Environmental Impact Assessment
For
The Baha Mar Resort Project

BAHA MAR
NASSAU, BAHAMAS

Volume I of II

Prepared for:
Bahamas
Environment
Science &
Technology
Commission

HALEY & ALDRICH

July 2012

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EXECUTIVE SUMMARY

This Executive Summary provides an overview of the Environmental Impact Assessment (EIA) for the Baha Mar Ltd resort development project proposed for New Providence Island, Nassau, The Bahamas. The EIA was prepared in accordance with The Bahamas Environment, Science and Technology (BEST) Commission guidance, and has been developed in consultation with that agency and in accordance with applicable Bahamian regulations as well as in consideration of applicable State of Florida regulations, United States Federal requirements, and World Bank guidelines.

S.1 PROJECT DESCRIPTION

The Baha Mar Resort Project includes constructing a signature resort development consisting of approximately 3,500 hotel rooms, a world class 18-hole golf course, a retail village, luxury spas, the region's largest casino, meeting space, restaurants, and entertainment venues. Aesthetic features of the Baha Mar resort include a 50-feet high waterfall at the main entrance, a saltwater canal system, and a "show lake" for live entertainment events. The project will also consist of the relocation of a portion of West Bay Street and the construction of a new remote Central Services Facility to house activities inconsistent with the resort operations such as, employee parking, wastewater and water treatment facilities, a central warehouse, laundry facilities, and a standby electrical generating facility.

The Baha Mar Resort will be developed by Baha Mar Ltd, a Bahamian international business company incorporated in February 2010. Baha Mar Ltd will, through a network of subsidiary entities, develop, own and operate the Baha Mar Resort. Baha Mar will establish a new blueprint for resort development, representing the largest, single hospitality investment in the region, and creating a unique resort metropolis in terms of its setting, design, operation, and services.

Project Objectives:

- Locate, design, and operate the project in a manner that results in minimal impact to the natural and socioeconomic environment of The Bahamas.
- Create benefits for local economics through job creation and services.

This Environmental Impact Assessment (EIA) evaluates potential environmental, social, economic, cultural, and natural impacts of the proposed Baha Mar Resort Project. The proposed project involves the renovation of the existing Radisson Cable Beach Resort and Wyndham Nassau Resort and Crystal Palace Casino properties and the development of new hotel and residential units and other facilities at the existing, developed Cable Beach site. The environmental impact analysis examines the change in impacts due to the redevelopment of existing developed areas as well as the potential impacts from the development of facilities in undeveloped areas.

The proposed Baha Mar resort is intended to be one of the premier destination resorts in the world. Situated on a pristine ocean-front site at Cable Beach in Nassau, the Bahamas, Baha Mar is a pioneering "Resort Metropolis" offering world-class sanctuary for discriminating travelers seeking an unparalleled vacation paradise.

To achieve this goal of being an international resort destination – Baha Mar includes a collection of amenities that will set it apart from other resort destinations and enhance New Providence Island's reputation as the destination of choice worldwide. The development program for the resort incorporates a number of critical development components that together will work together to achieve the goal of making Nassau a world-class destination. The result is six remarkable hotels, a first class casino, a renowned golf course, refined spas, sumptuous eateries, celebrated shopping, sophisticated entertainment, and stunning beach amenities, all surrounded in the luxury and magnificence of the Caribbean – inspired architecture.

Key elements of the Resort will include:

- Location on a world class beach in a recognized resort Island location.
- Proximity to an International Airport that provides a direct connection from the Airport to the resort in 15 minutes or less.
- "Las Vegas Style" Casino.
- Convention Center capable of attracting a variety of meetings, conventions, trade shows, and banquets.
- On site resort amenities including pools and water features, restaurants, retail and craft shops, entertainment venues, and other attractions.
- A wide variety of hotel rooms and hotel types and sizes for resort, casino, and convention guests.
- A Signature Championship Resort golf course.

Cable Beach in Nassau was selected for the location of this project because of Cable Beach itself, its location near the Nassau International Airport, The Government of the Bahamas policies of encouraging new and expanded tourist facilities, and because Cable Beach has existing infrastructure to support the resort development.

The Baha Mar Resort Project will be the Caribbean's largest single-phase destination resort, representing the largest, single hospitality investment in the region, and creating a unique resort metropolis in terms of setting, design, operation and services. The Baha Mar resort will offer a total of approximately 3,500 guest rooms and innovative cross-property services, including the only championship-quality golf courses in Nassau. Table 1 provides a description of the proposed development activities for the Baha Mar Resort development.

Project Design Philosophy

The Baha Mar project will be designed in accordance with "sustainable" design principles. Baha Mar Ltd will incorporate Sustainable Design principles into the project design process in order to avoid adverse environmental impacts and minimize any negative environmental impacts associated with development of the project. Such an integrated approach positively impacts all phases of a building's life-cycle, including design, construction, and operation and decommissioning. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments.

The Baha Mar Resort Project will strive to incorporate the following sustainable design objectives into the proposed development:

- Increase energy and water efficiency and conservation.
- Increase use of renewable energy resources.
- Reduce or eliminate toxic and hazardous substances in facilities, processes, and their surrounding environment.
- Improve indoor air quality and interior and exterior environments leading to increased human productivity and performance and better human health.
- Use resources and material efficiently.
- Select materials and products that would minimize safety hazards and cumulative environmental impacts.
- Increase use of recycled content and other environmentally preferred products.
- Salvage and recycle construction waste and building materials during construction and during demolition.
- Prevent the generation of harmful materials and emissions during construction, operation, and decommissioning/demolition.
- Implement maintenance and operation practices that reduce or eliminate harmful effects on people and the natural environment.
- Reuse existing infrastructure, locate facilities near public transportation, and consider redevelopment of contaminated properties.

Baha Mar Ltd seeks to improve and enhance the environment associated with development of the Baha Mar Resort. From the inception of this project the Baha Mar development team has recognized the challenges presented with potable water supply. Included in these challenges is the scarcity of quality groundwater as well as lack of land available for well field development. The proposed development plans for Baha Mar include the following efforts to conserve water resources:

- Green roof techniques will be used to reduce heating and air conditioning loads and to mitigate rooftop stormwater runoff;
- Irrigation water will be provided by sewage effluent treated to tertiary standards, pumped to a freshwater pond on the golf course, and used for irrigation throughout the resort;
- Brackish water from non-potable aquifers and waste processes will be used for irrigation of the golf course fairways and greens;
- Stormwater run-off will be collected and discharged to retention ponds on the golf course for flood control and to recharge the aquifer; and
- Additional water conservation measures will be implemented throughout the resort as further discussed in subsequent sections of this document.

Additional examples of the Baha Mar Ltd efforts to protect and preserve the environment include restoration and preservation of Cable Beach and Hobby Horse Pond, recycling and reuse of construction demolition materials, and use of salt-tolerant grass on the golf courses to minimize the use of pesticides and herbicides that could impact adjacent wetlands.

Project Alternatives

Baha Mar Ltd analyzed potential project alternatives, as outlined in Section 1.7 of the EIA, during development of the Baha Mar resort project. Project alternatives considered include: the no-build option, existing resort refurbishment, and construction of the Project at an alternative site. Additional project alternatives considered include: construction of the central services facility at an alternative site, potable water supply, wastewater treatment, and

electrical generation. As described within the EIA, the proposed project best satisfies the overall economic, technical, environmental, social and cultural criteria used to evaluate project alternatives.

S.2 LEGAL, REGULATORY, AND ADMINISTRATIVE REQUIREMENTS

As discussed further in Section 2 of the EIA, The Commonwealth of The Bahamas has established a comprehensive institutional and legal framework for environmental protection and natural resources management. Three key organizations, The Bahamas Environment, Science and Technology Commission (BEST), the Department of Environmental Health Services (DEHS) and The Bahamas National Trust (BNT), together with specific governmental resource management agencies, provide the institutional direction for environmental protection and management. Environmental protection is supported by a number of laws and regulations that control activities in the physical and biological environment. Recent modifications to long-established natural resources laws, and new laws and regulations dealing with the physical environment, have enhanced the existing legal framework. Additional laws are currently under development to update the existing legal structure.

The Ministry of Works and Transport and the Ministry of Environment play a lead role in managing the physical development of The Bahamas. The Ministry of Works and Transport is responsible for the development of the country's roadway network and the Department of Physical Planning in the Ministry of Environment is responsible for the establishment of planning and zoning requirements.

Table 12 summarizes the key governmental organizations, the specific regulations that grant a particular agency its jurisdiction, and their charge. Summarized in the table are the institutional and administrative frameworks governing proposed new actions, followed by a listing of the laws, regulations and criteria that apply to this project.

S.3 BASELINE PHYSICAL ENVIRONMENTAL

The Bahamas consist of an archipelago of some 700 islands, many of which are uninhabited, with a total land mass of 13,942 km^2 (5,383 mi^2). At its closest point, The Bahamas is only 45 miles from the Florida coast.

Multiple studies were commissioned by Baha Mar Ltd to collect information used to assess existing baseline conditions of the marine and terrestrial environment within the project area. As described in Section 3 of the EIA, the assessment of the project area's physical environment consisted of an evaluation of the following:

- Topography and Climate,
- Oceanographic Conditions,
- Regional Geology;
- Hydrology and Surface Waters;
- Air and Noise;
- Existing Land Uses and Facilities; and,
- Potential Environmental Contamination.

S.4 BASELINE NATURAL ENVIRONMENT

As discussed further in Section 4 of the EIA, natural environment components include analysis of upland, wetland, developed and disturbed habitats, offshore and inshore aquatic ecosystems, and protected species and habitats.

Nine categories of coverage within the subject property and its immediate vicinity were identified:

- Dry Broad-Leaved Evergreen Forest
- Dry Broad-Leaved Evergreen Shrublands
- Red Mangrove Forest Wetlands
- Red mangrove Shrubland Wetlands
- Cocoplum-Marsh Fern Woodland Wetland
  Buttonwood-Black Sedge Temporal Marsh Wetland
- Ephemeral Pond Wetland
- Open Water Areas
- Developed and Disturbed

Developed and disturbed areas comprise approximately 66% of the proposed development area. Wildlife surveys of the project area were performed with a focus on avifaunal species. Survey results are presented in Section 4 of the EIA.

Baseline offshore and inshore aquatic ecosystem surveys were analyzed. Inshore aquatic ecosystems include manmade and altered natural systems. Manmade aquatic ecosystems in the project area consist of the golf course ponds located at the project site. A further analysis of these ecosystems is presented in Section 4 of the EIA.

The presence of protected species and habitats was identified within the project area. Based on The Wild Animals Protection Act of 1968, there has been no documentation of any protected animal species present within the project area. While the presence of protected plant species within the project limits has been confirmed, no habitats formally designated as protected exist within the project limits. Four protected tree species were observed within the project limits. These included *Ceiba pentandra*, *Guapira discolor*, *Lysiloma sabicu*, and *Swietenia mahagoni*.

No National Parks, protected areas, or marine reserves exist within the project area.

S. 5 BASELINE SOCIOECONOMIC CONDITIONS

As discussed further in Section 5 of the EIA, baseline socioeconomic conditions include population, economics, land use, transportation, infrastructure and public services, cultural resources, and community organizations.

Population
The Bahamas is a politically stable, middle-income, developing country with a population of just over 300,000. The most densely populated island is New Providence, where Nassau is located, with a population density of 2340.4 persons per square mile.

Economics

The Bahamas is one of the wealthiest nations in the Caribbean region. In 1999, The Bahamas' per capita income was $14,500, the highest of the Caribbean nations. The Gross Domestic Product (GDP), by government estimates, was approximately $4.81 billion in 2000. The Bahamas has an import-oriented, service-based economy that relies heavily on tourism for foreign exchange. The country does produce some chemicals and pharmaceuticals for export, and products such as the aragonite, rum and sun-dried sea salt. With few domestic resources and little industry, The Bahamas imports nearly all its food and manufactured goods from the United States. The Bahamian economy has grown by three to four percent in each of the past two years, largely attributable to strong investment in the tourism sector.

Land Use

The project will take place primarily on previously developed land that includes hotels/resorts and their support facilities and commercial buildings (banks, a police station, and small retail stores) along West Bay Street, and a golf course south of West Bay Street along the eastern property boundary. Undeveloped properties included within the proposed development areas consist of upland and wetland cover types. The proposed Cable Beach development site and related land classification types and acreages are described in Table 44.

Transportation

The roadway network in and around the resort serves both traffic destined for the resort facilities as well as through traffic moving east and west across New Providence. The major roadways in the vicinity of the project include: West Bay Street, Prospect Road, Prospect Ridge Road, Skyline Drive, JFK Drive, and Gladstone Road. Traffic along these roadways is at or above carrying capacity creating congestion during peak travel times.

Infrastructure and Public Services

Each of the existing resort facilities has a Reverse Osmosis Water Treatment system for potable water, Waste Water Treatment Plants to handle wastewater and sewage, trash containers to handle solid wastes, and electric generators to supplement or backup electricity provided by The Bahamas Electricity Corporation. The intent of the proposed Central Services Facility is to consolidate these services for the entire Baha Mar Resort and locate them where they will not interfere with the guest experience.

Cultural Resources

Based on preliminary archival, literature, and map background research, interviews with the various personnel, and a project site visit/walkover, there presently appears to be a least four (4) above ground points of potential historic significance and/or areas of potential for prehistoric or historic subsurface archaeological resources: Hobby Horse Hall, The Estate of Sir Harry Oakes, The "Old Golf Course", and Wetland and Lakeshore Margins. Despite the modifications to landscapes and structures that have subsequently taken place on or near the aforementioned above ground points of historic significance since the period of origin, height of notoriety or use, or habitation by original owner, that these sites are considered to be of great historic significance by Bahamians and Bahamian agencies, and merit detailed and documentary study prior to project adverse impacts. Archaeological survey within the project area for the express purpose of locating prehistoric and historic archaeological sites that have not been previously recorded (the focus being on the wooded areas in the western and southern portions of the Baha Mar Development Site and near the margins of wetlands and lakeshore) will provide an opportunity to gain information on potentially significant

archaeological cultural resources through a combination of testing and mitigation options prior to project adverse impacts.

Community Organizations

Baha Mar Ltd has held informal meetings with local communities groups such as neighborhood groups in the Skyline Drive and Prospect Ridge Road areas to discuss the components of the project and potential impacts to the surrounding areas. Baha Mar Ltd will maintain an open dialogue with stakeholders throughout the permitting, planning and construction phases of the Project.

S.6 ANTICIPATED PHYSICAL ENVIRONMENTAL IMPACTS

As discussed further in Section 6, extensive evaluation and planning during the site selection and project design phase, as well as operational features and procedures discussed in Section 9 of the EIA, will be implemented to avoid or minimize potential environmental impacts from the project. The construction and operational impact evaluation consists of an evaluation of erosion and sedimentation, water quality, air quality, noise level, solid and hazardous waste, and fire and hurricane risk.

Erosion and Sedimentation

It is expected the construction phase of the Project will pose a risk of erosion and sedimentation for impacted soils. However, activities will be monitored in accordance with the Environmental Management Plan (EMP), located in Appendix G of the EIA, thus minimizing impacts to environmentally sensitive resources on and off site.

Water Quality, Air Quality, and Noise

The project will have minimal impact on water quality, air quality, and noise. While short-term negative impacts are likely due to construction activities, these impacts will diminish upon project completion. The project will result in the removal of a number of existing wastewater discharges to surface water. Existing air quality emission sources will be replaced with new, high efficiency units resulting in lower emissions. Ground water/soil contamination areas will be cleaned up. An Air Quality Impact Analysis is provided as Appendix C of the EIA. During the operation phase of the proposed Baha Mar Resort, noise levels will be similar to those occurring today with the current operations. A Noise Impact Analysis is provided as Appendix D of the EIA.

To protect the quality and use of surface and groundwater in the Project area, Baha Mar commits to the following:

- Baha Mar will install impervious lining beneath any irrigation pond, canal or show lake it constructs to prevent impacts to the freshwater lens beneath the project site.

- As per the Bahamas Investment Authority letter dated November 30, 2010 approving this Environmental Impact Assessment, Baha Mar Ltd. will prepare and submit to the Ministry of Works and Transport and the Ministry of Environment a drainage/stormwater management plan for the Central Services (Back-of-House) facility on Gladstone Road that is designed to minimize site runoff.

Baha Mar is committed to reducing its emissions of air pollutants, and in particular, carbon dioxide, to fullest extent possible. Baha Mar will undertake measures to reduce its direct and indirect emissions of CO2. Baha Mar will use the lowest sulfur content distillate fuel that is reasonably available; will investigate the use of a seawater district cooling system to reduce electricity use for air conditioning; and will consider the use of solar hot water heaters for the laundry facility to be located at the Central Services Facility.

Air and fugitive dust emissions resulting from construction operations will be temporary in nature, and will be controlled to the maximum extent practicable as described in Section 6.4.1. Baha Mar will require that all contractors prepare and submit fugitive dust suppression and monitoring procedures as part of their contract-specific Environmental Management Plans.

Solid and Hazardous Waste
Solid and hazardous wastes (i.e., petroleum products and chemicals) will be utilized during the construction phase of the project to support the operation of heavy equipment, electrical generating equipment and the construction process. Negative impacts to the environment will be mitigated by:

- Storing all Hazardous Materials in clearly labeled containers and vessels.
- A materials inventory listing the approximate types and quantities of petroleum and chemical materials to be stored at the facility will be used.
- Additional details on petroleum and chemical management practices, and spill control, response and pollution prevention programs are presented in the EMP, provided as Appendix G of the EIA.

Solid and Chemical Waste Management
The measures implemented to mitigate negative impacts associated with solid and chemical wastes during the construction and operation phase of the project is similar to those measures identified for solid and hazardous waste. Refer to Sections 6.6 and 6.7 in addition to the EMP for a detailed description of prevention and mitigation measures.

Fire and Hurricane Risk
Impacts from fires and hurricanes will be minimized during the construction and operations phase of the development project by:

- Storing all Hazardous Materials in clearly labeled containers and vessels.
- Baha Mar Ltd has established a base elevation of 10 feet for buildings and critical building systems as protection from flooding caused by storm surges and wave levels.
- Continually evaluating design requirements to respond to any new information or guidance provided as the building designs process continues.
- Upgrading existing fire control systems and installing new stare-of-the art fire control systems in the newly contrasted facilities.
- Constructing a new police and fire station to provide an increased level of service to the resort as well as the local community.

Baha Mar Ltd has developed an Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan, Emergency Plan, Security Plan and Contractor Health and

Safety Plan in the EMP to address the risks associated with non-routine events, as discussed in Section 9 of the EIA.

S.7 ANTICIPATED NATURAL ENVIRONMENTAL IMPACTS

As discussed further in Section 7 of the EIA, anticipated natural environmental impacts include assessments of terrestrial, aquatic, protected, and shoreline habitat impacts from the proposed development. While there will be negative impacts associated with habitats being converted to developed areas, measures will be taken to minimize habitat alteration and to create positive habitat impacts where practical. The project core will result in the development of 181.3 acres of land that are currently undeveloped. Table 40 provides a summary of the changes in ecosystem types that will occur due to project development.

In order to provide mitigation for project-related wetland impacts, Baha Mar Ltd has committed to establishing a wetland park/reserve on the 71.4-acre Volpi parcel between Atlantic Avenue and Skyline Drive. As provided in the Amended and Restated Heads of Agreement, this parcel will be designated by the Government as a "no build zone", to be used as a public park for appropriate recreational use. Baha Mar is committed to improving, beautifying, and developing the parcel as a wildlife and wetlands sanctuary. Baha Mar will also establish a trust for perpetual maintenance of this wetlands and wildlife sanctuary.

Baha Mar will employ a qualified arborist to survey and mark any protected tree species occurring within the construction area in accordance with its *Protected Tree Species Preservation Plan and Protocol*. During the construction process Baha Mar's Environmental Monitor will oversee the protection of the flagged trees. The shoreline along Cable Beach will be positively impacted from the proposed removal of an existing jetty, which will result in positive long-term impacts by restoring it to its natural condition.

Baha Mar will prepare and submit to the Ministry of the Environment a plan identifying the construction techniques to be employed during the removal of the "Wyndham Jetty" structures to be removed as part of the development; any restoration or stabilization measures to be carried out; and any preventative or monitoring measures that will be taken during the demolition to ensure protection of Goodman's Bay.

S.8 SOCIOECONOMIC IMPACTS

As discussed further in Section 8 of the EIA, anticipated socioeconomic impacts include an assessment of land use, visual and aesthetic impacts on neighbors, relocation, traffic, economics, and cultural resources.

Land Use

The effect of the redevelopment of the existing Cable Beach Resort properties will be restricted to those areas directly impacted by project construction activities. These areas include the Cable Beach Resort Properties, the currently undeveloped properties south and west of the Resort Properties. The mixed commercial residential strip along West Bay Street to the west of the project site and the residential areas south of the mixed commercial/ residential strip would not be directly impacted by the proposed project.

Visual and Aesthetic Impacts on Neighbors

The proposed project facilities will include hotels that will exceed the existing building heights. The existing Sheraton Cable Beach Resort and Wyndham Nassau Resort and Casino buildings are 100-feet and 160-feet tall, respectively, and new buildings will have heights ranging from 72 to 321 feet. These new buildings will be visible by travelers using the relocated West Bay Street and by residents at higher elevations south of the project site. However, the existing hotels and infrastructure in the Cable Beach area does not reflect the Bahamian culture and style and lacks the aesthetic value of the indigenous architecture and culture. The proposed Baha Mar Resort Project is being designed to capture the flavor and feel of The Bahamas and it is believed that that future views will generally be considered a positive change in the visual landscape. It is anticipated that neighborhoods in proximity to the Baha Mar Resort development will experience positive increases in property values. The increased economic activity associated with the resort will result in increase vehicular traffic along roadways in the project area including the main arterials leading to residential areas in the project vicinity.

Relocation Impacts

The re-development of the existing Cable Beach Resort properties into the Baha Mar Resort will require the relocation of some existing commercial businesses and government offices. No residential or institutional relocations will be required for the development.

Traffic Impacts

The potential impacts of project-related traffic was studied at the following junctions:

- West Bay Street/Atlantic Avenue. Existing roundabout.
- West Bay Street/Skyline Drive. Existing roundabout.
- West Bay Street/Prospect Road. Existing roundabout.
- Prospect Road/Prospect Ridge Road/Sandford Drive. Existing signalised junction.
- Prospect Road/JFK Drive/Tonique Williams-Darling Highway. Existing signalised junction.
- JFK Drive/Gladstone Road. Existing signalised junction.
- West Bay Street/Cable Beach Resort Entrance. Proposed roundabout.
- West Bay Street/West Podium Entrance/Commercial Village Entrance. Proposed roundabout.
- West Bay Street/Gladstone Road/Main Podium Entrance. Proposed roundabout.
- West Bay Street/East Podium Entrance. Proposed roundabout.
- West Bay Street/Breezes Entrance. Proposed roundabout.

The junction of JFK Drive/Gladstone Road was found to operate above capacity with the Year 2012 No Build Conditions. The additional traffic generated by the Baha Mar Resort Project would result in higher volume to capacity ratios and further degrade junction performance. While mitigation at this junction is justified with or without the Baha Mar Resort Project, the additional Baha Mar traffic creates the need for additional capacity at this location.

In summary it is expected that traffic destined for the resort will generally use the new Gladstone Road extension from JFK Drive and West Bay Street for access. The potential for increased traffic to access the new Central Services Facility via Prospect Ridge Road and Skyline Drive and impacting those neighborhoods will be minimized by the planned disconnection of Prospect Ridge Road as it crosses the new golf course site.

Economics
The development of the Baha Mar Resort will result in a significant increase in direct employment at the Baha Mar Resort compared to existing employment, and a corresponding major increase in the direct wages paid to Bahamian workers. The effect of these increased wages will result in other indirect and induced benefits as the direct wages are multiplied through the economy. Construction and development over four years will generate $404 million in wages and salaries, and $528 million in GDP. During the 5 year construction period, the project will sustain an average employment level of 2,822 jobs with a peak level of 5,238 construction jobs. Within its first full year of operation, the resort will contribute nearly $400 million to GDP, adding 6.5% to The Bahamas' current gross domestic product. Additionally, the resort will directly sustain over 5,000 permanent jobs at full operation, an increase of approximately 125% over current employment levels, and indirectly generate an additional 2,525 jobs within suppliers and other parts of the Bahamas economy. The cumulative GDP impact of construction and operations will be $11.2 billion over 20 years. Total generated taxes over a twenty-year period of resort operations will tally $4.7 billion.

Cultural Resources
The Baha Mar Resort Project has the potential to not only adversely impact a previously recorded prehistoric site on the shoreline of Lake Cunningham, but also impact previously unrecorded historic sites in close proximity to the proposed Project construction. Despite the modifications to landscapes and structures that have subsequently taken place on or near the aforementioned above ground points of historic significance since the period of origin, height of notoriety or use, or habitation by original owner, that these sites may considered to be of great historic significance by Bahamians and Bahamian agencies, and merit detailed and documentary study prior to project direct and indirect adverse impacts.

S.9 CONCEPTUAL ENVIRONMENTAL MANAGEMENT PLAN

Baha Mar Ltd commits to hiring a full-time environmental manager to oversee environmental aspects associated with the Project. The environmental manager will oversee the execution of mitigation measures identified in the EIA and the implementation of the procedures and requirements established through the Environmental Management Plan (EMP).

The EMP discussed Section 9 and located in Appendix G of the EIA, presents a series of measures that will provide for the mitigation of potential environmental impacts resulting from Resort construction and operation.

The objectives of the EMP are to:

- Define the specific requirements for environmental compliance with the Bahamian government, permit conditions, and other applicable environmental documents that contain environmental requirements;
- Identify the responsibilities and actions required by all parties (i.e., Baha Mar Ltd, contractors) during project execution and operation to maintain compliance with the environmental requirements; and
- Provide the necessary procedures for communication, documentation, and review of environmental compliance activities.

Specific plans included in the EMP are:

- Attachment 1: Construction Spill Prevention, Control and Countermeasures (SPCC) Plan;
- Attachment 2: Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan;
- Attachment 3: Contractor Health and Safety Plan;
- Attachment 4: Sediment, Erosion and Stormwater Control Plan;
- Attachment 5: Golf Course Management Plan;
- Attachment 6: Contaminated Sediment and Soil Management Plan;
- Attachment 7: Waste Minimization Plan;
- Attachment 8: Construction Management Plan;
- Attachment 9: Worker Safety Plan;
- Attachment 10: Emergency Plan;
- Attachment 11: Security Plan; and,
- Attachment 12: Invasive Species Management Plan

The EMP will be a living document that will be continually updated throughout construction and operation of the project to ensure environmental hazards are controlled to the maximum extent practicable.

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ACRONYMS AND ABBREVIATIONS

AAQS	Ambient Air Quality Standards
AEC	Areas of Environmental Contamination
ASCE	American Society of Civil Engineers
AST	Above Ground Storage Tanks
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ATCO	ATCO Noise Management
Baychem	Baychem Spill Technologies
BBC	Bahamas Building Code
BBM	buttonwood / black sedge marshland
BEC	Bahamas Electricity Corporation
BEST	Bahamas Environment, Science and Technology Commission
BLS	Below Land Surface
BML	Baha Mar Ltd.
BMP	Best Management Practices
BNT	Bahamas National Trust
BOH	Back-of-House
BOO	Buy/Own/Operate
BTU	British Thermal Unit
CFR	United States Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species
CMW	Cocoplum-Marsh Fern Woodland Wetland
CO	Carbon Monoxide
CSF	Central Services Facility
CSTT	United Kingdom Comprehensive Studies Task Team
D	Disturbed invasive
DBEF	Dry Broad-leaved Evergreen Forest
DBES	Dry Broad-leaved Evergreen Shrubland
DEHS	Department of Environmental Health Services
D-P	Disturbed pine
dS/m	deciSiemens per metre
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIFS	Exterior Insulation and Finish Systems
EHA	Environmental Health Act
EMP	Environmental Management Plan
ESF	Emergency Support Functions
ESM	Environmentally Sound Management
FOH	Front-of-House
GDP	Gross Domestic Product

ACRONYMS AND ABBREVIATIONS
(Continued)

GES	Groundwater & Environmental Services
GPD	Gallons Per Day
GPM	Gallons Per Minute
HAI	Hydrologic Associates U.S.A., Inc.
HCB	Hotel Corporation of The Bahamas
HDPE	High Density Polyethylene
HGL	Hydraulic Grade Line
HP	Horse Power
hr	hour
HRSG	Heat Recovery Steam Generator
HSA	Health Services Act
HVAC	Heating/Ventilation/Air Conditioning
ITE	Institute of Engineers
KGPD	Kilograms per Day
Leq	equivalent continuous noise level
LP	Liquid Propane
MEP	Mechanical/Electrical/Plumbing
MIG	Million Imperial Gallons
MIGD	Million Imperial Gallons per Day
MOWT	Bahamas Ministry of Works and Transport
MPN	Most Probable Number
MW	Monitoring Well
NAS	Nassau International Airport
NEA	Northeast Ecological Associates
NEMA	National Emergency Management Agency
NFPA	National Fire Protection Association, Inc.
NDP	National Disaster Plan
NOx	Oxides of Nitrogen
NOAA	National Oceanographic and Atmospheric Administration
P	Ephemeral pond
PACD	Plan of Action to Combat Desertification
Pb	Lead
PM_{10}	Particulate Matter measuring 10mm or less
PTC	Performance Test Code
RFC	Ratio of Flow to Capacity
RMS	Red Mangrove Shrubland
RO	Reverse Osmosis
SHELL	Shell Bahamas Ltd.
SO_2	Sulphur Dioxide
SVOC	Semi Volatile Organic Compounds

ACRONYMS AND ABBREVIATIONS
(Continued)

SWRO	Seawater Reverse Osmosis
TDS	Total Dissolved Solids
TEP	Total Energy Plant
TRL	Transport Research Laboratory
UN	United Nations
UNCLS	United Nations Code of the Law of the Sea
UNCOD	United Nations Code of Desertification
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
VFD	Variable Frequency Drives
WHO	World Health Organization
WSC	Water and Sewerage Corporation
WWTP	Waste Water Treatment Plants

1. PROJECT DESCRIPTION

1.1 Objective and Scope of Environmental Impact Assessment

This Environmental Impact Assessment (EIA) evaluates the potential environmental, social, economic, cultural, and natural impacts of the proposed Baha Mar Resort Project, planned for New Providence Island, Nassau, The Bahamas. The proposed project involves the renovation of the existing Sheraton (formerly Radisson) Cable Beach & Golf Resort and Wyndham Nassau Resort properties, demolition of the Nassau Beach Hotel, relocation of West Bay Street, relocation of existing commercial properties, construction of a new 18-hole golf course, and the development of new hotel and residential units and other facilities at the existing, developed Cable Beach site.

As the project will involve both the renovation of existing and construction of new facilities, the environmental impact analysis will examine the change in impacts due to the redevelopment of existing developed areas as well as the potential impacts from the development of facilities in areas that are currently undeveloped. The EIA was prepared in accordance with The Bahamas Environment, Science and Technology (BEST) Commission guidance including the *General Components of an Environmental Impact Assessment (2005)* and the revised Terms of Reference provided to the BEST Commission in January 2006.

1.2 Project Proponents

The Baha Mar Resort will be developed by Baha Mar Ltd, a Bahamian international business company incorporated in February 2010. Baha Mar Ltd will, through a network of subsidiary entities, develop, own and operate the Baha Mar Resort. Baha Mar will establish a new blueprint for resort development, representing the largest, single hospitality investment in the region, and creating a unique resort metropolis in terms of its setting, design, operation, and services.

Baha Mar Ltd. subsidiary companies will own fee simple interest in parcels of land where the Sheraton Cable Beach Resort and the Wyndham Nassau Resort and Casino are located. Sheraton Cable Beach Resort will be managed and operated by Starwood under the Sheraton brand. The Wyndham Nassau Resort and Casino will be managed and operated by Wyndham Hotel Management Inc. Baha Mar will feature a collection of four hotel brands at a single resort. This will consist of a 200-room Mondrian Hotel at Baha Mar, with an additional 100 condo units; a 200-room Rosewood at Baha Mar, including 100 condo units, a 600-room Hyatt at Baha Mar and 100 condo units; and a 1,000-room Casino Hotel at Baha Mar. In addition to the hotels, branded luxury spas are also planned at the Mondrian and Rosewood Hotels, respectively, as well as a new destination Spa.

1.3 Project Purpose

The proposed Baha Mar Resort Project is intended to be one of the premier destination resorts in the world. Situated on a pristine ocean-front site at Cable Beach in Nassau, the Bahamas, the Baha Mar Resort Project is a pioneering “Resort Metropolis” offering world-class sanctuary for discriminating travelers seeking an unparalleled vacation paradise.

To achieve this goal of being an international resort destination – Baha Mar includes a collection of amenities that will set it apart from other resort destinations and enhance New Providence Island's reputation as the destination of choice worldwide. The development program for the resort incorporates a number of critical development components that together will work together to achieve the goal of making Nassau a world-class destination. The result is six remarkable hotels, a first class casino, a renowned golf course, refined spas, sumptuous eateries, celebrated shopping, sophisticated entertainment, and stunning beach amenities, all surrounded in the luxury and magnificence of the Caribbean – inspired architecture.

In the planning of the resort, Baha Mar Resorts, Ltd. built on its experience and consulted with experts and conducted market research to identify the key program elements that would be required for the resort to achieve its goal as a "Resort Metropolis". These program elements include:

- Location on a world class beach in a recognized resort Island location.
- Proximity to an International Airport that provides a direct connection from the airport to the resort in 15 minutes or less.
- A "Las Vegas Style" Casino
- A Convention Center designed as a mid size facility to attract medium sized conventions, trade shows and consumer shows.
- On site resort amenities including pools and water features, restaurants, retail and craft shops, entertainment venues, and other attractions.
- A wide variety of hotel rooms and hotel types and sizes for resort, casino, and convention guests, and
- A signature golf course as part of the resort.

Cable Beach in Nassau was selected for the location of this project because of Cable Beach itself, its location near the Nassau International Airport, the Government of the Bahamas policies of encouraging new and expanded tourist facilities, and because Cable Beach has existing infrastructure to support the resort development.

The Baha Mar Resort Project will be the Caribbean's largest single-phase destination resort, representing the largest, single hospitality investment in the region, and creating a unique resort metropolis in terms of setting, design, operation and services. The Baha Mar Resort Project will offer a total of approximately 3,500 guest rooms and innovative cross-property services, including the only Jack Nicklaus Signature golf course in The Bahamas.

This project will preserve and strengthen the character of the Cable Beach area in such a way to preserve and insure its future. Baha Mar's revitalization of the Cable Beach area includes development of a 686-acre mixed use site to attract international visitors to this waterfront, and provide hotel accommodations, a free-standing luxury spa facility - the largest in the Caribbean, housing, offices, retail space, civic facilities, gaming, entertainment and recreational activities. The Baha Mar Resort Project will provide a major enhancement to the local economy, providing thousands of construction jobs and permanent employment opportunities to support all aspects of operations at the site, as well as revenue from increased tourism. Construction on Baha Mar is scheduled to begin in 2011, with opening anticipated in 2014.

1.4 Project Design Philosophy

The Baha Mar project will be designed and constructed under the direction of Baha Mar Ltd in accordance with "sustainable" design principles to the greatest extent possible with world class resort standards. Sustainable design seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments.

Sustainable design principles include the ability to:

- Optimize site potential;
- Minimize non-renewable energy consumption;
- Use environmentally preferable products;
- Protect and conserve water;
- Enhance indoor environmental quality; and,
- Optimize operational and maintenance practices.

Specific sustainable design objectives include, but are not limited to:

- Increase energy and water efficiency and conservation.
- Increase use of renewable energy resources.
- Reduce or eliminate toxic and hazardous substances in facilities, processes, and their surrounding environment.
- Improve indoor air quality and interior and exterior environments leading to increased human productivity and performance and better human health.
- Use resources and material efficiently.
- Select materials and products that would minimize safety hazards and cumulative environmental impacts.
- Increase use of recycled content and other environmentally preferred products.
- Salvage and recycle construction waste and building materials during construction and during demolition.
- Prevent the generation of harmful materials and emissions during construction, operation, and decommissioning/demolition.
- Implement maintenance and operation practices that reduce or eliminate harmful effects on people and the natural environment.
- Reuse existing infrastructure, locate facilities near public transportation, and consider redevelopment of contaminated properties.

Utilizing a sustainable design philosophy encourages decisions at each phase of the design process that will reduce negative impacts on the environment and the health of the occupants, without compromising the bottom line. It is an integrated, holistic approach that encourages compromise and tradeoffs. Such an integrated approach positively impacts all phases of a building's life-cycle, including design, construction, and operation and decommissioning.

Baha Mar Ltd will incorporate sustainable design principles into the project design process in order to avoid adverse environmental impacts and minimize any negative environmental impacts associated with development of the project. Furthermore, Baha Mar Ltd seeks to improve and enhance the environment associated with development of the Baha Mar Resort.

For example, from the inception of this project, the Baha Mar development team has recognized the challenges presented with potable water supply. Included in these challenges is the scarcity of quality groundwater as well as lack of land available for well field development. The proposed development plans for Baha Mar include the following efforts to conserve water resources:

- Green roof techniques will be used to reduce heating and air conditioning loads and to mitigate rooftop stormwater runoff;
- Irrigation water will be provided by sewage effluent treated to tertiary standards,, pumped to a freshwater pond on the golf course, and used for irrigation throughout the resort;
- Brackish water from non-potable aquifers and waste processes will be used for irrigation of the golf course fairways and greens;
- Stormwater run-off will be collected and discharged to stormwater ponds on the golf course or recharged to the aquifer using drainage wells; and
- Additional water conservation measures will be implemented throughout the resort as further discussed in subsequent sections of this document.

Additional examples of Baha Mar Ltd's efforts to protect and preserve the environment include restoration and preservation of Cable Beach itself, recycling and reuse of construction demolition materials, and use of salt-tolerant grass on the golf courses to minimize the use of pesticides and herbicides that could impact aquifers and adjacent wetlands.

1.5 Project Study Area

The proposed project involves the redevelopment of the existing Sheraton, Wyndham, and Nassau Beach Hotels at Cable Beach. The area of direct influence associated with the proposed redevelopment extends roughly from Goodman's Bay on the north, west along West Bay Street to Atlantic Drive, south to the intersection of JFK Boulevard and Gladstone Road, and east to the intersection of Prospect Ridge Road and West Bay Street. This area of direct influence will include land areas disturbed by construction, roadways impacted by construction and operational traffic, and changes in noise and visual characteristics. Figure 1 presents the project study area. Secondary impacts of the project will extend across New Providence Island due to the increased economic activity generated by the development.

1.6 Resort Facilities Description

The project includes constructing a large resort development consisting of approximately 3,500 hotel rooms, a world class 18-hole golf course, a retail village, luxury spas, the region's largest casino, meeting space, restaurants, and entertainment venues. Aesthetic features of the Baha Mar resort include a 50-ft high waterfall at the main entrance, a saltwater canal system, and a "show lake" for live entertainment events. Figure 2 provides an overview of the proposed project development master plan. Additional views of the proposed development are provided in Figure 3.

The Baha Mar Resort Project will be constructed over a period of 4 years between 2011 and 2014. For project planning purposes, the resort development has been subdivided into subunits. Development activities have been further designated to either occur in the First

Phase opening in 2014 or in the Future ultimate build-out plan. These planning subunits are shown on Figure 3 and in Table 1.

A brief description of each of the development subunits is presented below. This description begins with those facilities expected to be in place at the end of Phase 1 followed by a description of the later development phases to provide a complete description of all the proposed development activities. In total the first phase of the resort facilities will offer a total of approximately 3,600 guest rooms, including six hotels, a variety of residential units, a convention center, a spa, and retail facilities. The detailed description of the proposed resort facilities is based on the Diagrammatic Master Parcel Plan provided as Figure 3 and on Table 1.

1.6.1 Phase 1 Facilities

1.6.1.1 Area 1 – Casino Podium

Development Area 1 consists of a generally 2-level podium that houses the main resort core functions. The lower, basement, level includes the main back-of-house (BOH) service areas for the Casino Hotel and Casino, Hyatt Hotel, Mondrian Hotel and Rosewood Hotel, and meeting rooms, retail, restaurants, night clubs, offices, spa, and mechanical/electrical/plumbing (MEP) functions. The roof of the Podium will be a "garden type" finish inclusive of hard and soft landscaping.

The Casino Podium totaling 764,855-sf, and consisting of a two story structural concrete frame structure will serve as the base for the four newly constructed hotels and condominium facilities at Baha Mar. It will also serve as the support structure for a spa, a nightclub, and non-hotel retail.

The upper level is the main arrival level. There are three main entry Porte Cocheres serving the podium. The south Porte Cochere is the main entry drop-off for the casino, Casino Hotel and Hyatt Hotel. The west Porte Cochere is the main entry drop-off for the Mondrian Hotel. The east Porte Cochere is the main entry drop-off for the Rosewood Hotel and also the Casino. The main functions on this level include casino (gaming, front-of-house (FOH), and support), Hyatt, Mondrian and Rosewood hotels (FOH/lobbies), meeting rooms, retail, restaurants and the destination spa.

1.6.1.2 Area 1 - Casino

The casino facility will feature approximately 68,000 sf of gaming floor area. It will include 1,500 slot machines, 100 high limit slots, 70 table games, 15 poker tables, 10 high limit table games, 2,500 sq. ft of race/sports booking and 2,000 sq. ft of outdoor gaming. The Casino will be a single level facility of structural concrete frame. The Casino is part of the Podium structure. The skin of the Casino building will be a composite of glass, masonry and stucco. There will be Mezzanine Level directly under the Casino Hotel and Hyatt Tower which houses the MEP and service functions.

1.6.1.3 Area 1 - Casino Hotel Facility

The Casino hotel will include 1,060 room keys with an approximate mix of 900 typical rooms and 150 suites. The Casino Hotel will have 15 large luxury villas at the beach side base of the podium (5 two-level villas and 10 one-level villas). The hotel tower sits on top of the podium on the east side, with it main lobby and entrance arrival on the south side main Porte Cochere Level.

