetically pleasing washing up on the shore but can injure and kill marine organisms if they ingest it or are inadvertently trapped in the waste.

No hazardous materials or substances will be avoided or kept at a minimum, and if only necessary. Changing of oils and similar servicing of vehicles will only take place offsite. If refuelling or addition oils are needed in construction equipment or machinery, the containers will be collected, bagged and disposed of separately at the public landfill facility. There will be a zero tolerance for any waste being disposed of in the terrestrial, marine, or coastal environments.

#### 4.12.11 Liquid Waste Management

The contractor will be contractually required to develop a hazardous waste management plan for review and approval by the Developer. This will include the identification of potentially hazardous liquid waste on the site, means and methods of use, storage and disposal. The Project Manager shall conduct regular observations of the project site to ensure compliance with the approved management plan. Containers of oils and other similar effluent that will be used in construction equipment and machinery will be collected, bagged, and disposed of separately at the public landfill facility in consultation with the Chief Environmental Health Officer.

#### 4.12.12 Control of Air, Dust, Water and Noise Pollution

The storage of materials and equipment will be within the confines of the parcel boundaries. Consideration will be given to the unsightly storage of equipment and/or machinery, which may appear injurious and/or unsightly. Effort will be made to store equipment and/or machinery away from the boundaries of adjoining properties. Stockpiling of any materials including aggregate will require regular wetting to prevent any dust nuisances to the adjoining properties. Construction hours will be limited to starting not earlier than 7:30 a.m. for noise noise-generating equipment

and/or machinery and finishing not later than 6:30 p.m. There will be a zero tolerance for any waste being disposed of in the terrestrial, marine, or coastal environments.

#### **4.12.13 Control/Storage of Fuels and Other Dangerous Substances**

Hazardous materials will be stored in a secure location using appropriate storage cabinets, if applicable. Non-compatible chemicals (i.e., acids and bases) will be segregated to prevent mixing in the event of a spill. Employees are required to read information on labels and safety data sheet (SDS). Storage areas will be kept clean, with access kept clear. Instructions on signs must be obeyed. Appropriate personal protection clothing, if necessary, must be worn.

#### **4.12.14 Emergency Mitigation Plan (EMP)**

Effective planning helps to reduce potential impacts. In the case of the project, the threat of emergencies is small and can be largely avoided with conscientious planning.

This plan outlines strategies to avoid and mitigate spills of hazardous materials on land and in the marine environment. The following are events that can require emergency and mitigation responses:

- Hurricanes and Tropical Storms
- Noxious Liquid Spill
- Public Safety Issues

Successful emergency management may require the participation of key government agencies, including:

- The Turks and Caicos Islands Fire Department
- The Department of Disaster Management and Emergencies (DDME)
- Environmental Health
- Department of Environment and Coastal Resources (DECR)
- Maritime Affairs
- The Ports Authority
- The Turks and Caicos Islands National Healthcare Agency

Success also depends on financial resources, administration, and trained personnel for implementation. Any emergency and mitigation plan should be seen as a "living" document, in



that revision and review should take place, incorporating newly available information, changing circumstances and lessons learned.

Any pollution incident that poses a threat to the natural environment should be reported immediately to DECR, the Department of Environmental Health, DDME and Maritime Affairs. Spill mitigation materials should be immediately available to the construction crew, including booms and absorbent materials. The silt fences, which should be in place throughout the construction process, will help to avoid and reduce impacts from potential spills. However, the emergency mitigation plan should remain in place in the event that a spill occurs.

The following are the roles and responsibilities are assigned to the various project principles.

Project management/monitoring team, contract administration and oversight ensure that work is compliant with the mitigation measures outlined in the EMP. The Project Manager ensures that the necessary equipment, manpower and resources are available to provide an effective and immediate response to an emergency or hazard and to alert relevant authorities immediately. The Project Manager also ensures that construction crews are adequately trained to discharge disaster management responsibilities and/or arrange for additional assistance, if required. All staff members should be informed of emergency procedures, and applicable signage and information should be posted at key locations.

Project Contractor - Monitoring operations are to be conducted in accordance with the recommended monitoring and mitigation measures in the EMP to ensure that siltation, spills and pollution are avoided, reduced, restored and offset, where required. All solid wastes generated are to be disposed of on a regular basis, and any solid wastes with the potential to become airborne are not to be permitted near coastal areas. No replacement of hydraulic or machine fluids is to take place onsite. Equipment and machinery shall be serviced, maintained and washed offsite, away from the marine environment.

Hurricane/tropical storm response measures - The following procedures are to be taken in the event of a weather statement regarding hurricanes and tropical storms.

- In the event of a tropical storm/hurricane watch, construction can proceed to within 24 hours of expected landfall. No construction activities should take place under an active tropical storm/hurricane watch at the time of predicted landfall. All equipment should be

secured onsite and all other materials secured within 24 hours of predicted landfall so that they cannot become windborne.

- In the event of a tropical storm/hurricane warning, all construction activities should cease once the warning has been issued. All equipment should be secured onsite to a secure area until the storm has passed. Any materials onsite that have the potential to become windborne should be removed to a secure location. No construction activities should take place until warnings have been lifted.

Spill response measures - The following procedures are to be taken in the event of a spill of hazardous materials:

- Recording of the actions and decisions taken during an accident should be undertaken to ensure lessons are learned. Any improvements shall be enforced in response to improved technologies and capabilities.
- All relevant factors are to be immediately assessed, including the nature, amount, location, wind and current directions and speeds, areas potentially affected, and resources needed and available.
- Priorities are to be established and response initiated, based on most-critical factors first. The employment of chemical dispersants/oil herders is to be used only under the approval of DECR. Response shall include reduction of impacts in sensitive areas, via the removal of the pollutant in all affected areas.
- Contaminated materials shall be recovered and disposed of on land at the PLS landfill. DECR shall oversee and dictate the clean-up strategy and risk assessment.
- Prevailing weather conditions and hazardous material types will determine the equipment and methods to be used.
- Biological and other environmental values, accessibility and ability to utilize such equipment shall be considerations in selecting the clean-up method.
- Any solid materials, such as tar balls, will be put into plastic bags and disposed of at the PLS landfill.

- Response shall also include during- and post-incident biological monitoring to determine the effectiveness of the response.