A second phase expansion of the Casino Tower is envisioned that will include 500 room keys, extending south across the canal to the adjacent parcel. This hotel expansion will sit on top of additional hotel BOH/FOH support facilities below. The Casino Tower hotel will be a twenty-two story structural concrete frame facility. The foundation of this hotel will be supported by the Podium structural system. The skin of the building will be a composite of masonry, stucco and glass, or panelized system of composite material, EIFS and glass. The Casino Tower will occupy 507,000 sf.

1.6.1.4 Area 1 - Hyatt Hotel Facility

This newly constructed hotel will occupy 331,000 sf and provide 700 guest rooms with an approximate mix of 600 rooms and 120 luxury condos. The tower sits on top of the 2-level podium base on the west side, with its main entry and lobby arrival at the main Porte Cochere Level, on the south side.

The facility will be a nineteen story structural concrete frame construction. The skin of the building will be composite of masonry, stucco and glass, or panelized system of composite material, EIFS and glass. EIFS, exterior insulation and finish systems, are multi-layered exterior wall systems that are used on both commercial buildings and homes. EIFS typically consist of three layers: insulation board, a fiberglass reinforced water-resistant base coat, and a durable finish coat. EIFS provide superior energy efficiency and offer much greater design flexibility than other cladding products. The foundation of this hotel will be supported by the Podium structural system.

1.6.1.5 Area 1 - Mondrian Hotel Facility

The Mondrian Hotel will be an eleven story newly constructed 153,000-sf hotel, offering 300 guest rooms including 200 room keys and 100 luxury condos. Construction will be of structural concrete frame. The tower is located on the west end of the 2-level podium overlooking the entertainment village lake to the west. Its main entry and lobby arrival is at the west Porte Cochere. The skin of the building will be a composite of masonry, stucco and glass, or panelized system of composite material, EIFS and glass. The luxury condominium building will be seven stories and constructed of a structural concrete frame. The luxury condominium facility will offer 100 units and will be approximately 150,000 sf.

1.6.1.6 Area 1 - Rosewood Hotel Facility

The Rosewood Hotel will include 100 room keys, 100 luxury condos and 5 luxury 2-level villas. The hotel tower is located on the east end of the podium with its u-shape footprint facing the beach. The main entry and lobby arrival is at the east Porte Cochere. The Rosewood will be an eight story structural concrete frame new hotel, occupying approximately 177,000 sf. The skin of the building will be a composite of masonry, stucco and glass, or panelized system of composite material, EIFS and glass. The foundation of this hotel will be supported by the Podium structural system. The Rosewood Condominium units will be located in a 150,000 sf, thirteen story structural concrete frame building, the foundation of which will be supported by the Podium structural system. The skin of the building will also be a composite of masonry, stucco and glass, or panelized system of composite material, EIFS and glass.

1.6.1.7 Area 1 - Entertainment Village

The Entertainment Village will be a one story approximately 129,874-sf facility that incorporates part of the Podium structure and freestanding units. The skin of the Entertainment Village will be of multiple finishes due to the theme of each retail operation.

1.6.1.8 Area 2 - Convention Center

The Baha Mar Convention Center will be a 300,000 sf facility, consisting of two levels and constructed of composite concrete and structural steel. The skin of the building will be a composite of concrete, masonry, glass and stucco. One level of parking will be located in the lower level of the Convention Center.

The generally 2-level Convention Facility is located to the west of the podium. The lower level includes the back-of-house, service, storage and loading dock areas. The upper level includes the Main Exhibition Hall which can be subdivided, a Ballroom, registration space, meeting rooms, Pre-function space, a food service area, and support functions. The facility will include 300,000 sf of convention space, including space for support functions. An area designated for potential future convention expansion area is located in Area 6 next to the convention facility.

The Convention Center will be designed to serve a variety of meetings, conventions, trade shows, or banquet events. Convention centers are generally classified according to the amount of floor space they offer. Large facilities provide over 500, 000 sf of space, medium size facilities are in the 100,000 to 500, 000 ft range, while small facilities have less than 100,000 sf of space. The Baha Mar Convention Center will be considered a “Mid Size” facility. According to Expo Magazine (www.expoweb.com) a mid size facility will have an average attendance of 3,700 for a convention/trade show

event and 10,200 for a consumer show. The Baha Mar Convention Center will serve both the Bahamian and the US/international market.

1.6.1.9 Area 3 - Parking Structure

Area 3 consists of a parking structure that will serve the hotels, convention facility and the adjacent Residential development.

1.6.1.10 Area 4 - Central Utility Plant

The Central Utility Plant will be located in Area 4 and will contain the mechanical heating/ventilation/air conditioning (HVAC) systems for the resort core. The Central Utility Plant includes a central refrigeration plant and a central boiler plant as described below:

A. Central Refrigeration Plant

The Central Refrigeration Plant will consist of seven (7) electric drive centrifugal refrigeration machines sized at 1,300 tons-refrigeration each, of which six (6) will be active to support the air conditioning load of the facility and one will be standby. Each refrigeration machine will have an associated chilled water pump and condenser water pump. Cooling towers will be located on the roof of the Central Utility Plant. The cooling tower will consist of multiple cells, sized for the installed refrigeration plant tonnage. The cooling tower condenser water system will be provided with a bypass sand bed filtration system.

Refrigeration machines will produce 40°F supply water with a 56°F return water temperature with condenser water at 87°F supply and 97°F return. In addition, a refrigerant detection and exhaust system will be provided at the chiller plant to automatically detect and exhaust a refrigerant leak. A dedicated mechanical ventilation system will also be provided for the central refrigeration plant.

The primary chilled water distribution will be located within the Central Utility Plant that connects all of the hotel and public space facilities. Chilled water will be routed through the utility tunnel to the core project for distribution to each hotel. Valved outlets will be provided at each hotel, public space, time share, etc., as required to provide primary chilled water to each entity.

For the Central Refrigeration Plant, a potential alternative method of heat rejection from the central refrigeration plant being considered is via salt-water wells as described below in lieu of cooling towers.

This condenser water system would consist of a series of extraction and rejection sea water wells and associated turbine type well water pumps. In this scenario there would be multiple extraction and rejection wells, with turbine pumps at each extraction well. The well

water supply temperature is approximately 70 degrees F and is assumed constant year round. The condenser water return temperature will be approximately 77 degrees F, for a total flow rate of approximately 32,000 gpm. Each extraction well and corresponding discharge well would be located at an approximate depth of 200 ft.

B. Central Boiler Plant

A Central Boiler Plant for providing hot water to the resort. The Plant's boilers will provide hot water to the resort facility and will be the primary source of heat for domestic hot water heating and air conditioning reheat systems for dehumidification.

The boiler plant will consist of three (3) high efficiency 250 bhp firetube hot water boilers and one 125 bhp firetube boiler for low load conditions. The 250 bhp boilers will be rated at 8,368,000 Btu/hr and use 73 gals/hr of diesel fuel at its rated capacity. The 125 bhp boiler is rated at 4,184,000 Btu/hr and uses 36 gals/hr at its rated capacity. The system will consist of three (3) active primary hot water pumps and one (1) standby hot water pump. The water circulated will be supplied at 200 degrees F and returned at 180 degrees F. All primary hot water pumps will be provided with variable speed drives.

A No. 2 fuel oil system will be provided for the central hot water boiler plant. The plant will be sized for three days of continuous operation at full load and as such, the fuel storage tank will consist of one (1) 8,000 gallon steel main storage tank located within building. The diesel fuel tank will be located in a separate fuel oil storage vault. The fuel oil transfer pumps will be located within the boiler plant. An oil/water separator will be provided on the drain from the boiler room to eliminate any oily water discharges to the building drainage system. It is estimated that the central hot water boiler plant will consume approximately 1,250,000 gallons of fuel oil per year.

1.6.1.11 Area 5 - Parking/Future Development

During the initial project phase, this area will be used for surface parking. This area is slated for future development.

1.6.1.12 Area 8 - Main Lake

Incorporated throughout the core project is a series of saltwater lakes and canals. These water features will act as an aesthetic resource as well as a small boat circulation route through the project. Water level in the canals is intended to be at a static elevation. There will be no tidal influence. Depth and treatment of the floor of the lakes and canals will be coordinated with the design team but is assumed to be 4 ft in depth and covered with sand. The Main Lake and associated canals will be lined to prevent intermixing between the canal water and the upper aquifer and to maintain the water level to be within 2 ft of the ground surface.

The Main Porte Cochere Bridge will span the central lake with an overall length of approximately 500 ft, with segmented flat arch spans of up to 200 ft. The bridge will likely be faced in stone veneer or textured architectural concrete, and will terminate at the Main Porte Cochere which will be supported above a water taxi drop-off. The bridge will have pedestrian access (5% slope max.) on each side as well as lighting and an architectural façade and railing component. The Main Lake is the central site element on the south side of the core project. Below the vehicular porte cochere is a water taxi drop-off. The area of the lake is approximately 4 acres. Its perimeter will be lined with pavilions, seating areas, water taxi access, and retail shops.

1.6.1.13 Area 9 - Show Lake

The 2.5 acre lined Show Lake sits at the western edge of the core project. It is intended that there will be a pavilion situated 150 ft into the lake. The pavilion will be accessed to shore by a raised causeway. Surrounding the pavilion will be a series of water display jets.

1.6.1.14 Area 25 - Entertainment Show Canal

The Entertainment Show Canal connects the Show Lake with the Main Lake. The canal is approximately 725 ft in length with varying width. Alongside of the canal are steps which are access points for water taxis. Two pedestrian ft bridges cross the canal. The west utility/service tunnel goes under this portion of the canal. The West porte-cochere bridge will span the Entertainment Show Canal and terminate at the entrance to the Mondrian Hotel. The bridge is assumed to have segmented flat arched designs and will likely be faced in stone veneer or textured architectural concrete.

1.6.1.15 Area 10 - Rosewood Canal

The Rosewood Canal is similar in scope to the Entertainment Show canal and leads from the main Show Lake to the Rosewood Hotel. The canal is crossed by one pedestrian footbridge. Phase 1 of the Casino Hotel will span the canal. The east service tunnel goes under this portion of the canal. The system of internal water taxis will use this canal segment to shuttle guests

from the Rosewood Hotel and condominiums to the Casino, and other areas within the resort. The canal will be lined with pedestrian walkways, kiosks, shops and landscaping as shown in Figure 4 and Figure 5. The East Porte Cochere Bridge will span the canal and terminate at the entrance to the Rosewood Hotel. The bridge is assumed to have segmented flat arched designs and will likely be faced in stone veneer or textured architectural concrete.

1.6.1.16 Area 20 – Commercial Village

The Commercial Village project is a relocation project for the three existing banks, and Police & Fire Station currently located on the West Bay Street. These buildings need to be relocated in order to clear the site for the main Baha Mar project's construction in 2012. All the facilities on West Bay Street within the Baha Mar project site will be relocated to the new Commercial Village site directly south of the current Sheraton Resort Hotel with the exception of the Cecil Wallace Whitfield Government Building.

The Commercial Village will include 10,641 sf of relocated Commonwealth Bank functions, 30,000 sf of offices, 17,832 sq. ft of bank/retail areas and the 13,000 sf Fire and Police Station. The following is a brief description of the buildings involved with the project and the intended scope of work.

Site works including parking drainage and landscaping will be a part of the overall Commercial Village project. These are identified below and will be confirmed through design development.

A. *The Commonwealth Bank*
The Commonwealth Bank will be located on the southeast corner of the Commercial Village site on a parcel of land totaling 1.7 acres. The exterior finish is stucco, glazing and some ceramic tile. The structure is a combination of steel framing and block infill. There are a variety of access points including a drive up bank teller, front entrance, and armored truck window. The owner has requested that the existing facility be reproduced on the new site.

B. *Fire and Police Station*
The two-story facility will sit on a piece of land totaling approximately .98 acres located on the South West corner of the site. The building will be constructed using a combination of concrete and concrete block materials with potentially steel joists and concrete decking. The exterior finish is comprised of stucco and glazing units. The new Police and Fire station will be reconstructed with like finishes and materials. The footprint of the building has increased from the existing area of 6,447 to 13,000+ sf, due partly to user requested upgrades and from the need of providing an emergency facility that can support the new Baha Mar Development.

C. *Baha Mar Corporate Building*
The Baha Mar corporate center will be located along West Bay Street on the north side of the Commonwealth Bank parcel. On the ground floor of the building both the Scotiabank and Fidelity Bank will conduct retail banking operations as tenants. On the second and third floor, the Baha Mar Ltd. will house their corporate offices.

The building will be constructed using a combination of steel, concrete, and concrete block materials. The finishes will be a combination of glazing units, stucco, and other decorative elements.

D. *Employees*
Table 2 identifies the approximate number of employees that will be accommodated at the Commercial Village facilities.

E. *Traffic & Parking*
Table 3 lists the estimated parking requirements for each of the relocated facilities within the Commercial Village.

1.6.1.17 Area 26 – Beach/Pool Area

The beach comprises 17 acres of development directly adjacent to the Podium core on the north and Cable Beach itself. The grade of this area drops from 30 ft at the podium to sea level at the waters edge. The grade transitions are achieved through a series of pool platforms connected with stairs, walls and walks. The beach front area is a mix of formal pool areas associated with each Hotel, informal site buildings and sitting areas which are for use of Baha Mar guests. The existing concrete jetty at the Wyndham Resort will be removed and the beach realigned or widened to its natural contours to restore this area back to its former state.

1.6.1.18 Area 27 – Cable Beach Resort Site

Development Area 27 consists of the site of the existing Sheraton Cable Beach Resort and Wyndham Nassau Resort and the Crystal Casino. The Sheraton was renovated in two phases, closing one 346-room wing of the hotel for completion of renovation before commencing work on the second wing. The renovated Sheraton at Baha Mar occupies 315,000 sf and offers 700 guest rooms.

The project also includes extensive renovation of the Wyndham Nassau Resort and Crystal Palace Casino and closure and demolition of the Nassau Beach Hotel. The Wyndham towers will be renovated on a floor-by-floor basis, with no more than 40 guest rooms out of service at a time to minimize guest inconvenience. The existing hotel will be downsized from 863 rooms to 559 rooms in order to accommodate the new resort plan. The downsizing will include the removal of the F and J Towers, providing additional beach space for the resort. The Nassau Beach Hotel will be demolished in its entirety.

1.6.2 Other Project Components

Phase 1 projects will also include the following activities:

1.6.2.1 Relocated West Bay Street

As shown in the Master Plan, Figure 2, existing West Bay Street will be relocated to the south to create a new ring road around the Baha Mar Resort. Relocated West Bay Street will be a four lane divided road similar to its current configuration with 5 new roundabouts and landscaping along its length. From the west, a new roundabout will provide access to the Sheraton and the Wyndham Resorts. The second roundabout will provide access to the Commercial Village and to the West Port Cochere of the Casino Podium. Roundabout 3 will connect with the extended Gladstone Boulevard and the main approach to the Casino Podium by the bridge over the Show Lake. Roundabout 4 will provide a connection to the Mondrian Hotel and the Rosewood Hotel, while the easternmost roundabout will provide access to the Breezes Super Club, and other buildings east of Cable Beach Resort not part of this project. The West Bay Street relocation will be one of the first project elements to be constructed to allow existing and future traffic to use West Bay Street during the project construction period.

1.6.2.2 Refurbished Cable Beach Golf Course

The existing Cable Beach Golf Course will be renovated and extended to the south and west to allow for the construction of the resort core and to upgrade the quality of the course. A new 18-hole signature golf course is being designed by Jack Nicklaus and his design company, Nicklaus Design. This new course will be from the southern perimeter of the core resort, running along the relocated West Bay Street as shown on Figure 6.

The following section provides a description of the existing golf course maintenance practices and the maintenance practices to be employed for the redeveloped course. Golf course maintenance practices include: mowing, fertilization, insect and fungus control, irrigation and equipment care. A Golf Course Environmental Management Plan for operation of the Jack Nicklaus Signature Golf Course is provided in Appendix of this report.

A. Existing Cable Beach Golf Course Maintenance Practices

Mowing: The greens, pins, and tee markers are mowed everyday from May to October and six days out of every week from November to April. The tees, fairway, and driving range are mowed Monday, Wednesday, and Friday throughout the year. Sand traps and bunkers are raked everyday using a sand pro or hard rake and edged as needed. Lake edges and perimeters are mowed once a week.

Fertilization: Greens are treated every 14 days alternating among Milorganite 5-3-0, Complete 14-2-14, and Fire Pearh 13-2-13 fertilizers. The tees, sand traps and bunkers are fertilized once per

month using a 15-5-15 or a 19-3-19 complete fertilizer. Landscape areas and the driving range are also treated once per month and kept weed free at all times. The fairway and rough are treated every 6-8 weeks and Ronstar is applied at least 3 times per year. Fairway grade fertilizers used are: 21-3-21, 14-2-14, and 9-2-24 Fairway fertilizers, and 6-3-0 Milorganite.

Insect and Fungus Control: Greens are treated every 14 days and tees, fairways, rough, and the driving range are treated every month or as needed. Insecticides used include: Orthene, Nemacure, Diazinon, Chloripyrifos, Talstar, and Seven. Nemacure is used to spot treat isolated, infected areas. Fungicides used include: Manicure, Dacinol, Allette, and Chloride.

Herbicides: Areas are treated as needed using Roundup, Hydro Block, Admiral, Reward, Threeway Herbicide, 2.4-D, Lescocide plus algaecide, Manage, or Morton Salt. The type of herbicide used depends upon the type of vegetation being treated and its proximity to a water source.

Irrigation: The current golf course uses about 6,450 gallons/acre/day based on a total of 750,000 gallons per day used over the entire site. Optimum irrigation is estimated at 1 ft of water per week. Irrigation occurs each night at dark starting with the fairways and rough and is followed by tees and greens. When necessary, areas will be irrigated during the day where they are dry, or are being fertilized or chemically treated.

Equipment Care: Equipment is serviced every 3 months or 300 working hours. Daily maintenance includes washing and refueling the equipment. Weekly maintenance includes greasing and checking for 'wear and tear' on parts.

B. *Future Jack Nicklaus Signature Golf Course Maintenance Practices*

Maintenance: Golf course maintenance will generally follow the same guidelines used on the existing course for mowing, fertilization, and equipment care. The major deviation from these existing practices will be with the irrigation practices and a reduction in the use of herbicides and pesticides. The majority of the fertilizers, herbicides and pesticides will be applied using the irrigation system and will be applied as needed only and in the minimum amounts required, this liquid application will greatly reduce the amount of chemicals required.

Irrigation: The new course at peak demand conditions is estimated to apply about 5,054 gallons/acre/day of fresh water on landscaped areas. A separate salt water irrigation system will apply about 3,663 gallons/acre/day on the fairway turf. The salt water irrigation system will use water from the canal system to mix with pumped water and

rainfall, as required to provide a consistent source of brackish water for seashore paspalum (*Paspallum vaginatum*) turf used on the golf fairways. Paspalum turf grass has been developed to tolerate salty water to enable golf courses to be maintained in areas where high quality water is not available.

High salt levels in water interfere with the germination of new seeds. Salinity acts like drought on plants, preventing roots from performing their osmotic activity where water and nutrients move from an area of low concentration into an area of high concentration. Therefore, because of the salt levels in the soil, water and nutrients cannot move into the plant roots.

As soil salinity levels increase, the stress on germinating seedlings also increases. Perennial plants seem to handle salinity better than annual plants. In some cases, salinity also has a toxic effect on plants because of the high concentration of certain salts in the soil. Salinity prevents the plants from taking up the proper balance of nutrients they require for healthy growth. Plant species vary in how well they tolerate salt-affected soils. Some plants will tolerate high levels of salinity while others can tolerate little or no salinity. The relative growth of plants in the presence of salinity is termed their salt tolerance.

Salt tolerances are usually given in terms of the stage of plant growth over a range of electrical conductivity (EC) levels. Electrical conductivity is the ability of a solution to transmit an electrical current. To determine soil salinity EC, an electrical current is imposed in a glass cell using two electrodes in a soil extract solution taken from the soil being measured (soil salinity). The units are usually given in deciSiemens per metre (dS/m).

The Salt tolerance (ECc) for Paspalum turf is as follows:

- Threshold dS/m: 0-20, average 8.6 ds/m
- 50% growth reduction, average dS/m: 31
- 1 dS/m = 640 mg/L
- Sea water is 54 dS/m (34,400 mg/L)

Paspalum turfgrass thrives when irrigated with brackish water with salinities that range from approximately 3500 to 12,500 mg/L. By point of comparison, the salinity of sea water generally is about 35,000 mg/L.

The existing 2-acre irrigation lake on the Cable Beach Golf course will be used in the future for the mixing and storage of brackish water for the Nicklaus golf course. A new, 3.5-acre freshwater irrigation pond will be developed to store and distribute the treated wastewater to be used to irrigate the tees and greens, the golf course landscaped

areas, and the resort core landscaping. An estimated 750,000 gallons/day of fresh (treated effluent) water per day will be used with an annual estimate of 200,522,910 gallons on the entire golf course. Irrigation will take place an estimated 10 hours/day and 6 days/week during peak season.

1.6.2.3 Offsite Central Services Facility

A remote Central Services Facility (CSF) will be constructed outside the core of the resort to provide for those infrastructure services that are incompatible with the activities in the central core of the resort. These facilities and services that will be located in the Central Services Facility include a Central Laundry Facility, a Central Warehouse, a wastewater treatment plant, a potable water treatment facility, a standby emergency generator, a vehicle fueling and service facility, and central employee parking. These facilities are shown on Figure 7. Although Baha Mar Ltd plans to contract with the Bahamas Water & Sewerage Corporation for the provision of wastewater treatment and potable water supply services, the site plan conservatively shows these facilities being located at the CSF for purposes of environmental impact assessment.

Baha Mar's requirements for a centralized service facility required the identification of a contiguous parcel of land within a reasonable distance from the resort core where all these activities could be accommodated. Three locations within one mile of the resort core were identified – an approximately 80-acre site at the south end of the golf course identified as the Christie Parcel, a 74-acre site west of the project off Atlantic Drive identified as the Volpi Parcel, and an approximately 100-acre site south of the project off Gladstone Road identified as the Gladstone Road Parcel. Baha Mar Ltd originally proposed to construct the CSF at the 74-acre Volpi Parcel off Atlantic Drive. However, based on further review and at the request of the BEST Commission, Baha Mar Ltd has determined that construction of the CSF at the Gladstone Road Parcel would serve all of the project needs with the least environmental impact.

The Gladstone Road Central Services Facility will encompass approximately 50 acres. For the purposes of this assessment, a parcel that is approximately 100 acres in size was studied, although it is not intended that the entire parcel would be included in the proposed project development. The Gladstone Road Parcel is located approximately 1.5 miles south of the central core. The Gladstone Road Parcel is bounded to the north by the Bahamas Food Services facility, to the east by a recently constructed Home Improvement Center and to the south by an undeveloped parcel. The New Providence Sanitary Landfill is located approximately six tenths of a mile east of the Gladstone Road Parcel. Each of the components of the CSF is shown on Figure 7 and is described below. The alternative locations for the CSF are described in Section 1.7.3.

A. Central Laundry Facility

A Central Laundry Facility will be constructed at the Central Services Facility as shown on Figure 7. The central laundry facility will occupy approximately 75,000 sf as a single story stand alone structure with the capability of being expanded to 100,000 sf. It will contain approximately 10 washers and 18 steam or dual fuel dryers, and 3 dry cleaning machines along with appurtenant presses, folders, and other equipment to service the resort complex. Other infrastructure will include 3 boilers, hot water tank, and a compressed air system. Baha Mar Ltd will use high efficiency dry back firetube boilers to generate the steam and hot water for the laundry facility. Two of the laundry boilers will be 750 HP units capable of producing 25,106,000 British Thermal Units/hour (BTU/hr) while burning 219 gallons/hr of diesel fuel. The third boiler will be rated at 300 HP and deliver 10,043,000 BTU/hr while using 87.5 gallons/hr of fuel oil. A 12,000 gallon aboveground tank will be utilized to store fuel oil for the Laundry facility. The tank will be designed with the control measures described in the Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan, which is included as Appendix to this document.

Average water consumption is estimated at 164,000 gallons per day (GPD) or 11,750 gallons per minute (GPM) with peak daily water usage at 200,000 GPD or 12,500 GPM. The water usage estimate is based on providing laundry services for 4,200 rooms using tunnel washers and washer/extractors for room linen, towels, and food and beverage and colored linens. Laundry operations would occur over a 16 hour work day, 7 days per week. As shown on Figure 7, Baha Mar Ltd currently plans a minimum size of 75,000 sf for the laundry facility with the ability to expand to 100,000 sf. For the purposes of this EIA, Baha Mar Ltd has accounted for the maximum anticipated facility size in its impact assessment. The anticipated impacts from project construction and operation are further described in Sections 6 and 7.

B. Central Warehouse

Baha Mar Ltd will rely heavily on containerized ocean freight for the majority of its operating and capital needs. With this in mind, Baha Mar Ltd has proposed a remote central warehouse to act as the single point of supply vendor to the resort complexes. In lieu of variety of local distributors receiving containers, breaking them down, and delivering on demand to the various hotels and restaurants, the hundreds of items required each day for inventory at the resort complex will be stored in a warehouse space that will be developed at the CSF, as shown on Figure 7. The warehouse will be constructed as a single story, stand alone structure. The building will be a composite of concrete and steel. The exterior will be finished with steel and block.

Baha Mar Ltd currently plans a minimum size of 150,000 sf for the central warehouse facility with the ability to expand to 200,000 sf. For the purposes of this supplemental EIA, Baha Mar Ltd has accounted for the maximum anticipated facility size in its impact assessment. The anticipated impacts from project construction and operation are further described in Sections 6 and 7.

C. Wastewater Treatment Plant

The wastewater demands for the Baha Mar Resort as its associated facilities are summarized in Table 4. If required, a wastewater treatment plant (WWTP) would be located at the Central Services Facility, as shown on Figure 7, and will be a conventional extended air activated sludge process plant. It will consist of a master flow meter, headworks, equalization basins, aeration basins, clarifiers, tertiary treatment facilities, chlorination facilities, product water storage facilities, dewatering facilities, supporting mechanical equipment and operator facilities. The plant will be built in phases to accommodate flows generated by the phased construction.

The plant would be designed such that ease of operation will be considered in all phases. Some design features that will aide in the operation of the plant include redundant mechanical equipment, valving to easily bypass or isolate different components of the plant, easy to read meters on all air piping and critical pumps, the use of variable frequency drive (VFD) motors on pumps and easy to use testing equipment.

Baha Mar Ltd understands that The Bahamas Water and Sewerage Corporation (WSC) is planning to build a central wastewater treatment plant on Gladstone Road that would accommodate flows from the Baha Mar Resort. Baha Mar Ltd has not yet reached an agreement with WSC regarding the provision of wastewater treatment services. Should the aforementioned parties reach an agreement, the proposed WWTP facility would not be required as part of the CSF. Per BEST Commission Letter dated 8 January 2007, this matter is relative to contractual discussions between Baha Mar Ltd and WSC; therefore, this item is not within the scope of the EIA review.

As part of its agreement with WSC, Baha Mar Ltd will receive tertiary treated wastewater to be used for landscape irrigation purposes. The treated water will be sampled on a periodic basis to ensure it meets the following tertiary treatments standards for re-use:

- BOD will be less than 10 mg/l;
- TSS will be less than 10 mg/l;
- Total coliforms will be less than 1 MPN;
- Ammonia level will be less than 10 mg/l;
- Phosphorus level will be less than 5 mg/l; and,

- effluent pH will be between 7.0 and 7.5
- The Total Dissolved Solid Effluent will be less than 700 mg/L

The reuse water will discharge into a lined pond at the golf course where it will be used for golf course and general resort irrigation purposes. The anticipated golf course irrigation demand is 750,000 GPD.

D. Potable Water Treatment Facility

Similar to wastewater treatment described above, Baha Mar Ltd intends to contract with the WSC for potable water for the entire project. Potable water provided by WSC's water treatment plant will be used for consumption, fire suppression, irrigation (as needed), and central plant operations. A potable water treatment plant is shown on Figure 7 and analyzed as part of this document as a conservative measure. A summary of potable water demands for the Baha Mar Resort is summarized in Table 5.

The potable water will be distributed to the resort facilities via a common potable water and fire suppression distribution system to be owned and operated by WSC.

The water main distribution system will be looped around the development to the greatest extent possible. It will be sized to provide adequate pressure during a period of maximum day flow (two times the average daily flow) plus the fire demand (2,500 GPM). Where it is not possible to provide a looped portion of the system, dead-end mains will be completed with blow-offs to control problems associated with stagnation.

At each point of connection with the buildings, the potable water will pass through a reduced pressure backflow prevention device. Furthermore, at each building point of connection for the fire suppression system(s), the water will pass through a double check valve backflow prevention assembly and a post indicator valve. The backflow prevention devices are necessary to prevent possible contamination of the site's potable water distribution system from chemicals and/or stale water present in the fire sprinkler system. The water main system will be complete with properly located fire hydrants and Fire Department Connections for each fire sprinkler suppression system.

The systems mains, fire hydrants, valves, backflow prevention devices and other appurtenances will be designed to meet the standards of the WSC.

The potable water will be pumped from the tank(s) into a common potable water and fire suppression distribution system. The pumping system will include multiple pumps of the same manufacturer and

model to meet the different flow demands that occur through a day, as identified in Table 5. During the early phases of the project, there will be only as many pumps as are needed to meet the existing fire and max day demands plus one pump for redundancy. During subsequent phases, additional pumps will be manifolded into the system to meet the new demands. The pumps will be connected to variable frequency drive controllers that will allow the operators greater control of the pump operations.

The pumps will be manifolded into common suction and discharge headers. The pump manifolding system will be designed so that the future pumps can be added to the system easily. Testing headers and recirculation lines will be utilized to help with operation. Tank level controls will be connected to the controls for the pumps to ensure that there is always adequate fire volume in the potable water cisterns.

The water main distribution system will be looped around the development to the greatest extents possible. It will be sized to provide adequate pressure during a period of maximum day flow (two times the average daily flow) plus the fire demand (2,500 GPM). Where it is not possible to provide a looped portion of the system, dead-end mains will be completed with blow-offs to control problems associated with stagnation.

At each point of connection with the buildings, the potable water will pass through a reduced pressure backflow prevention device. Furthermore, at each building point of connection for the fire suppression system(s), the water will pass through a double check valve backflow prevention assembly and a post indicator valve. The backflow prevention devices are necessary to prevent possible contamination of the site's potable water distribution system from chemicals and/or stale water present in the fire sprinkler system. The water main system will be complete with properly located fire hydrants and Fire Department Connections for each fire sprinkler suppression system.

Baha Mar Ltd currently plans a one potable water storage tank and the approximately 50,000 sf RO Plant at the CSF. For the purposes of this EIA, Baha Mar Ltd has accounted for the future expansion, including an additional storage tank and a larger RO Plant, in its impact assessment. BML has committed to completing the design of water tank level controls during the detailed facility design phase to ensure that there is always adequate minimum supply of water for fire suppression. The anticipated impacts from project construction and operation are further described in Sections 6 and 7.

E. Standby Emergency Generator

A summary of the anticipated electrical energy requirements of the Baha Mar Resort is provided in Table 6. Baha Mar Ltd proposes to

construct a single Standby Emergency Electrical Generator that provides backup power to the Central Services Facility to sustain day-to-day operations. The generator will be a 3 MW diesel generator with an 11 kV output. The unit will be complete with inlet air filtration, inlet silencer, lube oil system, generator, indoor type acoustic enclosure, and an indoor grade critical muffler on the discharge. A No. 2 fuel oil system will be provided for this generator that will include a 6,000 gallon concrete encased integral storage tank beneath unit providing capacity to run 24 hours at full load without re-fueling. The generator will be contained in an individual, weatherproof housing on a concrete pad. A spill containment box will be provided at the fuel fill port in accordance with the requirements of the Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan, which is included in Appendix of this document.

While Baha Mar Ltd currently plans a one emergency generator at the CSF, for the purposes of this EIA, Baha Mar Ltd has accounted for the future expansion at the backup generator facility at the CSF, in its impact assessment. The anticipated impacts from project construction and operation are further described in Sections 6 and 7.

F. Centralized Employee Parking

Approximately 1,600 to 2,000 parking spaces are needed for employees of the Baha Mar facilities. In order to reduce traffic impacts resulting during shift change at the resort complex, Baha Mar is studying different parking options to minimize traffic impacts. The Baha Mar Ltd development team anticipates three employee shifts, two of which will require the presence of 2,500 employees and the third shift, 1,000 employees. The parking area will be constructed of asphalt material with concrete curbing. The location has yet to be determined.

G. Landscaping

Baha Mar Ltd is working with landscape architects to determine what species will be proposed for the vegetation of the project area. Existing landscaping will be re-used to the extent possible. As specified in the Invasive Species Management Plan provided in Appendix of this document, Baha Mar Ltd will not introduce invasive/exotic species; and will identify mitigation measures that will be implemented to prevent the inadvertent spread of these species during construction of the project.

H. Gladstone Road Site Elevation

Baha Mar Ltd proposes to place fill on the CSF site to raise the elevation of the facility. As the CSF is still at the conceptual design phase, for purposes of this EIA supplement it has been assumed that the overall elevation will be raised a minimum amount to lessen the

overall impact. This would result in a minimum embankment height and reduce the overall filling impact.

I. Stormwater Management

Baha Mar Ltd had originally proposed to construct a Stormwater Pond at the Gladstone Road CSF site. Based on a review of biological data and the presence of an Ephemeral Pond Wetland and Red Mangrove Shrubland Wetland, Baha Mar Ltd will determine the best solution for storm water run off, on site ponds or injection wells or a combination of both. Consideration will be given to the oversall water shed area. Baha Mar Ltd will continue to coordinate with the WSC, Ministry of Public Works and Transport, and the Ministry of Environment over the design of this stormwater management system.

1.6.2.4 Water Features

Water features to be developed include salt water lakes, a canal system to serve as a "water boulevard" for transporting guests, a 17-acre beach and pool experience with 3,000 ft of continuous beachfront, and a "show lake" for presentation of live entertainment, as shown on Figure 2. Additionally, the entrance to the resort will feature a 50-ft waterfall.

The intent of the saltwater canals throughout the project site is to allow transportation of guests around the resort via small boats. The canals will contain salt water and be lined with an HDPE membrane and contain salt water. Lining the waterways allows the water surface to be elevated above existing groundwater levels. The HDPE lining would also serve as a protective barrier, preventing the salt water from contaminating adjacent freshwater wetland areas and the fresh water lens in the southern portion of the site.

The salt water will be continuously circulated throughout the canal system. Saltwater will be drawn from wells near the shore, circulated throughout the canal system and discharged via injection wells. No discharges of wastewaters will be made into the canals or show lakes, and the water transportation system will use electric boats. Therefore the water that is to be withdrawn from the canals for circulation is not anticipated to be contaminated.

A system of interconnected salt water show lakes and canals are planned for the project. Maintaining excellent water quality for these amenities is of paramount concern for the project team.

Water quality for salt water canals and lakes planned for the site will be addressed via a combination of circulation and aeration. Circulation will be accomplished by mechanical systems, which will pump saltwater into and out of the canal system to maintain circulation. In addition, it is anticipated that additional salt water will be injected into the canals at mid points along the canal to further ensure propel circulation. The lake and canal system is

anticipated to use an estimated 1 million gallons per day of salt water to maintain a high level of water quality.

During intense storm events, such as tropical storms or hurricanes, the volume of saltwater in the canal system will be drawn down to create capacity for accepting emergency overflow from the stormwater system.

A series of freshwater pools, fountains, and water features will also be developed. Fresh water decorative water features with potential for human contact are typically sanitized in accordance with local commercial swimming pool codes. This usually includes a chemical treatment as well as mechanical filtration such as a sand, bag, or diatomaceous earth filter. Variables such as bather load, location, source water and landscaping material factor into how water feature water quality should be maintained. Water will be tested on a daily basis and adjustments made to circulation or treatment processes as needed.

1.6.2.5 Irrigation Strategy

The overall strategy for the Baha Mar Resort Project is to use reclaimed fresh water for irrigation of all landscape and to use brackish water for fairways on the golf courses. Sources of reclaimed fresh water will include treated sewage effluent from WSC and potable water. The emphasis will be on recycled water or harvested water, with potable water only used in cases of shortfalls of other water sources. The golf course will use water from the canal system to mix with stormwater runoff on the course and well water, as required to provide a consistent source of brackish water for the paspalum turf used on the golf fairways. A new lined lake for the mixing and storage of treated wastewater will be located within the golf course.

As the Baha Mar Resort Project will be built in phases, the total irrigation water demand will not be realized for a number of years. In the early phase it will be necessary to augment the recycled sources of water with potable if the landscape is installed prior to all of the hotel developments. However at completion of Phase 1 the anticipated flows could produce reuse in the amount required to irrigate the Project, eliminating or greatly reducing the need for potable water.

1.6.2.6 Water Reuse System

Reclaimed wastewater obtained from WSC will be stored in a lined pond on the golf course to provide a reliable source of irrigation water. This freshwater irrigation lake on the golf course will be designed to hold about 3.0-4.0 million gallons of rainfall, stormwater, and treated sewage effluent. This equates to approximately 3.5 surface acres.

1.6.2.7 Core Area Stormwater Management

It is proposed under this project to capture as much stormwater to prevent untreated stormwater from impacting Goodman's Bay or surface wetlands and water bodies. Stormwater from the resort core will be collected from paved areas, building roofs and some landscaped areas. Stormwater in the hardscape and greenspace areas will be collected by means of swales, curb and gutter inlets, trench drains, and area drains and then conveyed via underground piping to stormwater retention ponds on the Jack Nicklaus Signature Golf Course, as shown on Figure 8. Building roof collection systems will also be tied directly into the underground piping facilities. A series of stormwater wells will also be incorporated into the overall master stormwater plan.

In certain areas, stormwater will be routed to injection wells that will be installed in accordance with the Bahamas Building Code. The roadway design of re-located West Bay Street allows for stormwater piping crossing under the roadway to transport the drainage from the Resort Core to the golf course.

The drainage system for relocated West Bay Street and the Corridor 7A roadway is being designed in consultation with the Ministry of Public Works and Transport (MOWT). Stormwater from West Bay Street - Section A will be collected in an underground piping system for section and will discharge to a series of infiltration wells in the short term with an ultimate outfall to future Pond WestBayA, as shown in Figure 8. The underground piping system for the remaining portion of West Bay Street (WBayStB) will discharge into the series of stormwater ponds on the golf course. These lakes are designed to treat the first 1" of rainfall from this portion of roadway areas and as well as retain the 10yr-24hr storm event. Stormwater from rainfall events in excess of this design will be allowed to flow out onto the golf course and dissipate through infiltration.

Drainage from Corridor 7 is separated into 3 basins. Corridor 7 A discharges via underground piping to the golf course pond system along with Basin W Bay Street B. Corridor 7 B and Corridor 7 C are routed through proposed ponds (C7B and C7C respectively) that are designed to treat the first 1" of rainfall and attenuate the 10yr-24hr. storm before discharging by weir into the adjacent low-lying areas.

Therefore the golf course ponds will be designed to treat the first 1" of rainfall from the roadway and core areas as well as retain the 10yr-24hr storm event. Stormwater volumes exceeding this design standard will overflow to the adjacent golf course where it will pond and infiltrate into the ground.

Stormwater collection and treatment at the CSF was described in Section 1.6.2.3 I.

1.6.2.8 Roads, Bridges and Parking

Roughly parallel to Cable Beach is West Bay Street which bisects the northern portion of the Baha Mar property. This thoroughfare will be relocated to the south around the southern perimeter of the property allowing traffic to be diverted away from the resort core. Gladstone Road will be extended from its current terminus at JFK Drive north through the resort property to a new intersection with West Bay Street. Additional information concerning development of transportation infrastructure is presented in the subsections, below.

A. *Roads*

Proposed road construction will be of asphalt material with concrete curbs and sidewalks. Roads will be landscaped on both sides and medians will be landscaped. The scope of road construction includes installation of water, sewer, electrical, telephone and cable utilities. Two and one half miles of double carriage way road construction, and rerouting of 1.5 miles of West Bay Street and 1.0 mile of Gladstone Road connector are planned. Figure 32 shows the proposed road construction.

B. *Bridges*

Two bridges will be constructed in the core project area. The main bridge will enter the center of the project and will span over the main lake; as shown on Figure 2 and Figure 3. The remaining bridge will span over the canals and will provide entry to the Mondrian hotel. All three bridges will be constructed using in-situ poured concrete or a "Conspan" precast concrete material.

C. *Core Project Road and Parking*

The core project roads and parking lots will be constructed of asphalt material with concrete curbs and sidewalks. The roads and parking lots shall also be constructed to collect rainfall and distribute stormwater in accordance with Ministry of Works drainage standards.

1.6.2.9 Standby Power Generation

As discussed in Section 3.5 the project will result in the decommissioning of several, individual emergency generators, four boilers, and the four oil-fired engines that run continuously at the Total Energy Plant (TEP). The project will replace some of these units with one centrally located emergency generation station that include eight 3 MW diesel-fired generators for a total resort generation capacity of 2.800 MW at the Skyline Substation as well as similarly sized back-up electrical generators at the Sheraton, the Wyndham, the CSF.

1.7 Alternatives Considered

In the planning stages of the proposed development, the implications of a number of alternative project configurations were considered by Baha Mar Ltd. These

alternatives included a consideration of alternative resort sizes and building arrangements as discussed below.

1.7.1 No Build Option

Baha Mar considered a "No Build Option" of maintaining the existing Sheraton Cable Beach Resort, Wyndham Nassau Resort and Crystal Palace Casino, and Nassau Beach Hotels. The resort facilities would continue to operate at their current capacity and Baha Mar would gradually renovate the rooms and facilities associated with each Hotel but make no major expansions or upgrades. This option would minimize the changes to the Cable Beach landscape and would maintain the current levels of economic benefits provided to the national economy. However, to do only this would not fully revitalize the Cable Beach area, nor meet the goals of the project as shown in Table 7.

1.7.2 Develop the proposed Resort in an Alternate Location

Baha Mar also looked at the implications of developing the proposed project in an alternate location that has not yet been developed. The location would need to be a beach front property, likely located somewhere on the south side of New Providence. Development of the facility in an alternate location would pose similar challenges as the Cable Beach redevelopment however it would also result in the conversion of undeveloped ("green") lands to an urbanized state and the extension of roadways and other infrastructure into areas where these are not currently present. These impacts would be avoided by development at an existing developed site where the current infrastructure can support the development with a minimum of upgrading. In addition, it would fail to regenerate and build on the assets of the existing Cable Beach Area, and the properties owned by Baha Mar Resorts. This alternative is further evaluated in Table 8.

Based on the goals of the project the No Build alternative alone would not meet intent of the resort metropolis and would not provide the expected economic benefit to The Bahamas. The Alternative Location alternative could be designed to meet the project requirements; however, a land area adequate and suitable to create the unique mixture of accommodation and attraction envisioned for the Resort may not be available, and the infrastructure to support this development would not exist within such a site. The Alternative Location alternative would require the installation of substantial infrastructure to support the project goals and would likely create additional traffic impacts in areas of New Providence where commercial development does not exist. The proposed project fulfills the project goals, uses and revitalizes an already urbanized area, and will provide the maximum benefit to the Bahamian economy.

1.7.3 Central Services Facilities Alternatives

The proposed Central Service Facility option is outlined above in Section 1.6.2.3 . The intent of the Central Services Facility concept is to provide a central location away from the resort core for these support functions and allow them to share common infrastructure such as parking and fuel storage. The proposed Central Services Facility includes the following infrastructure facilities at one location:

- Central Laundry Facility
- Central Warehouse
- Wastewater Treatment Plant (if necessary)
- Potable Water Treatment Facility (if necessary)
- Standby Emergency Generator
- Central Employee Parking

It is desired that the Central Services Facility should also be located in an area that will minimize impacts to the local infrastructure while minimizing the potential impact on the environment. The proposed Central Services Facility site provides a location near the resort core where all the desired elements can be combined at a single location. Options and locations considered for the Central Services Facility include the following:

- Development of the Central Services Facility at the Gladstone Road Parcel.
- Development of the Central Services Facility at the proposed Volpi Parcel, a 74-acre site west of the project off Atlantic Drive, as shown on Figure 10.
- Development of Central Services Facility at the proposed Christie Parcel, an 80-acre site at the south end of the golf course.

A qualitative assessment of the Central Services Facility alternatives is presented in Table 8. Based on an assessment of how these alternatives would meet the project operational needs and an evaluation of the environmental and land use impacts that would be associated with use of either of these sites, Baha Mar Ltd determined that the Gladstone Road location would meet operational requirements and have the least impact on the environment and neighbors of the sites.

1.7.4 Potable Water Supply Alternatives

Baha Mar Ltd considered several options in an effort to establish the most feasible and beneficial approach towards providing potable water for the resort. Alternatives considered for potable water provision included the following:

1. Purchase and operate a reverse osmosis plant onsite.
2. Enter into a Buy/Own/Operate (BOO) Lease agreement, for potable water production, with one of several service providers.
3. Obtain potable water from the Water and Sewer Corporation of the Bahamas.

Each of the alternatives carry similar environmental impacts including but not limited to power production, noise pollution, light pollution, brine disposal. Options 1 and 2 present nearly identical environmental impacts, with the difference being operational staff. For Baha Mar Ltd one advantage of both Options 1 and 2 would be the use of a new dedicated distribution system independent of the New Providence distribution system. In using a newly constructed water treatment and distribution system, and connecting to the WSC grid only for emergency water supply, the project limits its daily demands on the already stressed New Providence water supply system. Option 3, obtaining potable water from the WSC would involve the construction and operation of an expanded RO treatment system by WSC as the existing WSC water

distribution is contained. The location of the WSC collaborative RO plant (Option 3) has not been identified and may ultimately offer some environmental advantages that could offset the losses associated with the New Providence distribution system. Also, there may be some synergy and efficiencies realized by expanding existing island wide water production capacity. In light of the above considerations, Baha Mar Ltd Plans to obtain its water supply through the WSC as it presents an advantageous solution, considering reliability and economy of supply.

1.7.6 Wastewater Treatment Alternatives

Similar to the provision of potable water to the resort, Baha Mar Ltd evaluated constructing and operating its own wastewater treatment plant, contracting this service to outside vendors, or obtaining this service through the WSC. Baha Mar Ltd has agreed to transmit its wastewater to the WSC for treatment, and to receive reclaimed wastewater for resort irrigation and non-potable uses.

1.7.7 Electrical Generation Alternatives

Two alternatives for meeting the projects electricity/energy needs were considered by the Baha Mar development team. The proposed action is for Baha Mar to obtain its primary power from the Bahamas Electric Company (BEC). A summary of the estimated electrical energy requirements of the resort is summarized in Table 6. Due to the need to maintain a reliable source of supply for critical life safety and other requirements, the Project will need to maintain a robust back-up generating system. Two redundant BEC 11 kV electric service feeders are also required to the standby generator system location for interface and distribution to two 11 kV PDC's within the main complex in addition to the one at the standby generator system location to provide for an adequate level of reliability.

Another alternative considered by Baha Mar would have been to construct and operate its own electrical generating facility (Energy Center) to serve as the primary power source, with BEC serving as the secondary or back-up source. For a number of technical and economic reasons, Baha Mar will obtain its primary electrical power from the BEC.

1.8 Description of Construction Activities

1.8.1 Phased Construction

Baha Mar Ltd is proposing to perform phased construction activities in an effort to minimize the impacts of construction to the local economy and residents. A construction schedule is provided as Figure 26.

The first phase of construction which is scheduled to commence during the first quarter of 2011 will include construction of the Commercial Village and a temporary road to access the site. This will also include the installation of upgraded underground utilities along C7, progression of the relocated West Bay Street and demolition of the Old Hobby Horse Racetrack Grandstand Building as well as demolition of obsolete resort support buildings. The demolition of the Breezes Waste Water Treatment Plant will occur during the fourth quarter of 2011 following the handover of the new plant.

The West Bay Street relocation will be completed and open to traffic in the fourth quarter of 2011. The Commercial Village will be occupied and open for business in the fourth quarter of 2011. During this period the golf maintenance facility and Wyndham Resort Warehouses will be relocated and the existing structures demolished. The New C7 Skyline Substation construction will be underway. The vacated West Bay Street commercial buildings and part of the Nassau Beach Hotel will be demolished during the fourth quarter of 2011. The remainder of the Nassau Beach Hotel will be demolished during the second quarter of 2012.

Following the relocation of West Bay Street and the demolition of the commercial buildings and grandstand, the second major phase will begin. This construction phase includes construction of the Resorts Core Project and will begin in the second quarter of 2011. Elements of this phase include:

- The Wyndham Hotel will be reorganized to arrange for demolition of the F Tower which will begin in the fourth quarter of 2011 and conclude in the second quarter of 2012.
- In the third quarter of 2012 the Construction of the C7 Road will be completed, Skyline Substation will be operational, the former Leisure Time substation will be demolished and overhead cables from the substations will be buried.
- The new Central Services Facility will be completed and operational in the second quarter of 2014.
- Construction of the podium will begin in the third quarter of 2011 and will be completed in the fourth quarter of 2014.
- Construction of the Casino Hotel will begin in the third quarter of 2011 with the construction of the Hyatt Hotel (Convention Hotel), Rosewood Hotel (Luxury Hotel) and Mondrian Hotel (Lifestyle Hotel) beginning in the first quarter of 2012. Opening of the Casino Hotel, Hyatt Hotel, Rosewood Hotel, Mondrian Hotel and Hotel Condos will occur in the fourth quarter of 2014.
- Construction of the golf course will begin in the third quarter of 2012 and will be completed by the fourth quarter of 2013.

1.8.2 Typical Construction Techniques

The following section provides a description of the typical construction methods to be used for this project. Table 10 provides a listing of the construction phases and activities for the project.

1.8.2.1 Clearing and Grading

The construction area will be cleared and graded to remove brush, trees, roots and other obstructions such as large rocks or stumps, except for sensitive wetland or tree resources. Non-woody vegetation may be mowed. Temporary fences and gates will be installed as needed. Stumps or other timber that is not merchantable or other vegetative debris may be chipped or disposed. Disposal of materials will be conducted at commercial facilities or other locations in accordance with Bahamian regulations.

1.8.2.2 Utility Transmission

Utilities for the project including potable water, sanitary sewer, electrical, cable TV, telecommunication, and storm sewers will be installed underground. These utilities will typically be installed within the rights-of-way of existing and new roadways utilizing generally accepted construction methods. A typical cross-section of utility installation within rights-of-way is shown on Figure 11.

1.8.2.3 Building Structures, Roadways and Bridges

Buildings will be constructed utilizing generally accepted construction techniques. Table 10 presents the construction techniques, excavation depths and construction materials to be used for each building.

1.8.2.4 Erosion and Sedimentation Control

Erosion and sediment control measures are to be placed prior to, or as the first step in, construction. Sediment control measures will be applied as a perimeter defense against any transportation of silt and /or water turbidity off site.
Options for Erosion Control include use of:

- Grassed Swales
- Temporary gravel construction entrances
- Silt Fences
- Riprap
- Temporary seeding
- Sodding
- Permanent plantings

Additional methods for sediment and erosion control for construction activities are discussed in the Environmental Management Plan, included as Appendix of this document.

1.8.3 Construction Workforce

To house laborers working on the Core Site of the project, Baha Mar is planning on constructing "man camps". There will be three camps all together (Appendix I – Site Logistics Plan) with each camp having four dormitory buildings with each dormitory housing a maximum of 200 workers. Other buildings in the camps will feature wash rooms, dining rooms, a library, prayer rooms, lounges, and medical and laundry facilities. The buildings will be prefabricated and constructed on concrete floor slabs.

Man camps Nos. 1 and 2 will be constructed in the southeast corner of the site near the Cable Beach Golf Course. A temporary wastewater treatment plant will be constructed south of the camps to treat and dispose of sanitary wastes. See the Site Logistics Plan in Appendix I for the location. Man camp No. 3 will be located along the west end of the site near the Sheraton

Laundry Facility. Wastewater generated in this camp will be treated at the Sheraton wastewater treatment plant.

Potable water will be supplied to the camps by the Water and Sewer Corporation (WSC). Additionally, solid wastes/trash will be collected in dumpsters throughout the site and disposed of by Bahamas Waste.

1.9 Comparison of Environmental Consequences

As described above, Baha Mar Ltd has performed a screening of the proposed project and a selection of alternatives. Based on the qualitative screening process and quantitative data analysis Baha Mar Ltd has developed a comparison of the environmental consequences of the proposed project and alternatives, as shown in Table 11. This analysis provides additional support for Baha Mar's decision to move forward with the development of the Baha Mar resort as presented above. A detailed evaluation of the environmental and socioeconomic aspects associated with development of the Baha Mar resort Project is presented in subsequent sections of this report.

2. LEGAL, REGULATORY AND ADMINISTRATIVE REQUIREMENTS

The Commonwealth of The Bahamas has established a comprehensive institutional and legal framework for environmental protection and natural resources management. Three key organizations, The Bahamas Environment, Science, & Technology Commission (BEST), the Department of Environmental Health Services (DEHS) and The Bahamas National Trust (BNT), together with specific governmental resource management agencies, provide the institutional direction for environmental protection and management. Environmental protection is supported by a number of laws and regulations that control activities in the physical and biological environment. Recent modifications to long-established natural resources laws, and new laws and regulations dealing with the physical environment, have enhanced the existing legal framework. Additional laws are currently under development to update the existing legal structure.

The Ministry of Public Works and Transport (MOWT) and the Ministry of Environment play lead roles in managing the physical development of The Bahamas. The MOWT is responsible for the development of the country's roadway network and the Department of Physical Planning within the Ministry of Environment is responsible for the establishment of planning and zoning requirements.

Table 12 summarizes the key governmental organizations, the specific regulations that grant a particular agency its jurisdiction, and their charge. Summarized are the institutional and administrative frameworks governing proposed new actions, followed by a listing of the laws, regulations and criteria that apply to this project.

2.1 Institutional

2.1.1 The Bahamas Environment, Science & Technology Commission

The Bahamas Environment, Science & Technology Commission (BEST), the country's environmental agency created in 1994, is responsible for the overall environmental and natural resources management of The Bahamas. The BEST Commission has developed Environmental Impact Assessment (EIA) guidelines and requires an EIA for major development projects. BEST has the primary responsibility for assessment of proposals submitted for development projects. The Commission reviews EIA reports, advises the Government as to the acceptability of projects and recommends amendments when necessary. BEST is developing policy and procedures for environmental management, including coastal zone management. The agency's mandate also includes:

- Advising the Government on the environmental impact of development proposals submitted to the Commission for review.
- Conducting site visits for projects under EIA review.
- Serving as the country's focal point and point of contact for all international organizations on environmental, scientific and technological matters.
- Coordinating activities related to international treaties, protocols and agreements to which The Bahamas is or will become a signatory.

- Representing the Government in discussions and negotiations with representatives of regional and international organizations and foreign governments on environmental, scientific and technological matters.
- Serving as a forum to encourage and enhance dialogue and information exchange between government agencies and private sector entities.

BEST is headed by the Minister for the Environment and consults with representatives from the following agencies:

- Senate, Department of Fisheries;
- Department of Environmental Services;
- Department of Agriculture;
- Water and Sewerage Corporation;
- College of The Bahamas;
- Ministry of Tourism;
- Director of Physical Planning;
- Ministry of Foreign Affairs;
- Ministry of Finance;
- Port Department;
- Department of Land & Surveys; and,
- Bahamas National Trust.

A Director, assisted by technical officers, heads the daily operations. The Inter-American Development Bank has provided the Commission with a technical cooperation grant for institutional capacity strengthening.

2.1.2 The Department of Environmental Services

The Department of Environmental Services is responsible for enforcing public health guidelines and industrial regulation and enforcement. The Department is responsible for solid waste management and oil spill contingency plans.

2.1.3 Other Government Agencies

Other Government agencies with specific environmental responsibilities are a) the Department of Fisheries - enforcing fisheries regulations and establishing marine reserves; b) the Department of Agriculture – conservation of birds and plants; and c) the Department of Lands & Surveys, Forestry Unit – managing forest resources.

2.1.4 The Bahamas National Trust

The Bahamas National Trust is a non-profit organization established through The Bahamas National Trust Act in 1959. It is responsible for establishing and managing national parks and protected areas, public awareness and outreach on environmental issues.

2.1.5 Ministry of Environment

The Ministry of Environment is responsible for planning, protecting, regulating and maintaining the natural environment of The Bahamas for its residents and visitors. The Baha Mar Resort project will require the approval of the departments of Physical Planning to ensure that the proposed project complies with zoning, building, and other requirements. The following considerations should also be undertaken:

- All projects within the historic area of Nassau must be reviewed by the Special Architectural Committee - which advises the Town Planning Committee.

2.2 Legislative and Regulatory Framework

2.2.1 The Environmental Health Act

The Environmental Health Act, Chapter 217, and the Environmental Health Regulations (1998), promote the conservation and maintenance of the environment in the interest of public health. The Minister of Health and Social Development is responsible for regulating, monitoring, and controlling the actual and likely contamination or pollution of the environment from any source, for ensuring compliance with all relevant regulations and for setting out minimum standards for a clean and healthy environment. The Minister is assisted by the Director of Public Health and staff, and is advised by an Executive Management Committee.

2.2.2 Certificate of Approval

A Certificate of Approval from the Director of Public Health must be obtained by anyone who intends to construct, alter, extend or replace any plant, structure, equipment, apparatus, mechanism or thing that may emit or discharge, or from which may be emitted or discharged, a contaminant or pollutant into any part of the environment.

2.2.3 The Conservation and Protection of the Physical Environment of The Bahamas Act

The Conservation and Protection of the Physical Environment of The Bahamas Act, No 12 (1997) is administered through the Department of Physical Planning in the Ministry of Environment and controls:

- The physical landscape to prevent environmental degradation, flooding and removal of hills;
- Excavation in the form of land removal, quarrying, mining, or harvesting sand or rock;
- Filling lands, wetlands, drainage basins or ponds;
- Digging or removing sand from beaches and sand dunes;
- Any work that will affect the coastlines; and
- Harvesting or removing protected trees.

Permits must be obtained from the Director of Physical Planning for any of these activities. Severe penalties, fines and imprisonment can be imposed for violations of the Act. The Quarrying and Mining Zones Order (1997) provides additional control over land removal.

2.2.4 Conservation and Protection of the Physical Environment of The Bahamas Act and the Declaration of Protected Trees Order

Certain species of hardwood trees, rare trees, and trees of remarkable growth or historical significance are protected under the Conservation and Protection of the Physical Environment of The Bahamas Act and the Declaration of Protected Trees Order (1997). A license to harvest any protected trees is required. Before any excavation or construction begins, the area would be inspected by a qualified person to identify potentially protected trees. Currently, eleven tree species are protected by the Order.

2.2.5 The Wild Birds and Plant Protection Acts

The Wild Birds Protection Act (1987) protects birds and bird eggs during closed seasons. Protection of the bird habitats is not addressed by this Act. The Plants Protection Act (1987) relates to plant disease and controls importation of plants to prevent outbreaks of exotic disease and establishment of unwanted species.

2.2.6 The Fisheries Resources Act

The Fisheries Resources Act, Chapter 225, amended as No. 38 in 1993, provides for conservation of the fisheries resources of The Bahamas. It establishes an exclusive fisheries zone and regulates harvesting of fisheries resources within the zone. The Minister of Agriculture and Marine Resources may declare any area within the zone, as well as the land adjacent to it, a protected area for the purposes of the Act. Department of Fisheries officers enforce the regulations. Permission must be granted to fish within an exclusive fisheries zone, and permission may include conditions necessary or expedient to conserve and manage the resource.

2.2.7 The Bahamas National Trust Act

The Bahamas National Trust Act directs The Bahamas National Trust to promote permanent preservation of lands, buildings, underwater areas of beauty, and areas of natural or historic interest. Additionally, the Act directs the Trust to identify sites for protection, and to administer those areas declared protected. The Trust administers the National Parks of The Bahamas, and it has been the leading organization in the country's conservation efforts.

2.2.8 Antiquities, Monuments and Museum Act

Areas or structures of cultural, anthropological, archeological, paleontological or historical significance are regulated under the Antiquities, Monuments and Museum Act (1998) and Regulations (1999). Discovery of a cultural or historical feature must be reported to the Prime Minister and measures are required to preserve its integrity. A permit must be obtained to excavate, carry on building or other work, plant or fell trees, and deposit earth or refuse on, in or near a monument, or demolish, remove, obstruct, deface, or interfere with a monument.

2.2.9 The Public Works Act

The Public Works Act, Chapter 21, while providing for construction, management and development of public works, buildings and roads, also provides that the Minister of Works and Transport can make rules to regulate the use, obstruction, alteration, encroachment upon or damage to any government property.

2.2.10 Acquisition of Land Act

Land to be acquired for a specific building or construction by Government must meet the requirements of the Acquisition of Land Act (1913) and its regulations (1987). Whenever land in any locality is likely to be needed for any public purpose, a notification to that effect must be published in the Gazette, the official Government publication. A public notice is also required to be displayed at a convenient place in the respective district to show what land is needed and where. After notification, a 30-day public response period is observed. The selected land may be acquired by private purchase agreement or through compulsory purchase by the Government. In the event that a structure is moved, compensation is paid to the owner to cover the expense of moving the house to another site plus payment for any damages incurred.

2.2.11 International Persons Landholding Act, 1993

The Immovable Property (Acquisition by Foreign Persons) Act, 1981 is now repealed. The International Persons Landholding Act, 1993 came into operation on January 1st, 1994 to facilitate the holding of land by non-Bahamians and by companies under their control. Under the new law, approval is granted automatically for non-Bahamians to purchase residential property of less than five acres for use as a single family dwelling. The Real Property Tax Act provides for a two-year real property tax exemption for foreign persons acquiring undeveloped land in The Bahamas for development purposes in certain instances, provided that substantial development occurs during those two years.

A foreigner will require a permit if (1) the property is five acres in size or larger, or (2) the property is to be used for commercial purposes. Failure to obtain a permit will render the acquisition null and void but the foreigner will be entitled to recover all monies paid in consideration of the acquisition less any legitimate deductions. If a permit has been granted for the acquisition of land and the intended usage changes then the permit must be varied by the Board otherwise it will be invalid. A registration certificate or permit must be included along with title documents to be

recorded in the Registrar General's Office otherwise the recording will be null and void.

2.2.12 National Disaster Plan

Disasters or emergencies include all natural and man-made disasters that exceed the resources of the local community or island nation. In The Bahamas, the National Emergency Management Agency (NEMA) is responsible for coordinating disaster management through mitigation planning, community preparedness, public information, and recovery coordination. NEMA operates under the authority of the Disaster Preparedness and Response Act, 2006 and falls under the portfolio of Cabinet Office.

NEMA is currently drafting the National Disaster Plan (NDP) which organizes the national response assistance into 13 Emergency Support Functions (ESFs), each of which has a designated lead agency. For the tourism industry, the Ministry of Tourism and Aviation is designated as the ESF and has the role of coordinating activities to ensure that the tourism industry is equipped to effectively respond to and recover from, any disaster impacting the nation.

The NDP covers the full range of complex and constantly changing requirements following a disaster: saving lives, protecting property, and meeting basic human needs (response); restoring the disaster-affected are (recovery); and reducing vulnerability to future disasters (mitigation). The NDP does not specifically address long-term reconstruction and redevelopment.

Baha Mar Ltd will work in close concert with each of the governing agencies to ensure the safe relocation and/or evacuation of hotel patrons and visitors in the event of an impending hurricane or other natural disaster. The NDP is currently in draft form and likely to undergo revisions as roles and responsibilities become further defined. Prior to the initiation of construction, Baha Mar Ltd will develop a hurricane evacuation plan for construction activities. As the NDP is completed, Baha Mar Ltd will coordinate with NEMA to develop an appropriate hurricane response plan for the resort facilities.

2.2.13 Proposed Legislation

Proposed legislation to increase environmental protection and natural resources management includes the Environmental Planning and Protection Act, the Pollution Control and Waste Management Act, the Revised Fisheries Act, the Ozone Protection Act and the Environmental Impact Assessment Regulations.

2.3 Applicable Regulations

Currently BEST is in the process of promulgating new environmental regulations for The Bahamas. Because these standards and regulations are still in the development phase, Baha Mar Ltd proposes to comply with appropriate existing United States Regulations and World Bank Criteria, as described below.

2.3.1 Heads of Agreement

Baha Mar Ltd and the Government of the Commonwealth of The Bahamas have negotiated a Heads of Agreement for the Baha Mar Resort Project. An Amended and Restated Heads of Agreement was finalized on January 31, 2011. Article 18 of the Amended and Restated Heads of Agreement, which addresses environmental protection and safety, requires Baha Mar Ltd to submit to the Ministry of the Environment an Environmental Impact Study prepared by qualified consultants in connection with the Project which shall be evaluated by the Ministry of Environment or any other relevant Government agencies.

In addition, Baha Mar Ltd. is required under the Heads of Agreement to design, construct, operate and maintain the Baha Mar Resort Project in accordance reasonable protocols and requirements of the relevant government agencies, including but not limited to, the Ministry of Health and the Ministry of the Environment in relation to all aspects of the development and operation of the Project (including the Ministry of the Environment monitoring mechanisms).

2.3.2 Baha Mar Resort (Bahamas Building Code)

The Baha Mar Resort at Cable Beach will be operated and constructed consistent with the Bahamas Building Code (BBC). The BBC is adopted closely from the South Florida Building Code (SFBC) which is, in turn, adopted from the National Fire Protection Association, Inc. (NFPA) 101 Life Safety Code Standard. NFPA 101, the latest revision to the Standard, was approved and adopted by NFPA on 7 November 2002. The Standard is inclusive of regulations and accepted practices in the United States and Canada.

The Standard applies to:

- Means of Egress,
- Features of Fire Protection,
- Special Structures and High-Rise Buildings,
- New Hotels,
- Construction,
- Operation, and
- Residential and Business Occupancies.

Where the BBC is silent, the International Building Code will be referenced and used as the operative guideline (examples of this include reference to ASHRAE 90.1 as the operative energy conservation code, stair pressurization, engineered smoke control systems, etc).

2.3.3 Project Air and Noise Quality Requirements

World Bank Guidelines, Florida Department of Environmental Protection, and United States Environmental Protection Agency (US EPA) regulations will be used to develop air or noise emission standards for the project. For the purpose of evaluating

potential impacts from the proposed project, technical guidance and procedures published by the US EPA were consulted.

2.3.4 World Bank Criteria

The World Bank has developed guidelines for a number of sector-wide environmental analysis topics. These are typically applied in the context of programs involving a number of sub-projects. Sectoral guidelines have been developed for both electric power transmission systems and thermoelectric projects.

The *Environmental Assessment Sourcebook* (World Bank 1991) identifies the Bank's policies, procedures, and sectoral and cross-sectoral issues involved in environmental assessment (EA) preparation. This document provides general guidance in the preparation of EA documents and has been utilized in the preparation of this EIA.

The Bank has also published several other documents and policy guidelines that are relevant to this project. The Pollution Prevention and Abatement Handbook includes specific pollutant discharge and ambient environmental quality protection standards.

Environmental Sourcebook Updates relevant to this project include:

- Public Consultation in the EA Process: A Strategic Approach (1999);
- Analysis of Alternatives in Environmental Assessment (1996);
- Biodiversity and Environmental Assessment (1997);
- Coastal Zone Management and Environmental Assessment (1994);
- Environmental Hazard and Risk Assessment (1997); and,
- Environmental Management Plans (1999).

2.3.5 Coastal Zone Management Program

Recently the Bahamas Government along with Non-Governmental Organizations and the InterAmerican Development Bank have initiated the development of a National Coastal Zone Management program designed to address the development of legislation, zoning, and land use planning. This program is still under development.

2.4 International Environmental Conventions and Treaties

The Bahamas is a contracting party to a number of international environmental agreements, treaties and conventions. All businesses operating in The Bahamas are expected to adhere to these international agreements which are into force and to which The Bahamas has signed and ratified to date.

2.4.1 Global Warming Impacts

The Kyoto Protocol to the United Nations (UN) Framework Convention on Climate Change (the Kyoto Protocol) addresses the emission of greenhouse gases. Greenhouse gases are naturally occurring and man-made gases that absorb infrared radiation and thus may enhance atmospheric warming. The Kyoto Protocol aims to reduce emissions of six greenhouse gases, including CO_2, methane (CH_4), and nitrous

oxide (N_2O) by 2008-2012. Article 2 of the Kyoto Protocol calls on the participating governments to implement policies that enhance energy efficiency and encourage measures to limit or reduce emissions of greenhouse gases. The Kyoto Protocol was opened for signatures on March 16, 1999, at the UN Headquarters in New York. After signing the agreement, each government must ratify it before it becomes officially adopted. As of July 24, 2002, 84 parties have signed the agreement, and 22 Annex I nations have ratified the agreement. The Kyoto Protocol will become effective 90 days after it has been ratified by at least 55 Annex I Parties to the United Nations Framework Convention. This will represent at least 55 percent of the total 1990 CO_2 emissions from developed countries. The Bahamas has signed and acceded to the agreement.

Like all industrial and utility combustion sources that use carbon-based fossil fuels (natural gas, oil, coal, etc.), the Project's backup generators and boilers will emit CO_2. Due to the small scale of the boilers and the intermittent use characteristics of the emergency generators, there are no economical post-combustion control options for CO_2. The project will involve replacement of old boilers and generating units with newer, more efficient units which should result in a decrease of emissions to the environment.

The high efficiency of the Resort's replacement boilers and backup power generation complies with the Kyoto Protocol's goals of enhanced energy efficiency and reduction in greenhouse gases.

2.4.2 The Basel Convention

The Bahamas is a signatory of the Basel Convention which is a global treaty among nations to limit the generation of hazardous wastes in terms of quantity and toxicity, including but not limited to, toxic, poisonous, explosive, corrosive, flammable, ecotoxic and infectious types of hazardous wastes. The central goal among signatories includes the protection of human health and the environment through a process known as environmentally sound management (ESM). The goal of the convention is to encourage the disposal of hazardous wastes as close to the source as possible and to limit the movement of these types of wastes. The Convention, which dates back to the 1989 Basel diplomatic conference, encourages strong controls from the initial generation of a hazardous substance, in addition to the storage, transport, treatment, reuse, recycling, recovery and final disposal. In the future, the Basel Convention will continue to advocate for a stronger emphasis on creating partnerships with industry and research institutions to create innovative approaches to ESM. One of the most critical aspects of ESM is lowering demand for products and services that result in hazardous by-products.

2.4.3 United Nations Convention on the Law of the Sea (UNCLOS).

In 1983 the Bahamas ratified the United Nations Convention on the Law of the Sea (UNCLOS). As a result, the government continues to seek to ensure sustainable development of its marine and coastal resources. In the year 2000, the government established an integrated network of "no-take" marine reserves. Such reserves will be

used to ensure the protection of the Marine Biodiversity of the Bahamas, while enhancing support for fisheries production for local communities.

2.4.4 The United Nations Convention to Combat Desertification

In 1977, the United Nations Conference on Desertification (UNCOD) adopted a Plan of Action to Combat Desertification (PACD). This Convention offers new hope in the struggle against desertification. Further, the Convention promotes a fresh new approach to managing dryland ecosystems and -- just as important -- to managing development aid flows. It entered into force on 26 December 1996, 90 days after the 50th ratification was received. Over 170 countries are now Parties. The Bahamas acceded 10 November 2000.

2.4.5 United Nations Framework Convention on Climate Change

The text of the Convention was adopted at the United Nations Headquarters, New York on the 9 May 1992; it was open for signature at the Rio de Janeiro from 4 to 14 June 1992, and thereafter at the United Nations Headquarters, New York, from 20 June 1992 to 19 June 1993. The Bahamas ratified this convention on 9 April 1999.

2.4.6 Convention on Biological Diversity

The Convention on Biological Diversity was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). It remained open for signature until 4 June 1993, by which time it had received 168 signatures. The Commonwealth of The Bahamas was among the first of the small island developing states to become signatory to the Convention September 2nd 1993.

2.5 Other Relevant Legislation

Besides the legal, regulatory and administrative requirements for environmental protection and natural resources management there are other regulations and legislation which will need to be considered for the development of the Project and include the following:

2.5.1 The Bahamas Vacation Plan and Time Sharing Act (1999)

On 1994 the Bahamas government passed the Bahamas Vacation Plan and Time Sharing Act, which requires the registration and licensing of all time-share projects. This legislation is sought to protect and safeguard the rights of time share purchasers. The Act required a Developing Owner's License and a Marketing Agent's License.

2.5.2 Labor Practices

Labor practices in The Bahamas are governed by the Employment Act 2001, as amended, which establishes standard work hours and vacation with pay for certain employees.

2.5.3 Labor Relations

Wage rates and other conditions of employment are established between employer and employees, either on an individual basis or through collective bargaining.
Unions are regulated by the Industrial Relations Act, Chapter 321, Statute Law of The Bahamas Revised 2000, as amended. The Act determines the conditions under which a union can be recognized, industrial agreements can be made, and industrial disputes settled. Contracts entered into by unions are legally binding.

2.5.4 Labor Laws & Regulations

An investor seeking to do business in The Bahamas must submit to The Ministry of Finance a proposal that includes the projected number of Bahamian and non-Bahamian employees, and the projected number of non-Bahamian key and non-key employees. Non-Bahamians will require work permits.

2.6 Agency Consultation

Throughout the initial planning phases of the Baha Mar Resort Project, Baha Mar Ltd has held meetings with a variety of Ministries and public agencies including:

- The Bahamas Environment, Science & Technology Commission;
- Department of Environmental Services;
- The Bahamas Water and Sewerage Corporation;
- Bahamas Electric Corporation;
- The Ministry of Works and Transport;
- The Hotel Corporation of The Bahamas;
- The Department of Physical Planning;
- The Ministry of Finance;
- Batelco; and,
- Cable Bahamas.

Baha Mar Ltd will continue consultation with these agencies throughout the permitting and development process.

2.7 Public Involvement

In consultation with BEST, Baha Mar Ltd will develop an appropriate approach for soliciting and adequately addressing relevant public concerns about the project. This approach will include identifying and documenting the public consultation process to be used; methods for disseminating pertinent information about the project and obtaining public input; timeframes and appropriate junctures for public consultation; respective roles, responsibilities and expectations for BEST, Baha Mar Ltd, and other interested parties; and other appropriate characteristics of a useful public consultation process.

Baha Mar Ltd will take an active role in the public consultation process. This will likely include, among other things, the conduct of town meetings and open forums and consultations with community leaders, politicians, government officials, interest groups and other interested parties. Baha Mar Ltd will participate in all meetings with BEST, the Ministry of Works and Transport, and offer relevant technical assistance, present relevant background information on the project, and respond to questions and concerns.

3. BASELINE PHYSICAL ENVIRONMENT

Multiple studies were commissioned by Baha Mar Ltd to collect information used to assess existing baseline conditions of the marine and terrestrial environment within the project area. As described below, the project area baseline physical environment assessment consisted of an evaluation of the following:

- Topography and Climate,
- Oceanographic Conditions,
- Regional Geology;
- Hydrology and Surface Waters;
- Existing Land Uses and Facilities; and,
- Air, Noise, and Environmental Contamination.

The information presented in this section, along with the description of the facilities and construction techniques described previously, was used to identify the potential impacts of the project discussed in Section 6, Anticipated Physical Environmental Impacts.

3.1 Climate

The climate of The Bahamas, including the project area, is subtropical marine with winter and summer seasons. The summer season, from May to November, is warm with abundant rainfall; and, the winter season, from December to April, is mild and dry. The climate is influenced by the warm waters of the Gulf Stream, which has the effect of slightly lowering temperatures in the summer and contributing to mild winters. The air temperature in The Bahamas during winter months averages approximately 25 °C (77 °F), while the summer temperature ranges between 23-32 °C (73 - 90 °F). Water temperature ranges between 20-30 °C (68 – 86 °F) with an average temperature of approximately 25 °C (77 °F). Much of the Bahama Bank has a relatively humid climate with annual rainfall between 100 and 150 cm (39-59 in) per year. Rainfall is seasonal and predominantly occurs during the summer months. Trade winds, which are the product of a pressure feature known as the Bermuda high, blow in a predominately easterly direction with consistent wind speed. The Bermuda high is a semi-permanent high pressure system. Although the prevailing wind is from the east and northeast, wind direction ranges from southeast to northeast throughout the year. Average wind speeds during summer months typically fall below 10 knots, while exceeding 13 knots during the winter season. Conditions within the project area are expected to fall within these general ranges for The Bahamas area.

Much of the Bahamian archipelago lies within the Atlantic hurricane belt. Hurricanes are cyclones that develop over the warm tropical oceans and have sustained winds in excess of 64 knots. These storms occasionally hit The Bahamas with dangerous winds, torrential rains, and flooding.

The Great Bahama Bank, together with the Florida Peninsula and the island of Cuba, separate the Atlantic Ocean from the Gulf of Mexico and the Caribbean Sea. The connection between these oceans is limited to the seaways between The Bahamas, the Florida Peninsula, and Cuba. As such, the seaways serve to funnel water masses in and out of the major ocean basins, resulting in high velocity currents in the Straits of Florida and the Santaren Channel.

The Antillean Current flows northwest through the Santaren Channel and is believed to mix with the Florida Current off the southern tip of Florida before flowing north through the Straits of Florida. The Florida Current borders The Bahamas on the west and is renamed as the Gulf Stream after it passes north of Grand Bahama Island Other important ocean currents include the Antilles Current which flows north to south to the east of Abaco and Eleuthera and the Southwest and Northwest Providence currents that flow westerly between Abaco and the Berry Islands joining the Florida Current at the west end of Grand Bahama Island.

3.1.1 Precipitation

The climate of the island of New Providence is generally mild year-round with average air temperatures of 77° F. Winter weather typically begins sometime between November and January. The winter season has a maximum average daily temperature of 78°F and northeasterly cold fronts which bring winds of 20-25 knots and often rain. Summertime begins in May with the summer season seeing an average maximum daily temperature of 88°F. Winds in the summer typically blow from the southeast. Average year-round rainfall for Nassau is 50 inches per year.

Monthly rainfall at the Nassau Airport was obtained from the U.S. National Oceanic and Atmospheric Administration for the period 1987 through 2003. The average rainfall by month is shown on Figure 12. Elevated rainfall, ranging between 4.6 mm per day (0.18 inches per day) and 7.3 mm per day (0.29 inches per day), occurs between June and October. Significantly drier conditions occur over the remainder of the year, with precipitation on the order of 2 mm per day. The annual average precipitation is 3.7 mm per day (0.14 inches per day).

Pan evaporation rates were obtained from The Bahamas Department of Meteorology for the years 1992 through 2005. These rates were adjusted using a coefficient of 0.7 per ASCE (1996) to obtain estimates of surface water evaporation rates. These rates are shown on Figure 12. The estimated rate of evaporation exceeds the rate of precipitation in every month except June and August, with the greatest deficits in precipitation occurring from December through May. The average evaporation rate over this period is 6.0 mm per day (0.24 inch per day).

3.1.2 Wave Climate

Goodman's Bay, located north of the project site, is a shallow embayment located along the north shore of New Providence Island approximately 3nm (nautical miles) to the west of the Port of Nassau. To the south the Bay is bordered by low lying lands with mean elevations ranging from 6 to 12 m above mean sea level. Much of the immediate shoreline has been developed and contains a variety of residential housing, resort hotels and casinos. In contrast, the backshore beyond Lake Cunningham is sparsely populated and dominated by shrubs, forest vegetation and sand dunes.

The following summarizes typical beach and coastal conditions along the principal resort shoreline of Cable Beach.

From Breezes to the Wyndham Resort, existing buildings are set-back from the beach. Included within this reach, from east to west, are Breezes SuperClub, private villas,

the daily embarkation beach for tourist cruises, the former site of the Rock'n'Roll café, tennis courts, and Nassau Beach Hotel. Along this portion of Goodman's Bay, beginning east of the New Providence Wing of the Nassau Beach Hotel, and continuing eastward along the undeveloped shorefront, the beach is typically sound.

Chronic erosion is observed beginning just east of Nassau Beach Hotel, Wing A, and increases in severity toward the west, to the Wyndham Resort. Along the Nassau Beach Hotel, this erosion is evident as exposure of the underlying sandstone. The top of this sandstone is often visible along the beach crest from the Wyndham Resort to the centerline of the New Providence Wing – which is evidence of repeated beach erosion (rock exposure) and periodic sand recovery.

In this area the eroded sandstone bluff ("scarp") is 2 to 5 ft high. The eroded scarp increases in height westward. Adjacent to the Wyndham Resort, this erosion has repeatedly threatened to undermine existing beach huts and other infrastructure and has required the placement of repeated sand fill. This fill has been mostly ineffective in stemming the erosion. The exposed sandstone bluff is breaking off ("calving") along the 200+ ft shoreline east of the Wyndham Resort's eastern, rock groin. As a result of this erosion, there is a significant vertical discontinuity in the beach between the Wyndham Resort and the Nassau Beach Hotel, and minimal usable recreational beach along the western end of the latter.

The Wyndham Resort shorefront represents a significant and deleterious interruption to the natural shoreline and sand transport along Cable Beach. The property's developed shorefront includes a seawall and rock toe along the western and central portions, a narrow gap to an internal 'swimming' lagoon, and a rock groin along the eastern end. These structures, referred to as the Wyndham Jetty, were constructed in the early 1990's. They were intended to reclaim lands for the pool; sunning and bathing areas where insufficient land otherwise existed. The pool and sunning areas have been constructed across what would ordinarily be the natural tidal beach and seabed.

The seawall and groin interrupt the natural alongshore flow of sand, and are principally responsible for beach erosion observed to the east of the Wyndham Resort. The narrow gap between the structures, and seabed excavation therein, was intended to create a swimming lagoon. During typical ocean seas and swell, there is a strong offshore-directed current through the gap, which results from the ocean waves' water flowing back to sea. Seaweed, silt and detritus are collected within the over-excavated lagoon (and are not otherwise flushed out), and create unfavorable swimming and wading conditions therein. Periodic wave overtopping of the seawall results in damage and erosion along the northern area of the reclaimed area, leeward of the seawall. The geometry of the structures is not sufficient to create a stable high-tide beach along the central and eastern portions of the lagoon.

Water outfalls (pipelines), related to the Wyndham Resort infrastructure are routed across the beach immediately east of the eastern, rock groin.

The area in the vicinity of the Sheraton Hotel and west of Wyndham Resort, the beach is generally wide and usually stable west of the Wyndham Resort (with temporary

fluctuations immediately west of Wyndham Resort and at the west end of the Sheraton). This is principally attributed to (1) sand build-up along the Wyndham Resort western seawall, and (2) modest effects of three offshore rock breakwaters constructed in the early 1980's. During times of easterly waves, localized erosion is observed west of the Wyndham Resort.

The existing offshore breakwaters have deteriorated since their construction. The crest elevations are at or about Mean Higher High Water. Nonetheless, the entire shoreline along the Sheraton is anomalously "built out" in the lee of these structures, indicating their residual effect upon the beach. There is minimal or no sandy beach along the seawalled villa properties west of this breakwater field.

Based upon limited probings conducted mostly offshore of the Wyndham Resort, the nearshore seabed is typified by rock and/or a mostly thin veneer of sand (0" to 24") over rock, with scattered seagrass beds and some corals.

Waves and tidal fluctuations in the vicinity of Cable Beach were monitored during the period of February 2006 during the Littoral Study by instruments deployed as shown on Figure 13. This report of results has made a distinction between operational and storm wave climates. In general, the term "operational wave climate" refers to the day-to-day wave climate, whereas the term "storm wave climate" is used to describe the wave conditions during the passage of tropical cyclones that occasionally affect the site. In addition, as an island, New Providence is exposed to waves from all directions. The project area located in Goodman's Bay is protected by a naturally occurring shelf break and series of barrier islands as shown on Figure 14.

The offshore of Goodman's Bay is a generally smooth and featureless platform with average water depths ranging from approximately 6 to 9 ft. Beyond the intertidal area, depths increase rapidly within the first 150 ft and then remain nearly constant for a distance of approximately 1.5 nautical miles to the edge of the platform. Beyond this point depths again increase rapidly approaching 3000 ft within 2 nautical miles. Exposed to the north, Goodman's Bay is sheltered from direct ocean influence by a nearly continuous coral reef along the edge of the platform and several small islands including North Cay (also known as Balmoral Island) and Long Key (also known as Rooster Cay). Some additional sheltering from northeasterly winds is provided by Browns Point.