Reporting Information Requirements for Hazardous Materials Management (HAZMAT) – measures for reporting shall include the following:

- Name of person reporting
- Date and time of incident
- Nature of incident (leak, explosion, spill, fire, etc.)
- Location and source of incident
- Details of injuries and fatalities, causes of injuries, treatments applied
- Identification of material(s) released (if known), manufacturer, label information, characteristics, physical state (e.g., gas, liquid, solid), etc.
- Amount of material released/duration of release
- Affected resources (e.g., air, water, land) and amount of materials released, including a description of direction, height, colour, odour, plumes, vapor, etc., including wind, current speeds and directions
- Local weather conditions
- Response personnel

Public safety response - In the event of a public safety incident of any magnitude, emergency medical assistance shall be sought immediately. Note it is preferable to have someone within the construction/management team who is familiar with and can administer first aid. If emergency medical assistance cannot be reached in a timely manner, then affected persons should be transported, if feasible, to Grace Bay Medical Centre (the nearest medical facility). In the case of a public safety incident, documentation is critical. The following information should be recorded:

- Time and date of the incident
- Description of the incident/injury
- Name(s) of affected persons
- Actions taken
- Names and contact information of witnesses to the incident

Follow-up with witnesses may be necessary if legal proceedings are initiated.

Water quality management – In addition to previous measures, no washing down of equipment near the water shall take place during construction.

Emergency plan testing and review – This plan will be reviewed and updated as necessary as further information becomes available that may influence plan implementation and emergency operations. If an incident should occur prior to review, the review is to take place immediately following the incident to adjust the plan as needed, incorporating lessons learned.

#### **4.13 Social-Economic Impacts**

The proposed project is consistent with site zoning and intended use for the property. The project is anticipated to complement existing development with the Grace Bay area. Generally positive impacts are anticipated from the proposed development and contributions to negative impacts (traffic, congestion, etc.) are anticipated to be minor in consideration of the limited additional density proposed.

##### **4.13.1 Demographics**

The proposed resort property is located on Grace Bay. There are high-end residential villas utilized by owners and to some extent available as rental properties to the north, and resort hotels and restaurants to the south. As with the surrounding development, it is projected that the majority of use (approximately 70%) will be by tourists and residents from the United States.

##### **4.13.2 Employment**

A summary is provided herein. It is recognized that the employment of TCI Belongers in the construction and operations of the Project, wherever possible is of paramount importance to TCIG. The Project will necessitate the employment of a certain number of expatriate staff and workers. During the development and subsequent operation of the Project, the Developer will use its best efforts to promote employment, for TCI Belongers.

Approximately 450-500 jobs are expected to be supported by the project construction phase. Based on the findings of the National Skills Audit it has been assumed that the number of foreign nationals employed will outnumber Belongers by 2 to 1 suggesting approximately 150 direct TCI (Belonger) jobs will be supported during the project construction phase. It is important to point out that there are some difficulties in defining what constitutes a TCI job. The ratios used are between Belongers and foreign nationals which appears to be the approach adopted by the National Skills Audit. However, a large proportion of the construction staff are anticipated to be



individuals who have long-term residence status in TCI whether that be by virtue of having Permanent Residency Certificates with the right to work and/or Naturalisation. Accordingly, the jobs created that are not described as TCI jobs will likely include many individuals who are legally resident in TCI. A total of 180 direct jobs are expected to be created during operations of which 90 are projected to be direct TCI (Belonger) jobs. The proposed development will in addition support regional employment through contributions to established businesses. In addition to guest expenditure at the hotel, hotel guests will also spend on non-hotel related activities such as tours, entertainment, shopping. The Project will generate tax revenues for TCIG from business licenses, work permits, accommodation tax, stamp duty, and airport taxes.

#### **4.13.3 Issues Raised in the Public Consultation**

Engagement with the Department of Planning and DECR is ongoing and will continue through review process regarding this study. A public consultation will be held upon receipt and resolution of comments from the Department of Planning and DECR regarding the EIA. The public consultation will be added as an appendix to this study. Comments that result in significant revision to the document will be implemented and an amended document will be issued if appropriate.

#### **4.13.4 Public Beach Access**

Two designated public beach access points are near the project area at Sunset Beach to the north and next to Ocean Club Resort to the south. The project will not impede nor prohibit access to the public within the existing, common use portions of the beach.

### **4.14 Potential Alternatives**

The proposed project will contain three main hotel buildings ranging from 5 to 7 stories, four oceanfront villas (two stories each) and three town homes (two stores each). Alternatives to this proposed development are described in the following sections.

#### **4.14.1 'No Go' Alternative**

At present, the study property is undeveloped but exhibits evidence of a pattern of disturbance, resulting in a mixed vegetative environment that provides limited habitat functions. The property could remain in its current, undeveloped state. This alternative would not meet the intent of the Developer to develop the property or the intent of the zoning designation for development. Further, the current conditions of the property do not suggest that conservation of this land is

warranted from an environmental perspective. There are no special or unique conditions or species that would warrant a conservation designation. The property is surrounded by parcels with similar development designations and are largely developed. The proposed development would infill this remaining undeveloped property with similar usage to the surrounding properties. This is consistent with accepted development practice, as it is more appropriate to allow for infilling of similar development than to allow for expansion into more pristine, undeveloped areas. This no-go alternative would also result in no revenue potential for the property or net socio-economic benefit for the Developer or surrounding community.

#### **4.14.2 Design Alternatives**

Zoning provisions for this property allow for increases in both parcel density and building height elevation relative to the proposed development plan. As such, the developer could propose a higher density project on this parcel under current zoning. This alternative would increase site density and impacts, in particular, relative to the elevation of buildings and infrastructure requirements.

The developer could also consider a site plan of lesser density. This would reduce impacts particularly to infrastructure. However, given that the current site plan is less than the allowable density for the parcel, there is no particular basis to compel a reduction in density. Such a reduction would, in principle, reduce the return on investment for the development. This would reduce both the value for the developer and the net socio-economic benefit of the development.

#### **4.14.3 Site Layout Alternatives**

The site as proposed has been designed to provide for the efficient use of the property as a high-end resort-style property. This includes the efficient use of both horizontal and vertical space on the property to support usage. Alternative layouts could be considered, although likely at the expense of site efficiency. The building footprints could be reduced; however, this would require an increase in building height to retain the same density. The reduction in footprint would be nominal and would not change the overall character of the property. Any change that would reduce site efficiency would reduce the return on investment and the net socio-economic benefit of the plan.