The surface of the submerged platform within and adjacent to Goodman's Bay is dominated by non cohesive fine to medium sands and patchy growths of short stemmed sea grass. Bed forms consisting of a mix of three dimensional dune fields and two dimensional long crested ripples with maximum amplitudes of approximately 12 cm and wavelengths ranging from 0.5 to 1 m are found throughout the area. The symmetry of these forms indicates that their formation and migration is the result of oscillatory currents associated with the surface wave field. Coarser lag deposits are typically observed in the troughs of these features. Tracks throughout the Bay indicate that the surface sediments are regularly reworked by foraging benthic biota such as urchins.

3.1.2.1 Sediment Transport Factors

The shape and figure of the shoreline and the associated movement of sediment throughout Goodman's Bay is the resultant of interactions between surficial sediments and the local transport field dominated by the astronomical tide, winds, and surface wind waves and to some extent the influence of man. Tides in the area are dominated by the semi-diurnal lunar component. Tidal range varies from a maximum of approximately 4.3 ft during springs to 2.1 ft during neap. Associated currents within Goodman's Bay are typically low energy. Short term deployments of electromagnetic current meters (InterOcean S4) at three locations within the Bay during February, 2006 yielded data showing current speeds varying from less than 10 cm/sec at the inshore stations (east and west stations) to nearly 50 cm/sec (1 knot) at the offshore (i.e. north) station. The elevated speeds at the offshore station persisted for less than three hours of the observation period. For the remainder of the period speeds at the offshore station remained below 10 cm/sec and were essentially similar to those observed at the inshore stations. The noticeable change in flow direction associated with the termination of the high flow period at the offshore station suggests that currents in the area may be quite sensitive to the interaction between the local islands and the flows entering and leaving the port via the dredged channel. The observed high flows occurred during a time of easterly or ebbing current and may be the result of a redirection of a portion of the flows exiting the harbor to follow a trajectory leading south of Long Cay and North Cay. The effects of these intermittent flows appear to be confined to the offshore areas adjoining North Cay. No evidence of similar high speed flows was found in the short term inshore measurements.

3.1.2.2 Storm Waves

Storm waves in the Cable Beach area are mainly due to the passage of tropical cyclones, which are low-pressure systems that generally form in the tropics from June to November. These cyclones are accompanied by thunderstorms and, in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface. Tropical cyclones are classified as follows:

- Tropical depressions, which are an organized system of clouds and thunderstorms with a defined surface circulation and maximum sustained wind speed of 17 m/s (38 mph) or less;
- Tropical storms, which are systems of organized thunderstorms with defined surface circulation and maximum sustained wind speed of 17 m/s to 33 m/s (38 to 74 mph); and,
- Hurricanes, which are intense tropical weather systems of thunderstorms with a well defined surface circulation and maximum sustained wind speed of over 33 m/s (74 mph).

As shown in Table 13, hurricanes are categorized according to the strength of their winds using the Saffir-Simpson scale.

The potential for a hurricane to generate very large waves is related to the hurricane's sustained wind speed and its forward moving speed. Thus, the above described categories are relative terms, as lower category storms with a slower forward moving speed can sometimes generate larger waves than higher category storms, with faster forward moving speeds.

The winds affecting New Providence Island are predominantly from the east to southeast. Analysis of ten years of data from the Bahamas' Department of Meteorology station at Nassau International Airport indicates speeds ranging from a maximum of 50 knots to an average of approximately 8.6 knots. Maxima are typically dominated by winds from the northwest. Application of extreme value analysis to this limited data set indicates that winds of 30 knots can be expected to occur at least once every two years while winds of fifty knots occur every 25 years. These estimates however, are relatively inaccurate due to the short length of the data set and are best used to establish ranges of probable wind speeds rather than expected recurrence periods.

Examination of the longer term climatological data set (see StormCarib.com) extending back in time to 1851 indicates that during this period the area of Nassau was affected by a total of 14 hurricanes ranging from Category 3 to 5 in strength on the Saffir-Simpson Scale. These storms passed within 60 nautical miles of the island. Over the same period an additional 14 less intense hurricanes occurred with strengths ranging from Category 1 to 2 as well as 25 tropical storms. Recognizing that some of the earlier records are inaccurate or incomplete it has been agreed to take 1944 as the start of the "reliable" record. During this shorter period Nassau has experienced the effects of 15 major storms including 5 tropical storms and 10 hurricanes. The majority of the hurricanes were Category 1 or 2. Only one Category 4 hurricane occurred and no storm of Category 5 has occurred.

In addition to affecting wind speeds, directions, and durations, the passage of high energy storm events has the potential to significantly affect sea levels within the study area. Given the relatively low elevations of much of the coastal area on New Providence Island these storm induced water level variations may significantly alter alongshore sediment transport and the associated shoreline contours. Numerical analysis of storm surges associated with Category 1 to Category 5 hurricanes using the SLOSH model (Rolle, ~1995) indicates that storm passage can be expected to produce and an increase in water level above mean sea level ranging from 5 ft in Category 1 storms to more than 15 ft in a Category 5 event. Actual water levels will deviate slightly from these as a function of tidal state and surface wave conditions. In addition to the average ambient tidal conditions and the effects of aperiodic storms the location of the water line along shore is also affected by a variety of factors which influence long term sea level elevations. For the Caribbean Basin these include eustatic and isostatic factors, global warming and North Atlantic oceanographic and meteorological influences. Long term observations at several adjacent islands (~1937-1990 indicate a slow rising trend with values ranging between 0.055 and 0.063 inches/yr (see tidesandcurents.NOAA.gov/sltrends) or approximately 6 inches/100 yrs.

Such a rise will move the average waterline inshore over distances varying as a function of beachfront slope. It will also move the intertidal shoreward and increase the fraction of the backshore subject to wave attack during storm events.

Given the limited sheltering provided by the surrounding land masses, wind from all directions will produce some surface wave activity in Goodman's Bay. Wave characteristics will necessarily vary as a function of fetch, wind speed, direction and duration with winds rich in northerly components producing the most energetic waves. With the location of the project area and its exposure it is also these waves that will tend to dominate alongshore sediment movements. Reviews indicate that there have been no direct observations of the surface wave field in Goodman's Bay.

3.1.3 Storm Surge

In order to more closely examine the potential impact of storm-related waves and surge on the development, storm surge elevations were calculated and are presented below. The storm elevation is the sum of the stillwater elevation of the storm surge, and tidal and wave influences. In addition, because of anthropogenic activities, sea levels are increasing because of thermal expansion of oceans and melting of ice on land. Where there is a range associated with a calculation, it is also presented. Table 16 presents calculated stillwater and storm surge elevations for Cable Beach.

Waves add additional height to the stillwater storm elevation. Wave effects were calculated using standard methods in FEMA (2003). The net wave effect is taken as the maximum of possible wave influences from wave runup, wave setup, and wave overland flow. Table 15 and Table 16 illustrate the sum of the stillwater elevation of the storm surge, the Spring tide height, and the maximum of the wave influences.

3.2 Topography

The topography of the Cable Beach development site and its immediate vicinity averages approximately 8 ft within 750 ft of Cable Beach and 32 ft along Prospect Ridge. The highest elevation is located along Prospect Ridge and is 52 ft. Prospect Ridge and Gladstone Ridge consist of lithified dune systems or ridges, which when they formed, trapped and created the lower lying area of Lake Cunningham between them, as shown on Figure 17. The Bahamas is comprised of an extensive archipelago of carbonate islands and shallow banks. According to soils information provided by the Department of Agriculture, Bahamian soils are classified into three basic physical classes, sand, silt, and clay, graded by the size of the soil particle size in decreasing order. All soils, except organic soils derived from peat, are one of these classes or some combination of these. The typical nature of soils occurring in the Bahamas is that of an alkaline reaction dominated by the bedrock or parent material, which is limestone. The pH is often 7.9 to 8.4, except for organic soils occurring in marshes. The Prospect Ridge area consists of limestone rock with a thin humic soil layer characterized as Bahama Black Loam. Within the Cable Beach area, man-made soils exist and are most likely derived from limestone quarry or carbonate sands.

3.3 Geology

A consideration of the surface and subsurface drainage are of importance in that they provide an indication of the direction of contaminant migration. The following is a discussion on the hydrology of the site and the surrounding areas based on a review of literature regarding the geology and hydrogeology of New Providence.

The geology of New Providence Island is comprised of carbonate sediments overlying the Bahamas Banks which are stable but slowly subsiding. The underlying igneous rock is assumed extend very deep and is overlain by clastic and evaporate deposits. As a result the carbonate banks have formed over this low lying platform.

The near surface strata correlate with the Pliocene/Pleistocene Lucayan Formation. The strata are comprised of a series of corals and carbonate deposits in varying states of sedimentation and re-crystallization which are mixed and laterally irregular. More specifically The Project Area overlies an area of Holocene (Recent) deposits formed by an accretion of beach materials over the last few thousand years. These low lying areas included the present day beach ridge (dune) of Cable Beach. These Holocene deposits are comprised primarily of sand layers interspersed with some fine materials (marls and clays) and some mangrove peat. Uncemented sands, particularly fine-grained ones, are highly porous but because the pores are very small, surface tension is high and this allows little groundwater movement. Despite their relative impermeability they can, because of their water-retaining ability, store freshwater even in close proximity to the sea. The water table in these areas was encountered between 2 to 4 ft below land surface (BLS) and somewhat greater below the beach ridge. This water table generally reflects the sea level and can be tidally influenced to a minimum degree. The groundwater gradients in this area are inferred to be towards the north to tide.

To the south of the low lying coastal areas is a Pleistocene beach ridge which has been well cemented into limestone. Because of the elevation and low permeability, this ridge contains a freshwater lens (aquifer) that is utilized for minor local water supply. Historically, in the 1940's, a wellfield was located on top of this ridge to tap the freshwater lens (north of the site). This wellfield is now abandoned. On either side (north and south) of this Pleistocene ridge are perched surface water bodies. To the north is a shallow marsh that is somewhat brackish (including the subject site) and to the south, bordering John F. Kennedy Drive is Lake Cunningham. On the Pleistocene ridge the unconfined water table is at a minimum 10 to 15 ft BLS. The carbonate sequence features cavernous zones which were likely formed by solution during periods of lowered sea levels. As a result, kartistic surfaces, caves and collapsed sinkholes are found throughout the Bahamian Islands.

3.3.1 Soils

Bahamian soils are generally so poorly developed that they have been classified as part of an immature category or as azonal ('without category'). However, the Bahamian soil types have been broadly categorized into the following categories:

- Red clay soils;
- Sedimentary soils; and,
- Organic soils.

Each of these is briefly described below, together with their main characteristics.

3.3.1.1 Red Clay Soils

Red clay soils, which consist mainly of insoluble iron and aluminum oxides, are lateritic. Laterite is a type of soil produced by intense, prolonged weathering, usually in tropical climates. Abundant oxygen, water, and warmth leach most water-soluble minerals from particles of parent rock and leave a nonsoluble residue enriched in hydroxides of aluminum, iron, magnesium, nickel, and titanium. These lateritic red clay soils can be further subdivided into two categories. The first consists of aluminous laterite or Bahamas Red Loam which is a shallow red clay containing considerable quantities of free oxides and hydroxides of iron and aluminum. This soil is generally encountered in relatively isolated basins on the lower slopes and on upland formed by coalescing ridges. The Bahamas Red Loam is virtually free of humus, therefore overall fertility is poor. These soils are found in areas of New Providence Island.

In contrast to the Bahamas Red Loam, immature bauxite appears as a dark brown clay and pebble mixture that demonstrates significantly higher degrees of weathering than aluminous laterite. The upper soil horizons have high proportions of organic matter while the lower horizons are characterized by the presence of insoluble iron and aluminum oxides. This type of soil is not typically consistently deep.

3.3.1.2 Sedimentary Soils

Sedimentary soils are characterized by unconsolidated rock. While sand or other sediments can be characterized as unconsolidated rock, organic matter must be present to be included in this soil category.

3.3.1.3 Organic Soils

Organic soils differ greatly from sedimentary soils with respect to the relative quantities of mineral and organic matter. Organic soils consist of leaf mould soil and muck soils. Leaf mould soil is characterized by a variable depth of humus overlying less than six inches of humic sandy earth. This in turn is underlain by irregular and often outcropping parent limestone rock. This soil type forms the majority of soils in The Bahamas. Muck soils are typically found in areas that are water logged with fresh water within a ft of the surface of the soil.

3.3.2 Structure and Seismicity

Although bedrock faults may exist in the basement rock, they are unlikely to exist in the carbonates of the Bahama Platform based on the structure and nature of the rock. Deeper bedrock faults within the basement rock may have exerted some influence on the creation and locations of the channels between the series of banks, which comprise the Bahama Platform. The Bahama Platform lies in a location where the North

American crust meets the oceanic crust; however there is no plate boundary in this region (a geologic setting referred to as a passive continental margin). Passive margins are characterized by low rates of earthquake activity and surface deformation. No references have been found in published literature to indicate modern active faulting exists in the Bahama Platform.

Available earthquake databases indicate almost no record of earthquakes centered in the northern Bahamas. One minor earthquake, a 3.2 body-wave magnitude with an epicenter approximately 109 km (approximately 67 miles) north-northeast of New Providence; was recorded in 1992. The available data indicate that Cable Beach is located in a tectonically stable region with no history of significant seismic activity.

3.4 Water Quality

As is the case with most of the Bahamian Islands, there are no rivers or streams on New Providence. Percolation and infiltration rates are usually very high and it is only in heavy storms that surface runoff occurs from undisturbed areas. There are some fresh water lenses found close to the surface, resting on underlying salt water. Several lakes exist on New Providence, however without a steady influx of fresh water from sources such as streams to replenish them these lakes are typically shallow and brackish.

3.4.1 Surface Water

Aquatic ecosystems at the Site consist both of man-made and natural, but altered, systems. A series of natural, but altered, open water areas constitute what is referred to herein as Hobby Horse Pond. Hobby Horse Pond is a 10-acre body of open water oriented in an approximate east-west direction lying to the north of Prospect Ridge and to the south of West Bay Street. Though not confirmed, but based on observed topography as well as 1970s topographic maps and historic aerial photos, this pond may have had a historical connection to the sea to the west and through an area in the vicinity of Delaport. In the recent past, the pond, and the wetlands associated with it, appear to have been altered through fragmentation and filling during the development of roadways, utilities, residential and commercial structures among other forms of urbanization. This area was surveyed by kayak by two staff for vegetation and wildlife. The results of the wildlife survey of this area are discussed in Section 4.1.

Currently, the pond and wetland system appear to be supporting both marine and freshwater flora and fauna. Areas along the perimeter of the Hobby Horse Pond and mangrove fringe have some *Typha* invasion as well as *Casuarina*. Currently, the most readily apparent source of freshwater input to the open water area appears to be from rainfall run-off from Prospect Ridge and the surrounding areas. The open water area also receives the brine discharge from the RO System operating at the Total Energy Plant, as described in Section 4.1. A sample of water from the Hobby Horse Pond was collected and analyzed to determine the quality of water in the flow-way. The results of the analysis are presented in Table 33 and discussed in Section 3.4.1.

Man-made aquatic ecosystems at the site consist of the golf course ponds as shown on Figure 6. Based on observed water turbidity, coloration, as well as the abundance of *Typha* (U.S. EPA., 2002), all of the ponds on the golf course appear to be receiving

some level of excess nutrient input. In addition, some of the golf course ponds appear to be so heavily eutrophied that there was an observable difference in terms of wildlife utilization between ponds at the time of the survey. Fewer ducks and no fish were observed in the ponds with the most turbid and greenest water, located within the central and western portions of the golf course. The eastern golf course ponds had a greater number of turtles (non-native Red-eared Sliders (*Trachemys scripta*), ducks, wading birds, Mosquito Fish (*Gambusia sp.*), and slightly better water clarity. Samples were collected from two of the ponds on the site and analyzed to determine water quality. The results of the analyses are presented in Table 17.

It also was noted that the ponds with the worst observed water quality were those containing aerating fountain installations. At the time of the survey, some of the fountains appeared to functioning while others did not. It is likely that some of the ponds are indeed oxygen-depleted and eutrophic and aeration is one method previously attempted to alleviate this problem.

3.4.2 Groundwater

As described above in Section 3.3, the project area overlies an area of Holocene deposits formed by an accretion of beach materials over the last few thousand years. These Holocene deposits are highly porous but because the pores are very small, surface tension is high and this allows little groundwater movement. Despite their relative impermeability they can store freshwater even in close proximity to the sea. The water table in these areas is approximately 2 to 4 ft below land surface (BLS) and somewhat greater below the beach ridge. This water table generally reflects the sea level and can be tidally influenced to a minimum degree.

Groundwater measurements were taken in the vicinity of the Sheraton Laundry in April 2005. Based on the results of the study the groundwater table in this area is approximately 5.7 ft below ground surface. A significant variation in groundwater elevations was noted during the study, which is likely a result of tidal fluctuations given the porous substrate and proximity to the shoreline.

The groundwater gradients in this area are inferred to be towards the north to tide. To the south of the low lying coastal areas is a Pleistocene beach ridge which has been well cemented into limestone. Because of the elevation and low permeability, this ridge contains a freshwater lens (aquifer) that is utilized for minor local water supply. In the 1940's, a well field was located on top of this ridge to tap the freshwater lens to the north of John F. Kennedy Drive, but this well field has since been abandoned. On either side the Pleistocene ridge are perched surface water bodies. To the north is a shallow marsh associated with the Flow Way described above that is somewhat brackish and to the south, bordering John F. Kennedy Drive is Lake Cunningham. On the Pleistocene ridge the unconfined water table is at a minimum 10 to 15 ft BLS.

3.5 Air Quality

There were no monitoring stations on New Providence Island or in the Bahamas that record background or ambient air quality data. In order to establish the ambient air levels for the Air

Quality Impact Analysis provided in Appendix, data was obtained from monitoring stations in Florida that have similar climates and geographical location.

There is little industry in the vicinity of the Cable Area that impacts air quality. Currently The Sheraton Hotel and Wyndham Resort maintain emergency generators to serve as a back up to the existing Bahamas Electric Corporation (BEC) electric system. The Nassau Beach Hotel purchases approximately 40 percent of its power from BEC and generates 60 percent of its power from a series of four diesel fired generators located at the Total Energy Plant. Table 28 presents the existing emissions sources associated with the Project area.

As part of the proposed development, some of the existing emergency generators will be removed and replaced by newer, more efficient generators at a central location as described in Section 1.6.2.3 . Additionally, the Total Energy Plant will be decommissioned as part of the project scope therefore there will be a net decrease in ambient air emissions in the Cable Beach Area.

There are no current air quality standards or impact analysis guidelines in the Bahamas for assessing the air quality impact of proposed emission sources. Therefore, a detailed dispersion modeling was performed for the proposed project using US EPA modeling guidelines applicable to new major sources to demonstrate compliance with Ambient Air Quality Standards (AAQS). Results if the air quality impact analysis are summarized in Section 6.4.

3.6 Noise

In order to establish baseline sound levels in the site area, background sound level measurements were obtained during the period October 20 – October 24, 2006 as part of a comprehensive noise impact assessment. The complete Noise Quality Impact Analysis is provided in Appendix. The locations at which background sound level measurements were obtained are detailed on Figure 18. Baseline sound levels in the site area were established through methods of acoustic measurements and modeling.

Various predominant noise sources were identified within the survey area. These sources include: traffic sounds from nearby and distant roadways, occasional aircraft sound, natural and wildlife sounds, noise generated by residential activities, and noise generated from commercial equipment including site activities. West Bay Street is the single most significant source of existing community noise. The Total Energy Plant and Sheraton Laundry Facility which are other considerable sources of existing community noise will be removed as part of the proposed development, and will significantly reduce the sound levels at some community locations. An unexpected result was the nighttime ambient levels at Locations 1 and 4, which were dominated by high frequency insect sounds. A summary of background noise levels is provided in Table 19. Seasonal variation of ambient noise occurs, especially in areas dominated by insect noise.

The Government of The Bahamas does not presently have regulations or guidelines that provide quantitative limits on noise from construction or operation for major development projects. Based on discussions with the BEST Commission, potential construction and operational noise impacts at community locations were compared to the World Bank

guidelines. A discussion of potential construction and operational noise impacts is included in Section 6.5.

3.7 Existing Land Uses and Facilities

Initially the Cable Beach area was developed as residential cottages and homes. During the 1950's the Cable Beach area along West Bay Drive slowly began to be developed with hotel and commercial properties. The first hotel in the area was the Emerald Beach Hotel which was constructed in the early 1950's. This hotel was constructed in the area now occupied by the Sheraton Resort and the Wyndham Resort. During the 1960's a fire destroyed the Emerald Beach Hotel. Later during the early 1980's, the Radisson Hotel (now Sheraton) was built on the western portion of the property and the Wyndham Resort/Crystal Palace Casino was built on the eastern portion.

To the east of the Wyndham Resort/Crystal Palace Casino the Nassau Beach Resort was constructed during the late 1960's through the early 1970's. This resort was developed in three phases. Moving east along West Bay Street, a defunct night club, the Rock N' Roll Cafe was, present. This building was originally constructed in the 1940's and upgraded several times. Site utilization of this property included restaurant and night club businesses. To the east of the site of the Rock N' Roll club, there were several cottages also constructed during the 1940s. These cottages were demolished in 2007. Other properties not included in the development are located to the east of the cottages and include the Wong parcel, Sulgrave Manor, a private condominium complex, and Breezes SuperClub Hotel. Further east, Bahamas Development Bank and the Nassau Gaming Board are present.

Moving south from Cable Beach are the Cable Beach (formerly Radisson) Golf Course and Driving Range, Golf maintenance building, the Cable Beach Police Station, Hotel Storage Building, Total Energy Facility, several banks, the Cecil Wallace-Whitfield Centre, a car wash, the Sheraton Fitness and Racquetball area, two straw markets and the Sheraton Laundry and sewage treatment building are present. These buildings were built in conjunction with the respective hotel facilities. The banks, police station and straw markets were built during the 1990's. These properties are developed on the former Hobby Horse Hall Race Track area. The Hobby Horse Hall Race Track property has been largely redeveloped for the hotel support facilities.

A recent aerial photograph, Figure 19, shows the local land use proximal to the Core Project area. Figure 20 details the land use at the proposed Central Services Facility location at Gladstone Road. Approximately 63% of the land use within the proposed Baha Mar Project Resort and Central Services Facility area, is currently developed, disturbed, or a golf course. Impacts to land use is further discussed in Section 8.1 and detailed on Table 44. The following sections more specifically describe the nearby properties along Cable Beach and Lake Cunningham.

3.7.1 Cable Beach

The Cable Beach subject site is bordered on the north by Goodman's Bay, residential properties on the west, and Lake Cunningham to the south. Further south of Lake Cunningham, John F. Kennedy Drive and undeveloped land are present .Residential

properties are present to the east of the subject property. Residential and some commercial properties are present to the southeast of the subject property.

3.7.2 Sheraton Resort

The Sheraton (formerly Radisson Cable Beach) Resort is set on a 1,000-ft stretch of Cable beach. The hotel consists of over 700 rooms including:

- 669 Guest Rooms (382 sf)
- 18 Executive Suites (552 sf)
- 11 International Suites (1,600 sf)
- 2 Presidential Suites (1,600 sf)

The Sheraton Resort also includes a seven-acre tropical waterscape with three swimming pools, flowing waterfalls and Jacuzzis, a duty-free shopping arcade, a children's day camp and a fitness center with squash, tennis and racquetball courts. Additionally the facility operates six specialty restaurants, and a Lounge. The facility has more than 25,000 sf of meeting space.

The Sheraton Resort was constructed in 1983 on the western portion of the former Emerald Beach Hotel. The Sheraton Resort is located to the north of West Bay Street; on the shore of Goodman's Bay; to the east of West Wind II, a private condominium complex; and to the west of the Wyndham Resort/Crystal Palace Casino.

The Sheraton operates with approximately 700 rooms and suites. The hotel includes a lobby, front desk, conference rooms, excursion planning areas, guest rooms and suites, restaurants, a pool and retail shops. The hotel operates with one 1500 KW diesel fired backup generator. The Sheraton Racquetball and Fitness Center located to the south of the Resort across West Bay Street. This facility includes indoor racquetball courts, outdoor tennis and squash courts and indoor exercise equipment on this property.

3.7.3 Cable Beach Golf Course

The Cable Beach Golf Course is an 18-hole golf course located to the east of the Police Station, to the north of residential properties, to the south of the Gaming Board and East Bay Street and to the west of the Bahamas National Bank. The golf course includes a club house and snack shop, 18 holes of golf, a driving range and a maintenance building.

3.7.4 Wyndham Nassau Resort

The Wyndham Nassau Resort & Crystal Palace Casino consist of 850 rooms and suites, one of the Caribbean's largest casinos, eight specialty restaurants and lounges, a 5,000 sf fitness center, gift shop, shopping arcade and concierge. Additionally the resort includes a private beach and lagoon, swimming pool with water slide. The facility also operates over 30,000 sf of meeting space, including the 13,000 sf Crystal

Ballroom and twelve meeting rooms. In addition, an 800-seat Rainforest Theatre and eight specialty restaurants are also within the confines of the resort.

The Wyndham Nassau Resort/Crystal Palace Casino was built in the early 1980's and occupies the eastern portion of the former Emerald Beach Hotel.

The hotel operates with five backup generators, an on-site laundry facility, an electric fire sprinkler system and an on-site RO system with chillers. The sewerage treatment facility and "grey" water system for the Wyndham is located to the south of West Bay Street in the area of the Sheraton Sewage Treatment area. As further described below in Section 5.5.2, the Sheraton and Wyndham utilize the same wastewater injection well.

3.7.5 Nassau Beach Hotel

The Nassau Beach Hotel was constructed from the late 1950's through the early 1960's in three phases. The hotel is located to the north of West Bay Street and the Cable Beach Golf Course. The Nassau Beach Hotel includes a lobby, a nightclub, restaurants and bars, two swimming pools, tennis courts, water sports, more than 400 guest suites, a fitness center and retail shops.

3.7.6 Straw Markets

There are two straw markets located in Cable Beach. The eastern straw market is located to the east of Commonwealth Bank and to the west of British American Bank. This area includes retail areas and parking areas for patrons.

The western straw market is located to the north of the Sheraton Fitness Center and to the east of parking lots for Sheraton employees. This area includes retail areas and parking areas for patrons.

3.7.7 Gaming Board

This property is located to the north of West Bay Street, to the east of the Breezes SuperClub Resort. This building includes office and administrative areas and parking areas.

3.7.8 Total Energy Plant

This building was developed during the construction of the Nassau Beach Hotel. This facility is utilized for the electrical generator system, laundry, dry cleaning services (no longer provided), reverse osmosis drinking water system, vehicle and equipment maintenance (no longer provided) and sewage treatment system for the Nassau Beach Hotel. The water treatment and sewage treatment systems are discussed below in Section 5.5.2. This building is located to the north of Hobby Horse Pond and to the south of the hotel storage building. Four generators are present on this property and are fueled by two 15,000 gallon Above Ground Storage Tanks (AST), additional details regarding the generators is provided in Section 5.5.4.

The electricity, water and other services listed above are provided by this facility and piped along the access road to the resort. The laundry service for the Nassau Beach Hotel provided at this facility will be shifted to the Sheraton Laundry when an upgrade has been completed. Dry cleaning services were also conducted in this laundry building, but have been discontinued.

The injection well for the Nassau Beach Hotel is located to the south of Total Energy with a discharge interval approximately 300' below land surface. The Hotel Storage Building is located north of the TEP. This building is warehouse utilized for hotel storage for general materials and supplies.

3.7.9 Cable Beach Police Station

This property and building is located to north of the hotel storage building, to the east of Scotiabank and to the west of the Cable Beach Golf Course maintenance area. This building is utilized as the police and fire station for the Cable Beach area. The building includes office/administration areas, temporary jail cells, police car and fire engine repair bays, a basketball court, parking areas, storage areas and an emergency/backup generator.

3.7.10 Cecil Wallace-Whitfield Centre

This property consists of a four-story office building containing Scotiabank and government office/administrative areas including the Prime Minister's office and the Ministry of Finance. This property is located to the east of British American Bank and to the west of the Cable Beach Police Station. This building was constructed in the early 1990's.

3.7.11 British American Bank

This property is located to the west of the Cecil Wallace Whitfield Center. The building was constructed in 1993 in an area formerly occupied by the Hobby Horse Hall Race Track. This property includes teller areas, office/administrative areas and an emergency generator.

3.7.12 Commonwealth Bank

This property is located to the east of a car wash and Sheraton parking area and to the west of a straw market. The building was constructed in the early 1990's. This property includes teller areas, office/administrative areas and an emergency generator.

3.7.13 Bahamas Development Bank

This property is located to the east of the Breezes Resort and to the west of the Bahamas Gaming Board. This bank includes office and administrative areas and parking areas.

3.7.14 Car Wash

This area is located to the east of the Sheraton Fitness Center and to the west of Commonwealth Bank. This car wash includes a sales and wash area for Sheraton employees and patrons.

3.7.15 Undeveloped Areas

Undeveloped Areas are present within the proposed project area and are comprised of uplands, wetlands, and open water areas. A more detailed discussion of these undeveloped areas is included below in Section 4.1.

3.7.15.1 Hobby Horse Pond Area

South of the developed area containing the Sheraton laundry and wastewater treatment plant, the Hobby Horse Racetrack grandstand, and the Total Energy plant is an undeveloped parcel that is part of the development site. This undeveloped parcel extends east from Skyline Drive, to the north of residential single-family homes, to the south of the former Hotel Corporation Board property and single-family homes, and to the west edge of the Cable Beach Golf Course. It contains approximately 30 acres of disturbed land, 13 acres of open water areas including the Hobby Horse Pond, and 63 acres of wetlands.

3.7.15.2 Volpi Parcel

The Volpi parcel is a 74-acre undeveloped parcel between Skyline Drive and Atlantic Drive. It contains approximately 9 acres of disturbed land, 63 acres of wetlands, and 2.5 acres of open water areas.

3.7.15.3 Central Services Facility at Gladstone Road

The Gladstone Road Parcel is an undeveloped government owned parcel located approximately 1.5 miles south of the Core Project. It is situated along Gladstone Road south of the Bahamas Foods facility and west of the new Home Depot. It is located north and east of a large undeveloped area of uplands and wetlands that extend west towards Lake Killarney. For the purposes of this assessment, a parcel of approximately 100 acres in size was studied, although it is not intended that the entire parcel would be included in the proposed project development. It contains approximately 13 acres of disturbed land and 88 acres are wetlands.

3.7.15.4 Water & Sewerage Corporation Parcel

Another undeveloped portion of the development site includes a parcel partly owned by the Water & Sewerage Corporation and the government. This parcel is approximately 106 acres located to the south of the Cable Beach Golf Course. Lake Cunningham borders the southwest corner of the property. The property is bisected from north to south by an unpaved road constructed

in preparation for the C7 road construction project and from the east to west by Skyline Drive. The eastern portion of this parcel was utilized as the old wellfield area for Cable Beach and the surrounding areas. There are approximately 8 supply wells located throughout this area that are no longer in use. It contains approximately of 10 acres of disturbed land, 95 acres of uplands, and 1 acre of wetlands.

3.7.16 Past Uses of the Property and Adjoining Properties

A review of aerial photographs was used to determine past uses of the property. Aerial photographs of the subject property were inspected for the years 1942, 1943, 1958, 1961, 1974, 1982 and 1999.

Pre-1940's
This area was first known for the Hobby Horse Hall Race Track located to the south of Cable Beach. The race track was first opened in the 1840's and operated until the last race in 1977. Before 1940, the Cable Beach area was generally undeveloped with a few homes along the north side of West Bay Street.

1942/1943
The aerial photos show the site area as being developed with West Bay Street, the Hobby Horse Race Track, the golf course and some residential properties along West Bay Street. The remaining portions of the site are undeveloped, vegetated land. The wetland areas of the subject property are present to the south of the Hobby Horse Hall Race Track. To the north, the Atlantic Ocean is present. To the south of the site was undeveloped land, a road currently known as John F. Kennedy Drive, and Lake Cunningham. Further south, undeveloped land is present. To the east, undeveloped, vegetated land borders the site. Further east close to downtown Nassau, some residential homes are present along the coast. To the west, undeveloped land and residential properties are present.

1958
The subject property is shown developed with the Emerald Beach Hotel located to the north of West Bay Street and the Hobby Horse Hall Race Track. No other significant changes noted to the subject property. No significant changes noted to the surrounding areas.

1961
On the northeastern areas of the subject site, two commercial properties are present along the coast near the current Gaming Board location. No other significant changes noted to the subject site or to the surrounding areas.

1974
The Emerald Beach Hotel is no longer present on the subject property. The Nassau Beach Hotel is shown along West Bay Street. The Total Energy Plant, associated with the Nassau Beach Hotel, is present to the south of West Bay Street, to the east of the Hobby Horse Hall Race Track and to the west of the golf course. No other significant changes noted to the subject site or to the surrounding areas.

1982
The Hobby Horse Hall Race Track is no longer present on the subject site. Demolition activities are present in that area of the subject site. The Sheraton Hotel, Wyndham Resort/Crystal Palace Casino and the Nassau Beach Hotel are shown in their current configurations. The Sheraton Laundry facility and the fitness center are shown. No other significant changes noted to the subject site. To the east and west of the subject site, more residential properties are shown. No other significant changes are noted to the surrounding areas other than a continued infilling of residential development.

3.8 Potential Environmental Contamination

Environmental assessment and investigation of the Baha Mar site and adjacent properties have been conducted and/or are underway by the Hotel Corporation of The Bahamas and by Baha Mar Ltd. Studies conducted by Haley & Aldrich, Inc. on behalf of Baha Mar Ltd identified various potential Areas of Environmental Concern (AEC) on the site where there was likelihood that the environmental quality of soil, sediment, surface water or groundwater had been adversely impacted by historic or existing activities or operations. One or more AECs were identified on the following parcels within the developed portion of the site:

- Sheraton Laundry
- Sheraton Hotel and Service Buildings
- Wyndham Resort/Crystal Palace Casino
- Cable Beach Golf Course and Maintenance Facility
- Nassau Beach Resort
- Total Energy Facility
- Hotel Storage Building for Nassau Beach Hotel
- Leisure Time Substation
- Breezes Sewage Treatment Plant and injection well
- Cecil V. Wallace-Whitfield Center (a.k.a. Scotiabank)
- British American Bank
- Cable Beach Police Station
- Commonwealth Bank

Locations of the AECs are shown on attached Figure 21.

In general, significant AECs were not identified in the undeveloped portions of the site, inclusive of the Gladstone Road Parcel. However, one significant AEC was discovered during the course of the review, the Sheraton Laundry Facility. The Sheraton Laundry Facility is located south of West Bay Street in the northwestern portion of the site, refer to Figure 21. The Sheraton Laundry, formerly owned by the Bahamian Government and managed by the Hotel Corporation of the Bahamas (HCB), is presently owned by Cable Beach Resorts. In addition to cleaning laundry, the laundry facility supplies the nearby Sheraton Resort with various engineering support such as potable, flush, hot and chilled water.

In May 2001, Shell Bahamas Ltd. (Shell) repaired leaky oil lines connecting a 15,000 gallon aboveground diesel fuel storage tank to the boiler system located at the (then) Sheraton Laundry Facility. In March 2002, petroleum product was observed in a pit on an abutting residential property to the west of the laundry facility. In April 2002, the Bahamas

Department of Environmental Health Services (DEHS) directed the HCB to assess the extent of floating product and implement a strategy to recover as much of the lost product as possible. From May through December 2002, Baychem Spill Technologies (Baychem), working on behalf of Shell, recovered over 14,000 gallons of diesel fuel. Additional recovery efforts were recommended by Baychem, but it is unclear if this ever occurred. In April 2005, Groundwater & Environmental Services (GES) was hired by Shell to undertake a subsurface investigation of the degree and extent of the Facility product plume. GES was later hired by HCB to perform additional investigations.

To date GES has concluded that a plume of floating diesel fuel approximately seven acres in size is located below and surrounding the Facility. The Hotel Corp is presently working jointly with DEHS, the Bahamas Environment, Science and Technology (BEST) Commission and Baha Mar Ltd to develop a remedial action plan and clean up the impacted soils and groundwater in accordance with commitments entered into when the property was sold to Cable Beach Resorts. Remedial efforts will be coordinated with the construction schedule. Currently DEHS and the BEST Commission are developing site-specific clean-up standards that will be used to establish remedial goals for the site.

Haley & Aldrich observed oily staining, indicating spillage or leakage had occurred, at several of the AECs in the developed portion of the property. Additionally, results of previous investigations confirmed the presence of impacts at some locations. Presence of staining and/or previous testing detected evidence of soil contamination at the following locations:

Nassau Beach Hotel

- Oily staining observed on and around abandoned electrical transformers.

Total Energy Plant

- Oily staining observed at various locations on the parcel.
- Petroleum hydrocarbons and or semi volatile organic compounds (SVOCs) detected in soil samples from one or more explorations.

Cable Beach Golf Course and Maintenance Facility

- Metals detected in soil at several locations.

Cecil V. Wallace-Whitfield Center (a.k.a. Scotiabank)

- Oily stained soil observed around an aboveground tank and generator storage area.

Leisure Time Substation

- Stained soils observed in this area.

Results of the previous Phase II and Phase III investigations by Hydrologic Associates, Inc. on behalf of Baha Mar Ltd and by GES detected evidence of groundwater contamination at the following locations:

Sheraton Resort

- Petroleum hydrocarbons detected in groundwater sample collected in vicinity of emergency generator/fuel storage area

Sheraton Resort Service Building

- Petroleum hydrocarbons (including free phase petroleum product), volatile organic compounds (VOCs) and SVOCs have been detected in groundwater near service building.
-

Wyndham Nassau Resort/Crystal Palace

- Petroleum hydrocarbons detected in groundwater near fuel storage tanks at hotel.
- Halogenated VOCs detected in groundwater in the vicinity of a former hotel laundry.

Cable Beach Golf Course and Maintenance Facility

- Metals detected in groundwater; additional testing is required to determine if impacts from metals are present.
- Petroleum hydrocarbons and gasoline constituents detected in groundwater near underground tanks at the maintenance facility.

Total Energy Plant

- Petroleum hydrocarbons, aromatic and halogenated VOCs and SVOCs detected in groundwater at several locations.
- VOCs detected in influent from Nassau Beach Resort sewage treatment plant injection well, located at Total Energy facility.

Hotel Storage Building

- Halogenated VOCs and petroleum hydrocarbons detected in groundwater sample from this parcel.

Baha Mar Ltd is conducting supplemental Phase II investigations to determine the presence or absence of releases at each AEC where there is a likelihood that impacts have occurred. The Phase II investigations will include soil, groundwater, surface water and sediment sampling and analysis. The ongoing Phase II work will include an expanded program of sampling and chemical analysis of sediment and surface water samples to determine if these media have been similarly impacted. Limited analysis for sediment by HAI during their 2005 Phase II investigation did not identify impacts.

Based on the results of the Phase II investigations, Baha Mar Ltd will conduct Phase III investigations to further characterize the specific source area, and define the nature and extent of any environmental impacts. The results of the Phase III investigations will be used to determine the most appropriate remedial action.

Baha Mar Ltd has also been reviewing results of ongoing investigations and remedial actions, currently being performed by GES in the location of a previously-identified fuel spill in the vicinity of the Sheraton Laundry Facility. Baha Mar Ltd will be conducting confirmatory sampling, and potentially installing additional explorations in that area to ensure full characterization and remediation of the fuel spill.

4. BASELINE NATURAL ENVIRONMENTAL

4.1 Terrestrial Uplands and Wetland Ecosystems

Surveys of upland, wetland, and open water areas, protected species surveys, and diurnal and nocturnal wildlife surveys were conducted at the Site to identify baseline natural environment conditions. Surveys were conducted during the period January 16 through January 20, 2006 and at the Core Project Site. Additional surveys were conducted at the Gladstone Road Parcel during the period July 31 through August 4, 2006. Various vegetation types were mapped using aerial photography and ground truthing. The habitat classifications and mapping units used in the land cover assessment were developed based on aerial photo classification with ground verification using the Florida Land Use, Cover and Forms Classification System (FLUCCS) (FDOT January 1999).

While the presence of protected tree species within the project limits has been observed and is discussed herein, no habitats formally designated as protected exist within the project limits. The survey methodology consisted of a combination of walking and point transects through forested areas (DBEF) and developed areas, including the existing golf course, hotel grounds, the Gladstone Road Parcel, wetlands and shorelines. All of the manmade golf course ponds were easily accessed by land. In some cases, bird species readily identifiable from the vehicle were also recorded. Wildlife surveys of the project area were performed with a focus on avifaunal species. Species abundance, individual abundance, and habitat utilization throughout the site were noted. The period of time in which the Core Project survey was completed generally falls within what the American Birding Association considers to be the winter reporting season, while the Gladstone Road Parcel survey was completed in what is generally considered the summer reporting season.

The Hobby Horse Pond located to the south of the existing hotel complex was accessed by kayak. This pond and its associated open water areas surveyed on two occasions during the evening hours, the period of time when waterfowl are most active. Special attention was given to detecting the endangered West Indian Whistling Duck (*Dendrocygna arborea*), which are nocturnal, and most active just after nightfall (White, 1998).

This section contains cover descriptions, acronyms, and acreage information of the nine categories of vegetation or coverage within the subject property and its immediate vicinity that have been identified:

- Dry Broad-Leaved Evergreen Forest,
- Dry Broad-Leaved Evergreen Shrubland Wetlands,
- Red Mangrove Forest Wetland,
- Red-Mangrove Shrubland Wetlands,
- Cocoplum-Marsh Fern Wetland,
- Buttonwood-Black Sedge Temporal Marsh Wetland
- Ephemeral Pond Wetland
- Open Water Areas
- Disturbed or Developed (including Man-made Pond) Areas,

These vegetative areas are shown on Figure 22 and Figure 23. Information concerning these categories of vegetation is presented in the following subsections.