#### **4.14.4 Summary of All Alternatives**

In consideration of the range of potential alternatives, the proposed development is consistent with accepted practice and is within the limits of development density allowable for the property.

There is no readily identifiable alternative development that would both meet the intent of the developer and current zoning and provide an appreciable benefit.

## **5.0 Impact Assessment**

### **5.1 Impact Identification**

For most projects, overlaying the proposed development onto the results of landside and marine investigations reveals the extent to which a project would have direct impacts on landside vegetative communities, intertidal communities and nearshore sub-tidal marine areas.

### **5.2 Description of Impact**

Based on the information provided by the Developer, the development team has advised that, because of the comparatively low natural terrestrial topographic elevations of the property, fill material will need to be brought in to raise the base elevations to an extent that future infrastructure (i.e., buildings, roads, etc.) will be less vulnerable to potential impacts due to storm surge and/or sea level rise. Therefore, from an ecological impacts perspective, the remainder of this EIA assumes that placement of this fill will impact the entire property, from the east boundary of the property to the top of the sandy beach and from the north to south property lines.

Because no structures (piers, docks, boat slips etc.) are proposed to be constructed waterward of the mean high water line, no direct impacts are expected to the marine environment, and the potential for secondary impact to the marine environment are limited.

Based on these assumptions, the extent of direct impacts of the project on landside and marine communities are presented in Table 5-1 and shown on Figure 5-1.

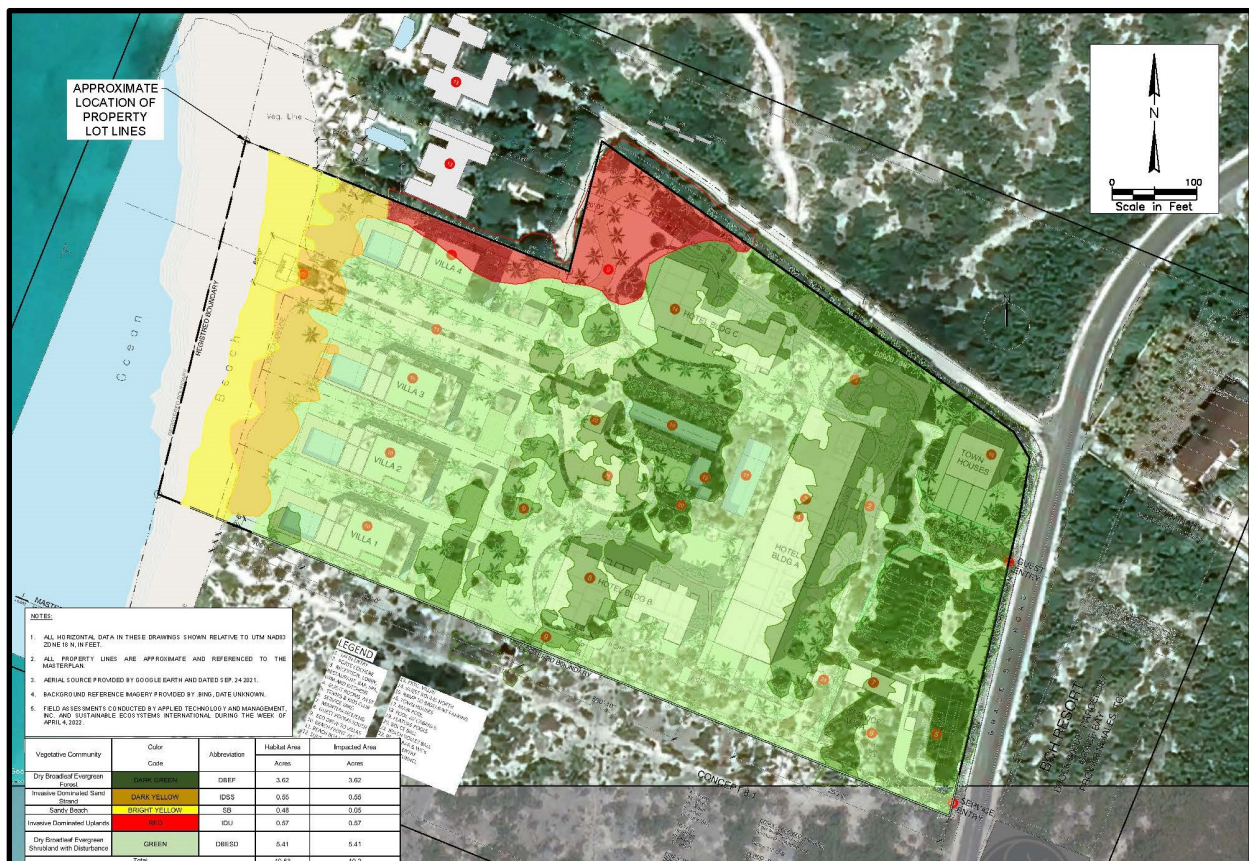
The proposed project will result in an increased protection from hurricanes and increased resiliency to sea level rise.

The proposed Landscape Plan is attached in Appendix D (Project Plans and Drawings).



**Table 5-1. Direct Impacts on Landside and Marine Communities**

Community Type	Existing Size (acres)	Area to be impacted (acres)	Comments
Unvegetated Sandy Beach	0.48	0.05	Impacted by the western end of the boardwalk/beach access
Invasive-dominated Sand Strand	0.55	0.55	Fill to be brought in to raise ground surface
Invasive-Dominated Uplands	0.57	0.57	Fill to be brought in to raise ground surface
Dry Broadleaf Evergreen Shrubland	5.41	5.41	Fill to be brought in to raise ground surface
Dry Broadleaf Evergreen Forest	3.62	3.62	Fill to be brought in to raise ground surface
Marine Impacts	n/a	0	No changes proposed
<b>Total</b>	<b>10.63</b>	<b>10.2</b>	



**Figure 5-1. Areas of Impact**

Descriptions of the results of these direct impacts and secondary impacts on each community type are provided in the following sections.

### **Direct, Indirect and Secondary Impacts to the Sandy, Unvegetated Beach**

No sand or infrastructure (e.g., groynes, jetties, docks, piers etc.) is proposed seaward of the top of the existing dune, so direct impacts to this community are expected to be negligible.

Secondary/indirect impacts to this community will occur, however, as the result of increased human use of the beach after the hotel, villas and townhome become occupied. This increased use will likely result in reduction in available foraging for resident shorebirds (e.g., Wilson's plovers) and migratory shorebirds (e.g., sanderlings, ruddy turnstones, willets, semi-palmated plovers, etc.).

Additional secondary impacts could occur as the result of increased lighting and noise and for beach management purposes. Although "seaweed" (actually sargassum, dead blades of seagrass and other flotsam and/or jetsam) had not accumulated in large quantities during or immediately prior to the April 2022 site investigation that was conducted for this EIA, seaweed piling up on beaches in the tropics has been an increasing problem in recent years, particularly when winds and ocean currents deposit these materials on beaches in large quantities. This may not be a problem on beaches adjacent to undeveloped tracts and may be beneficial for natural recycling of nutrients and when amphipods, small crabs and other marine organisms provide prey for foraging shorebirds. However, it can be objectionable when it accumulates in large amounts on beaches that are used by property owners and vacationers.

Beach management techniques to address this problem certainly vary based on the extent of the problem on a day-to-day, week-to-week, and/or seasonal basis. For minimal or relatively light build-ups, taking no action may be appropriate. When build-ups get to be objectionable, addressing them may be as simple as a deploying an individual or two with a rake and hauling the material offsite for disposal (or composting). When build-up is heavy, a small army of laborers (rakers, baggers, hole diggers) and equipment (e.g., tractors fitted with rakes) may be necessary to deal with the problem. It is recommended (refer to the Mitigation section) that a beach management plan be developed in advance of unit occupancy, to be prepared when the problem arises.

### **Direct, Indirect and Secondary Impacts to the Invasive-Dominated Sand Strand**

#### **Community**

With the exception of a 60-ft-wide corridor that will allow hotel and townhouse occupants access to the beach, the proposed site plan has been designed to provide a minimum 50-ft setback from the seaward vegetation line to the most waterward infrastructure (the pool decks for each of the four villas).

However, because the existing vegetative community within the setback area is dominated by *Casuarina* trees and the invasive beach cabbage, replacement of these undesirable species with site-appropriate dune vegetation (e.g., sea oats, bay tansy, dune sunflower, etc.), will result in direct impacts that are expected to occur on 100% of the invasive-dominated Sand Strand community.

In the long term, the replacement of the invasive non-native plants with species that are more appropriate for the setting could result in a net increase in ecological values, particularly if native species that are endemic, good for wildlife and/or are resilient to storm surges and sea level rise are used.

Secondary impacts may occur in this area when the owners and/or occupants of the villas access the beach, since presently, no confined paths have been identified for this purpose. Implementation of defined beach access paths can minimize this potential.

### **Direct, Indirect and Secondary Impacts to Invasive-Dominated Uplands**

This 0.7-acre area is located in the northwestern part of the property. The presence of these undesirable species appears to be linked to land-clearing that took place when the Coral Pavilion and Coral House structures were built a number of years ago. The proposed site plan calls for much of this area to be cleared and revegetated as a buffer between Villa #4 and Hotel Building C and the adjoining property. An approximately 20-ft-wide driveway as the sole vehicular access to Villa #4 is also proposed in this area. Removal of existing debris piles and replacement of invasive pest plants and with native and/or non-invasive ornamental species will likely be a net positive ecological effect in this area.

Due to the extremely poor environmental quality of this area, it did not appear to be valuable as nesting habitat for birds or provide significant habitat functions for other fauna of note.

Indirect and/or secondary impacts are not expected to be significant in this area but could include potential nutrient loading if fertilizers and/or other chemicals are needed to keep the new landscaping in an aesthetically appealing condition.

#### **Direct, Indirect and Secondary Impacts to Dry Broadleaf Evergreen Shrubland**

Impacts to the 5.41 acres of DBES pose the most significant ecological impact of the proposed project. Extrapolation of the results of the vegetation analysis plots suggest that, unless proactive mitigation steps are undertaken, the project could result in the destruction of significant numbers of native orchids, air plants and other vegetation that is designated on the TCIG's list of endemic and/or notable flora and fauna. Observations of fauna in this area, including curly-tailed and anolis lizards, butterflies and other insects and nesting birds indicate that there is the potential for impact to these species when the land is cleared, and fill is deposited to bring the ground surface up to buildable standards.

Motile species (e.g., thick-billed vireos, common ground-doves etc.) will need to either find other suitable habitat that is unoccupied or persist until after revegetation work is completed, at which time, foraging and nesting habitat may be re-created within the reconstituted vegetative landscape. Based on observations in the field and publicly available data, it is likely that, in its present condition, the property likely provides habitat for small sustainable populations of one to three families of these species. Habitat that is potentially suitable for these species is available on properties to the north, east and south.

Indirect and secondary impacts that are likely to result from the loss of this habitat includes the reduction (and temporary loss) of habitat for insects and insectivores, including migratory birds that may use existing vegetation for foraging and/or roosting during their annual migrations.

#### **Direct, Indirect and Secondary Impacts to Dry Broadleaf Evergreen Forest**

Similarly, although to a lesser extent based on the smaller area of impact, the loss of 3.62 acres of DBES is likely to pose the second-most significant ecological impact of the proposed project. As described above in the impacts to the DBES, extrapolation of the results of the vegetation analysis plots suggests that, unless proactive mitigation steps are undertaken, the project could result in the additional destruction of orchids, air plants and other vegetation that is designated on the TCIG's list of endemic and/or notable flora and fauna. Observations of fauna in this area, which also included curly-tailed and anolis lizards, butterflies and other insects and nesting birds



indicate that there is a potential for impact to these species when the land is cleared and fill is deposited to bring the ground surface up to buildable standards.

Motile species (e.g., thick-billed vireos, common ground-doves etc.) that inhabit this area will also need to either find other suitable habitat that is unoccupied or persist until after revegetation work is completed, at which time foraging and nesting habitat may be re-created. Habitat that is potentially suitable for these species is available on properties to the north, east and south.

Indirect and secondary impacts that are likely to result from the loss of this habitat include the reduction (and temporary loss) of habitat for insects and insectivores, including migratory birds that may use existing vegetation for foraging and/or roosting during their annual migrations.

### **Direct, Indirect and Secondary Impacts to the Marine Environment**

Because no structures (piers, docks, boat slips, discharge pipes, etc.) are proposed to be constructed waterward of the mean high water line, the project is not expected to have any direct impacts on the marine environment.