4.1.1 Dry Broad-leaved Evergreen Forest

Dry Broad-leaved Evergreen Communities in the Jack Nicklaus Golf Course Area were characterized as forest due to the dominant life form stature and canopy coverage. These areas contain a mixed humic soil-leaf-litter layer overlying a rocky limestone substrate. Dry Broad-leaved Evergreen Forest (DBEF) at the Site typically contained Gumelemi (*Bursera simaruba*), Stoppers (*Eugenia spp*.), Poisonwood (*Metopium toxiferum*), Pigeon Plum (*Coccoloba diversifolia*), Crabwood (*Ateramnus lucidus*), Lancewood (*Nectandra coriacea*), Snake Root (*Picramnia pentandra*), and White Indigo Berry (*Randia aculeata*). Approximately 95 acres of DBEF is found in the immediate vicinity of the intersection of a high voltage power line easement and Skyline Drive, on property currently owned by the WSC.

The DBEF area located to the northwest of the intersection of the high voltage utility easement and Skyline Drive had a very grassy understory, immature trees, Sisal (*Agave sisalana*) and rock walls. The DBEF area located to the northeast of the intersection of the high voltage utility easement and Skyline Drive had the greatest number of mature trees of significant height and girth. This area also had a number of towers associated with an abandoned wellfield. A cave was observed in an area of DBEF bordering Lake Cunningham to the north.

Interior areas of the DBEF at the Site are affected by human disturbances. These disturbances are in the form of footpaths, single-family home construction, historic wellfields, the partly constructed C7 Corridor road, improperly discarded refuse, some *Casuarina* invasion, and the utility easement, resulting in fragmentation, edge effects, and establishment of invasive alien plants in some areas. Improperly discarded waste in this area includes several domestic appliances and other domestic refuse discarded along an unpaved road located to the southwest of the intersection of the high voltage utility easement and Skyline Drive.

4.1.2 Dry Broad-leaved Evergreen Shrublands

Dry Broad-leaved Evergreen Communities at the Gladstone Road Parcel were characterized as shrubland due to the dominant life form stature and coverage. These areas contain a rocky limestone substrate. In some locations at the Site, pocket depressions in the limestone substrate temporally support wetland flora within this vegetation category. These depressional pockets were smaller than the minimal mapping unit and therefore were mapped within the larger category of Dry Broad-leaved Evergreen Shrubland (DBES).

DBES at the Site typically contains plants such as Gumelemi (*Bursera simaruba*), Wild Dilly (*Manilkara bahamensis*), Thatch Palm (*Thrinax morrissii*), Poisonwood (*Metopium toxiferum*), Strongback (*Bourreria ovata*), Wild Saffron (*Bumelia americana*), Pigeon Plum (*Coccoloba diversifolia*), Box-leaved Maytenus (*Maytenus buxifolia*), Black Torch (*Erithalis fruticosa*), and Five-finger (*Tabebuia bahamensis*). As shown on Figure 23, DBES is found as a transition zone between Disturbed Areas

including Disturbed Pine Woodlands along Gladstone Road and wetlands to the south and west within the Site's interior. DBES are also present as "islands" scattered within wetlands at the Site. DBES comprise approximately 14 acres of the Gladstone Road Parcel.

4.1.3 Red Mangrove Forest Wetlands

These areas are dominated by Red Mangrove (*Rhizophora mangle*) trees. Other plants types observed in these areas include Buttonwood (*Conocarpus erectus*), Sawgrass (*Cladium jamaicense*) and Cattail (*Typha domingensis*). These areas are also characterized as Red Mangrove Forest due to the dominant life form coverage, canopy, and stature. Red Mangrove Forest Wetlands comprise approximately 24 acres of the project site and are located on the proposed Jack Nicklaus Golf Course area, within the Project Core, and on the Volpi Parcel. They are primarily found adjoining the Hobby Horse Pond and associated open water areas.

These forested wetlands transition into Red Mangrove Shrublands and Cocoplum-Marsh Fern Woodland Wetlands, which adjoin them. As with the Red Mangrove Shrublands, these wetland areas are in an urbanized setting and appear to be hydrologically isolated due to the residential and commercial development and roadways which surround them. Current and historic hydrological input is likely from the same sources as those describe for Red Mangrove Shrublands.

This wetland area and the pond appear to provide habitat for avifauna. Avifauna observed in these areas included Anhingas (*Anhinga anhinga*), Double-crested Cormorants (*Phalacrocorax auritus*), and Least Bitterns (*Ixobrychus exilis*) in addition to a number of ducks, wading birds, and other species of avifauna. Information concerning wildlife is presented in the subsequent subsections.

4.1.4 Red Mangrove Shrubland Wetlands

All areas of shrubland wetlands within the project limits appear fragmented and impacted. Approximately 107 acres of Red Mangrove Shrubland Wetlands are found at the project area in the four following areas:

- Along the northern edge of the Hobby Horse Pond and west towards Skyline Drive,
- On the eastern fridge of Lake Cunningham, just south of Prospect Ridge, and adjacent to the C7 corridor,
- On the Volpi Parcel between Atlantic Drive and Skyline Drive, and
- In the southwestern corner of the Gladstone Road Parcel.

These areas are dominated by the coverage of two obligate species, Red Mangrove (*Rhizophora mangle*) and Sawgrass (*Cladium jamaicense*). These areas are characterized a Red Mangrove Shrublands due to the dominant life form coverage and stature.

Within the project area, at the eastern limit of Lake Cunningham and immediately east of the north Gladstone Road extension (currently under construction), Red Mangrove

Shrublands appear to have been previously impacted. Portions of this wetland fragment have been cleared and the area appears to be hydrologically isolated due to the prior development of the surrounding roadways.

Plant types observed in the area south of Cable Beach and north of Prospect Ridge include Buttonwood (*Conocarpus erectus*), Spikerush (*Eleocharis cellulosa*), Cattail (*Typha domingensis*), Giant Leatherfern (*Acrostichum*), and Wax Myrtle (*Myrica cerifera*). Forested wetland, ponds, and disturbed areas adjoined these areas.

The southern and western perimeter areas of Red Mangrove Shrublands west of Skyline Drive, abruptly transition into human-altered and disturbed areas. Construction of a subdivision and housing in this area has resulted in filling of wetland areas. Substantial invasion by *Casuarina* and other invasive exotic flora was also observed in this area. Filling and exotic flora invasion is also apparent along the wetlands' southern perimeter to the east of Skyline Drive and to the wetlands' eastern terminus at the high voltage power easement. These wetland areas also appear to be hydrologically isolated due to residential and commercial development and the roadways which surround them. Currently, hydrological input appears to be from rainfall and drainage from the higher southerly elevations of Prospect Ridge.

The Gladstone Road Parcel has Red Mangrove Shrubland Wetlands primarily within the southwestern most portion of the Site. However, some shrublands or individual shrubs are also found within the other categories of wetlands in the Gladstone Road Parcel: Ephemeral Pond and the Buttonwood-Black Sedge Temporal Marsh Wetland. These areas were too small to be mapped on aerial photography. Hydric marl soils and algal mats are also present in the Red Mangrove Shrublands at the Gladstone Road Parcel.

4.1.5 Cocoplum-Marsh Fern Woodland Wetland

The approximately 5.7 acres of Marsh Fern Woodland Wetland located in the Volpi Parcel is dominated by a mixture of woody shrubs and trees with an open canopy and a fern-dominated ground layer. Cocoplum (*Chrysobalanus icaco*) and Marsh Fern (*Blechnum serrulatum*) are the dominant plants, while other plants typically observed in this area include Buttonwood (*Conocarpus erectus*), Red Mangrove (*Rhizophora mangle*), Wax Myrtle (*Myrica cerifera*), Giant Leatherfern (*Acrostichum aureum*) and Bracken Fern (*Pteridium aquilinum*). Some broad-leaved plants characteristic of uplands are present, but represent a minor component.

This area may represent the northern limit of the larger wetland system that adjoins it to the south and is the last transition zone to upland DBEF areas to the immediate north. This area is located to the west of Skyline Drive within a northern portion of the Volpi Parcel.

4.1.6 Buttonwood-Black Sedge Temporal Marsh Wetland

This wetland category identified at the Gladstone Road Parcel represents the upper northern and eastern limits of a larger wetland system consisting of an Ephemeral Pond and Red Mangrove Shrublands, as shown on Figure 23. This area can also be categorized as a floodplain or temporal wetland which seasonally encounters varying levels of saturation or inundation or substrate exposure. This area also acts as a transition zone to disturbed uplands to the north and east. This wetland area is dominated by two Facultative Wet plants (Rule 62-340 Florida Administrative Code). The Facultative Wet flora observed consists of dwarf Buttonwood (*Conocarpus erectus*) and Black Sedge (*Schoenus nigricans*). While the substrate consists primarily of exposed limestone rock (note: the limestone substrate may be submerged during wetter times of the year), the presence of saturated algal mats and hydric soils within pockets in the limestone further supports a positive wetland determination. While Buttonwood is present throughout this wetland category, the greater abundance and coverage of Black Sedge supports a "marsh" definition. Some other plants observed less frequently in this area consist of Red Mangrove (*Rhizophora mangle*), Wax Myrtle (*Myrica cerifera*), and Sawgrass (*Cladium jamaicense*). Within this area, some islands of DBES exist. Approximately 48 acres of Buttonwood-Black Sedge Temporal Marsh Wetland is found at the Gladstone Road Parcel.

4.1.7 Ephemeral Pond Wetland

An Ephemeral Pond Wetland of approximately 18.5 acres was observed with the western portion of the Gladstone Road Parcel, which appears to vary seasonally in area, potentially shrinking and expanding its limits, during dry and wet seasons. This ephemeral pond is shallow in depth and surrounded by marl flats with Sawgrass (*Cladium jamaicense*). Other typical wetland vegetation present within the fringes of the ephemeral pond consists of Red Mangrove (*Rhizophora mangle*) and Buttonwood (*Conocarpus erectus*) shrubs. Due to the apparent seasonal fluctuations, the area mapped as the limits of the ephemeral pond on Figure 23 is not considered definitive. In addition, it appears that during the wet season the ephemeral pond may overflow into the surrounding Buttonwood-Black Sedge Temporal Marsh, which, in essence, represents a floodplain or the upper limits of the wetland system in its transition to DBES and disturbed uplands to the east and north. Some avifauna was observed utilizing the ephemeral pond.

4.1.8 Open Water Areas

Inshore aquatic ecosystems or open water areas at the project site consist both of manmade and altered natural systems. A series of natural, but altered, open water areas constitute the Hobby Horse Pond and associated flow-way, which runs in an approximate east-west direction within Red Mangrove Forest and Red Mangrove Shrublands, lying to the north of Prospect Ridge and to the south West Bay Street. This flow-way appears to have been altered through fragmentation and filling during the development of roadways, utilities, residential and commercial structures among other forms of urbanization.

Currently, Hobby Horse Pond and its associated wetland system appear to be supporting both marine and freshwater flora and fauna. Areas along the perimeter of the pond and mangrove fringe have some *Typha* invasion as well as *Casuarina*.

In addition to rainfall, the most readily apparent source of freshwater input to the pond appears to be from run-off from Prospect Ridge and from the surrounding areas.

Manmade aquatic ecosystems in the project area consist of the golf course ponds located at the project site. Based on observed water turbidity, coloration, as well as the abundance of *Typha* (U.S. EPA., 2002), all of the ponds on the golf course appear to be receiving some level of nutrient input.

4.1.9 Developed and Disturbed Areas

There are approximately 333 acres of developed and disturbed areas within the project site and Gladstone Road Parcel. Human-altered and disturbed areas comprise were combined due to the conclusion that these areas are not representative of natural ecosystems in the Bahamas. These areas represent areas of previous impacts, disrupted ecosystem function, and loss of habitat through human alterations as well as areas of significant invasive and/or exotic plant coverage.

Human-altered and disturbed areas include all developed portions of the Cable Beach area including the existing hotel compounds, roads and parking areas, a golf course, disturbed areas within and along the wetlands in the Cable Beach area, disturbed areas along an unpaved high voltage power line easement which bisects Prospect Ridge, and disturbances within natural areas due to apparently illegal dumping, unpaved roads, footpaths or other human-induced alterations. Invasive plant species were frequently found in these areas and included Casuarina or Australian pine (Casuarina sp.), Tropical Almond (Terminalia catappa), Brazilian Pepper (Schinus terebinthifolius) and Trailing Wedelia (Wedelia trilobata).

In addition, two disturbed areas were observed at the Gladstone Road Parcel within its eastern and northern portions (west of Gladstone Road and south of the access road to Bahamas Food Services). The area denoted as Disturbed and located along Gladstone Road is colonized by invasive plants such as Brazilian Pepper (*Schinus terebinthifolius*), Poinciana (*Delonix regia*), *Casuarina*, and Jumbay (*Leucaena leucocephala*). The southern portion of the area appears to have been cleared by bulldozers (in a manner that appears to be the beginnings of an access road to the Site interior to the west) and contains mostly herbaceous plants and some shrubs. It is uncertain if this cleared area lies on the property or outside its southern boundary, but they appear to be within the Site's southern boundary.

The second category of disturbed area within the Gladstone Road Parcel is located along the remaining boundary the Gladstone Road Parcel site with Gladstone Road and continues to the west and north where it terminates along the access Road to Bahamas Food Services and along a canal associated with the Bahamas Food Services property. This area was separated out due to the presence of Caribbean Pine and a determination that this area represents a lower level of disturbance than described in the former Disturbed Area. This area is has some invasion by the invasive flora

described previously, but not as severe. Between one and two acres of this area appears to have been cleared, but Pine saplings and native shrubs have recruited back into this area.

4.2 Offshore Environment

Baha Mar Ltd performed an offshore bathymetric survey of Goodman Bay and Delaporte Bay. A singlebeam bathymetric survey of the in shore area along Cable Beach from Delaport Point in the west to Browns Point in the east was conducted using a high frequency echo sounder with lines running perpendicular to the shoreline at ¼ to ½ mile spacing between lines. The new survey data will be used in conjunction with the National Oceanographic and Atmospheric Association (NOAA) navigation sheets to provide detailed bathymetric information, as shown on Figure 14.

As discussed in Section 3.1, Baha Mar Ltd performed an evaluation of the offshore environment including wave climate, sediment survey and littoral transport model. Surficial sediments within Goodman's Bay and along the bordering shoreline are affected by a variety of transport factors that interact with the sediment displacement and ultimately the morphology of the Bay bottom and beaches. Sieve analyses of grab samples of surface sediment obtained at selected points along and offshore indicate significant spatial variability. Offshore, samples obtained at each of the current meters stations indicate a dominance of coarse to medium sands at the East and North Stations with an evident decrease in mean grain size at the easterly station. These variations are not considered significant however, due to the extent of small scale spatial variability induced by bedform migration. Most likely the range observed in median grain size ranging from 0.35 mm at the West Station to 0.8 mm at the East Station is representative of diversity of sediments distributed by wave activity throughout the Bay rather than evidence of substantial differences in local source or transport.

A similar range in grain size characteristics is observed along the beachface above the waterline with median grain sizes varying from a low of 0.28 mm (fine sand) along the upper beach at the far western end of Sheraton Beach to a high of 1.0 mm in the low intertidal on the beach east of the jetty/groin just beyond the limits of the Nassau Beach Hotel beachfront. Despite being slightly coarser than the intertidal sediments found to the west of the jetty/groin the intertidal characteristics observed along the eastern beach appear consistent with both dynamics and sediment supplies. This is after all an area likely to be affected by progressive erosion/breakup of the prominent limestone platform east of the jetty/groin. This reworking is expected to yield a range of grain sizes including some amount of coarse material. It is possible that some fraction of this material remains within the active intertidal for extended periods of time. The divergence in grain size characteristics along the upper beach is more difficult to explain given the similarity between the sediments obtained to the east and west of the jetty/groin. These distributions are essentially identical. In contrast, the sediments on the upper beach at the west end of Sheraton Beach are finer and contain small fractions of silts. Such fine distributions are not typically found on a beach where wind and/or water driven sorting favors elimination of the finer materials. These distributions suggest that some fractions of the sediments in this area were mechanically placed and obtained from an off site source. Discussions with individuals familiar with the history of this beach confirm that sands were placed during the initial construction period approximately 25 years ago.

4.3 Protected Tree Species

Under the Conservation and Protection of the Physical Landscape of The Bahamas (Declaration of Protected Trees) Order, 1997 the following species of trees are protected throughout the Commonweath of the Bahamas:

- Rauwolfia
- Red Cedar
- Silk Cotton
- Horseflesh
- Lignum Vitae
- Mahogany (Madeira)
- Brasiletto
- Candlewood
- Caribbean Pine
- Beefwood
- Black Ebony

In addition to the species discussed above, several other species of plants and animals have been identified as at risk within The Bahamas. A list of these at risk species is included in Table 20.

While the presence of protected plant species within the project limits has been confirmed, no habitats formally designated as protected exist within the project limits. Protected species data was gathered through the placement of nine square meter (9 m^2) quadrants along linear transects in Dry broad-leaved Evergreen Forest (DBEF). Five protected tree species were observed within the project limits. These included *Ceiba pentandra*, *Guapira discolor*, *Lysiloma sabicu*, *Swietenia mahagoni, and Pinus caribaea)*. Three (3) *Ceibas* were observed on the golf course (D) and were counted individually. Two (2) *Guapiras*, nine (9) *Lysilomas*, and six (6) *Swietenias* were counted across all forty-four (44) quadrats placed along transect lines in DBEF at the Site. Based on a conservative extrapolation of the data collected, the potential exists for seven-hundred eighty-five (785) *Guapiras*, three-thousand nine-hundred twenty-five (3,925) *Lysilomas*, and two-thousand, three-hundred fifty-five (2,355) *Swietenias* to be present throughout the DBEF located in the Core Project area of the site. In addition, the potential exists for two-hundred and fifty (250) *Pinus caribaea* to be present throughout Gladstone Road Parcel. This extrapolation assumes even distribution and disregards patchiness, disturbances, and other factors. A more detailed quantification and location of protected tree species will be conducted prior to any construction activities occurring within the DBEF and Gladstone Road areas. Baha Mar Ltd will preserve these protected tree species to the best of their ability by avoiding impacts and by removing and reusing the tree as part of the resort landscaping program. Development of the Baha Mar Resort Project will unavoidably require removal of trees, some of which may be protected species. Baha Mar Ltd will obtain tree removal permits as required.

4.4 Wildlife Baseline

Wildlife surveys were conducted at the Core Project area during the period January 16 through January 20, 2006. This time of year is generally known to be the American Birding Association winter reporting season. Additional wildlife surveys were conducted at the

Gladstone Road Parcel during the period July 31 through August 4 2006. This time of year is generally known to be the nesting season for both permanent resident and summer breeding resident bird species. Species abundance, individual abundance, and habitat utilization throughout the Site were recorded. Special attention was given to accessing the open water areas and wetlands after dark in an effort to detect the endangered West Indian Whistling Duck (*Dendrocygna arborea*), which are nocturnal, and most active just after nightfall.

4.4.1 Species Distribution and Habitat Coverage

The results of the wildlife surveys, with a focus on avifaunal species, are presented in Table 21 and Table 22. A total of 1274 individual birds were observed during the survey periods.

4.4.1.1 Winter Survey – Core Project Area

Eight hundred sixty-six (866) individual birds in thirty-seven (37) species were observed during the survey and are classified as permanent breeding residents in the Bahamas (White, 1998, pp. 230 –250). The presence of these species in the winter, and the observation of immature individuals during this survey suggests that some of these individuals may utilize the Core Project area for breeding.

Several resident bird species (Bahama Woodstar, *Calliphlox evelynae;* Thick-billed Vireo, *Vireo crassirostris;* Bahama Yellowthroat, *Geothylpis rostrata*) breed throughout the year, with no specific season (White, personal communication, December 18, 2004). However, juvenile individuals of these species were not observed during the survey.

Three hundred twenty-four individuals (324) represented in twenty-eight (28) species are classified as winter non-breeding residents that migrate to and from the Bahamas outside of their breeding season.

4.4.1.2 Summer Survey – Gladstone Road Parcel

A total of eighty-four (84) individual birds from sixteen (16) species were observed within the Gladstone Road Parcel. Seventy-two (72) individual birds in fourteen (14) species observed during the survey are classified as permanent breeding residents in the Bahamas. The observation of immature individuals during this survey suggests that some of these individuals may utilize the Gladstone Road Parcel for breeding. Twelve (12) individuals represented in three (2) species are classified as summer breeding residents that migrate to the Bahamas during the summer months and return to wintering grounds during the fall.

4.4.2 Dry Broad-leaved Evergreen Forest Area Wildlife

Twenty-six species of avifauna were observed in DBEF located in the Core Project area. The larger tracts of DBEF that exist at the project site are surrounded by busy roads and/or track roads with large disturbed shoulders on either side. The highly

fragmented nature of the natural terrestrial habitat and lack of natural buffers between natural and disturbed habitats make it difficult to isolate species usage across the site with regard to these distinct terrestrial habitat delineations. This is evidenced by the fact that in many cases species seen in Developed or Disturbed Areas were often also observed in DBEF.

During the course of this survey a total of six Black Rats (*Ratus ratus)* were observed in DBEF. These animals were observed seeking shelter in trees or ground cavities. Piles of debris, including chewed seedpods, were found throughout these areas suggesting that these animals may be inhabiting portions of the remaining natural areas of the site. The introduction of rats has had dramatic effects on local bird species, particularly ground nesting species (Rafaelle, et al., 1998, page 22). A number of Brown Anoles (*Anolis sagrei*) were observed in DBEF.

4.4.2.1 Endemic and Species of Note in Dry Broad-leaved Evergreen Forests

- There were no endangered species found in DBEF.
- Appendix II CITES-listed Merlin (*Falco columbarius*) and the Bahama Woodstar Hummingbird (*Calliphlox evelynae*) (CITES, 1987).
- The Great Lizard Cuckoo (*Saurotherea merlini*) has been observed by local birders in the Prospect Ridge area of the site in DBEF (Personal observation, Michelle Bethell, January 21, 2006). This species is known to inhabit wooded areas with dense cover, which can make them difficult to detect outside of their spring and summer breeding season. No Great Lizard Cuckoos were observed at the time of the survey.
- Two Bahama Woodstar Hummingbirds (*C. evelyndae*), which are considered endemic species, were observed in DBEF. This species relies heavily on native plant species and natural areas.

4.4.3 Dry Broad-leaved Evergreen Shrublands Area Wildlife

Eight species of avifauna were observed in DBES at the Gladstone Road Parcel. The area of DBES that exists onsite adjoins both disturbed habitat types – disturbed pine (D-P) and disturbed invasive (D). The close proximity of disturbed and natural terrestrial habitat throughout the site makes it difficult to isolate species usage across these habitats with regard to these distinct terrestrial habitat delineations. This is evidenced by the fact that in all cases species seen in the less impacted DBES areas were also observed in disturbed areas.

4.4.3.1 Endemic and Species of Note in Dry Broad-leaved Evergreen Shrublands

- One American Kestrel (Falco spaverius spaveroides) was observed in the DBES area at the Gladstone Road Parcel. This species is increasing in numbers throughout the region and is frequently seen in populated areas. This species also occurred in adjoining disturbed invasive habitat. American kestrels are carnivorous raptors whose primary food sources are small reptiles and birds, and large insects.

- Ten (10) White-crowned Pigeons (*Columba leucocephala*) were observed during the survey at Gladstone Road. White-crowned Pigeons (*C. leucocephala*) are a common year-round resident throughout the Bahamas. Both adult and immature birds were seen flying overhead, and flushing from vegetation throughout the Site. This species is a regulated game species in the Bahamas.
- No endemic species were observed in the DBES area of the Gladstone Road Parcel. Utilization of this area by endemic species known from similar habitats in New Providence may be possible, but was not confirmed during the survey.

4.4.4 Red Mangrove Forest Wetland Area Wildlife

Red Mangrove Forests are found bordering the ponds that exist as standing open water on the site. Although the structure of this habitat may be altered from its natural state by previous development of the surrounding area, these forests are providing habitat for shelter, breeding, and feeding purposes. These areas appear to be buffered from the surrounding developed areas by Red Mangrove Shrublands or other vegetation, making it a little less accessible to human disturbance and the possible threat of introduced predators such as feral Cats and Raccoons.

Twenty-two avifaunal species were observed in Red Mangrove Forest areas. This area had a high abundance of American Coots (*Fulica americana*), Common Moorhens (*Gallinula chloropus)*, and Least Grebes (*Tachybaptus dominicus*).

4.4.4.1 Endemic and Species of Note in Red Mangrove Forest Wetland Areas

- There were no endangered species observed in these areas.
- Least Bitterns (*Lxbrychus exilis*), an uncommon breeding resident in The Bahamas (Rafaelle *et al.*, 1998), were observed in this area. The existence of both adult and sub-adult individuals suggests this species may be using this area for breeding purposes.
- Anhingas (*Anhinga anhinga*), which are listed as vagrants to The Bahamas, are being seen in New Providence more frequently utilizing shallow, calm water bodies either, fresh, brackish, or saline (Rafaelle *et al*., 1998). A number of Anhingas were observed perched on limbs along Red Mangrove Forest, bordering the Hobby Horse Pond.

4.4.5 Red Mangrove Shrubland Wetlands

Fourteen species of wildlife were found in Red Mangrove Shrubland Wetlands in the Core Project Area. In most cases, these species were also found in Red Mangrove Forests. It is most probable that wetland-dwelling birds are utilizing Red Mangrove Shrublands in conjunction with other water features on the site. The area of Red Mangrove Shrublands at the Gladstone Road Parcel appear too small to be considered distinct to the avifauna utilizing this site. The one species that occurred in RMS at the Gladstone Road Parcel, White-crowned Pigeon (*Columba leucocephala*), was also observed throughout other habitat types, and throughout New Providence. While this

species is known to nest in stands of red mangrove, there was no evidence that nesting is occurring on the site.

4.4.5.1 Endemic and Species of Note in Red Mangrove Shrubland Wetlands

- Glossy Ibis (*Plegadis falcinellis*) were observed in Red Mangrove Shrubland Wetlands and are considered a vagrant in or rare to the Bahamas, although its range is worldwide (Rafaelle *et al.*, 1998).

4.4.6 Cocoplum Marsh Fern Woodland Wetland Wildlife

Eighteen species were observed in this habitat, which is found in the Core Project area. All species found in this habitat are passerines and typically inhabit woodlands and/or reedy areas, or shorelines in wetland areas, including mangroves. Two of the observed species, Northern Waterthrushs (Seiurus motacilla) and Common Yellowthroats (Geothylpis trichas), were found in other wetland areas on the site.

4.4.6.1 Endemic and Species of Note in Cocoplum-Marsh Fern Woodland Wetland

- No endangered species were observed in this habitat.
- One Bahama Yellowthroat (*G. rostrata*), which is considered an endemic species, was observed in this habitat. This species relies heavily on dense native cover for breeding and foraging purposes.

4.4.7 Buttonwood-Black Sedge Temporal Marsh Wetland

One (1) avifaunal species was observed in this area, located at the Gladstone Road Parcel, during the survey: Red-winged Blackbird (*Agelaius phoeniceus*). This species is a common songbird throughout New Providence, found in nearly all habitats. It occurs in natural and disturbed areas close to water, and generally in areas with dense grassy or reedy cover.

4.4.7.1 Endemic and Species of Note in Buttonwood-Black Sedge Temporal Marsh Wetland

- No endangered species were observed in this habitat.

4.4.8 Ephemeral Pond Wildlife

Avifaunal species observed in wetland areas at the Gladstone Road Parcel occurred most often in the area designated as ephemeral pond. There were five (5) species observed in the area designated ephemeral pond. These included Double-crested Cormorants (*Phalacrocorax auritus*), Common Moorhens (*Gallinula chloropus*), American Coots (*Fulica americana*), Black-necked Stilts (*Himantopus mexicanus*), and Laughing Gulls (*Larus atricilla*).

It is possible that this area may host a larger number of species during the months of September through April. Typically during this period, there tends to be a higher

abundance of migratory waterbirds (shorebirds and ducks) residing in and migrating through the region.

4.4.8.1 Endemic and Species of Note in the Ephermeral Pond

- Ten (10) Black-necked Stilts (*Himantopus mexicanus*) were observed nesting on the ephemeral pond (P). This species is considered an uncommon to rare breeding resident in the northernmost Bahamas. The presence of this species in this area suggests that the Pond, as a nesting site, has appropriate buffers from existing disturbed or developed areas. It appears that the large buttonwood/black sedge wetland (BBS) may act as a buffer from human disturbance and predation.

- Twenty-five (25) Laughing Gulls (*Larus atricilla*) were observed perched on the ground or sitting on nests. This species is common to the Bahamas during the summer months, and is known to breed locally in New Providence.

4.4.9 Open Water Area Wildlife

The golf course ponds appear to be so heavily eutrophied that there was an observable difference in terms of wildlife utilization between ponds at the time of the survey. Fewer ducks and no fish were observed in the ponds with the most turbid and greenest water, located within the central and western portions of the golf course. The eastern golf course ponds had a greater number of turtles (non-native Red-eared Sliders (*Trachemys scripta*)), ducks, wading birds, Mosquito Fish (*Gambusia sp.*), and slightly better water clarity. It is likely that some of the ponds are indeed oxygen-depleted and eutrophic and aeration is one method previously attempted to alleviate this problem.

Twenty-three avifaunal species were observed in the open water flow-way. This area had a high abundance of American Coots (*Fulica americana*), Common Moorhens (*Gallinula chloropus)*, and Least Grebes (*Tachybaptus dominicus*).

4.4.9.1 Endemic and Species of Note in Open Water Areas

- There were no endangered species observed in these areas.
- One species observed was the CITES-listed Osprey (*Pandion haliaetus*) (CITES, 1987).
- Least Bitterns (*Lxbrychus exilis*), an uncommon breeding resident in The Bahamas (Rafaelle *et al.*, 1998), were observed in this area. The existence of both adult and sub-adult individuals suggests this species may be using this area for breeding purposes.
- Anhingas (*Anhinga anhinga*), which are listed as vagrants to The Bahamas, are being seen in New Providence more frequently utilizing shallow, calm water bodies either, fresh, brackish, or saline (Rafaelle *et al.*, 1998). A number of Anhingas were observed diving into the waters of the Hobby Horse Pond.

- White-cheeked Pintails (*Anas bahamensis*) are considered threatened, and are experiencing a moderate decline. This species faces imminent threats warranting specific conservation measures (Rafaelle *et al*, 1998). A flock of White-cheeked Pintails were observed on Hobby Horse Pond at the time of this survey.

4.4.10 Disturbed and Developed Area Wildlife

Thirty-five (35) species of avifauna were observed in Disturbed and Developed areas within the Core Project area and eleven (11) species of avifauna were observed in disturbed areas at the Gladstone Road Parcel.

Species occurring in disturbed areas constituted the highest species occurrence across all land cover types. It is most likely that the high degree of disturbed area coverage adjacent to smaller fragmented natural areas might be attributing to the utilization of disturbed areas by birds due to a sheer lack of available, desirable habitat. Furthermore, the highly mobile nature of birds leads one to believe that these habitats are not distinct, and birds are using them together to the best of their ability.

Man-made Ponds (MP) at the Site were separated out from other Disturbed areas as they represent a specific habitat type for waterbirds. The manmade ponds appear to be providing considerable habitat and possibly creating a situation whereby certain species, those unaffected, or better adapted to human altered habitats are able to thrive. Twenty (20) avifaunal species were observed utilizing these ponds. These species included an unusually high individual abundance of American Coot (Fulica americana), Common Moorhen (Gallinula chloropus), and Least Grebe (Tachybaptus dominicus) in addition to a number of wading birds and other ducks.

4.4.10.1 Endemic and Species of Note in Disturbed and Developed Areas

There were no endangered or threatened avifaunal species detected in Developed/Disturbed areas or on the Man-made Ponds.

- One species observed in the Project Core area is CITES listed – Appendix II, American Kestrel (Falco spaverius spaveroides), (CITES, 1987). This species is increasing in numbers throughout the region and is frequently seen in populated areas (Raffaele, H., J. Wiley, O. Garrido, A. Keith, J. Raffaele, 1998).
- One (1) Bahama Yellowthroat (G. Rostrata), considered an endemic species, was observed along a roadside adjacent to Dry Broad-leaved Evergreen Forest (DBEF). This species relies heavily on dense cover for breeding and foraging purposes.

There were no endemic species observed at the Gladstone Road Parcel disturbed areas. The close proximity to this site to the Core Project area and similarities in habitat type and coverage suggests that endemic species are likely to exist on this portion of New Providence as well.

4.5 Protected Wildlife Species and Habitats

The following discussion focuses on species potentially occurring within the project area that are recognized internationally as being endangered, threatened, or potentially at risk. Under The Wild Animals Protection Act 1968 the following species of animals are protected throughout the Commonweath of The Bahamas. Wild horses in the Island of Abaco, that is to say, any member of the species *Equus Caballus* in that Island in a state of nature, including the young of that species, Agouti or Hutia (*Geocapromys ingrahami*), Iguanas (*Cyclura species*), and Green turtles (*Chelonia mydas*) are protected.

The green turtle (*Chelonia mydas*) is widespread in waters between 35˚ north and 35˚ south latitude, including The Bahamas. Green turtles are a mobile species and utilize a variety of habitats during their life cycle including coral reef areas, where juveniles are often found and seagrass beds where the mainly herbivorous adults graze for food. Mating occurs in the water and adult females return to sandy beaches at night where they deposit their eggs into nests they have dug in the sand. They nest at intervals of 2-4 years and lay an average of 3-5 clutches within a given season. As with most sea turtle species, the eggs incubate for an average of 60 days. Nesting occurs on beaches throughout the Caribbean, including The Bahamas. Major threats to this species include anthropogenic modifications to their nesting grounds (coastal beaches), commercial fishing fatalities, ingestion of artificial trash and debris, direct impacts from boats, and dredging of their resting and foraging habitats. The green sea turtle also faces severe threats from the commercial harvest of the turtles and their eggs. Green turtles can be harvested in The Bahamas from August 1 – March 31, but taking of green turtle eggs is illegal in The Bahamas. Given the existing coastal development in the Cable Area is unlikely that turtles nest in the project area. Sea turtles are known to migrate and nest specifically on their native beaches.

The Bahamian rock iguana is actually a complex of species including: *Cyclura cychlura*, *C. carinata*, *C. rileyi*, and related subspecies, which occur on Andros, San Salvador, Acklins, Mayaguana, and in the Exuma Cays. Rock iguanas live in dry areas characterized by limestone rock outcrops, which provide a shady retreat and sandy areas for breeding. Bahamian rock iguanas were not observed within the project area.

4.6 National Parks, Protected Areas and Marine Reserves

Delineation and management of the protected land and marine resources of The Bahamas is the responsibility of The Bahamas National Trust (BNT) and the Department of Fisheries in the Ministry of Agriculture. The policy of The Bahamas government is to set aside a minimum of 20 percent of its marine resources in protected areas.

The Bahamas National Trust is a statutory, nonprofit, non-governmental organization, established by an Act of Parliament in 1959 to conserve and manage the country's natural and historic resources. In 1983, 53 sites throughout the country were proposed by the Trust for protection. In 1989, ten of these sites were designated as high priority, one of which has been declared a national park. The BNT currently manages 12 designated national parks and protected areas, including “The Retreat”, an 11-acre garden of native woodland in the Heart of New Providence featuring one of the world’s largest privately owned collections of rare palms.

The Department of Marine Resources manages five designated marine protected areas, primarily as nurseries to enhance and protect juvenile and breeding fish. Local citizen groups promote marine protected areas to protect fin and shell fisheries and lobby government and the Trust to declare them protected areas. The recently approved marine protected area in central Andros was proposed by local citizens.

5. BASELINE SOCIOECONOMIC CONDITIONS

Baha Mar Ltd evaluated the current land use of the project area, population, employment, transportation, infrastructure, and cultural resources in the project area. The following information is presented in more detail below:

- **Vehicle Traffic - AM and PM** peak volumes of traffic passing by/through the resort properties. Existing type and volume of vehicles arriving/departing from existing resort properties based on surveys and observations. Roadway operations modeling of existing traffic operational levels at key project area intersections.
- **Socioeconomic -** The number and classification of current resort employees and related wages, resort expenditures and receipts, tax receipts, primary and secondary benefits to economy of The Bahamas.
- **Energy -** Current electrical and fuel requirements.
- **Water -** Current water use data for hotels, ancillary facilities, and non-resort facilities. Water treatment system location and capacity (average/peak). Water withdrawal location. Energy use and treatment process waste generation and disposal information. Potable and non-potable resort uses and distribution systems.
- **Wastewater -** Current wastewater generation data. Wastewater treatment system location and capacity (average/peak). Energy use and effluent characterization, effluent discharge limits, and disposal location.
- **Waste -** Estimates of current solid waste generation volumes and disposal methods and locations. Food waste and cooking waste generation/storage/disposal. Chemical, petroleum, herbicide/pesticide/biocide and other use and disposal information.

5.1 Population

The Bahamas is a politically stable, middle-income, developing country with a population of just over 300,000. It consists of an archipelago of some 700 islands, many of which are uninhabited, with a total land mass of 13,942 km^2 (5,383 mi^2). At its closest point, The Bahamas is only 45 miles from the Florida coast. Most of the country's population resides on the Island of New Providence, where Nassau is located, and in Freeport on the island of Grand Bahama. Smaller settlements are scattered over several of the other islands of The Bahamas, known as the "Family Islands." The most densely populated island is New Providence, with a population density of 2340.4 persons per square mile.

5.2 Economics

The Bahamas is one of the wealthiest nations in the Caribbean region. In 1999, The Bahamas' per capita income was $14,500, the highest of the Caribbean nations. The Gross Domestic Product (GDP), by government estimates, was approximately $4.81 billion in 2000. Nearly sixty percent of The Bahamas' GDP is derived from tourism. Benefiting from an absence of personal and corporate income taxes, financial services constitute the second most important sector of the economy. Excluding the public sector, financial services account for up to 15 percent of GDP. Agriculture and industrial activities together account for less than 10 percent of GDP. The agricultural and fisheries sector produces such goods as vegetables,

lobster and fish. The country produces some chemicals and pharmaceuticals for export, and products such as the aragonite, rum and sun-dried sea salt.

The Bahamas has an import-oriented, service-based economy that relies heavily on tourism for foreign exchange. With few domestic resources and little industry, The Bahamas imports nearly all its food and manufactured goods from the United States. The Bahamian economy has grown by three to four percent in each of the past two years, largely attributable to strong investment in the tourism sector. Continued economic growth is heavily dependent on economic conditions in the United States, which provides approximately 82 percent of the visitors to the islands. Recent growth in the economy, especially in the construction sector, has reduced the official level of unemployment in The Bahamas to around 7 percent. Government and consumer borrowing have increased along with the growth in the economy. The Government maintains the value of the Bahamian dollar on par with the U.S. dollar.

Foreign exchange reserves are at historically high levels ($404 million in 1999) as a result of recent inflows of foreign direct investment. Although the Bahamian government has actively encouraged foreign investment in industrial and agricultural areas as well as in tourism and banking, particularly to expand local employment in white-collar or skilled jobs, the vast majority of successful foreign investments have remained in the areas of tourism and banking. Because of the heavy dependence of the Bahamian economy on tourism and, to a lesser extent, the financial services industry, further diversification of the economy is desirable. Such development is particularly encouraged on the Family Islands. Nevertheless, despite its interest in foreign investment to diversify the economy, the Bahamian Government responds to local concerns about foreign competition and tends to protect Bahamian business and labor interests.

Remaining challenges for the Bahamian government are to privatize The Bahamas costly national corporations, to provide job retraining for hundreds of workers affected by the changes wrought by privatization as well as training for Bahamian nationals for jobs arising from new foreign investments, and to continue to create jobs for new entries in the employment market. These efforts follow on considerable progress in revitalizing the tourism industry, attracting new investment to The Bahamas, and rebuilding the country's infrastructure. Infrastructure improvement projects particularly involve construction of primary and secondary residences, electrification of all of the Family Islands, improvements to water systems on the Family Islands, and construction of roads in key locations. Building permit statistics indicate ongoing buoyancy in both residential and commercial construction activities in the near term.

5.2.1 National/Regional Demographics and Labor Force

The Bahamas has a total population of approximately 303,000 (2000 estimate), with a growth rate per annum of approximately 1 percent. Almost 60 percent of the population lives on New Providence, which includes the capital city, Nassau, and the resort areas of Cable Beach and Paradise Island.

The vast majority (65 percent) of the population in The Bahamas is between the ages of 15 and 64 years and the gender ratio is 0.96 men to each woman. The next largest sector is under the age of 15, making up almost 30 percent of the population. Bahamians enjoy a life expectancy of 70.5 years.

In 1999 the labor force consisted of approximately 158,000 workers, with tourism, financial services and government being the largest employers. This labor force is employed in the following major economic sectors:

- Tourism 50 percent
- Other Services (includes financial services and government) 40 percent
- Industry 5 percent
- Agriculture and Fishing 5 percent

The Bahamian government strongly focuses on job creation and protection for its citizens. Foreigners are required to obtain work permits before they can become employed in The Bahamas. The government will permit foreign employees to work in technical, supervisory or managerial capacities provided there are no qualified Bahamians available for the jobs. Foreign business owners are expected to train as many of their Bahamian employees as possible to eventually fill technical and managerial positions.

The official unemployment rate at the end of 1999 was estimated at 7.8 percent, now estimated to be down to approximately 7.0 percent, both historically low levels. Unemployment is highest among young people (approximately 40 percent of the unemployed are under 25 years old), and is higher for women than for men (9.7 percent versus 6.0 percent, respectively). Unemployment rates outside the two major population centers of Nassau and Freeport tend to be significantly higher than in the two cities, and underemployment can be considerable, especially in the Family Islands. Wage rates, although lower than those in the United States, tend to be higher than elsewhere in the Caribbean.

The country has a widespread education system available to all segments of the Bahamian population. There are more than 210 schools in the country, with a total enrollment at about 64,000 and a teacher to student ratio of 1:18. Education is compulsory for persons 5 to 16 years of age. Beginning in the 1960's, the government significantly expanded and strengthened its educational system in part to position its citizens for jobs resulting from future economic expansion initiatives. As a result, Bahamians are the most highly educated of the Caribbean nations, with a literacy rate of 98 percent. Likewise, technical and higher education was strengthened to address shortages of skilled and technical personnel, including expansion of The Bahamas Technical and Vocational Institute, a publicly managed institution.

The existing Cable Beach Resort facilities provide an important contribution to both the local economy of New Providence, and of the Bahamas as a whole. In 2005, approximately 288,000 guests visited the Cable Beach Resort properties (Sheraton, Wyndham and Nassau Beach Hotel). The Cable Beach Resort employed 2,211 staff with a payroll of $40,922,558 in 2005. When the multiplier effect is taken into account, the actual impact of these wages on the economy is greatly increased.

5.3 Land Use

The proposed development area primarily includes hotels/resorts, support facilities for the hotels/resorts and other commercial buildings along West Bay Street. The commercial buildings include banks, a police station and small retail stores. A golf course associated with an on-site hotel is located to the south of West Bay Street and extends to the eastern boundary of the subject property. Five out parcel undeveloped properties consisting of uplands and wetlands are also included in this assessment and are located to the south of this area and extend further south toward John F. Kennedy Drive, which contain a mix of both wetlands and uplands. The proposed 686-acre development site and related land classifications are shown on Figure 19. The proposed 61 acre CSF site and related lad classifications are shown on Figure 20. For purposes of this assessment, approximately 100 acres at the Gladstone Road Parcel were studied, although it is not intended that the entire parcel would be included in the proposed project development.

5.3.1 Existing Zoning Regulations

The area comprising the Baha Mar Resort development area has three zoning orders in place. The strip of land between West Bay Street and the water is zoned for Beach Use. This zoning designation allows for hotels, restaurants, and related facilities and has a height restriction of 73 ft. The Beach Zone extends from west of the project site to the east, encompassing the entire Baha Mar project site north of current West Bay Street. A zoning order has not been adopted for the Baha Mar development property located south of the existing West Bay Street. Two other zoning orders are in place for areas abutting the development site. The residential area west of the development site and south of West Bay Street is generally zoned single family residence. An area of multi family zoning is located near Atlantic Avenue.

In areas where a specific height limit has not been set, the Department of Physical Planning uses a formula to determine maximum building heights. The top of the building cannot above the plane(s) extending on a 65 degree angle extending inward from the property line. In addition, the total of both angles cannot be greater than 120 degrees.

5.4 Transportation

The proposed Baha Mar Resort Project involves the redevelopment and expansion of the existing Sheraton, Wyndham, and Nassau Beach Hotels along the Cable Beach strip. The roadway network in and around the resort serves both traffic destined for the resort facilities as well as through traffic moving east and west across New Providence. The major roadways in the vicinity of the project include:

- **West Bay Street.** West Bay Street is an important east-west roadway running along the north shore of New Providence Island, linking the project site to downtown Nassau. Adjacent to the Baha Mar site, it operates with two lanes in each direction with a wide central median and carries approximately 21,000 vehicles per day.
- **Prospect Road.** Prospect Road currently provides the only north-south connection between the Cable Beach area and JFK Drive and neighbourhoods to the south. It

operates with one lane in each direction and carries approximately 8,400 vehicles per day.

- **Prospect Ridge Road.** Prospect Ridge Road is a residential road that serves the Prospect Ridge neighbourhoods south of the cable beach resort. It operates with one lane in each direction and carries approximately 6,500 vehicles per day.
- **Skyline Drive.** Skyline Drive is a residential road that serves the Westward Villas and Prospect Ridge neighbourhoods south of West Bay Street. It operates with one lane in each direction and carries approximately 6,500 vehicles per day.
- **JFK Drive. J**FK Drive is an important east-west roadway running between the Nassau International Airport and the neighbourhoods of Nassau City. It is located south of the proposed Baha Mar site and operates with one lane in each direction carrying approximately 13,300 vehicles per day.
- **Gladstone Road.** Gladstone Road is an important road that connects the neighbourhoods in southern New Providence Island to JFK Drive. It operates with one lane in each direction.

The existing roadway network in the vicinity of the project is illustrated in Figure 24.

5.4.1 Existing Resort Facilities

The existing Cable Beach Resort is comprised of the Sheraton Resort (691 rooms), the Wyndham Nassau Resort and Crystal Palace Casino (850 rooms), and the Nassau Beach Hotel (400 rooms). In addition to resort hotel and casino functions, the resort area also contains meeting and convention facilities, as well adjacent commercial and government offices.

5.4.2 Existing Traffic Counts

In order to characterize the existing levels of traffic using the area roadway network, turning movement counts were conducted during the weekday AM and PM peak periods of demand at the study junctions in January and November 2006. Supplemental historical counts were also obtained for three of the junctions from March 2005. The observed January 2006 volumes were increased by 5% as a seasonal adjustment factor. The resulting AM and PM peak hour turning movement count data is summarized in Appendix.

Traffic counts were also undertaken at the existing Cable Reach hotels in January 2006. At the time the data was collected, the three hotels were approximately 65% occupied. The observed counts were increased to reflect a baseline occupancy of 85%. The trips generated by the existing hotels were assigned to the existing roadway network based on existing traffic patterns. Data presenting the existing AM and PM peak hour traffic volumes generated at the study junctions are contained in Appendix.

5.4.3 Existing Junction Operations

The existing conditions traffic volumes were analysed at the study junctions using OSCADY and ARCADY software. The junctions of West Bay Street with Atlantic Avenue and Skyline Drive are currently unconventional offset roundabouts. The

configuration cannot be directly tested using ARCADY roundabout software. Traffic on the eastbound approach is free flow, while traffic circulating inside the roundabout must yield to eastbound traffic. A modified approach was necessary to analyse these junctions combining both roundabout analysis and stop-controlled junction analysis tools. The results for the northbound approach describes right turns from inside the roundabout to eastbound West Bay Street and were calculated using Highway Capacity Software for two-way stop controlled intersections. The results for the westbound approach, which operates like a traditional roundabout entry, were obtained from an ARCADY analysis. The results for the eastbound approach are based on the assumption of free-flowing traffic with a saturation flow of 1,700 vehicles per hour per lane. The resulting Ratio of Flow to Capacity (RFC) values for each junction approach for the AM and PM peak hours are summarised in Table 23 and Table 24, respectively. A complete copy of the traffic study is included in Appendix.

The capacity analysis results indicate that the three signalised junctions are operating near or above capacity. This is consistent with field observations, as significant congestion occurs at the JFK Drive/Prospect Road/Tonique Williams-Darling Highway junction and the JFK Drive/ Gladstone Road junction during peak times. The existing roundabouts on West Bay Street currently operate with spare capacity.

5.5 Infrastructure and Public Services

The Commonwealth of the Bahamas established the wholly owned Bahamas Water and Sewerage Corporation (WSC) under the Water and Sewerage Corporation Act of 1976. Under the Act, the control and administration of the water resources of the Commonwealth rests with the WSC. These duties and responsibilities include but are no limited to:

- providing water supplies for domestic and other uses, provide adequate drainage and dispose of sewage and other effluent;
- extending the water and sewer systems in the country;
- ensuring and controlling the optimum development and use of the water resources; and
- serving as advisor to the Minister responsible for water and sewerage, draft regulations and register users of the systems

Additionally, the Ministry of Health is entrusted with the administration of the Environmental Health Act (EHA) and the Health Services Act (HSA) which regulates and monitors among other things, the supply of water to ensure that public health and well-being are preserved. The Environmental Monitoring and Risk Assessment, formerly the Public Analyst, Laboratory attached to the Department of Environmental Services (DEHS) has the responsibility for monitoring water quality in conjunction with the Water and Sewerage Corporation. The WSC, in conjunction with the branches of government, has been expanding its systems for potable provision and sewerage treatment since its inception. Each of the existing systems is described below.

5.5.1 Potable Water Supply

The WSC established its Marine operations division in 1976, which was responsible transporting potable water across 37 miles of sea, from the well fields in North Andros, via water vessels (barges) to the reservoirs at Arawak Cay, New Providence. The Marine Operation began by transporting 0.6 Million Imperial Gallons (MIG) of potable water per day and has steadily grown to the current level of 4.25 MIG of potable water per day in the year 2000. As of 2005, approximately 55% of the potable water supply in New Providence was supplied by Andros well fields (an average of 300 mg/L Chloride). Currently an 8,000-ton and a 14,000-ton tanker, the M/T Dolphin and the M/T Titas are being used to transport water.

The water is stored in three sets of earth mound reservoirs, which are polymer lined. Water is removed from the reservoirs via two 300 horsepower pumps. Chlorine gas is added for disinfection purposes during extraction. Arawak Cay assists in maintaining the Corporations storage capacity, and services the following areas / pumping stations:

- Princess Margaret Hospital via the Fort Fincastle Station;
- Blue Hills high level tank;
- Cable Beach area;
- Winton Station;
- Paradise Island;
- Prince Georges Wharf; and,
- Prospect Station.

As development in New Providence increase resulting in a demand for more water resources the WSC began its efforts to have a high capacity water treatment plant constructed. In 1996 the WSC developed a joint venture company under the name Waterfields Company Limited who was responsible for the design, construction and operation of seawater reverse osmosis plant. The Waterfields Company Limited completed the primary construction of the plant and began producing water in December 1997.

This seawater reverse osmosis plant, located at Windsor Field adjacent to the Nassau International Airport, is designed to produce up to 2,640,000 US gallons (or 2,200,000 imperial gallons) per day of high quality portable water. Its design incorporates unique and interesting features such as diesel-driven high-pressure positive displacement pumps, work exchanger energy recover system and a 95% second pass RO system.

Consolidated Water Co. Ltd. supplies water from its Blue Hills RO plant under the terms of a 20-year water supply agreement dated May 20, 2005. The Blue Hills plant was commissioned in July 2006, is situated near the BEC power station. The Blue Hills RO plant is currently operational, providing approximately 5 US million gallons per day to customers, and is capable of providing 7.2 US million gallons per day. Other plants planned for New Providence include, one at Perpall's Tract and one for eastern New Providence. RO plants are being introduced throughout The Bahamas to

supplement or replace groundwater sources, and reduce the reliance of barged and piped water.

Additionally, on the Island of New Providence there are nine pumping stations that distribute water throughout the island. The names of those stations are as follows:

- Blue Hills
- Arawak Cay
- Windsor
- Prospect Ridge
- Old Southwest
- Southwest No. 1
- Southwest No. 2
- Fort Fincastle
- Winton

At all pumping stations, there are tanks, which store all of the water collected, except Arawak Cay, which has reservoirs that store the water-barged daily from Andros to New Providence.

In addition to these tanks and pumping stations, a desalination (RO) plant using water from Windsor Well fields, supplies water to the island.

The water pumped at the above pumping stations is collected mainly from groundwater in the wellfields, in New Providence and on Andros. In New Providence there are five (5) wellfields, which are sources of water, in addition to barged water and water produced through Reverse Osmosis.

The water from the SWRO Plant is blended with the highly saline waters of the Windsor area wellfields to produce a "sweetening" effect and thus reducing the salinity of the overall product. This blended water is then chlorinated to kill harmful bacteria before delivery to consumers. Areas within the distribution zone include Love Beach, Gambier, Delaport, Cable Beach Strip, and the Prospect Station which further distributed the water to; Stapledon Gardens, Oaks Field Bain Town, Nassau Street, Centreville, Palmdale, Pyfroms Addition, St. James Road and other areas including Paradise Island.

Currently, most of the major developments in the Cable Beach area as well as Paradise Island operate independent Reverse Osmosis "RO" desalination plants to meet potable water demands. All resort developments, with the exception of portions of Paradise Island, are connected to the city's municipal water and use it when and if their systems cannot meet demand.

From the inception of this project the development team has recognized the challenges presented with potable water supply. Included in these challenges are the scarcity of quality groundwater as well as lack of land available for well field development. Large developments are typically required to provide their own water without impacting existing ground water lenses. This has historically been accomplished via independent Reverse Osmosis (RO) systems. As such Baha Mar Ltd has evaluated the

alternatives describe in Section 1.7.4 to meet the water demands of the proposed project.

Currently the Wyndham Nassau Resort, the Sheraton Resort and the Nassau Beach Hotel operate their own RO water purification systems to provide potable water to their facilities. Table 25 presents the characteristics of each system.

Each hotel maintains and operates their RO systems to provide potable water to the respective hotel operations. Each hotel is also connected to the WSC water main in case the RO systems fail and the hotels need an alternative source of potable water.

5.5.2 Wastewater and Sewage

The WSC serves as advisor to the Minister responsible for water and sewerage, draft regulations and register users of the systems. The site of the Malcolm's Park Sewerage Facility has been the singular final collection point of Nassau's sewage system since the inception of the operations in the late 1920's.

The location collected flows from both the eastern and western directions from Dick's Point to Saunders Beach. Over the last 65 years, the role of the site has varied and changes have been made over time to suit.

In 1992, as a part of the Downtown Sewerage Project, the sewer mains along Dowdeswell Street and side streets north up to Bay Street and south to Shirley Street were replaced. The Primary Treatment Plant was also completed. The overall objective of this project was to reduce the infiltration and discontinue untreated sewage with a view of reducing pollution and creating a healthier environment. The treatment plant is designed to accommodate flows of up to 3.0 million gallons per day and carry out primary treatment to reduce organic and suspended solids concentration by 50 to 60%. The plant is equipped with features to aid in a smooth operation.

An integrated telemetry system is in place to monitor pumping station activities and tank levels at various stages. High level alarms will activate if any malfunction is detected in the treatment plant operation.

Flows into the system are measured on a continuous basis and information is stored on data loggers. All variations in flow are analyzed on a weekly basis.

Odor Control units are installed on both settling tanks and the sludge holding tank. These units help to eliminate gas odors produced during the breakdown of the organic materials in the raw wastewater.

Malcolm Park is the oldest and largest drainage facility in New Providence. It receives around 3 Million Imperial Gallons/Day (MIGD). A treatment facility was also commissioned there in 1993. There are five smaller drainage areas operated by the Corporation, and each has its own treatment facility:

- Yellow Elder Gardens
- Fox Hill

- Flamingo Gardens
- Pinewood Gardens
- Nassau International Airport

Only 10% of New Providence is currently served by a centralized sewer system but this is a fast-growing, environmentally important sector. There are also central sewerage systems in Grand Bahama and Spring City, Abaco.

Currently, the WSC does not operate wastewater collection within the project area however there are plans to provide this service. Major developments within the project area utilize a variety of measures, including small on-site wastewater treatment with disposal wells, larger wastewater treatment plants (150 kgpd) with grey water storage/reuse (1M gallon), and raw sewage deep well disposal.

Sanitary sewer demands are typically considered to be about 80% of overall potable water use. Table 26 presents a breakdown of the existing waste water demands from the Hotel facilities.

The Sheraton Resort, Wyndham Resort and Nassau Beach Hotel each operate their own waste water treatment plants (WWTP). The Sheraton waste water treatment plant is located south of West Bay Street. Sewage from the hotel is gravity fed to a central collection and then is pumped through 2 lift stations, one at the Sheraton and one at the Straw Market, and is sent to the Sheraton WWTP where solids are removed, and water is treated through extended aeration with activated sludge and tertiary treatment. The treated waste water is reclaimed and utilized for irrigation and flushing water at the Sheraton and Wyndham. Waste solids are dewatered and sent to landfill for disposal. The liquid wastes from the treatment and dewatering process are disposed of onsite in an injection well. The system has a maximum operating capacity of approximately 240,000 gallons per day.

The Wyndham's WWTP is collocated with the Sheraton WWTP and operates in the same manner. The Wyndham system has a capacity is approximately 280,000 gallons per day.

The Nassau Beach Club Hotel operates a stand alone WWTP. Sewage is directed by gravity feed to a central collection point where is pumped via a lift station to the WWTP at the Total Energy Plant. The system mechanically separates solids and treats wastewaters through an extended aeration and activated sludge treatment process. The treated water is pumped back to the Nassau Beach Club Hotel and used for irrigation and flushing water. The plant has a maximum capacity of approximately 150,000 gallons per day. The resulting sludge is sent to landfill for disposal and the remaining liquid wastes are disposed of in an injection well.
The existing businesses located along West Bay Street utilize individual septic systems to manage their waste water demands.

5.5.3 Solid Waste and Hazardous Waste

Solid wastes generated at each of the existing facilities are collected in various containers throughout each site. The Sheraton Resort operates a 30 cubic yard trash

compactor for hotel wastes and four open containers to collect waste from Engineering operations, Laundry, Warehouse and the Golf Course. The Wyndham maintains one 30 cubic yard trash compactor for hotel wastes and one 25 cubic yard open top container to collection construction debris. The facility also utilizes one 4 cubic yard container for wastes from the Engineering offices. The Nassau Beach Hotel operates one 30 cubic yard trash compactor for hotel wastes and two 25 cubic yard containers to manage wastes from the Warehouse and engineering operations. There is also a 4 cubic yard container at the Tennis court to manage wastes from the athletic facilities and one 4 cubic yard container at the Straw Markets. The average waste generation rates are shown in Table 27.

Solid wastes from the resort will be taken to the New Providence Sanitary landfill on Tonique Williams-Darling Highway for disposal. The New Providence Sanitary Landfill is operated by DEHS on 135 acres next to the old Harrold Road dump, and is a combined state-of-the-art sanitary landfill design with an innovative use of the porous coraline rock. The landfill is situated about a sixth of a mile east of the Gladstone Road Parcel.

The site was divided into five “cells,” each lined with a high-density polyethylene geomembrane to prevent contaminants from leaching into the ground. The geomembranes channel liquid contaminants from the waste deposits into holding chambers where they are treated bioreactively and then recirculated in the system.Wire baskets six ft long, three ft deep, and three ft wide are filled with coraline rocks and stacked one on top of the other in the landfill at strategic intervals to vent gases that form during decomposition of the waste. The venting also prevents explosions and fires.

The facility was designed to accommodate a total of 7.9 million cubic yards of waste over the course of 20 years. It is reported that some 1,500 tons of refuse are added to the landfill each day. When it reaches capacity, the landfill will be given a final layer of covering material and planted with vegetation.

DEHS has recently opened a hazardous waste management facility at the landfill site. Hazardous materials are sorted out from the waste and shipped to other countries under the terms of the 1989 Basel Convention, which allows the international shipment of such wastes so long as exporters have written consent from the recipient country. Other materials, such as old tires, are sorted out for export and recycling.

Baha Mar Ltd is working with DEHS to develop removal and disposal methods for asbestos containing materials, other hazardous materials, and waste products generated from construction and operation of the Baha Mar Resort. Based on consultation with the DEHS, Baha Mar Ltd anticipates that the New Providence Sanitary Landfill and Hazardous Waste Management facilities will be able to handle the waste products generated from the Baha Mar Resort construction and operation. In addition, BML commits to providing DEHS with an accounting of the materials to be stored and used at the Central Service Facility at least 30 days prior to initiation of operations at the CSF.

5.5.4 Electrical Consumption

The Bahamas Electricity Corporation (BEC) is a Government Corporation established under The Commonwealth of The Bahamas Electricity Act of 1956. As the nation's primary electricity provider, BEC owns and operates the Generation Plants and the Distribution Network that supplies the Bahamian archipelago (excluding Grand Bahama Island). The larger portion of BEC's consumer base resides on the country's capital island, New Providence inclusive of Paradise Island.

The corporation has a Total Installed Generation Capacity of approximately 40 Gigawatt-hours per year, produced by plants that burn fossil fuels (oil) to generate electricity. The BEC's primary electrical generating stations are located at Clifton Pier, at the southwestern corner of New Providence and at Blue Hills. The Clifton Pier facility includes 8 stationary diesel engines rated at approximately 152 megawatts. The Blue Hills Power Station contains 14 generators rated at 186 MW. The existing distribution infrastructure is shown on Figure 25. The Sheraton Resort, Wyndham Nassau Resort and Crystal Palace Casino receive their electricity from the BEC, each also maintains emergency generators in case of an outage in the main power supply. The Nassau Beach Hotel purchases approximately 40 percent of its power from BEC and generates the remaining 60 percent at the Total Energy Plant located to the south of the hotel. The generating capacities of each hotel, emergency and regular, are shown in Table 29.

The current energy consumption for each of these facilities is presented in Table 29.

5.6 Cultural Resources

A background historic research/cultural resources investigation was performed by NEA, Inc., Archaeological Services Group for Baha Mar Resort Development Project, New Providence Island, Nassau, Bahamas to establish the background context of the historic and archaeological setting of the project. The methodology for the investigation is described below:

Methods:

Archival research, literature search, and map search at the following institutions:

- Nassau Public Library
- The Department of Archives, Ministry of Education
- The National Museum of the Bahamas; Antiquities, Monuments, and Museums Corporation
- Bahamas Historical Society Museum
- Ministry of Works, Lands, and Surveys

Interviews with the following personnel:

- Dr. Keith Tinker, Director, The National Museum of the Bahamas; Antiquities, Monuments, and Museums Corporation

- Ms. Sherriley Strachan and Ms. Edith Sturrup, The Department of Archives, Ministry of Education
- Ms. A. June Maura, Historian
- Richard Gibson, Sheraton Cable Beach Resort, Resident Golf Professional
- Mr. Mark Piekarz, Baha Mar Ltd

The survey included a pedestrian project site visit (within the Baha Mar Development Site, the Golf Course, and the Goodwin Tract), concentrating on above ground points of potential historic significance, based on results of the preliminary research of available primary and secondary source materials and interviews. The survey also focused on areas within the project that potentially exhibit subsurface archaeological prehistoric or historic significance, based on terrain and proximity to wetland or lakeshores. Photographs were taken of above ground points of potential historic significance and of areas, by virtue of physical characteristics, that may exhibit potential for the presence of subsurface prehistoric or historic archaeological resources. A complete copy of the cultural resources assessment report is included as
Appendix - Cultural Resources Report. A summary of the findings is presented below.

Based on preliminary archival, literature, and map background research, interviews with the aforementioned personnel, and a project site visit/walkover, there presently appears to be a least four (4) above ground points of potential historic significance and/or areas of potential for prehistoric or historic subsurface archaeological resources:

- **Hobby Horse Hall**: The former site of a former one mile horse race track and appurtenant facilities is located directly across West Bay Street and south of the presently existing Sheraton, Windham, and Nassau Beach Resorts. Hobby Horse Hall had been utilized as a horse racing site beginning in the early 19th century, with the first participants being members of the military units of the West India Regiment stationed on New Providence Island. The race course evolved into a more formal race track complex over the century following, so that up until the 1970s appears to have been a focal point for the social and sporting life of the Bahamian elite. At the present time, several above ground structures associated with the heyday of horse racing at Hobby Horse Hall, notably the grandstand, remain, albeit in a condition of disrepair.
- **The Estate of Sir Harry Oakes**: Though modified by subsequent development and construction, above ground structures associated with the estate and holdings of Sir Harry Oakes, a notable and wealthy immigrant and landowner who arrived on New Providence in the early 1930s, are located within the project area in the vicinity of the Gaming Board parcel. Historically significant in terms of direct association with Sir Harry, a powerful developer and philanthropist in his day, the existing Gaming Board building and other structures also may commemorate a less savory if no less notable event in Bahamian history, namely the unsolved brutal murder of Sir Harry in 1943.
- **The "Old Golf Course"**: Though subsequently redesigned and modified since its inception in the mid 1920s, the site of the earliest established golf club and course in the Bahamas is located within the present location of the existing Cable Beach Golf Course. The original clubhouse is purported to have been located across West Bay Street from the entrance to the present course, on the site of the Gaming Board offices (which is also reported as the site of Sir Harry Oakes residence).

- **Wetland and Lakeshore Margins**: Well drained and level upland zones in proximity to the margins of the wetland in the west central section of the Baha Mar Resort Development Site to the south of the Resort Core area, and in proximity to the margins of Lake Cunningham in the southernmost section of the Baha Mar Development Site and the Goodwin Tract, exhibit potential sensitivity for the presence of prehistoric archaeological sites, e.g., resource extraction or open air habitation sites. There also exists the potential for the wooded and less developed tracts within the Baha Mar Development Site to contain above ground evidence of former plantation or post-emancipation estate development in the form of remnant structures, foundations, or walls.
- Despite the modifications to landscapes and structures that have subsequently taken place on or near the aforementioned above ground points of historic significance since the period of origin, height of notoriety or use, or habitation by original owner, that these sites may considered to have the potential to be of great historic significance by Bahamians and Bahamian agencies, and merit detailed and documentary study prior to project adverse impacts. Archaeological survey within the project area for the express purpose of locating prehistoric and historic archaeological sites that have not been previously recorded (the focus being on the wooded areas in the western and southern portions of the Baha Mar Development Site and near the margins of wetlands and lakeshore) will provide an opportunity to gain information on potentially significant archaeological cultural resources through a combination of testing and mitigation options prior to project adverse impacts. Baha Mar Ltd will work with the Antiquities, Monuments, and Museums Corporation to conduct further any studies and take any necessary actions that may be required to protect cultural resources.

5.7 Community Organizations

Baha Mar Ltd has held informal meetings with local communities groups such as neighborhood groups in the Skyline Drive and Prospect Ridge Road areas to discuss the components of the project and potential impacts to the surrounding areas. Baha Mar Ltd will maintain an open dialogue with stakeholders throughout the permitting, planning and construction phases of the Project.

6. ANTICIPATED ENVIRONMENTAL IMPACTS

6.1 Methodology for Impact Assessment

The environmental consequences of construction and operation of the proposed project facilities upon environmental resources are analyzed in this section. Environmental resources include the natural, human and built environment. The impacts on environmental resources from the proposed project will vary in duration and significance. Two types of impact duration were considered as part of the evaluation, including temporary/short term and permanent impacts. Temporary/short-term impacts are temporary in nature and will occur during the construction phase of the project. The construction phase will occur over approximately 47 months as summarized on Table 10. Temporary/short-term impacts will diminish to cessation once the construction phase of the project is completed. Permanent impacts are those resulting in a permanent and irreversible change to existing environmental resources in the vicinity of the project. Impacts may be positive or negative, and will be identified as such. The specific criteria used for determining the significance of impacts are identified for each resource, and the following assumptions were used when evaluating the potential project impacts:

- Baha Mar Ltd will comply with all applicable laws and regulations;
- Baha Mar will hire a full-time environmental manager to oversee environmental aspects of the Project;
- The Project will be constructed as described in; and
- Baha Mar Ltd will implement the management measures described in this EIA and in the Environmental Management Plans.

The construction and operational impact evaluation consists of an evaluation of the following:

- Erosion and Sedimentation;
- Water Quality;
- Air Quality;
- Noise Level;
- Solid and Hazardous Waste; and,
- Fire and Hurricane Risk.

The impacts to each of these areas are further described below.

6.2 Erosion and Sedimentation

Erosion and sediment control can be discussed as non-structural and structural controls having either temporary or permanent purpose. These controls, if installed and maintained properly, will reduce the amount of soil and sediment that would otherwise migrate off the project site. Non-structural controls include appropriate planning and sequencing of activities and use of recognized best management practices (BMPs). Structural control practices may include the installation of vegetative controls (e.g., seeding, mulching, and planting); chemical controls (e.g., mulch tackifiers and soil sealants); barriers and diversion structures; basins and sediment traps; inlet and outlet protection; and surface armoring (e.g., concrete, riprap, gabions).

Under no circumstances shall heavily sediment-laden waters generated during construction activities be directed and discharged towards surface waters, direct drainages to surface waters, or recognized environmentally sensitive areas (e.g., wetlands). Activities that generate turbidity will be monitored in accordance with the Erosion and Sediment Control Plan included in the Appendix.

During construction activities, erosion and sediment control measures will be used to prevent the migration of soil and sediment off the project site and potentially impacting environmentally sensitive resources offsite. These controls will be properly installed, maintained, and regularly inspected to assure they are functional for purpose.
Baha Mar Ltd will develop a work schedule that coordinates the sequence of ground disturbing activities with the installation of erosion and sediment control measures, by limiting the amount of time that an area is disturbed through the use of sequencing, soil erosion is reduced. The sequence of activities (or similar) for integrating erosion and sediment controls will be:

- Survey, and clearly mark in the field (e.g., flags, signs), site boundaries.
- Locate in the field environmentally sensitive receptors in and immediately adjacent to the project site.
- Locate site entry and exits points away from environmentally sensitive receptors.
- Install permanent/principle erosion and sediment controls (e.g., catch basins, diversion swales/berms) before major site grading.
- Clear and grade site per project drawings and specifications (i.e., staying within site boundaries).
- Install temporary erosion and sediment controls (e.g., silt fence) where and site areas (e.g., material laydown, temporary and permanent buildings, parking lots, site access) to minimize the project footprint to the extent possible.
- Stabilize disturbed surfaces per engineering drawings and specifications.
- Remove temporary erosion and sediment controls.
- Restore site per engineering drawings and specifications.

Baha Mar Ltd will develop specific control measures to ensure that the construction of resort component in the vicinity of the beach area will not cause sedimentation in Goodman's Bay. The implementation of the measures described in the EMP will required the installation of temporary sedimentation barriers for any work that the potential to impact the Bay's waters. Additionally, as described in Section 1.6.1.17 , Baha Mar Ltd proposes to remove the Jetty currently located to the north of the Wyndham Resort Hotel. The removal of the existing Jetty is proposed to restore the littoral transport and sedimentation occurring within Goodman's Bay to their preconstruction condition and improve the health of the aquatic system, as further described in Section 7.4. During the removal, measures such as installation of silt curtains and sheet piling may be used to prevent sedimentation.

Baha Mar Ltd will perform construction operations in the vicinity of wetland areas and open water areas such as the Hobby Horse Pond and Lake Cunningham. The direct impacts to these areas are discussed below in Section 6.3.3. Adverse impacts resulting from sedimentation and erosion will be avoided by implementation of the controls described in the EMP in areas where potentially sensitive receptors occurs, such as the Hobby Horse Pond and Lake Cunningham.

6.3 Water Quality

Baha Mar Ltd has evaluated the potential impacts of the proposed project on water quality in reference to the following:

- Potable Water;
- Waste Water;
- Surface Water; and,
- Groundwater.

The results of this evaluation are presented below.

6.3.1 Potable Water

As described above in Section 3.7, each of the existing hotel facilities operates its own RO water treatment system to provide potable water to its respective facilities. The proposed project will result in the decommissioning of each of the stand alone RO systems and associated wash water and brine discharges. Baha Mar Ltd intends to contract with the WSC for potable water for the entire project. Potable water provided by WSC will be used for consumption, fire suppression, irrigation (as needed), and central plant operations. A Baha Mar Ltd-operated potable water (RO) treatment plant is described in Section 1.6.2.3 and analyzed below as a conservative measure if WSC is not able to supply the project with potable water. A comparison of potable water demand is presented in Table 30.

As described in Section 1.6.2.3 , raw salt water would be pumped to the RO water treatment plant from two intake wells located at the Central Services Facility as shown on Figure 7. A third well would be installed as spare for backup. The raw water intake wells would be approximately 160 ft deep and sized appropriately to produce the volume of water required to serve the project. The total proposed capacity is estimated to accommodate approximately three million gallons per day of raw water usage during normal operations at full build out. The system will take raw water from the aquifer beneath the freshwater lenses existing under Nassau. This aquifer has the capacity to provide this quantity of water and will allow Baha Mar Ltd to account for the increased water demand without impacting other area users, who generally rely on shallower wells for water production or obtain their water from the WSC.

6.3.2 Waste Water

The proposed project will increase the number of hotel rooms and visitors to the Baha Mar Resort and the waste water generated will increase as well. The total proposed future build out program is estimated to generate approximately 3.2 million gallons per day of waste water. The existing hotels currently generate approximately 810,000 gallons per day. This figure does not account for wastewater from the existing businesses and facilities located within the project development area (Police and Fire, Cecil Whitfield-Wallace Building, etc.) that discharge their waste to on site septic systems so the actual quantity is likely to be somewhat higher.

The project will result in the decommissioning of the three active waste water treatment plants for the Cable Beach Resort facilities as well as the decommissioning of the Breezes waste water treatment system and the septic systems associated with the existing buildings located along West Bay Street (Police and Fire, Cecil Whitfield-Wallace Building, etc.). These systems will be replaced by the construction of one centralized plant to service the needs of the entire resort complex and Breezes. This will reduce the number of active systems and the number of various injection wells being utilized for waste water disposal. Similar to potable water treatment described above, Baha Mar Ltd intends to contract with the WSC for wastewater treatment for the entire project. A Baha Mar Ltd-operated wastewater treatment plant is described in Section 1.6.2.3 and analyzed as part of this document as a conservative measure in case WSC is unable to provide wastewater treatment services.

The overall projected wastewater volume is forecasted to be approximately 3.2 million gallons per day and this wastewater would be directed to the proposed WWTP at the CSF as described in Section 1.6.2.3 and processed through the tertiary treatment system. This treated water would be used to meet the freshwater irrigation demands at the new Jack Nicklaus Signature Golf Course which is estimated to be on average 0.75 million gallons per day. Additionally, treated wastewater will be used at the resort complex for irrigating the landscaping throughout the resort and roadways, which has an estimated demand of approximately 499,000 gallons per day. The treated wastewater will be pumped to a fresh water storage pond located on the golf course. This pond will be approximately 3.5 acres in size and will maintain a storage capacity of approximately 9 million gallons. The pond will be constructed with a liner to prevent mixing of the treated water with groundwater and shallow aquifers, as described in Section 1.6.2.5 . Any excess treated water that is not able to be reused on-site will be disposed of through injection wells as per the standard practices in The Bahamas. Currently, approximately 80 percent of the wastewater treated at the four existing WWTPs is recycled back to the Hotels as grey water used for toilet flushing and irrigation. The remainder of the 810,000 gpd is being disposed of via injection well. In the proposed action, Baha Mar proposes to treat and reuse all of the wastewater as irrigation water. The result will be a significant increase in the amount of wastewater being recycled and a corresponding decrease in the amount of wastewater being disposed of by well injection. If the wastewater volume is too great to be used on the resort facilities the treated waste water will be disposed via injection wells. This will result in the introduction of highly treated wastewater to the groundwater system as opposed to the injection of raw or partially treated wastewater as is the current practice when system demands cannot be met.

6.3.3 Surface Water

6.3.3.1 Canal and Lagoon System Water Quality

This section describes an investigation of water quality conditions in the system of lagoons and canals that will be constructed throughout the Baha Mar resort. The proposed lagoons will be fed with water from wells constructed near the shore. Flow in the lagoons will be toward inland portions of the system. The lagoons and canals will contain salt water and be lined with an HDPE membrane. Lining the waterways allows the water

surface to be elevated above existing groundwater levels. The HDPE lining would also serve as a protective barrier, preventing the salt water from contaminating adjacent freshwater wetland areas and the fresh water lens in the southern portion of the site.

The salt water will be continuously circulated throughout the canal system. Saltwater will be drawn from wells near the shore, circulated throughout the canal system and discharged via injection wells. No discharges of wastewaters will be made into the canals or show lakes, and the water transportation system will use electric boats. Therefore the water that is to be withdrawn from the canals for circulation is not anticipated to be contaminated.

The lagoons are to be used for conveyance of a system of electric-powered water taxis that will transport resort guests between various locations within the facility. The lagoons will not be used for any other recreational purposes, including fishing, swimming or bathing of any kind. The lagoons will not be connected to any surface water and are therefore not anticipated to become habitat for significant fish populations.

This evaluation of lagoon water quality has been conducted in three parts. First, water quality criteria were determined based on the anticipated water use. Second, the water balance was evaluated and the concentration of conservative compounds determined as a function of their concentration in the influent and the turnover time in the lagoon. Third, a box-model type analysis was performed to determine the impact of nutrient loadings on the lagoon water quality. The overall goal is to have the lagoon water quality with a high aesthetic quality and to be free of pollutants at levels that could cause harm to resort guests through incidental contact.

A. Water Quality Criteria

The applicable water quality standard must be both protective of public health and consistent with the aesthetic objectives of the resort as a whole. The only intended use for the lagoon that might lead to human contact with the lagoon waters is the use and operation of electric powered water taxis proposed to be used as a mode of transportation at the resort. Swimming, wading or other uses that involve prolonged dermal contact and relatively high likelihood of ingestion of lagoon waters will not occur. The removal of fish or other animals for human ingestion will likewise not occur as part of the permissible activities at the resort. Water quality criteria were adopted from State of Florida water quality standards that are applicable to secondary contact. More stringent criteria that are used to protect human health in situations where direct intake of water may occur, or where fish may be ingested are not considered to be relevant at this location.

State of Florida regulations define water quality criteria for five classes of water use:

- Potable water supplies;
- Shellfish propagation or harvesting;
- Recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife;
- Agricultural water supplies; and
- Navigation, utility and industrial use.

Potable water supplies have the highest standards of all water use categories as any toxics or carcinogens are in this case directly ingested by humans. Shellfish are capable of concentrating metals and other toxic compounds and therefore require relatively high levels of protection. The third water use involves both recreational uses and the maintenance of a healthy population of fish and wildlife. This is the water use classification most relevant to the proposed lagoons, with respect to bacteriological, nutrient, oils and dissolved oxygen water quality criteria. Some regulated compounds pose human risk only through the indirection ingestion of fish; chronic and significant inhalation or dermal exposure; or chronic direct ingestion. These compounds include both metals and organic compounds. For these compounds the navigational water quality standards from the Florida water quality regulations are considered to be of greatest relevance.

Loadings of either inorganic nitrogen or phosphorus in a closed water body may accelerate the growth of both algae and fixed plants. If the nutrient loading is at a sufficient rate relative to the rate of egress through deposition or natural removal this may lead to excessive plant growth, depletion of oxygen in the water body and the production of noxious gases. Plant growth depends on adequate concentrations of both nitrogen and phosphorus. When a system is deficient in one nutrient relative to the other, the deficient compound becomes growth-limiting, such that relatively small additions of the growth-limiting nutrient may significantly impact the rate of plant growth. Phosphorus is typically the growth-limiting nutrient in fresh water bodies, while nitrogen is typically the growth-limiting compound in sea water. Control of nutrients is of fundamental importance to water quality; however Florida water quality standards do not directly control the level of nutrient concentrations, except to say that the nutrient concentrations shall not be elevated to a level that may the cause the violation of other standards.

B. Water Balance

The lagoon water balance components are evaporation, precipitation, inflow from the ground-water wells and lagoon withdrawals. Over the long run, the rate of withdrawal is a direct function of the inflow and the rates of evaporation and precipitation. Stormwater runoff is not included in the water balance because the stormwater management

plan calls for runoff to be conveyed away from the lagoon. Discharges to or input from ground water are also excluded from the water balance due to the potential lagoon lining.

Monthly rainfall at the Nassau Airport was obtained from the U.S. National Oceanic and Atmospheric Administration for the period 1987 through 2003. Elevated rainfall, ranging between 4.6 mm per day (0.18 inches per day) and 7.3 mm per day (0.29 inches per day), occur between June and October. Significantly drier conditions occur over the remainder of the year, with precipitation on the order of 2 mm per day. The annual average precipitation is 3.7 mm per day (0.14 inches per day). The volumetric rate of precipitation to the lagoon is found by multiplying the length per time rate by the total lagoon area of 73,000 square meters (785,000 sf). This results in an annual average precipitation inflow of 270 cubic meters per day.

Pan evaporation rates were obtained from the The Bahamas Department of Meteorology for the years 1992 through 2005. These rates were adjusted using a coefficient of 0.7 per ASCE (1996) to obtain estimates of surface water evaporation rates. The estimated rate of evaporation exceeds the rate of precipitation in every month except June and August, with the greatest deficits in precipitation occurring from December through May. The average evaporation rate over this period is 6.0 mm per day (0.24 inch per day). This is equivalent to an annual average evaporation outflow from the lagoon surface of 438 cubic meters per day.

The steady state concentration of conservative constituents can be calculated as a function of the inflow concentration and the components of the water balance as:

$$C = C_{in}\left(\frac{Q_{in}}{Q_{in} - E + P}\right) \quad (1)$$

C_{in} - pumped-water inflow concentration
Q_{in} - rate of pumped-water inflow (m^3/day)
E - rate of evaporation outflow (m^3/day)
P - rate of rainfall inflow (m^3/day)

High rates of evaporation may cause conservative constituents to increase in concentration relative to their concentration in the ground-water source. If for example the inflow were 1000 cubic meters per day (0.012 cubic meters per second), the long term-average lagoon concentration of a conservative constituent would be 20 percent higher than its concentration in the ground-water inflow stream.

The selected water quality criteria specify that the chloride concentrations shall not be more than 10 percent greater than normal background. Figure 27 shows the ratio of the lagoon concentration to

the inflow concentration for varying rates of inflow based on both the annual average precipitation/evaporation and the average April precipitation/evaporation rates. Taking the source concentration as normal background and using the steady state increase in concentration implied by equation (1), the annual average inflow should be at least 1,850 cubic meters per day (65,300 cubic ft per day). The greatest monthly average deficit of rainfall relative to evaporation is 5.2 mm per day (0.20 inches per day) in the month of April. Based on the April precipitation and evaporation rates and the steady state solution, compliance with the 10 percent increase in chloride would require an average inflow of 4,200 cubic meters per day (148,000 cubic ft per day).

Equation (1) above is a steady state result that is achieved after a prolonged period with constant flow and climate conditions. In natural conditions, where the climate is both seasonally variable and variable from day-to-day, the steady-state result is never completely achieved. The theoretical time required to reach this steady condition in response to a change in climatic conditions is a function of the average retention time evaluated as the total volume divided by the rate of inflow. Following a change in the climatic conditions the system will theoretically reach 96 percent of the way to equilibrium concentration after a duration equal to twice this characteristic time. Figure 28 shows the lagoon retention time as a function of ground-water inflow.

For an average lagoon depth of 1.8 meters (6 ft) and a design inflow of 1,850 cubic meters per day (65,300 cubic ft per day), the average retention time would be 72 days.

C. Evaluating the Impact of Nutrient Loading

A screening assessment was used for analysis of the potential impacts of nutrients based on a steady state, box-model approach. The approach is an application of the screening model developed by the United Kingdom Comprehensive Studies Task Team of Group Coordinating Sea Disposal Monitoring (CSTT) for analysis of estuaries as described by Tett *et al.* (2003). The model does not address details of the lagoon hydraulics that might result in a nonuniform distribution of concentrations within the lagoon. More detailed analysis of hydraulics and nutrient cycles may be necessary as part of the detailed lagoon design.