Indirect and secondary impacts to the marine environment may occur, however. These could include potential eutrophication of the nearshore marine ecosystem if nutrients associated with the project find their way into the aquatic environment. Future owners and visitors also have the potential to affect the marine environment through their use of the water. Although there are no natural reefs in the vicinity of the site, the presence of marine life, including corals, sponges and juvenile reef-fish on the rock groyne located in shallow waters in close proximity to the site is likely to attract snorkelers who wish to see these resources.

Impacts could occur either through direct impact (i.e., blunt force trauma if an inexperienced or non-conscientious snorkeler kicks the coral), or if non-reef-safe sunscreens are used underwater. Although these potential impacts may seem inconsequential based on the low likelihood of damage from a single individual, the cumulative results of potentially hundreds of users visiting the site daily for the foreseeable future increases the likelihood of damage.

Additionally, although rooted epi-benthic natural resources are currently minimally present in the nearshore areas, they could be subject to trampling if they colonize nearshore areas.

The addition of significant numbers of new visitors over the lifetime of the facility and the likelihood that some of them will partake in water-based recreational activities (e.g., snorkeling, SCUBA

diving, parasailing, kayaking, stand-up paddleboarding etc.) will have an additive effect to the stressors on existing marine resources.

#### **5.2.1 Potential Impact to Coastal Environment and Processes**

There are no proposed development of the coast or changes to the shoreline proposed in the project plans. No impacts to the coastal environment or coastal processes are expected from this development.

#### **5.2.2 Potential Impact to Geological Environment**

There are no anticipated geological impacts. The project area surficial substrate is primarily sandy with occasional limestone outcrops. There are no known karstic features in the project vicinity.

#### **5.2.3 Potential Impacts to the Aesthetic and Other Built Environment**

The aesthetic impacts are anticipated to be positive and will include removal of exotic vegetation and planting of native dune plants. The project is designed to be aesthetically pleasing from all vantage points and will conform to established building standards for the area.

#### **5.2.4 Water Quality and Noise Pollution**

Hazardous materials, waste, fuels, lubricants, or other toxic substances will be stored in accordance with the referenced Hazardous Material Plan. All vehicles, equipment and machinery will be refueled by a fuel/maintenance truck owned and operated by the contractor, which will be called to the construction site on an as- needed basis. There will be no contamination or pollution of soils or water. The contractor shall be responsible for ensuring that there is absorbent material available onsite to manage and clean up any accidental spillages of oils, fuels, lubricants, or other similar substances.

In the absence of a central drainage system on the island, during operation of the development, hard surfaces (asphalt and concreted areas) will be designed in a way, including the installation of concrete trench drainage systems, that would direct runoff to be disposed of in holding tanks to be disposed of properly.

Construction hours will be limited to starting not earlier than 7:30 a.m. for noise-generating equipment and/or machinery and finishing not later than 6:30 p.m. There will be a zero tolerance for any waste being disposed of in the terrestrial, marine, or coastal environments.

### 5.2.5 Ecosystem and Economic Analyses

The proposed development will have a positive socio-economic impact on the economy and residents of the Turks and Caicos Islands. The economic impacts are associated with the potential for increased property values of adjacent upland properties, employment opportunities, off property spending of guest at local shops and restaurants.

The coastal marine environment, in particular, the coral reef ecosystems in the Turks and Caicos Islands, are vulnerable environmental resources that provide significant economic goods and services to the economy.

### 5.2.6 Socio-Economic Impact

During the development and subsequent operation of the Project, the Developer will use its best efforts to promote employment, for TCI Belongers. Approximately 450-500 jobs are expected to be supported by the project construction phase. A total of 180 direct jobs are expected to be created during operations.

A large proportion of the construction staff are anticipated to be individuals who have long-term residence status in TCI, whether that be by virtue of having Permanent Residency Certificates with the right to work and/or Naturalisation.

The proposed development will support regional employment through contributions to established businesses. In addition to guest expenditure at the hotel, hotel guests will also spend on non-hotel related activities such as tours, entertainment, shopping. The Project will generate tax revenues for TCIG from business licenses, work permits, accommodation tax, stamp duty, and airport taxes.

### 5.2.7 Public Beach Access

Two designated public beach access points are near the project area at Sunset Beach to the north and next to Ocean Club Resort to the south. The project will not impede nor prohibit access to the public within the existing, common use portions of the beach. Potential Impact to Neighbouring Developments, Businesses and Residential Houses

The project is anticipated to increase overall options for tourists and property values within the area. The potential risk of unanticipated impact from construction activities will be monitored, and corrective action will be implemented if warranted. In general, it is anticipated that the

construction, in concert with communication with neighbouring properties, will result in an overall positive development in the area.

### **5.3 Derivation of Significance**

It is important to acknowledge that the project area has already been impacted by a range of prior activities.

Impacts from the project are primarily associated with construction and can be minimized through appropriate monitoring and best management practices.



## 6.0 Mitigation and Monitoring

### 6.1 Proposed Actions and Schedule to Mitigate Against Anticipated Environmental Impact

Potential activities that could be considered to minimize and/or offset ecological impacts could include the following.

1. Salvaging and relocating minimally motile intertidal organisms (e.g., *Cerion* and *Hemitrochus* snails) to suitable offsite receiver locations prior to land clearing.
2. Proactively planning to enhance plant abundance and biodiversity by planting site-appropriate native vegetation and/or integrating other species of native plants that are not presently on the property (e.g., Turk's cap cactus (*Melocactus intortus*)) into the landscape plan for the project; All introduced native species should be responsibly procured from appropriate nursery-based sources.
3. Ensuring that field monitoring is conducted to avoid impacts to nesting birds during land clearing; Consideration of time of year for clearing to minimize impacts to nesting may also be considered.
4. Removing all non-native/invasive plants from the site and implementing a monitoring programme to prevent their re-establishment.
5. Incorporating state-of-the-art environmentally conscious design and management techniques into the project.
6. Considering development of educational materials notifying future residents of the presence of species of notable plants and that the collection and transport of endemic, endangered and/or threatened species is prohibited.
7. Ensuring coordination with the landscape team to ensure that no ornamental species that are on the list of invasive plants are introduced onto the property.
8. Consider development of educational materials notifying residents of the presence of critical marine species and the need for their protection.

9. Although no sand dollars, sea biscuits and other motile and/or sedentary marine organisms were observed during the marine investigation, species such as these are known to inhabit the sandy nearshore bottoms that will potentially be accessed by residents for recreational purposes. Collection of live specimens as souvenirs should be prohibited.
10. Notify DECR if nesting marine turtles, nesting birds (e.g., nighthawks on coastal rock, plovers on sandy beaches), or piping plovers are observed within coastal portions of the property and implement appropriate countermeasures (e.g., prohibition on unleashed dogs) to eliminate or minimize adverse impacts on these resources.
11. Conduct periodic beach clean-ups to remove flotsam, jetsam and/or other solid waste or debris that may accumulate on the shore.
12. Resist beach management initiatives that would mechanically remove naturally occurring tidal wrack (e.g., seaweed) from the beach, as it harbors prey for foraging shorebirds and is beneficial to the localized ecology, except when situations warrant more aggressive management.
13. Due to the natural curvature of the shoreline in the eastern portion of Grace Bay, recreational vessels pass closer to the shore adjacent to the project site than at other locations. To increase safety for future Resort residents and visitors who wish to swim, paddleboard, snorkel or participate in other watersport activities, it is recommended that navigational buoys be set/re-set to visibly mark the vessel operation area to prevent vessel operation any closer than 300 ft from shore.

## **6.2 Storm Surge Analysis and Mitigation Plan for Sea Level Rises**

As with all coastal properties within TCI, the study area is vulnerable to impacts from hurricanes and, in particular, direct impact from waves and storm surge. In general, storm surge values are limited for the region and are generally on the order of 1 m or less for typical hurricane conditions. The presence of deep water adjacent to the archipelago and the ability of surge to flow around the islands limit the potential for the creation of extreme storm surges in this area. Tide gauge data collected during the passing of Hurricane Frances (a direct major hurricane impact) on September 1 and 2, 2004, recorded a rise in sea level from storm surge of only 1.5 ft. Similar surge magnitudes have been reported in the area for historical storm impacts. This does not

preclude the potential for significant impacts from a major hurricane, as even limited increases in storm surge in combination with waves can result in damage to upland properties. This risk is further exacerbated by the continued increase and possible acceleration of sea level rise.

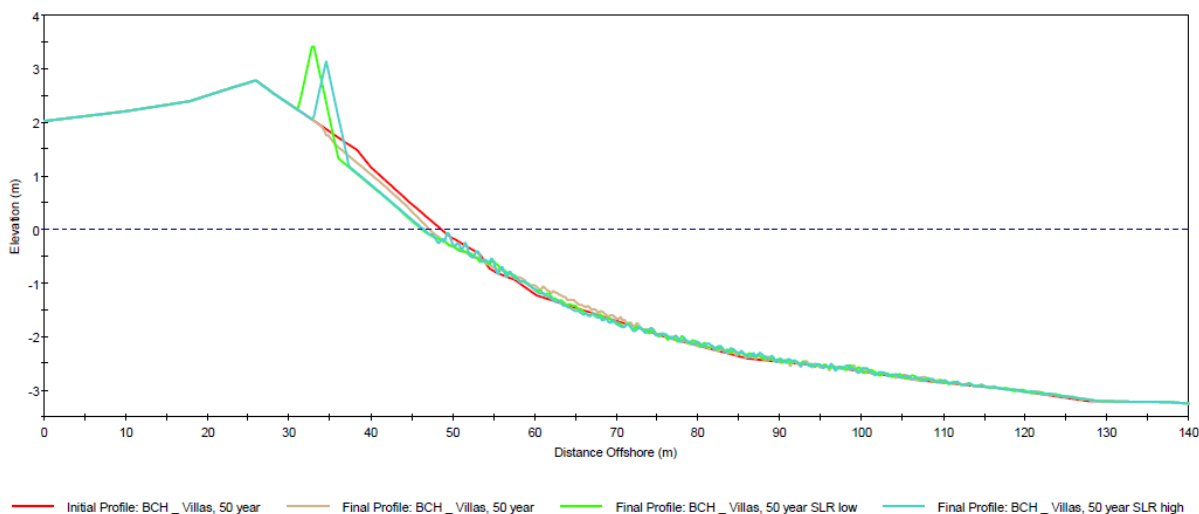
A coastal storm vulnerability analysis was performed on a representative project cross-section shore profile for the project area. The profiles were created from topographic and wading-depth bathymetric survey data collected near the property beachfront. The analysis was performed using the two-dimensional SBEACH (Storm-induced BEACH CHange) cross-shore transformation model. The shoreline profile was analysed for four different return interval storm events (Figure 6-1). Representative data from the Caribbean was used to develop the storm parameters for the simulation, which included storm surge and waves. Analysis considered both existing and with-project conditions. It is additionally noted that the shoreline in general for this property is long-term stable/accretional and, as such, use of the existing beach profile is appropriate for projections of future storm scenarios.

Consideration of the increased storm-induced impacts to the project area related to sea level rise was incorporated into the simulations. The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report includes ranges for projected global mean sea level rise associated with differing scenarios. An average of the range associated with scenarios RCP2.6 (low) and RCP8.5 (high) were incorporated into the simulations. Fifty years of the average sea level rise measurements associated with the low and high scenarios were applied to the simulated storm surge values for the 50-year storm, and simulations were run comparing the base 50-year storm and the low sea level rise and high sea level rise scenarios.

For the existing site conditions, the analysis suggests that erosion into the upland beach profile will occur for a 50-year event. The extent of incursion increases with estimates of future sea level rise, with a maximum landward incursion (relative to mean sea level) on the order of 30 m for the 50-year high estimate of sea level rise. In all cases, the model predicts both a landward progression of dune material and erosion on the beach face. This is consistent with observations of impacts from major storms. The existing primary dune on the property is of sufficient volume and elevation to withstand this impact, and development is proposed behind the primary dune at sufficient setback to suggest a limited risk from wave and surge attack. This includes consideration of future sea level rise scenarios. As such, preservation and enhancement of the existing dune feature is the primary mitigative action required to adapt to increases in sea level rise and storm surge/wave impact risk. At present the primary dune is dominated by inappropriate

invasive species. Replacement of these species with native, appropriate dune vegetation will both increase the stability of the dune feature and allow for dune adaption to sea level rise increases through capture of windblown beach sand. In addition, conformance to the required development setback for critical infrastructure is key to management of this risk.

An additional site concern relative to sea level rise is the low elevation of interior portions of the property that, at present, are on the order of +2 ft relative to mean sea level. As overall raising of the property grade, particularly within these areas, is proposed, site development incorporates appropriate strategies for adaption to increases in sea level rise .