One of the salient features of the original CSTT model is the elevation of nutrient concentrations that can occur due to the simultaneous loading of nutrients from upstream sources and limited tidal exchanges with the marine environment. In the case of the Baha Mar lagoons, no tidal exchanges are anticipated with the marine environment if the canals and lakes are lined. The model has been modified to exclude tidal exchanges.

The CSTT model approach is carried out in three steps. First, the equilibrium lagoon concentration of each nutrient is calculated for the fully mixed condition with no phytoplankton growth. In the second step, the worst case outcome is considered, whereby all of the limiting nutrient is assumed to be converted to phytoplankton. This phytoplankton mass is expressed as a chlorophyll a concentration that can be compared to empirical relations between the concentration of chlorophyll a and the eutrophic state of estuaries. In the third step, growth rates are estimated as a function of the quantity of available light and compared to estimates of losses by sedimentation, grazing and water discharge from the lagoon. Growth to loss ratios in excess of one are indicative of a condition where phytoplankton concentrations determined in the second step are considered to be physically plausible. Eutrophic conditions are considered to be likely if:

- the estimated maximum possible phytoplankton chlorophyll calculated in step 2 exceeds some recognized physical or regulatory standard and
- the light-limited rate of growth exceeds the rate of phytoplankton loss due to sedimentation and other effects.

As noted in USEPA (2003), the concentration of chlorophyll a is an indicator of both the photosynthetic potential and the phytoplankton biomass. Moreover they cite research findings that show that water clarity and low dissolved oxygen conditions are associated with excess phytoplankton indicated by elevated concentrations of chlorophyll a. The CSTT regulatory standard for chlorophyll in estuaries is 10 milligrams per cubic meter. The USEPA (2003) summarize investigations of the relation between eutrophic conditions and chlorophyll a. These results are consistent with eutrophic conditions in saline water bodies at lower chlorophyll a concentrations than in fresh water bodies. The State of Florida have adopted regulations (Florida, 2002 - 62-303.353) that use a breakpoint of 11 milligrams per cubic meter for estuaries for inclusion on the state's list of impaired surface waters. For planning purposes, it is recommended that the value of 10 milligrams per cubic meter chlorophyll a be used as a water quality objective for the lagoons.

Water will be derived from near-shore ground-water wells. The nutrient concentrations are not likely to deviate significantly from their concentration in the ocean. The concentration of nutrients is locale dependent, correlated with the presence of wastewater treatment plant outfalls, septic tanks, or other nutrient sources and the extent of mixing driven by oceanic currents.

Tett *et al*. (2003) present nitrogen and phosphorus concentrations at six locations offshore of various points of Europe. The measured

nitrogen concentration varies between 0.02 and 2.5 millimoles per cubic meter and averages 0.54 millimoles per cubic meter. The measured phosphorus concentration varies between 0.02 and 0.5 millimoles per cubic meter and averages 0.13 millimoles per cubic meter. This range of nutrient concentrations from the literature served as the basis for the modeling evaluation of the range of possible nutrient concentrations in the lagoon source water.

The loss rate due to sedimentation and grazing is assumed to be 0.1 per day. This is a highly uncertain value and may be impacted by the algae species distribution and lagoon hydraulics that are beyond the scope of this investigation. Bowie *et al.* (1985) for instance report literature values for settling velocities that vary over several orders of magnitude.

The screening model was evaluated for precipitation and evaporation rates reflecting the April, August and annual averages. Ground-water inflow rates of 1850 and 4200 cubic meters per day (65,300 and 148,000 cubic ft per day) were tested under each of the precipitation / evaporation scenarios. In each case, the nitrogen concentration in rainfall is assumed to be 14 mmoles per cubic meter based on total nitrogen measurements taken of rainfall collected in the Everglades National Park in Florida (Illinois State Water Survey, 2006). Under the low flow scenario, the nitrogen loading by rainfall is approximately 60 percent higher than the nitrogen loading from the input water.

Varied input parameters for each scenario and a summary of results are shown in Table 32. Figure 29 shows the results of the six scenarios relative to the phytoplankton growth rate and maximum phytoplankton concentration criteria. For all scenarios the calculated phytoplankton growth rate exceeded the estimated rate of loss due to discharge, sedimentation and other losses. The high growth rate is principally due to the relatively shallow lagoon depth and the intense sunshine at these latitudes.

Given the large volume of water contained in the lagoon (133,000 cubic meters) it is impractical to attain discharge rates sufficient to significantly impact the growth – loss rate ratio. None of the scenarios resulted in chlorophyll a concentration in excess of the 10 milligrams per cubic meter value. The highest chlorophyll a concentrations were achieved for scenarios 1 and 5. Both of these scenarios are for the high nutrient inflow concentration, low water flow and high precipitation conditions. The results of the analysis show that the water in the lagoons can be expected to be of good quality due to the low chlorophyll a levels.

In February 2006, Baha Mar Ltd collected samples of an existing RO intake well located at the Wyndham Resort Hotel.

Phosphorus and inorganic nitrogen concentrations at water supply well RO-1 have been received subsequent to the completion of the screening model calculations. The reported concentrations are:

Nitrite Nitrogen:	0.019 mg/L
Nitrate Nitrogen:	0.01 mg/L
Total Phosphorus:	0.019 mg/L

The reported phosphorus and nitrite concentrations are less than the laboratory practical quantitation limit. Nitrate was not detected. The reported value is in fact the detection limit. Using the reported values, the inorganic nitrogen concentration is 2.1 mMoles per cubic meter and phosphorus concentration is 0.61 mMoles per cubic meter. These values are close to the modeled values estimates of 2.5 mMoles per cubic meter inorganic nitrogen and 0.50 mMoles per cubic meter phosphorus. The model was rerun with the new values. The revised results show that the Lagoon system is still nitrogen controlled, with a slight reduction noted in the maximum chlorophyll a concentration. In order to maintain optimal water quality, Baha Mar Ltd has developed a strategy for canal and lagoon water management that is discussed further in Section 9.1.

6.3.3.2 Man-made ponds Water Quality

As described in Section 4.1.8, manmade aquatic ecosystems (open water areas) in the project area consist of the golf course ponds located at the project site. Based on observed water turbidity, coloration, as well as the abundance of *Typha* (U.S. EPA., 2002), all of the ponds on the golf course appear to be receiving some level of nutrient input.

All of the existing ponds will be redesigned and relocated as part of the new 18-hole signature golf course which is being designed by Jack Nicklaus and his design company, Nicklaus Design. This new course will form the southern perimeter of the resort, running along the relocated West Bay Street as shown on Figure 6.

The principal mechanism planned for improving and maintaining water quality within the manmade freshwater lakes and ponds of this project is aeration. Aeration systems inject oxygen into the water column to speed organic decomposition, tie up nutrients, and delay the lake aging process. Increased oxygen levels in the water column improve water quality, water clarity, and overall aesthetics. Aeration reduces or eliminates summer stratification by breaking up thermal layers and increases dissolved oxygen concentrations during winter. Phosphorus availability is reduced under these conditions, due to phosphorus inactivation and precipitating to the lake sediments. Oxygen injection allows ammonia to be rapidly denitrified, thereby limiting concentration of toxic unionized ammonia. Aerated lakes and ponds have improved water quality and clarity. The oxygen rich water

provides greater year-round habitat for aquatic life, and decreases nutrients available to algae and undesirable aquatic weeds, prolonging the life of any pond or lake.

As described in Section 1.6.2.5 , the golf course will include two different types of ponds: a lined irrigation pond sourced by treated wastewater and stormwater blended; and stormwater ponds.

The irrigation pond will serve as the source of the golf course and resort landscaping irrigation water. This pond will provide irrigation water for the greens and tees on the course, the ornamental landscaping and landscaping between the fairways on the course, and the landscaped areas within the resort core. This pond will be located in the south central portion of the golf course, west of the extended Gladstone Road corridor (see Section 1.6.2.5). The irrigation pond will be lined to isolate it from the underlying groundwater, and allow for the mixing and storage of treated wastewater. The irrigation pond will receive input from the wastewater treatment plant and rainfall in order to provide the estimated 750,000 gallons per day of fresh irrigation water required. The irrigation storage lake on the golf course will be designed to hold approximately nine million gallons of rainwater and treated sewage effluent. This equates to approximately 3.5 surface acres. This water will be used for irrigation of both the golf course and the resort landscaped areas. Utilization of this recycling approach will reduce the demands on freshwater sources (either RO systems, the WSC system, or freshwater wells) for fresh irrigation water and will significantly reduce the quantity of wastewater being discharged into the ground. This wastewater management system will also maintain improved water quality at the natural water surface water features adjacent to the golf course by ensuring that no wastewater or collected stormwater enter the Hobby Horse Pond and its associated wetlands either by surface runoff or by being discharged to the shallow water table.

Stormwater golf course ponds will be located in the eastern and central portion of the course (see Section 1.6.2.5). These ponds will be dug ponds and the source of the water for these ponds will be groundwater and rainfall, as is the case today. Fresh water ponds used for storm water detention will be unlined and provide recharge to the underlying aquifer.

As discussed in Section 1.6 and above, stormwater from the resort core will be collected from paved areas, building roofs and some landscape areas. Stormwater in the hardscape and greenspace areas will be collected by means of swales, curb and gutter inlets, trench drains, and area drains and then conveyed to drainage wells or stormwater treatment ponds on the golf course, as shown on Figure 9. Building roof collection systems will also be tied directly to the stormwater collection system.

Hobby Horse Pond and Lake Cunningham

Two large natural surface water bodies are located within or adjacent to the project site. The surface water body within the project boundaries is located

south of the existing Total Energy Plant and is referred to in this document as Hobby Horse Pond. This pond is believed to be the remnant of a tidal water body once connected to the ocean at a location west of Delaporte Point. The pond has a surface area of approximately 10 acres and is bordered by developed lands with a fringe of wetland along its banks. Water quality samples of the pond and its sediments were obtained in February 2006 and the results presented in Table 33.

The results of this sampling show that the existing pond is brackish with a chloride level of 2,400 mg/L.

Lake Cunningham is located at the southern limits of the project area, west of the proposed Gladstone Road extension and south of the new Jack Nicklaus golf course. Lake Cunningham is approximately 300 acres in size. Water quality sampling conducted by Baha Mar Ltd in September 2005 indicated that the Chloride content was 3,400 mg/L and the total dissolved solids was 7,400 mg/L. Chloride concentrations and water surface levels in Lake Cunningham were also monitored by the WSC during the period of May 1975 to May 1978. Water levels fluctuated approximately 1 ft during this period. Monitored chloride levels during this period ranged from approximately 6,000 mg/L to 11,000 mg/L with a mean of approximately 8,000 mg/L (Cantt 2006). This data indicates that the water in the lake is tidally influenced and brackish.

Project construction will result in some negative temporary and permanent impact to Hobby Horse Pond. Areas on all sides of the pond will undergo clearing and grading for the construction of the new Jack Nicklaus Golf Course facilities and construction of relocated West Bay Street. A natural buffer will be maintained along the lake edge with the exception of removal of invasive species and hand clearing of underbrush. Use of erosion and sedimentation controls as described above will minimize the amount of soil or sediment laden stormwater runoff entering the pond. Vegetated wetlands areas bordering the pond will be replaced by vegetated golf course fairways and non fairway areas. Positive impacts to the pond will include the removal of the existing waste brine flow from the Nassau Beach Hotel RO facility and the elimination of the occasional overflows and bypasses from Nassau Beach Hotel wastewater treatment plant malfunctions. Potential water quality impacts from golf course operations will be minimized through the use of the Integrated Pest Management Plan included in Appendix.

Lake Cunningham will experience no temporary or permanent impacts from project construction. The extension of Gladstone Road north to West Bay Street will not have any direct impact on the Lake. Erosion and sedimentation control practices will prevent soil or sediment laden stormwater from entering the Lake during the construction period. The roadway drainage system has been designed to divert stormwater runoff either into infiltration basins or to the east side of the road where the drainage will not enter Lake Cunningham. An undeveloped buffer will be maintained along the southern portion of the

golf course to avoid construction or operational runoff from impacting the Lake or its bordering wetland area.

6.3.3.3 Ephemeral Pond at the Gladstone Road Parcel

Baha Mar Ltd had originally proposed to construct a Stormwater Pond at the Gladstone Road CSF site. The construction of a Stormwater Pond at the CSF site would have reduced the Ephemeral Pond Wetland by approximately 12.35 acres. Based on a review of biological data and the presence of an Ephemeral Pond Wetland and Red Mangrove Shrubland Wetland, Baha Mar Ltd has determined that the elimination of the stormwater retention pond would be the most beneficial alternative to the natural environment. As such, stormwater runoff from the CSF will be collected through a series of drop inlets and underground piping and injected into the ground.

6.3.3.4 Impacts to Existing Surface Waterbodies

The proposed project will not include any direct discharges to surface waterbodies. Impacts to surface waterbodies during the construction period from erosion will be prevented through the use of erosion and sedimentation control measures as discussed above. The proposed project will eliminate the following existing discharges to surface waterbodies:

- The Wyndham Resort RO/Chiller brine discharge to Goodman's Bay
- The Wyndham Resort rooftop rainwater discharge to Goodman's Bay
- The Total Energy Plant RO brine to discharge to the Hobby Horse Pond
- Sporadic overland wastewater discharges from malfunctions at the Nassau Beach and Breezes wastewater treatment plants to surface water.

In summary, the proposed action will not include any discharges to surface water bodies and will eliminate existing discharges, thus resulting in an improvement to surface water quality.

6.3.4 Groundwater

Baha Mar Ltd intends to contract with the WSC for potable and wastewater treatment for the entire project. This will result in the elimination of a number of existing discharges to groundwater aquifers. Discharges to groundwater from the proposed project will involve the construction of roadway stormwater disposal wells and wells disposing of salt water from the lagoon system. Stormwater injection wells will be used on an interim basis collect rainwater from project rooftops, roadways, and other hard surfaces and inject the stormwater through wells cased to 70 ft and extended to a depth of approximately 150 ft to avoid discharging to Goodman's Bay and surface waterbodies. Once the full project stormwater collection system is in place, these wells will be decommissioned. Saltwater waste flows from the lake and canal system will be disposed by injection wells extended to a depth of 600 ft into the salt water aquifer beneath the freshwater lens.

Construction of the project will result in the removal of a number of existing stormwater, salt water, and wastewater discharge wells. Many of these wells were constructed prior to current standards regarding well casing and depths, and the level of wastewater treatment provided by the existing wastewater treatment plants is not as high as the proposed facility. Therefore the replacement of the existing system of disposal wells by the new system designed in accordance with WSC requirements will result improve the quality of the aquifers beneath the project site. Also, the project will result in the elimination of the current septic system wastewater discharges to the surface aquifer by the commercial buildings along West Bay Street.

To protect the quality and use of surface and groundwater in the Project area, Baha Mar commits to the following:

- Baha Mar will install impervious lining beneath any irrigation pond, canal or show lake it constructs to prevent impacts to the freshwater lens beneath the project site. Stormwater retention ponds will be unlined for use in flood control and to recharge the aquifer.

- As per the Bahamas Investment Authority letter dated November 30, 2010 approving this Environmental Impact Assessment, Baha Mar Ltd. will prepare and submit to the Ministry of Works and Transport and the Ministry of Environment a drainage/stormwater management plan for the Central Services (Back-of-House) facility on Gladstone Road that is designed to minimize site runoff.

6.4 Air Quality

As discussed in Section 3.5 the project will result in the decommissioning of several, individual emergency generators, four boilers, and the four oil-fired engines that run continuously at the Total Energy Plant (TEP). The project will replace some of these units with one centrally located emergency generation station that include eight 3000 KW diesel-fired generators for a total resort generation capacity of 2800 KW.

The decommissioning of the Nassau Beach Hotel Total Energy Plant will remove the emissions associated with the four oil-fired generators at that facility. This will eliminate the constant emissions from the TEP in the vicinity of West Bay Street.

The Sheraton and Wyndham properties have been receiving primary power from BEC with standby power being provided by backup generators. Based on records of backup generator use over the past three years, it is estimated that the existing emergency generators need to be operated approximately one percent of the year. It is assumed that the new facilities will be required to operate approximately that same amount of time on an annual basis. The construction of the project will involve installation of updated generators which operate more efficiently than a series of smaller, dispersed generators. Future project operations that will result in air emissions include oil-fired boilers at the Central Laundry Facility and at the Central Utility Plant. In addition, back-up electrical generators at the Sheraton, the Wyndham, the CSF, and at the Skyline Substation will operate when primary power is interrupted. All these facilities will use diesel fuel. To minimize potential air emissions from these facilities,

Baha Mar Ltd intends to use a distillate fuel oil with a sulfur content of .05% or less to the extent that is available.

An Air Quality Impact Analysis was conducted to assess the net impact to air quality resulting from the project. There are no current air quality standards or impact analysis guidelines in the Bahamas for assessing the air quality impact of proposed emission sources. Therefore, dispersion modeling was performed using US EPA modeling guidelines applicable to new major sources to demonstrate compliance with AAQS, as shown on Table 34. Maximum combined impacts from all modeled Baha Mar sources are compared to AAQS. Based on the results of this air quality impact analysis, all criteria pollutant emissions from the proposed Baha Mar facilities, when added to conservatively estimated background concentrations due to other potentially interacting sources, will not cause an exceedance of any applicable AAQS. A copy of the Air Quality Impact Analysis is provided in Appendix and summarized in Table 35.

6.4.1 Air Emissions from Construction

The use of equipment to construct the Project will result in temporary, short-term emissions of certain air pollutants. These emissions will be restricted to the construction period for the Project, will vary depending on the types of work being conducted at any given time, and will not be concentrated within any particular location. The project will utilize state-of-the-art engineering design and construction procedures to minimize air emissions during the construction phase. The principal sources of emissions will be combustion emissions from stationary and mobile equipment powered by diesel internal combustion engines. Fugitive dust emissions may also occur from earthwork, movement of construction vehicles and wind erosion of exposed soil on the site. These emissions will not result in significant adverse impacts to the air quality within the vicinity of the project area. Due to the variable and temporary nature of air pollutant emissions from construction activities associated with this type of project, a quantitative air quality impact analysis of construction emissions is not typically performed and has not been performed for this Project.

As discussed in Section 1.8, the major construction activities include:

- Refurbishment of Existing Structures;
- Demolition of Existing Buildings and Structures;
- Site preparation, including filling, grading, and excavation;
- Roadway construction;
- Ground Improvements, Foundation Construction, concrete pouring;
- Installation of utilities and other infrastructure components;
- Construction of the Central Services Facility;
- Building construction; and
- Finishing and cleanup.

6.4.1.1 Stationary and Mobile Source Air Quality Impacts During Construction Phase

Stationary source diesel engines used throughout the construction period include portable electricity generators, pumps, compressors, etc. Diesel engines will also be used to power mobile construction equipment and

delivery vehicles. Diesel engine-powered mobile construction equipment will include cranes, dozers, backhoes, graders, etc.

Use of stationary diesel engine-powered equipment, such as generators, pumps and compressors will vary throughout the construction phase, will be intermittent and will cease at the conclusion of construction activities. These sources will generally be small (less than 1 MW or 1600 hp) portable units that are moved as necessary.

Portable and mobile source diesel engines will emit criteria pollutant emissions (NO_x, SO_2, CO, VOC, PM_{10} and Pb). However, ambient air quality impacts are expected to be minimal for several reasons. Heavy construction activity during the site preparation phase will occur during a short period, conservatively estimated to be 42 months of the 52-month total construction period. The construction contracts will also require that construction equipment used on-site be well maintained, which will result in efficient fuel combustion and minimize criteria pollutant emissions. While the total construction period for the Project will be approximately 52 months, the period during which air pollutant emissions will occur within any particular location within the project area will be substantially less than the total construction period.

6.4.1.2 Fugitive Dust Emissions

Fugitive dust emissions during construction will result from earthwork (excavation, grading, landscaping, etc.), movement of vehicles on-site, roadways and wind erosion. During demolition and construction, the Contractor shall implement measures to minimize the generation of fugitive dust at the site. The Contractor shall implement measures to identify potential sources of dust and establish criteria to control these sources. Mitigation measures to minimize emissions of airborne particulate will be implemented, as necessary, including the use of water or other wetting agents on areas of exposed soils and completing final grading and landscaping of exposed areas as soon as possible. These measures shall include procedures for monitoring sources during demolition and construction, how the results of monitoring will be documented, the frequency of monitoring and action to be taken to reduce or eliminate dust sources.

Air emissions resulting from construction operations will be temporary in nature, and will be controlled to the maximum extent practicable as described in Section 6.4.1. In addition, Baha Mar will require that all contractors prepare and submit fugitive dust suppression and monitoring procedures as part of their contract-specific Environmental Management Plans.

Baha Mar is committed to reducing its emissions of air pollutants, and in particular, carbon dioxide, to fullest extent possible. In addition to the measures outlined above, Baha Mar will undertake additional measures to reduce its direct and indirect emissions of CO2. Baha Mar will use the lowest sulfur content distillate fuel that is reasonably available, will investigate the use of a seawater district cooling system to reduce electricity use for air conditioning, and will

consider the use of solar hot water heaters for the laundry facility to be located at the Central Services Facility.

6.5 Noise

During construction and operation of the proposed facilities there will be noise generated by the operation of various types of equipment and machinery. A description of noise impacts for construction and operation is provided below.

6.5.1 Construction Phase Noise Impacts

Construction noise of the Baha Mar Resort Project was analyzed in the report provided in Appendix. The levels and character of the sounds from individual construction segments such as grading, excavation, steel erection, etc will vary by area and by time period. As it is not possible to predict or represent every combination of activity and equipment that could be present at the site during the project snapshots of construction activity were made at six month intervals. For each interval, the types and numbers of equipment that will be needed for that construction period were identified. The activities were assumed to be in operation for the entire six month period. This may be true of some sources of noise, like dewatering pumps, but is a very conservative assumption for other noise sources like bulldozers and excavators, which will be used for a time and then moved to another resort location.

Core Project Construction Noise Impacts

The early phases of the project will include renovation of the existing hotel areas as well as demolition activities. Therefore, much of the most intense activity is north of West Bay Street. At the same time, early site work will be conducted in the area of the existing roadway and the future alignment of the roadway. Construction will continue to move around the site from phase to phase. The middle phases will include bridges, tunnels and roadway work. Later stages will focus more on the pedestal than on outlying areas. Generally, hard and soft landscaping will also take place late in the schedule. The changes to the sound field are shown graphically in the figures included in Appendix. The resulting sound levels at discrete receptors are summarized in Table 36.

The noise study concludes that, based on a conservative methodology, that construction noise levels in areas immediately adjacent to the Core Area construction site will noticeable, but will be limited to short periods of time over the period of construction. The noise levels experienced will be similar to those typically experienced in an area near a major construction site, but given the short term nature of the construction period, these impacts would not be considered to be a major impact. Baha Mar Ltd will undertake a number of construction noise management measures to both protect its guests as well as neighbors from excess noise.
Baha Mar will use the following measures to reduce noise impacts.

- Construction activities will be limited to daylight hours – generally 7 AM to 7 PM.
- Construction contractors will be required to maintain mufflers and other noise control devices.

- Baha Mar's construction managers will consult with the community prior to any extended work outside these established hours such as when extended concrete pours are necessary.
- Baha Mar does not anticipate any need for blasting, pile driving, or other impact-type noise sources.

Gladstone Road CSF Construction Noise Impacts

Construction of the CSF will use similar methods and equipment as the Core Project area. In the same way that sound levels were estimated at the community locations nearest the Core Project area, the CSF construction noise was estimated at the community locations nearest the CSF site. The levels are shown in the CADNA graphics included in the Appendix.

The adjacent land uses surrounding the CSF are also commercial and industrial in character as shown in Figure 20. The nearest residences to the CSF project are to the west beyond the roadway and commercial area.

The modeling indicates that the CSF construction activities will usually remain unnoticed at the nearby residential locations. This is based on a common acoustical rule of thumb that any sound that produces an increase of 3 dB or less is not noticed in a typical community. The heavy traffic on Gladstone Road will continue to dominate the sound field. Baha Mar Ltd will restrict construction activities to daylight hours, generally 7 AM to 7 PM. The CSF construction is expected to be completed in late in 2013.

During construction Baha Mar Ltd. will restrict construction activities at both the Resort and the Central Services Facility to the period between 7 AM and 7 PM to minimize noise exposure to the community and to resort guests. Each construction contractor's Environmental Management Plan will be required to contain measures to limit noise from equipment through the use of appropriate mufflers, shielding, and other methods.

6.5.2 Operation Phase Noise Impacts

Operational noise sources will include general resort activities including HVAC equipment, music, leaf blowers, mowers, and other typical maintenance activities. Future noise levels associated with these types of activities will be similar to those occurring today with the current operations. The resulting noise from these activities is largely restricted to areas within the resort, and it is not anticipated that nearby sensitive receptors, primarily the residential area west of the resort, will experience any increase in noise from the resort expansion.

The project will result in the decommissioning of several individual emergency generators, four boilers, and the four oil-fired engines that run continuously at the Total Energy Plant. The newly constructed backup generation facilities will be installed within enclosures designed to minimize noise and will have silencers and mufflers on air intakes and outlets.

The changes in sound levels resulting from the future operation of the resort was analyzed in the Noise Impact Study provided in Appendix. The analysis provides an estimate of the noise that is expected during normal operation of the proposed facility, both during the daytime and the nighttime. The major continuous noise sources at the facility evaluated are as follows:

- Heating, Ventilation, and Cooling Equipment (HVAC)
- Electrical Transformers
- Emergency Diesel Generators
- Background Noise Sources (unrelated to Baha Mar Resort)

An analysis of the combined noise from the component equipment was conducted by modeling the noise contribution of each of the major sources at each of the locations identified in Section 4.1 of the Noise Impact Analysis provided in Appendix. The analysis is based on the noise sources associated with continuous operation of the facility. Special conditions such as start-up, shut-down or maintenance of the facility may require equipment or activities that are not addressed in the analysis, but are expected to be minor compared to the major continuous noise sources identified above. The resulting sound levels at the neighboring sensitive were then compared to World Bank Guidelines, which are provided as Table 37. Both day time and night time levels were evaluated.

Overall, the operating facility sound levels will be similar to the existing levels. Significant existing sources such as the Total Energy Plant and Sheraton Laundry will be removed, which will significantly reduce the sound levels at some community locations. The public roadway West Bay Street, the single most significant source of existing community noise, will remain the greatest source of future community noise.

The compliance evaluation was made using the World Bank Standards. As shown in Table 38 and Table 39, future day time and night time sound levels will comply with the World Bank Guidelines at all locations. In addition, any changes in sound levels will be 3 decibels (measured on the A scale) dBA or less, and will not be noticeable. No mitigation is necessary as this level of increase should not be noticeable. The noise levels from the operations of the Central Services Facility also comply with the World Bank guidelines. The area surrounding the CSF is undergoing additional commercial and light industrial development and mitigation for this facility is not warranted.

6.6 Solid and Hazardous Waste

During construction and operation of the proposed facilities, petroleum products and chemicals will be required. All hazardous (ignitable, reactive, flammable, corrosive, and toxic) materials will be stored in clearly labeled containers or vessels. All storage locations will be equipped with secondary containment and fire prevention and extinguishment systems in accordance with good engineering practices. A description of chemical management strategies for construction and operation is described below.

6.6.1 Construction

During construction of the proposed facilities petroleum products and chemicals will be utilized to support the operation of heavy equipment, electrical generating equipment and the construction process. A materials inventory listing the approximate types and quantities of petroleum and chemical materials to be stored at the facility will be developed following final design and selection of contractors. Generally, petroleum and chemical uses will include the following:

- Aboveground oil storage
  - Aboveground diesel fuel oil storage tanks associated with portable electrical generators and pumps;
- Fuel Oil Transport
  - Fuel oil delivery by tanker trucks to the various construction work sites on the site;
- Chemical storage
  - Paints and coating materials;
  - Cleaners;
  - Water treatment chemicals;
  - welding and welding inspection chemicals and compressed gases;
- Lube and hydraulic oil storage systems
  - Drummed storage of oils and greases to support heavy equipment maintenance; and
  - Small containers of lubricants and oils used for on-site equipment.

Solid and chemical materials and waste management practices are described below in Section 6.7. Additional details on petroleum and chemical management practices, and spill control, response and pollution prevention programs are presented in the Requirements for the Contractor's, Spill Prevention, Control and Countermeasures Plan, contained in the Appendix.

6.6.1.1 Decommissioning and Disposition of Construction Materials

Each construction contractor selected for the project will prepare a written plan detailing how construction related equipment, materials and wastes will be decommissioned and disposed of at the completion of their work, as required. The decommissioning and disposal plan will be reviewed by Baha Mar Ltd prior to mobilization of the contractor to the site, and Baha Mar Ltd will maintain ultimate responsibility for the proper management of equipment, materials and wastes within the project area.

Prior to demobilization, the contractor will prepare a detailed list of all remaining equipment, unused materials, and wastes transported to the project area or generated as a result of work they performed. The equipment, unused materials and waste list will contain a description of the following:

- How each piece of equipment will be prepared for off-site shipment and the type and quantity of waste materials that will be generated during the equipment demobilization effort;

- The quantities and types of all unused materials, and the planned disposition of those materials; and
- The types, quantities and disposal plan for all wastes generated by the contractor which still remain within the project area.

The equipment, unused materials and waste list will be submitted to the Baha Mar Ltd Environmental Inspector prior to demobilization of the contractor to ensure that all equipment, unused materials and wastes are managed and disposed off in accordance with good practices, applicable regulatory requirements, and the procedures described below in Section 6.7.

6.6.2 Operation

The following is an overview of the activities involving petroleum and chemical materials on site during operation of the Baha Mar Resort Project. A materials inventory listing the approximate types and quantities of petroleum and chemical materials to be stored at the facility will be developed as described in the Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan, included in Appendix. A list of the materials expected to be on site during operations is presented below:

- Aboveground oil storage
  - AST's for supplying boilers at the laundry and Central Utility Plant;
  - LP Containers for back –up fuel storage for Boilers at Central Services Facility
  - Oil-filled transformers;
  - Aboveground diesel fuel storage tanks associated with emergency generators at the Standby Electrical Generating Facility;
- Fuel oil transport
  - Fuel oil delivery operations performed by tanker trucks;
  - Oil transfer pumps;
- Chemical storage
  - Water treatment chemicals/additives;
  - Water treatment wastes;
  - Paints, cleaners, oils, automotive fluids stored in the maintenance buildings (small containers, generally less than 209 liters (55 gal.) in size).
- Lube and hydraulic oil storage systems
  - Lubricating oil systems;
  - Small containers of lubricating and oils used for on-site equipment;
  - Hydraulic oil systems;
  - Compressors and oily compressor blow-down;

BML commits to providing DEHS with an accounting of the materials to be stored and used at the Central Service Facility.

The fuel storage tanks for the Central Utility Plant boiler will be located within the building inside a separate vault. Drainage from the exterior and interior tank containment areas will be routed to an oil/water separator. The fuel oil storage tanks

and underground storage tanks will have tank level monitoring systems and overfill alarms installed to prevent overfilling. Automatic shut-off valves will be installed in the fuel oil piping. Spill capture and containment pads will be provided in the fuel unloading and transfer areas as described in the EMP.

Further details of the management of fuel oil and other listed materials associated with the Baha Mar Resort Project are outlined in the Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan (Spill Plan) prepared for this project as discussed in the EMP, which is provided as Appendix.

6.7 Solid and Chemical Waste Management

The following section describes the types and sources of solid and chemical wastes that may be generated during the construction and operational phases of the proposed project facilities. A waste minimization plan for the disposition of spent petroleum and chemical products is included in the EMP.

6.7.1 Construction Related Waste

The construction contractor, under the oversight of Baha Mar Ltd, will be responsible for the proper characterization, collection, storage, and ultimate disposal of all construction-related waste materials, in compliance with The Bahamas Department of Environmental Health Services (DEHS) Solid Waste Regulations and the requirements of the DEHS Director. Baha Mar Ltd's facility personnel will be responsible for proper waste management practices during the operation of the completed project facility in compliance with the DEHS Regulations and the requirements of the DEHS Director.

The types, sources, and management of wastes anticipated to be generated during the construction of the proposed project facilities are as follows:

- Combustible wastes, such as scrap wood, cardboard, paper, and land clearing wastes (trees, brush, etc.) will be generated during the site preparation, construction, and operational phases of the proposed project facilities. These wastes will be collected and disposed of at the New Providence Landfill.
- Bulky construction wastes, such as concrete, clean fill material, scrap metal, glass, and plastics will be generated during construction of the proposed project. Concrete wastes will be crushed, screened and rebar will be separated. The resulting crushed concrete will be reused as part of the construction operations. Other solid wastes will be disposed at the landfill. Clean fill materials and other bulky construction wastes may be reused on-site as fill material or otherwise disposed of at an approved off-site disposal area.
- Special wastes, such as hazardous waste, industrial solvents and other chemical wastes, grease trap pumpings, lead acid storage batteries, and used oil, will be generated during the construction and operational phases of the proposed project. Special wastes could also include items such as waste lubricants, paints, maintenance-related wastes, used air and liquid filtration media, and empty or partially full chemical containers. Special wastes will be segregated from other waste streams, collected and stored in suitable

containers, within secondary containment and periodically transported off-site for disposal at an approved location by an approved waste transporter.

Short-Term Waste Accumulation Areas - Prior to off-site shipment, commercial, industrial, and special wastes will be accumulated in suitable containers that will be temporarily stored at designated storage areas equipped with the following: impervious flooring, roofing or other protection from the weather, and adequate structural means to contain reasonably anticipated potential releases.

Spills and Releases - Accidental releases or spills of waste materials will be controlled, cleaned up, and managed in accordance with the requirements, as described in the EMP, which is provided as Appendix.

6.7.2 Operational Related Waste

Baha Mar Ltd has performed a solid waste management analysis and developing a solid waste management plan for operation of the Baha Mar Project. Major facilities that will produce waste streams at the resort including the following:

- All Podium and commercial village operations including the four branded hotels, restaurants, casinos and retail stores;
- Off Podium Sheraton/Sheraton and Wyndham Resort Hotels including the associated restaurants and retail operations;
- The Central Warehouse and Baha Mar Ltd Common Services;
- The Laundry/Dry Cleaning facility;
- The Fleet maintenance facility; and,
- Baha Mar Ltd Common operations.

The following types of waste that will be generated at these facilities:

- Solid waste – all forms;
- Wet food grade waste;
- Cardboard and paperboard – all types;
- Paper products in general;
- Glass – colored and clear;
- Plastic – all types;
- Cooking oils;
- Fleet maintenance waste products;
- Laundry and dry cleaning waste products; and,
- Landscaping derived wastes.

On a weekly basis, Baha Mar Ltd estimates it will generate 217 compacted cubic yards of solid waste and 73 cubic yards of cardboard waste. This material will be transferred by a commercial waste hauler to the New Providence Landfill operated by the DEHS. Baha Mar Ltd has developed a waste minimization plan, included in Appendix that describes the methods that Baha Mar Ltd will utilize to reduce the amount of waste generated throughout the resort facilities.

6.8 Fire and Hurricane Risks

Baha Mar Ltd has evaluated the risks of fire, hurricanes and emergencies and their potential impact on construction and operation of the proposed project. Baha Mar Ltd has developed the EMP to address the risks associated with non-routine events such as fires, emergencies and hurricanes in the Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan, Emergency Plan, Security Plan and Contractor Health and Safety Plan.

Baha Mar Ltd will upgrade the existing fire control systems and install new stare-of-the art fire control systems in the newly constructed facilities. Additionally as part of the West Bay Street Relocation, Baha Mar Ltd is constructing a new police and fire station that increases its size from approximately 6,000 sf to approximately 10,000 sf. This will provide the Bahamian Police and Fire Departments to provide an increased level of service to the resort as well as the local community.

In addition, Baha Mar Ltd has evaluated the potential for storm surge and wave related flooding impacts to the resort facility. This information is presented in Section 3.1.2.2 . As part of the design process going forward, Baha Mar Ltd has established base elevation of 10 ft to protect the buildings and critical building systems against the effects of flooding caused by storm surges and accompanying wave levels. Baha Mar Ltd will continue to evaluate its design requirements to respond to any new information or guidance provided as the building designs process continues.

7. ANTICIPATED NATURAL ENVIRONMENT IMPACTS

7.1 Terrestrial Ecosystem Impacts

As described in Section 1.6, the Baha Mar Resort Project will involve the development of previously undeveloped areas, which will result in impacts to both upland communities and wetland communities. The majority of the impacts will result from the development of the new 18-hole Jack Nicklaus Signature Golf Course and the Central Services Facility, which are described in Section 1.6.2.2 and Section 1.6.2.3 , respectively.

Development of the proposed project will result in changes in terrestrial ecosystems as shown on Figure 30 and Figure 31. The acreage impacts of these changes are shown in Table 40.

The project will result in an increase of approximately 181 acres of developed or disturbed lands. However, the existing developed and disturbed lands quality will be improved by the removal of exotic/invasive plant species followed by replacement with native species. During the re-development of the man-made lakes, Baha Mar Ltd will implement the measures described in Section 3.4 to improve the water quality of each of those lakes as further described in Section 7.2. As a result the existing ponds which are in a state of eutrophication and support little to no wildlife will be maintained in order to promote wildlife propagation. Baha Mar Ltd will utilize native vegetation throughout the Jack Nicklaus Golf Course to provide a wildlife corridor for a variety of avian and terrestrial species. The original resort development plan would've caused direct impacts to approximately 85 acres of wetland area including approximately 6.1 acres of Ephemeral Pond Wetland, 10.8 acres of Dry Broad-leaved Evergreen Shrubland Wetland, 16 acres of Red Mangrove Forest Wetlands, 15.7 acres of Red Mangrove Shrubland Wetland, and 36.4 acres of Buttonwood-Black Sedge Temporal Marsh Wetland however, the golf course was redesigned to significantly reduce the wetland areas impacted. During construction operations Baha Mar Ltd will attempt to relocate these native plant materials to the maximum extent practicable and re-introduce them on the resort property to maintain a canopy of native vegetation. Removal of direct discharges to Hobby Horse pond will improve the overall water quality of the pond. Additionally, development of the project will result in the removal of approximately 95 acres of Dry Broad-Leaved Evergreen Forest during construction of the resort facilities, all appropriate measures will be taken to preserve as many trees as practicable during the construction of the resort facilities. The impacts associated with the development of each of these areas are further described below.

7.1.1 Resort Core

The re-development of the resort core and relocation of West Bay Street will result in impacts to previously disturbed/developed areas and some Red Mangrove Forest Wetland. The acreages of existing habitat type found within the proposed project core are presented in Table 41. During the construction of the relocated West Bay Street, the fill utilized to elevate the roadway will extend into the Red Mangrove Forest Wetland. The slope of the road embankment will impact approximately 3 acres of Red Mangrove Forest. Baha Mar Ltd will attempt to reduce the impact to the vegetation in the Red Mangrove Forest Wetland along the perimeter of the roadway to the extent conditions allow.

7.1.2 Jack Nicklaus Golf Course

The re-development of the Cable Beach Resorts Golf Course to the Jack Nicklaus Signature Golf Course will result in impacts to previously disturbed/developed areas, man-made ponds, natural open water areas, dry broad green leaved evergreen forest, red mangrove forest wetland, and red mangrove shrubland wetland, as shown in Table 42.

As described in Section 4.3, four protected tree species are found within the DBEF cover type. These include *Ceiba pentandra*, *Guapira discolor*, *Lysiloma sabicu*, and *Swietenia mahagoni*. Baha Mar Ltd will preserve these protected tree species to best of their ability. Development of the proposed golf course will require removal of trees within the Dry Broad-Leaved evergreen forest and red mangrove shrubland wetland cover types. While negative impacts to these tree species will be minimized by surveying and marking trees prior to the development of the golf course, removal will be necessary in some cases.

Baha Mar Ltd will re-vegetate the golf course area utilizing non-invasive tree and shrub species. The golf course fairways and roughs will be vegetated with paspalum grass, a salt tolerate grass specie, while the tee boxes and greens will be vegetated utilizing fresh water turf grass species. The areas surrounding the fairways will be vegetated with non-invasive shrubs and trees.

All invasive species will be removed if within the limits of golf course works.

Baha Mar Ltd plans to utilize stands of existing trees as buffers and barriers to the fairways and edges of the golf course to the maximum extent practicable. The man-made ponds at the golf course which are currently in a state of eutrophication, will be redeveloped and aerated to avoid this condition as the project progresses. Baha Mar Ltd anticipates watering the golf course fairways with approximately 250,000 gallons of brackish water per day from the brackish water irrigation pond and the tees, greens, and other non fairway areas with 750,000 gallons of fresh water ($<$500 mg/L of chlorides) per day from the waste water treatment plant effluent. Using this volume of water is anticipated to maintain conditions for the healthy development of wetland communities throughout the golf course.

As described previously, the brackish water for the fairway irrigation will be maintained at a level of approximately 10,000 mg/L of chloride to maintain the paspalum turfgrass. The brackish irrigation pond that will supply this water will be fed by a combination of shallow wells and rainfall supplemented with canal water to bring the chloride levels up to the target application concentration. The existing golf course ponds and adjacent surface water bodies were sampled and found to have Chloride Levels in the range of 750-2,400 mg/L. The brackish irrigation pond will be monitored on a regular basis in accordance with the Integrated Pest Management Plan for Golf Course Operations, included in Appendix of this document, and canal water will be added as needed to maintain the appropriate levels.

The existing man-made ponds are in a state of eutrophication and do not support extensive wildlife communities. They were originally created for aesthetic purposes during the golf course development. The removal of these ponds will be compensated for by creation of new man-made ponds on the Jack Nicklaus Signature Golf Course.

7.1.3 Central Services Facility

As described in Section 1.6.2.3 , the development of the CSF will require the development of a previously undeveloped area, which will result in impacts to both upland and wetland communities. Baha Mar Ltd has reviewed the baseline terrestrial biological survey and as a result has modified the proposed development for the Gladstone Road CSF site to avoid impacts to natural resources to the maximum extent practicable. However, development of the CSF will result in changes to terrestrial ecosystems as shown on Figure 31. The development of the CSF will change existing ecosystems as shown in Table 43.