**Figure 6-1. SBEACH Modelling of Shoreline Response for a 50-Year Storm Event for a Range of SLR Projections**

### 6.3 Building Around, or Rescue and Removal of Rare, Threatened, and Endangered Species of Plants, where Possible

The Developer has advised that fill must be brought in to raise the elevation of the ground surface on the entire property to meet building standards. This requirement pre-empts the typical sequential process of attempting to first avoid, then minimize impacts. on environmentally sensitive resources.

The ecological assessment that was completed as part of the EIA process at this site revealed the presence of populations of nine species of plants that are notable for their inclusion on the TCIG's lists of Endemic Plants, Lucayan Archipelago Endemics and/or Native Plants of Special



Conservation Concern (Table 2-3). While it is recognized that individuals of several of these species may not be transplantable due to their unique biology, other species can be salvaged and/or relocated with a comparatively high level of success and confidence. Activities that should be considered to further reduce impacts include the following.

1. Salvaging all individuals of all native orchids prior to undertaking any land clearing activities.
2. Salvaging all individuals of all native *Tillandsia* air plants prior to undertaking any land clearing activities.
3. Working with landscaping and native plant professionals to assess the individual biology of the other seven species identified in Table 2-3 to determine the extent to which they can be salvaged and/or transplanted with a high enough expectation of success that a plant salvage undertaking would be practical.
4. Developing and implementing a programme to relocate all notable plants, including the identification of a location and procedure for temporary relocation of floral species that could be removed from the site prior to land clearing and then moved back onto the site following the addition of fill.
5. Ensuring that additional ecological mapping of the location of notable plants is performed to prepare for relocation of individuals of notable plant species prior to construction.
6. Schedule the clearing of vegetation to be performed outside of the main bird nesting/migration season (December through April), ensure that no active nests (i.e., nests with eggs or young incapable of sustained flight) will be damaged or destroyed.

#### 6.4 Landscaping/Replanting Plan Utilizing Native Species

It is recommended that the Developer work with professionals who are knowledgeable about plant species that are native to the Turks and Caicos Islands and that a minimum of 80% of the species and numbers of plants be natives.

A monitoring program should be developed and implemented to maximize the rate of survival for the native plants that are to be salvaged.

6.5 Monitoring of the Dune System; Especially the Area between Registered Parcel Boundary (which is on Beach and within Princess Alexandra Land and Sea National Park [NP-09]) and Coastal Setback Limit; with Restoration or Maintenance of Dunes with Dune Flora and Removal and Control of Invasive Dune-Threatening Flora (including *Casuarina equisetifolia* and *Scaevola taccada*).

The following actions are recommended.

1. The project team should work with landscape professionals who are knowledgeable about plant species that are native to the Turks and Caicos dunes and that 100% of the species and numbers of plants be either nursery-grown natives or plants that have been salvaged from the site.
2. A monitoring programme should be developed to ensure that invasive pest plants do not become re-established on the site.

6.6 Environmental Monitoring and Financial Requirements

The following action is recommended.

- A biological monitoring programme should be developed and implemented such that monitoring for invasive species is completed not less than quarterly, and that protocols are implemented to ensure that invasive pest plants do not become re-established on the site and that the uses of chemicals (e.g., herbicides, pesticides, rodenticides, fertilizers etc.) be prohibited or minimized.

Other Mitigation Opportunities (including marine)

Given no changes to the shoreline and no need for any mitigation from construction activities, there are several mitigation opportunities along the coastline the Developer can consider:

1. Notifying DECRA if nesting marine turtles, nesting birds (e.g., nighthawks on coastal rock), or piping plovers are observed within coastal portions of the property.
1. Identifying and implement appropriate countermeasures (e.g., prohibition on unleashed dogs) to eliminate or minimize adverse impacts on these resources if they are documented to occur within the project area.

2. Conducting periodic beach clean-ups to remove flotsam, jetsam and/or other solid waste or debris that may accumulate on the shore.
3. Resisting beach management initiatives that would mechanically remove naturally occurring tidal wrack (e.g., seaweed) from the beach because it harbours prey for foraging shorebirds and is beneficial to the localized ecology.

#### **6.7 Building Around, or Rescue and Removal of Rare, Threatened, and Endangered Species of Plants**

The project plans will impact most of the current vegetation including threatened, rare, and endangered plant species. It is recommended that prior to construction, a professional with knowledge of Turks and Caicos Islands plant species conduct a survey to identify the location of any threatened, rare, and endangered plant species for transplantation to another site. Monitoring of the transplanted species should be conducted to ensure survival.

#### **6.8 Landscaping/Replanting Plan Utilizing Native Species**

The project has a landscaping plan in place. It is recommended that the Developer limit the number of potentially invasive ornamental vegetation, and that plantings in the upper portion of the dune region of the beach should be native species of plants to eliminate the potential of spreading of invasive species. The Landscape Plan can be found in Appendix D of this report.

#### **6.9 Environmental Monitoring and Financial Requirements**

Environmental monitoring prior to, during, and post-construction will be the responsibility of the property developer. Land clearing represents the most significant concern associated with project construction. Appropriate oversight will be required during this and all construction elements and conformance is required for development approval.

#### **6.10 Public Consultation/Social Listening/Monitoring**

Engagement with the Department of Planning and DECR are ongoing and will continue through the review process regarding this study. A public consultation will be held upon receipt and resolution of comments from the Department of Planning and DECR regarding the EIA. The public consultation will be added as an appendix to this study. Comments that result in significant revision to the document will be implemented and an amended document will be issued if appropriate.

## 6.11 Environmental Management Plan

Construction and operation of the Resort can have the potential to result in decreased biodiversity and adverse ecological impacts unless appropriate precautions are implemented. Development of an EMP for both construction and operational phases of the development is warranted.

### 6.11.1 Protection of Terrestrial Biodiversity

Presently, three of the six plant species that are designated by the TCIG as invasive pest plants are present on the site: *Casuarina equisetifolia*, *Scaevola taccada*, and *Leucaena leucocphala*. However, further site disturbance associated with construction and the introduction of ornamental vegetation have the potential to introduce non-native pest plants to the site. Invasive, non-native plant species that have the potential to adversely affect native plant communities should be removed, preferably before they have gone to seed. Not less than annually, invasive non-native plants should be targeted for eradication or control.

Due to the presence of *Euphorbia inaguensis*, *Vachellia choriophylla*, *Lantana involucrata* and/or other plant species that are designated as Endemics or Native Plants of Special Conservation Concern in areas that are proposed to be filled, impacts to these notable species are unavoidable. To ensure there is no loss of biodiversity, it is recommended that the Developer will work with the landscape architects and local individuals who are knowledgeable about native plants to ensure that populations of these notable species will remain on the subject property.

The landscape plan that is proposed for site includes a limited number of plants that are native to the Turks and Caicos Islands. It is recommended that native, drought-tolerant and salt-tolerant trees, shrubs and groundcovers be used for landscaping, and that, to the extent feasible, plants that are designated by the government as TCI Endemics, Lucayan Archipelago Endemics and Native Plants of Special Conservation Concern be integrated into the proposed landscape plan.

Erosion and sedimentation control will be addressed prior to construction to prevent surface water runoff from adversely affecting the nearshore waters through the following actions:

- Stabilizing temporarily exposed soils through the use of seeding, mulch, or erosion control blankets;



- Installing and maintaining erosion control measures (e.g., siltation fencing) prior to initiation of land clearing and grading when working adjacent to erosion-prone or environmentally sensitive areas; and
- Monitoring the effectiveness of erosion control measures and as needed, adjusting, maintaining and/or repairing them if they are inadequate to protect adjoining areas;

The following actions will address erosion and sedimentation during operation of the project:

- Routinely monitoring and maintaining the erosion, sedimentation and turbidity control measures until construction and landscaping becomes established and following storm events.

#### **6.11.2 Protection of Marine Biodiversity**

No direct impacts to the marine environment are anticipated from the project, so the primary concern is associated with secondary impacts. The primary secondary impacts of concern are associated with the potential for discharge from upland development and the potential for impacts to the environment from user actions. In principle, discharge into the marine (or terrestrial) environment should not occur from the proposed development and should be appropriately addressed through EMP procedures and facility design. Concerns regarding user impacts can be minimized through education initiatives and the oversight of the beach area by facility staff.

#### **6.11.3 Summary of the Potential Impacts of the Proposal**

The Environmental Management Plan (EMP) is outlined in Table 6-1.

**Table 6-1. Proposed Management**

Resource	Potential Impacts	Overall Significance	Proposed Management	Schedule	Cost
Terrestrial Resources	Adverse Impacts on Populations Of Endemic Species & Native Plants of Special Conservation Concern	Moderate	1. Perform thorough inspections for the presence, distribution & abundance of endemic species and Plants of Special Conservation Concern prior to initiating land clearing.	Pre-construction & Construction	Low
			2. To the extent desirable or necessary to maintain biodiversity on the site, relocate transplantable Endemic species and Native Plants of Special Conservation Concern out of areas to be developed and maintain temporarily until they can be replanted into suitable areas onsite following construction.	Pre-construction & Construction	Low
			3. Develop educational materials (e.g., kiosks, printed matter, etc.) about Endemic Species and Native Plants of Special Conservation Concern and make these materials readily available to residents and visitors in hard-copy and/or electronic versions	Post-construction	Moderate
	Clearing of Vegetation	Moderate	1. Minimize clearing of native vegetation to only those areas necessary for grading and construction of proposed facilities.	Construction	Low
			2. Where possible, maintain native landscapes and use native drought-tolerant and salt-tolerant plant materials for landscaping.	Pre-construction	Low
			3. Preserve and transplant, to the extent practical.	Construction	Low
	Risk Introducing Non-Native Species, Foreign Diseases, And Escape of Pests	Moderate	1. Develop strict inspection systems at Customs and entry points to eliminate or minimize the risk of unintentional introduction of undesirable flora, fauna and pathogens.	Construction	Low
			2. Ensure that construction equipment is clean and pest free before entering and leaving the property.	Construction	Low
			3. Employ Early Detection-Rapid Response protocols to eradicate or control undesirable species.	Construction & Operation	Low
	Impacts to Wildlife Habitat	Low	1. Landscape setback areas for conservation, as these areas will serve to preserve native plant species and habitats.	Pre-construction & Construction	Low
			2. Wherever possible, maintain native landscapes and use native plant materials for landscaping.	Pre-construction & Construction	Low
			3. Minimize clearing of native vegetation to only those areas necessary for construction of proposed facilities.	Construction	Low
			4. Design and construct beach access pathways to minimize the footprint in environmentally sensitive areas.	Construction	Low
			5. Implement an environmental monitoring program to include the monitoring and eradication or control of non-native species	Construction & Operation	Low
			6. Adopt and enforce covenants and protocols prohibiting the presence of unrestrained domestic pets.	Construction & Operation	Low
			7. Maintain floral and faunal lists and update them as new species are encountered.	Pre-construction, Construction & Operation	Low
			8. If possible, avoid land clearing during the bird nesting season in areas where birds are actively nesting.	Construction	Low
			9. Consider the rescue of <i>Cerion</i> and <i>Hemitrochus</i> snails and their relocation to suitable receiver sites.	Construction	Low
Marine Resources	Prevent Adverse Impacts to Water Quality	High	1. Develop and implement a hurricane preparedness protection plan.	Pre-construction & during Construction	Moderate
			2. Install and nurture dune plantings to create a vegetated buffer between the construction area and the sea.		

## **7.0 Conclusions and Recommendations**

The proposed development will result in 10.15 acres of direct impact to existing onsite vegetative communities. Of this area, 1.12 acres currently consists of largely invasive species. Within this area of direct impact, the site plan will reconstitute approximately 40% (4.1 acres) of greenspace. The remaining area will be converted to hardscape consisting primarily of structures and infrastructure. The relative proportion of hardscape is consistent with general requirements to support the high-end resort development envisioned. There is a potential for secondary impacts from the project, primarily associated with the discharge of materials and liquids into the environment. As this is a new development, the requirements to meet current building standards limit this potential, which can be further reduced through prudent operations of the Resort.

Opportunities exist to reduce the potential environmental impact from the project primarily through the implementation of appropriate EMPs during project construction and operational phases as discussed in Section 6 of this report. Land clearing and excavation represents the most immediate concern during the construction phase. Adoption of appropriate management and monitoring protocols are the primary focus during the operational phases of the facility.

Further recommendations are provided within the EMP provided with this study (Section 6).

## 8.0 References

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## **9.0 Appendices**

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