When initially evaluated in 2006, the development of the CSF was anticipated to impact approximately 61 acres of undeveloped property as described below. The aerial coverage of the ephemeral pond wetland would be reduced by 12.35 acres. Approximately 36.4 acres of Buttonwood-Black Sedge Temporal Marsh Wetland would be impacted by the development of the CSF as well as 10.75 acres of Dry Broad-leaved Evergreen Wetland. However, the existing disturbed lands quality would be improved by the removal of exotic/invasive plant species, which is currently the predominant vegetative cover in the 7.7 acres of disturbed land. Since the initial evaluation, the area anticipated to be developed has been significantly reduced to approximately 50 acres. Baha Mar Ltd will avoid impacts to the Red Mangrove Shrubland Wetland and has minimized impacts to the Ephemeral Pond Wetland as these two areas appeared to be the most biologically significant, based on the terrestrial survey.

While the proposed CSF will result in the impacts to terrestrial communities described above, the relocation of the CSF site from the Volpi Parcel to the Gladstone Road site will eliminate the impacts originally anticipated at the Volpi Parcel.

In order to provide mitigation for project-related wetland impacts, addition Baha Mar Ltd has committed to establishing a wetland park/reserve on the 71.4-acre Volpi parcel between Atlantic Avenue and Skyline Drive. As provided in the Amended and Restated Heads of Agreement, this parcel will be designated by the Government as a “no build zone”, to be used as a public park for appropriate recreational use. Baha Mar will invest in improving, beautifying, and developing the parcel as a wildlife and wetlands sanctuary. Baha Mar will also establish a trust for perpetual maintenance of this wetlands and wildlife sanctuary.

7.2 Aquatic Impacts

Baha Mar Ltd has attempted to minimize impacts to aquatic systems to the maximum extent practicable through the design of the proposed project. As described above the irrigation measures for the project facilities have been designed to reuse treated wastewater to eliminate the need to rely on RO systems, the WSC or the freshwater lens for irrigation purposes. The use of both freshwater and salt water for irrigation purposes will also minimize impacts from

irrigation water percolation on existing water brackish waterbodies such as Hobby Horse Pond, Lake Cunningham and man-made ponds on the Golf Course. The salinity proposed for use watering the fairways is approximately 3,000-10,000 mg/L chloride while the existing chloride levels in the Hobby Horse pond are 2,400 mg/L and Lake Cunningham are 6,000-11,000 mg/L. The dilution of the brackish water used for irrigation with the freshwater used for irrigation should result in irrigation flows with a concentration similar to the existing chloride levels in Hobby Horse Pond. The man-made ponds on the golf course will likely experience an increase in chloride levels as their current chloride levels range from 750 to 870 mg/L. However these ponds are currently in a eutrophic state as described in Section 6.3.3.2 . The implementation of aeration and oxidation measures should reduce the nitrification of these ponds and there by improve the water quality. These ponds are currently hydrologically isolated and will remain so as the project is constructed. During construction, the existing golf course ponds will be reconfigured and new ones will be established. The ponds have been and will continue to be colonized by salt tolerant species; however, through implementation of the Invasive Species Management Plan included in the EMP, Baha Mar Ltd will eradicate the invasive species and vegetate these areas with native salt tolerate species.

The project area is isolated from Lake Cunningham; therefore no impacts to Lake Cunningham are expected. An Integrated Pest Management Plan will be prepared and implemented at the golf course to minimize or avoid the use of fertilizers, pesticides and herbicides to the extent possible.

As described above, Baha Mar Ltd proposed to remove the Wyndham Resort Hotel Jetty which may cause a temporary increase in sedimentation levels in the vicinity of the removal activity. However the sedimentation will be controlled by implemented the aforementioned sediment control techniques. Following the removal of the Jetty, the historical cross shore transport mechanisms will be restored and the sand along Cable Beach will redistribute itself and stabilize along the beach front area.

7.3 Protected Habitat Impacts

Under The Wild Animals Protection Act 1968 the following species of animals are protected throughout the Commonwealth of the Bahamas. Wild horses in the Island of Abaco, that is to say, any member of the species *Equus Caballus* in that Island in a state of nature, including the young of that species, Agouti or Hutia (*Geocapromys ingrahami*), Iguanas (*Cyclura species*), and Green turtles (*Chelonia mydas*) are protected.

While these species occur in The Bahamas, none of the species are documented within the project area. Green turtles do travel back to their native beaches to nest but the existing beachfront if highly developed and not likely to be a nesting area. Therefore, the Baha Mar development is not thought to negatively impact Green Turtles. Habitat may exist for Bahamian Rock Iguana's within the project area on limestone rock outcrops. However, the proposed development will occur on previously altered land and is not thought to negatively alter any Rock Iguana habitat that does exist.

While the presence of protected plant species within the project limits has been confirmed, no protected habitats exist within the project limits. Four protected tree species were observed within the project limits. These include *Ceiba pentandra*, *Guapira discolor*, *Lysiloma sabicu*, and *Swietenia mahagoni*. The development project will preserve these protected tree species

to best of their ability. Development of the proposed golf courses will require removal of trees within the Dry Broad-Leaved evergreen forest and red mangrove shrubland wetland cover types.

Baha Mar will employ a qualified arborist to survey and mark any protected tree species occurring within the construction area in accordance with its *Protected Tree Species Preservation Plan and Protocol* (included in Appendix H). During the construction process Baha Mar's Environmental Monitor will oversee the protection of the flagged trees.

Where native tree removal is necessary, Baha Mar Ltd will obtain tree removal permits as required. While negative impacts to these tree species will be minimized by surveying and marking trees prior to the development of the golf courses, removal will be necessary in some cases.

The Department of Marine Resources manages five designated marine protected areas, primarily as nurseries to enhance and protect juvenile and breeding fish. These marine protected areas will not be impacted from building and roadway construction activities. The proposed jetty removal will positively impact marine fisheries by restoring the beachfront to its natural state over time.

7.4 Shoreline Impacts

Reviews of the factors affecting the sediment transport regime within Goodman Bay, as described in Section 4.2, indicate that the proposed removal of the jetty/groin in the vicinity of the Wyndham Resort will disturb the existing equilibrium conditions favoring a redistribution of sediments and moderate alteration of the contours of the shoreline, as further described in Appendix, Littoral Evaluation Report. As presently configured the jetty/groin serves to interrupt the longshore movement of sediment. The wave refraction data indicate that this transport is intermittent and not confined to a single direction. Winds from the easterly direction will produce some amount of east to west transport while winds from the west will drive countering west to east displacements of sediment. The combination of fetch and sheltering favors higher energy waves from the northwest resulting in a slight but significant dominance of west to east transport. This is the primary factor governing the evident difference in beach front contours to the east and west of the jetty/groin. It may be supplemented to some extent to the west by mechanical nourishment or regrading of the beach fronting the Sheraton Hotel and to the east by flow enhancement and erosion resulting from the piped discharge of hotel cooling waters. The quantitative extent of these influences is difficult to establish. Only the net result is evident.

The removal of the jetty/groin will initially result in an abrupt and unstable discontinuity in the crescentic form of the shoreline of Goodman Bay. Shoreline contours to the west will stand prominent relative to those to the east. Such prominence will tend to move the angle of approach of incoming waves away from shore normal increasing the alongshore component of flow producing a local increase in longshore transport rates. The resulting transport favors progressive erosion of the feature "smoothing" the contours and bringing them in line with the larger area crescentic form. In short, the process will favor progressive erosion of the beach face to the west of the present jetty/groin. The majority of the eroded sediment will be displaced eastward covering the area in front of the former Nassau Beach Hotel presently exposed as limestone platform and contributing to general beach accretion in this area. This

process will proceed until a new equilibrium condition is established. An estimate of the form of the new equilibrium contour is shown in Figure 39 of Appendix. This equilibrium contour, based on a review of existing conditions and the variety of factors affecting sediment transport in this area, should be essentially identical to the shoreline form observed in 1982 prior to the construction of the Wyndham Resort and the subsequent jetty/groin.

Views of the shoreline within Goodman Bay provide numerous examples of the effect of construction on the recreational beach and in particular the reduction in width or complete removal of beach as the position of the structure moves progressively seaward. This is particularly evident at the far western end of the beach fronting the Sheraton Hotel where structures reach to the intertidal and there is no recreational beach. The presence of sandy shorefront within the voids or alleyways in this wall provides clear indication that the absence of beach is related to the increase in wave associated turbulence and transport caused by wall/wave interactions and not sediment supply.

The construction of the Wyndham Resort tower closest to the waterline reportedly encountered this problem requiring supplemental building of the jetty/groin complex to provide recreational beach and protection of the foundation structures; both of the groins are proposed to be removed as part of the project. These effects can be avoided by placement of hard structures in locations thereby restoring the historical dune line. At present, due to more recent scour effects, this boundary is either seaward or approximately coincident with the inshore margin of the beach fronting, and to the east of, the former Nassau Beach Hotel site. As such, the removal of the Wyndham Jetty will have a net positive impact on the beach by restoring it to the natural condition as noted in 1982 prior to construction of the Jetty.
Baha Mar will prepare and submit to the Ministry of the Environment a plan identifying the construction techniques to be employed during the removal of the “Wyndham Jetty” structures to be removed as part of the development, the restoration or stabilization measures to be carried out, the environmental impacts of the work, and the preventative and monitoring measures that will be taken during the construction to ensure protection of Goodmans Bay.

8. SOCIOECONOMIC IMPACTS

The Nassau area of New Providence, specifically the Cable Beach Area has experienced substation growth including population growth, development and a heavily utilized tourist economy. The Baha Mar Resort Project is likely to increase the tourism in the region by providing additional resort facilities for visitors. The anticipated socioeconomic impacts from the Project are further discussed below.

8.1 Land Use Impacts

The proposed Baha Mar Development Project, planned for New Providence Island, Nassau, The Bahamas includes constructing a large resort development consisting of 3,500 hotel rooms, an 18-hole golf course, a retail village, luxury spas, casino, meeting space, restaurants, and entertainment venues. The location of the project elements are described in Section 1.6.

The subject property is located in Cable Beach, New Providence, Bahamas. Cable Beach is located approximately seven miles west of downtown Nassau. The property currently includes hotels/resorts, support facilities for the hotels/resorts and other commercial buildings along West Bay Street. The commercial buildings include banks, a police station and small retail stores. A golf course associated with an on-site hotel is located to the south of West Bay Street and is the eastern boundary of the subject property. Undeveloped areas which include a mix of upland and wetland habitats are also included in this assessment and are located to the south. Recent aerial photographs included as Figure 19 and Figure 20, shows the local land use proximal to the site.

As described in Section 1, the redevelopment of the existing Cable Beach Resort properties and the Gladstone Road Parcel has the potential to directly or indirectly impact areas within the site boundaries. These areas include the Cable Beach Resort Properties, the currently undeveloped Hobby Horse Pond Area west of the Resort Properties, the mixed commercial residential strip along West Bay Street to the west of the project site, the residential areas south of the mixed commercial/residential strip, and the undeveloped Gladstone Road Parcel.

8.1.1 Core Project Land Use Impacts

The proposed approximately 686-acre Resort development site and related land classifications are described in Section 5.3 and shown on Figure 19. The 686-acre total cited includes the Project Core, the Jack Nicklaus Golf Course Development, the CSF development site at Gladstone Road, and the Volpi Parcel at Atlantic Avenue. The core of the new resort development will be centered in the approximately 183 acre urban/developed zone. This area will remain as an urban/developed site. The existing golf course area will be redeveloped and expanded from approximately 156 acres to a total area of approximately 327.7 acres, 281 acres of which are considered developed or disturbed. The golf course land use area will be expanded into areas currently classified as undeveloped. This will result in a change in land use of 172 acres of undeveloped land, to golf course as shown on Table 44. The ecosystems present within the undeveloped land to be developed as golf course is described above in Section 7.1. Baha Mar has committed to protecting the Volpi Parcel at Atlantic

Avenue from any development. Therefore the ecosystems present within this undeveloped land parcel will remain unchanged. Of the approximately 290 acres of undeveloped land, shown on Figure 19, within the project area, Baha Mar Ltd will develop approximately 181 acres for resort, utility, roadway, and golf course purposes. No impacts or land use changes are proposed for the existing residential, mixed commercial/residential or the park areas adjacent to the project site.

8.1.2 Gladstone Road Land Use Impacts

The proposed CSF site and related land classifications are described in Section 5.3 and shown on Figure 20. For purposes of this assessment, approximately 100-acres at the Gladstone Road Parcel were studied, although it is not intended that the entire parcel would be included in the proposed project development. Continued design of the project was performed with the intent to reduce the actual areas of impacts from those initially estimated. The original design and evaluation showed impacts to approximately 61 acres (as described below) however; it has been reduced to approximately 50 acres. The CSF site will be classified as a developed site, with commercial/ industrial zoning. This will result in a change in land use of approximately 50 acres of previously undeveloped land, as shown on Figure 31.

The existing disturbed lands quality will be improved by the removal of exotic/invasive plant species, which is currently the predominant vegetative cover in the 7.7 acres of disturbed land. The aerial coverage of the ephemeral pond wetland will be reduced by 6.1 acres. Approximately 36.4 acres of Buttonwood-Black Sedge Temporal Marsh Wetland will be impacted by the development of the CSF as well as 10.75 acres of Dry Broad-leaved Evergreen Wetland. Baha Mar Ltd will avoid impacts to the Red Mangrove Shrubland Wetland and has minimized impacts to the Ephemeral Pond Wetland as these two areas appeared to be the most ecologically significant, based on the biological survey. A summary of ecosystem impacts at the Gladstone Road Parcel is included as Table 43. It should be noted that since the initial evaluation in 2006, the area anticipated to be impacted has been reduced from approximately 61 acres to 50 acres.

While the proposed CSF will result in the impacts to the vegetative communities described above, the relocation of the CSF site from the Atlantic Avenue Site to the Gladstone Road site will eliminate the impacts originally anticipated at the Atlantic Avenue site.

Visual and Aesthetic

As described in Section 5.3, the area comprising the Baha Mar Resort development in the Cable Beach area has three zoning orders in place. The strip of land between West Bay Street and the water is zoned for Beach Use. This zoning designation allows for hotels, restaurants, and related facilities and has a height restriction of 73 ft. The Beach Zone extends from west of the project site to the east, encompassing the entire Baha Mar project site north of current West Bay Street. A zoning order has not been adopted for the Baha Mar development property located south of the existing West Bay Street. The Gladstone Road Parcel is currently undeveloped, but is surrounded by industrial / commercial facilities.

In areas where a specific height limit has not been set, the Department of Physical Planning uses a formula to determine maximum building heights. The top of the building cannot above the plane(s) extending on a 65 degree angle extending inward from the property line. In addition, the total of both angles cannot be greater than 120 degrees.

The proposed project facilities will include hotels that will exceed the existing height requirements. Note that the existing Sheraton and Wyndham Resort buildings are 100-ft and 160-ft tall, respectively, which both exceed the existing 73-ft limit. The proposed height for each of the main project components in the first phase of development is presented in Table 45.

Baha Mar Ltd is currently working with the Department of Physical Planning to establish a new zoning order for the Baha Mar area to reflect the relocation of West Bay Street and the new core building heights.

8.2 Impacts on Neighborhoods

As described in Section 8.1, Baha Mar Ltd does not propose any modification to existing residential neighborhoods. Impacts from construction of the project may include visual impacts due to the replacement of the current 100-120 ft buildings with buildings that will range in height from 72 to 321 ft. The additional building heights will observable from the ground level for travelers along West Bay Street and for residents along Prospect Ridge as they are today.

The existing hotels and infrastructure in the Cable Beach area does not reflect the Bahamian culture and style and lacks the aesthetic value of the indigenous architecture and culture. The proposed Baha Mar Resort Project is being designed to capture the flavor and feel of The Bahamas. The entire Baha Mar Resort complex is being designed to feature Caribbean-inspired design elements that fuse the area's Colonial, European and African influences with the region's lush natural landscapes and waterscapes and it is believed that that future views will generally considered a positive change in the visual landscape. The increased economic activity associated with the resort will result in increase vehicular traffic along roadways in the project area including the main arterials leading to residential areas in the project vicinity. These impacts are described below in Section 8.4.

In summary it is expected that traffic destined for the resort will generally use the new Gladstone Road extension from JFK Drive and West Bay Street for access. The potential for increased traffic to access the development site via Prospect Ridge Road and Skyline Drive and impacting those neighborhoods will be minimized by the planned disconnection of Prospect Ridge Road as it crosses the new golf course site. The expected economic impacts expected for New Providence Island are described below in Section 8.5. For neighborhoods in proximity to the Baha Mar Resort it is anticipated that the new development will have a positive increase on property values.

8.3 Relocation Impacts

The re-development of the existing Cable Beach Resort properties into the Baha Mar Resort will require the relocation of some existing commercial businesses and government offices.

As described previously the Cable Beach Police and Fire Station will be relocated to a new facility in the Commercial Village along West Bay Street along with the Scotiabank, Commonwealth Bank, Fidelity Bank, and the Baha Mar Corporate Building. The Bahamas Government offices in the Cecil Wallace-Whitfield Building will be relocated to a new building to be constructed at West Bay Street and Chippingham Road or to another location. Other onsite commercial operators and vendors including the car wash, the east and west Straw Market buildings, and other small vendors will be temporarily relocated during the construction program and then provided a new permanent location within the completed resort.
No residential or institutional relocations will be required to develop the Baha Mar Resort.

8.4 Traffic Impacts

The purpose of this section is to report the results of the assessment of traffic conditions resulting from development of the proposed Baha Mar Resort and its associated roadway improvements in the vicinity of the project. While the analyses assumed that the project opening would occur in 2012, Baha Mar has determined that due to the recent economic conditions projected growth in background traffic has lagged behind the projections used and that the results of the analysis and recommendations are equally valid for a project opening in 2014.

8.4.1 Section Organization

This traffic analysis section is divided in the following subsections:

1. Study Area
2. Year 2012 No Build Conditions
3. Project Characteristics
4. Year 2012 With Project
5. Tonique Williams-Darling Highway Extension
6. Prospect Ridge Road Connection

8.4.2 Study Area and Junctions

Figure 24 presented the existing roadway network and the junctions studied in the operation analyses. Figure 32 presents the proposed roadway network with the Baha Mar project, and additional junctions studied in the analyses of future conditions. Junctions included in this analysis are listed below:

1. West Bay Street/Atlantic Avenue. Existing roundabout.
2. West Bay Street/Skyline Drive. Existing roundabout.
3. West Bay Street/Prospect Road. Existing roundabout.
4. Prospect Road/Prospect Ridge Road/Sandford Drive. Existing signalised junction.
5. Prospect Road/JFK Drive/Tonique Williams-Darling Highway. Existing signalised junction.
6. JFK Drive/Gladstone Road. Existing signalised junction.
7. West Bay Street/Cable Beach Resort Entrance. Proposed roundabout.

8. West Bay Street/West Podium Entrance/Commercial Village Entrance. Proposed roundabout.
9. West Bay Street/Gladstone Road/Main Podium Entrance. Proposed roundabout.
10. West Bay Street/East Podium Entrance. Proposed roundabout.
11. West Bay Street/Breezes Entrance. Proposed roundabout.

8.4.3 Analysis Scenarios

The operations of the study junctions were evaluated for the following four scenarios:

- **Existing Conditions.** Year 2006 conditions.
- **Year 2012, No Project Conditions.** Year 2012 background conditions, without the Baha Mar Resort Project. This scenario assumes a 2-lane Gladstone Road is connected to West Bay Street.
- **Year 2012, With Project Conditions**. Year 2012 with the full buildout of the Baha Mar Resort Project, including associated roadway network modifications. This scenario assumes that the remote CSF and employee parking area will be located on Gladstone Road, south of JFK Drive.

8.4.4 Junction Analysis Methods

Standard junction analysis software tools used in the United Kingdom were applied for this evaluation. ARCADY was used for the analysis of roundabouts, while OSCADY was used for the analysis of signalised junctions. Both of these tools were developed by the UK Transportation Research Laboratory (TRL).
The use of UK-standard tools is appropriate in order to accurately model left-side drive conditions, as well as roundabout operations. In addition, traffic control measures applied in the Bahamas typically follow UK standards.

Performance Criteria
The principal output of the junction analysis is the Ratio of Flow to Capacity (RFC) for each approach to the junction. An RFC of 1.0 indicates that the approach is operating at capacity, which will likely result in significant congestion and delay. For this analysis, the performance target was established as an RFC less than or equal to 0.85. An RFC of less than 0.85 is generally accepted to indicate a junction is operating below capacity and is commonly used as a performance target.

Peak Periods for Analysis
The busiest weekday AM and PM peak periods were used for the junction analyses. This was determined based on a review of traffic data collected in January, 2006 that found that the highest traffic volumes occurred in the morning between the hours of 8:00 to 9:00 AM and in the afternoon between 4:00 and 5:00 PM. The afternoon peak also coincides with the peak period of resort traffic.

The Saturday afternoon peak was also observed and found to be significantly less than the corresponding weekday afternoon peak period. Furthermore, the resort is not expected to generate substantially more traffic during that peak hour on a Saturday

versus an average weekday. The Saturday afternoon peak was therefore not considered to be a critical time period.

8.4.5 Year 2012 No Build Conditions

Planned Roadway Projects

The 2012 No Build network will generally be the same as the existing roadway network. It is assumed, however, that the Gladstone Road extension project is completed between JFK Drive and West Bay Street. This road would consist of 1 lane in each direction with junctions at the Skyline Lake subdivision and Prospect Ridge Road.

Year 2012 No Build Traffic Volumes

As directed by the Ministry of Works, a 3% annual growth rate was applied to the traffic counts conducted in January, 2006 to obtain the year 2012 No Build traffic volumes. A manual traffic assignment process was used to reassign existing traffic to the future network with the new Gladstone Road corridor.

Year 2012 No Build Junction Operations

The existing conditions traffic volumes were analysed at the study junctions using OSCADY and ARCADY software. The resulting Ratio of Flow to Capacity (RFC) values for each junction approach for the AM and PM peak periods are summarised in Table 46 and Table 47, respectively.

The addition of the Gladstone Road extension provides additional roadway capacity and an important north-south roadway link. This draws traffic from some existing roadways and results in improved performance at the junctions of JFK Drive/Prospect Road/Tonique Williams-Darling Highway and Prospect/Prospect Ridge Road. However, the junction of JFK Drive/Gladstone Road continues to operate above capacity. It is noted that this junction would experience congestion with or without the Baha Mar Resort Project.

8.4.6 Project Characteristics

8.4.6.1 Project Description

The proposed Baha Mar Resort Project involves the renovation of the existing Sheraton Hotel and Wyndham Resort and Crystal Casino properties and the development of new hotel and residential units and other facilities at the existing, developed Cable Beach site. The project includes constructing a large resort development consisting of approximately 4,971 hotel rooms as well as vacation condominiums, a world class 18-hole golf course, a retail village, luxury spas, the region's largest casino, meeting space, restaurants, and entertainment venues. The Baha Mar Resort Project will be constructed over a period of 4 years between 2011 and 2015, although the major initial phase will open in 2014. Table 1 summarises the planned development program at project buildout.

8.4.6.2 Project Roadway Changes

The Baha Mar Resort Project proposes several changes to the No Build roadway network. These proposed modifications include:

- Realigning and reconstructing West Bay. The roadway will be constructed with two lanes in each direction with a centre median. Five new modern roundabouts would be constructed on West Bay Street.
- Gladstone Road would be constructed with two lanes in each direction.
- Prospect Ridge Road would be disconnected through the Baha Mar site.
- A new roundabout will replace the existing signalized intersection at the JFK Drive/Gladstone Road junction.

8.4.6.3 Employee Transportation Strategy

An employee transportation strategy has been developed to ensure efficient travel to and from their workplaces, while limiting the negative impacts associated with employee traffic. The general strategy will be to consolidate employee access at one of three entrances that connect directly to the back of house facilities. These entrances will each have employee shuttle bus and private vehicle drop-off areas with convenient connections to West Bay Street. These areas will generally be located away from the main hotel entrances to minimize conflicts between employee and guest traffic. Convenient pedestrian links will also be provided between the employee entrances and strategically located jitney stops on West Bay Street. Employee parking will be provided in a remote lot at the CSF that will be served by a shuttle bus.

At project build-out, it is estimated that 7,900 employees will work at Baha Mar on a typical day. Of these, 60% are assumed to work the day shift, 30% will work the evening shift and 10% will work the night shift. Employees are expected to use one of the following modes of transportation to reach the resort: drive and park (50%), drop-off in a private vehicle (20%), and jitneys (30%).

Employee parking within the core project will be limited to a small number of executive parking spaces. All other employees who drive and park will be required to use the remote employee parking lot planned for the CSF site. Dedicated shuttle buses will transport employees between the core project and the remote CSF.

Two main employee entrances are being provided: one at the Cable Beach Resort (CBR) area serving the Wyndham and Sheraton, one near the main loading dock adjacent to the Rosewood Hotel. The employee entrances will connect directly to the back of house facilities within the project and will provide consolidated points for employee security screening, uniform pick-up/drop off and locker room facilities.

The employee entrances will have shuttle bus and private vehicle drop-off areas with convenient connections to West Bay Street. The drop-off areas will be used by the remote employee parking shuttle bus as well as by private vehicles dropping off or picking up employees. These areas will generally be located away from the main hotel entrances to minimize conflicts between employees and guest traffic. Jitneys will circulate on West Bay Street and drop passengers at stop locations with pull-outs, which are being incorporated into the design of the roadway. Convenient pedestrian links will also be provided between the employee entrances and the strategically located jitney stops on West Bay Street.

8.4.7 Central Services Facility Operation

The remote Central Services Facility (CSF) on Gladstone Road will include employee parking, warehousing and other infrastructure. The remote CSF is located approximately 2 miles south of the West Bay/Gladstone Road roundabout.

8.4.8 Project Trip Generation

A trip generation analysis was completed to estimate the number of additional AM and PM peak hour vehicular trips generated by the project. Trip generation rates were based on a variety of sources including assumed peak hotel check-in and check-out rates, published Institute of Engineers (ITE) trip generation rates, research into trip generation at casinos by the ITE Committee on Transportation Planning for Casinos and NAS airport flight schedules. The rates were further adjusted based on counts performed in early January at both the Cable Beach and Atlantis Resorts.

Table 48 summarizes the trips generated by the resort at full buildout. The trips in Table 48 include all employee trips to and from the site, as well as employee private car, employee shuttle bus and freight trips to and from the remote CSF location. It also includes trips to and from the proposed commercial village, which will be comprised primarily of relocated land uses.

The trips in Table 48 were allocated to 5 different zones corresponding to the access roads for the proposed Baha Mar resort: Existing Cable Beach Resorts zone, West Hotel Podium zone, Main Hotel Podium zone, East Hotel podium zone and the Central Services Facility.

The trip totals listed in Table 48 correspond to the total projected trip generation for the Baha Mar Resort project at buildout and incorporates the existing land uses that will be retained or relocated. The net number of new trips on the roadway network is the difference between the projected total trips and the existing Cable Beach Resort trips described in Section 5.

8.4.9 Year 2012 With Project Conditions

The Year 2012 with Project conditions traffic volumes were analyzed at the study junctions using OSCADY, ARCADY, and PICADY software. The resulting Ratio of

Flow to Capacity (RFC) values for each junction approach for the AM and PM peak hours are summarized in Table 49 and Table 50.

The junction of JFK Drive/Gladstone Road was found to operate above capacity with the Year 2012 No Build Conditions. The additional traffic generated by the Baha Mar Resort Project would result in higher volume to capacity ratios and further degrade junction performance. While mitigation at this junction is justified with or without the Baha Mar Resort Project, the additional Baha Mar traffic creates a need for additional capacity at this location.
The junction of JFK Drive/Tonique Williams-Darling Highway is projected to be approaching capacity on the southbound approach in the AM and the eastbound approach in the PM in the 2012 With Project conditions. Recommended mitigation for this junction consists of signal timing changes.

8.4.10 Prospect Ridge Road Connection

The analyses of the 2012 With Project scenario presented above assumes that the Prospect Ridge Road is disconnected through the Baha Mar Site. The cumulative operational impacts of this closure and the other Baha Mar Resort components were included in the results presented above. The following section describes the assumptions for traffic re-assignment and other impacts associated with the disconnection of Prospect Ridge Road.

Existing Conditions
Prospect Ridge Road currently serves about 6,500 vehicles per day, based on traffic counts conducted in January 2006. This compares to about 21,000 vehicles per day on West Bay Street and 13,000 vehicles per day on JFK Drive. Prospect Ridge Road therefore serves about 13% of the east-west trips on these three roadways.

Prospect Ridge Road currently serves the neighborhoods located south of the Baha Mar Site. Its functionality as a through route is somewhat limited compared to JFK Drive and West Bay Street. Apart from local neighborhood-serving trips, it is attractive only for drivers traveling between the northwest (West Bay Street west of Skyline Drive) and the southwest (Tonique Williams-Darling Highway or JFK Drive east of Prospect, or Gladstone south of JFK). The construction of the Gladstone Road connector will provide an alternative route for many of these trips, independent of changes to Prospect Ridge Road.

Impacts of Closure
Closing Prospect Ridge Road will impact the adjacent neighborhoods and the through trips described above.

Impacts on Adjacent Neighborhoods
Some residents will experience modest increase in trip lengths. This will primarily be for residents located west of the proposed closure who wish to travel toward Nassau. Currently, these residents can use Prospect Ridge Road and connect to either West Bay Street, JFK Drive or Tonique Williams-Darling Highway via Prospect Road. With the closure, these residents would need to reach West Bay Street via Skyline Drive, then use Gladstone Road to connect to JFK Drive or Tonique Williams-Darling

Highway. For these residents, it is estimated trip lengths will be increased on the order of 4-6 minutes.

Residents on the east side of the proposed closure will experience increased trip lengths only when traveling to or from West Bay Street west of Skyline Drive (increase of about 3 minutes).

Although travel times for some residents would increase, the closure would also remove all through trips and significantly reduce traffic volumes and their associated noise in these neighborhoods. This is a significant benefit for the residential areas.

Impacts on Through Trips

Closing Prospect Ridge Road will re-direct the through trips identified above to West Bay Street, Gladstone Road, and Prospect Road. It is estimated that there will be a nominal change in travel time for these trips (increase of approximately 70 seconds). It is anticipated that some of these through trips would shift to the Gladstone extension even if Prospect Ridge Road remains as a through street. It is also important to note that these trips will be using the new and upgraded roadways, which will have additional capacity and improved safety features. These arterial streets will be more suitable for through traffic than Skyline Drive and Prospect Ridge Road.

8.5 Economic Impacts

Baha Mar Ltd conducted a detailed study of the full economic and tax impacts of the proposed development of the Baha Mar Resort on Cable Beach. Baha Mar Ltd has incorporated Department of Statistics industry data into its models to accurately reflect the structure of the Bahamian economy. The conclusions of this study are based on projections which reflect the Baha Mar's schedule for construction and operations. Although the analyses presented below assume that the project opening would occur in 2012, Baha Mar has determined that due to the recent economic conditions projected growth in the economy has lagged behind the projections used and that the results of the analysis and recommendations are also valid for a project opening in 2014 and for the subsequent 20-year analysis period.

A five year development schedule and a twenty year operations horizon have been analyzed.

The construction of the first phase of the project will take place over five years, with completion in 2014. The first phase will consist of approximately 2280 newly constructed branded hotel rooms, 146 branded condo-hotel rooms, 1250 completely renovated branded hotel rooms, and 55 time share units. Baha Mar will also feature a commercial Town Center, an Entertainment Village, a Las Vegas style casino, a 18-hole Signature golf course, and convention and meeting space.

Baha Mar Ltd developed its economic impact model for the Bahamas using Department of Statistics data reflecting the structure of the country's economy. This model translates construction and visitor expenditures into local wages, jobs, taxes, and gross domestic product (GDP) by simulating the essential functions of an input-output model.

The model first provides information on the direct impact on the construction sector and to those operations providing goods and services to the visitor. It then estimates the indirect

impact as these operations purchase goods and services from local suppliers. Finally, the model estimates the induced or multiplier effect of wages as they are spent in the economy. This process importantly backs out imports that do not contribute to the Bahamian economy. Tax analysis is based on the application of standard rates to each category including:

- Property Transfer Stamp Tax
- Departure Fee
- Real Property Tax
- Occupancy Tax
- Import Duties and Stamp Tax
- Business License Fee
- Casino Tax

Analysis is first conducted on construction and development. The impact of ongoing operations and visitor activity is conducted separately. As discussed in Section 5.2.1, in 2005 the number of guests at the Cable Beach Resorts (Wyndham Resort, Sheraton Hotel and Nassau Beach Hotel) was approximately 288,000. The Cable Beach Resort currently employs approximately 2,211 staff members with a staff payroll of approximately $40,922,500.

8.5.1 Summary of Economic Impact

8.5.1.1 Development Impact

Over the five years of construction, the Project will generate wages of over $400 million. Construction-generated employment will average 2,822 over the 5 years of project development with a peak of 5,238. A cumulative gross domestic product of $528 million will accrue to the economy during development (see Table 51).

8.5.1.2 Operations Impact

The redevelopment project is anticipated to result in cumulative visitation of 11.6 million over 20 years, averaging 582,000 a year, an increase of approximately 294,000 visitors per year. This will result in local wages of $6.1 billion over 20 years and over $200 million in year one with a total employment generation of 7,341 in year one. Additionally cumulative government receipts will tally $4.6 billion, with $147 million in year one and cumulative gross domestic product tallies of $11.2 billion ($366 million in year one). Table 52 provides the results of the operations impact.

8.5.2 Cumulative Impacts

In addition to the direct, indirect, and induced impact of wages on the economy of the Bahamas, the project will also produce increases in government tax receipts and license fees collected. The analysis shows that the Government of The Bahamas total receipts over a twenty-year period of operations will tally $4.7 billion.

In summary the development of the Baha Mar Resort will result in a significant increase in direct employment at the Baha Mar Resort compared to existing employment, and a corresponding major increase in the direct wages paid to

Bahamian workers. The effect of these increased wages will result in other indirect and induced benefits as the direct wages are multiplied through the economy. Table 53 provides a comparison of the direct employment and wages from the Baha Mar Project.

Construction and development over five years will generate $404 million in wages and salaries, and $528 million in GDP. During the 5 year construction period, the project will sustain employment an average employment level of 2,822 jobs with a peak level of 5,238 construction jobs.

Within its first full year of operation, the resort will contribute nearly $400 million to GDP, adding 6.5% to The Bahamas' current gross domestic product. Additionally, the resort will directly sustain over 5,000 permanent jobs at full operation, an increase of approximately 125% over current employment levels, and indirectly generate an additional 2,525 jobs within suppliers and other parts of the Bahamas economy. The cumulative GDP impact of construction and operations will be $11.2 billion over 20 years. Total generated taxes over a twenty-year period of resort operations will tally $4.7 billion, as shown in Figure 33.

In addition to these identified benefits, it should be noted that the analysis above did not include the additional construction jobs and resort employment and their associated wages that would occur during the construction and operation of the Phase 2 facilities, or the additional spending and receipts from visitors from these additional facilities. Therefore, the net benefit to the economy of The Bahamas can be expected to be even greater than presented above.

8.6 Cultural Resources Impacts

The preliminary cultural resources assessment for the Project area resulted in the initial documentation of one previously identified prehistoric site and three historic sites or properties previously identified as historic sites. This documentation to date includes historic background research, interviews, and visual inspection, and indicates that the Project has the potential to adversely impact a series of prehistoric and historic sites or properties in close proximity to proposed Project development and construction phases.

There is an indication that the Project has the potential to not only adversely impact a previously recorded prehistoric site on the shoreline of Lake Cunningham, but also previously unrecorded prehistoric activity areas and sites in close proximity to proposed Project construction. Based on prehistoric background research and visual inspection, indications are that prehistoric occupation and use of Project upland zones in the vicinity of wetlands and shoreline environs of Lake Cunningham is likely.

The assessment also indicates there is a potential for physical remnants (structures, foundations, walls, field systems, etc.) of former plantation and/or post-emancipation estate development to exist within the presently wooded and less-developed tracts within the Project. Despite the modifications to landscapes and structures that have subsequently taken place on or near the aforementioned above ground points of historic significance since the period of origin, height of notoriety or use, or habitation by original owner, that these sites are

considered to be of great historic significance by Bahamians and Bahamian agencies, and merit detailed and documentary study prior to project direct and indirect adverse impacts.

9. CONCEPTUAL ENVIRONMENTAL MANAGEMENT PLAN

9.1 Mitigation Measures

Baha Mar Ltd will hire a full-time environmental manager to oversee environmental aspects associated with the Project. The environmental manager will oversee the execution of mitigation measures identified in the EIA and the implementation of the procedures and requirements established through the EMP.

9.1.1 Physical Environment Mitigation Measures

9.1.1.1 Water Quality

As described in Section 6.3, Baha Mar Ltd anticipates the following impacts to water quality:

- No impact to existing potable water systems outside the project area;
- A net improvement in water quality resulting from the discontinued operation of the existing WWTPs;
- Risk of nutrient loading in the canal and lagoon system;
- A positive impact to the man-made lakes existing on the golf course; and
- No impacts to Lake Cunningham.

Baha Mar Ltd proposes to manage the lagoon and canal system through flushing and periodic monitoring to reduce the risk of nutrient loading. The following mitigation measures will be implemented. In order to maintain optimal water quality, Baha Mar Ltd has developed a strategy for canal and lagoon water management that includes the following components. Analyses of bacteria will continue on a monthly basis through the first year of operation and annually thereafter. Additional bacterial analyses will be taken in the event of upsets in the operation of the ponds results in visual changes in quality or if outbreaks of flu-like symptoms among resort guests or staff. Secchi depth measurements will be made within the lagoon on the same frequency as the bacterial analyses. The Secchi depth measurement is an indicator of the water transparency and may be considered as a proxy indicator of nutrient impacts. Significant declines in the Secchi depth over time may require operational changes in the lagoon flow rate or additional aeration.

The temporary and negative impacts to Hobby Horse Pond will result from clearing and grading activities as discussed in Section 1. Positive impacts to the pond will include the installation of boardwalks to create opportunities for bird watching, walking, jogging and enjoying the indigenous species; and the removal of the existing waste brine flow from the Nassau Beach Hotel RO facility and the elimination of the occasional overflows and bypasses from Nassau Beach Hotel and Breezes Resort wastewater treatment plant malfunctions.

Baha Mar Ltd will have a positive effect on the groundwater in the region, by eliminating a number of existing stormwater, salt water, and waste water discharge wells. Many of these wells and systems were installed prior to the existing standards regarding well casing and depths. New injection wells will be designed and installed in accordance with WSC requirements and will result in an improvement to the existing quality of the groundwater aquifers beneath the proposed project site. Baha Mar will install impervious lining beneath any irrigation, or underneath any canal or show lake it constructs to prevent impacts to the freshwater lens beneath the project site.

As per the Bahamas Investment Authority letter dated November 30, 2010 approving this Environmental Impact Assessment, Baha Mar Ltd. will prepare and submit to the Ministry of Works and Transport and the Ministry of Environment a drainage/stormwater management plan for the Central Services (Back-of-House) facility on Gladstone Road that is designed to minimize site runoff.

Baha Mar will prepare and submit to the Ministry of the Environment a plan identifying the construction techniques to be employed during the removal of the "Wyndham Jetty" structures to be removed as part of the development, any restoration or stabilization measures to be carried out, and any preventative or monitoring measures that will be taken during the demolition to ensure protection of Goodman's Bay.

9.1.1.2 Air Emissions

As discussed in Section 6.4, the impacts to air quality from the project will be a net improvement during operation resulting from the decommissioning of the Total Energy Plant and removal of dispersed emergency generators. The proposed emergency generators are updated and will operate more efficiently than a series of smaller dispersed generators. In addition, the existing hotel and laundry boilers will be replaced with new high-efficiency boilers. The emissions from the new boilers and generators will comply with the health-based Ambient Air Quality Standards established by the USEPA.

Baha Mar is committed to reducing its emissions of air pollutants, and in particular, carbon dioxide, to fullest extent possible. In addition to the above, Baha Mar will undertake additional measures to reduce its direct and indirect emissions of CO_2. Baha Mar will use the lowest sulfur content distillate fuel that is reasonably available, will investigate the use of a seawater district cooling system to reduce electricity use for air conditioning, and will consider the use of solar hot water heaters for the laundry facility to be located at the Central Services Facility.

Air emissions resulting from construction operations will be temporary in nature, and will be controlled to the maximum extent practicable as described in Section 6.4.1. In addition, Baha Mar will require that all contractors

prepare and submit fugitive dust suppression and monitoring procedures as part of their contract-specific Environmental Management Plans.

9.1.1.3 Noise

Baha Mar Ltd will utilize appropriate mufflers and noise enclosures to minimize the noise generated by construction and operation of the project as described in Section 6.5.1. Noise from resort operations will comply with the World Bank Criteria and will be below 55 dB(A) during the daytime and 45 dB(A) during the nighttime at sensitive receptors. As a result no additional mitigations are required for operational noise.

During construction Baha Mar Ltd will restrict construction activities at both the Resort and the Central Services Facility to the period between 7 AM and 7 PM to minimize noise exposure to the community and to resort guests. Each construction contractor's Environmental Management Plan will be required to contain measures to limit noise from equipment through the use of appropriate mufflers, shielding, and other methods.

9.1.1.4 Waste

Baha Mar Ltd has consulted with DEHS regarding the management of project-related solid and hazardous waste, and construction and demolition materials and has determined that the existing waste management facilities have adequate capacity to accommodate the wastes from the project. The Construction Management Plan, Attachment 8 to the EMP, defines strategies and procedures for waste recycling and management during construction of the project. The Waste Minimization Plan, Attachment 7 to the EMP, describes the Baha Mar Ltd procedure that will be used to minimize waste generated by facility operations to the maximum extent practicable during operation of the resort.

Baha Mar Ltd will continue to assess the potential that contaminated soils and groundwater will be encountered during project construction. Baha Mar Ltd is continuing to work with the BEST Commission, the Department of Environmental Services, and the Hotel Corporation of The Bahamas to remediate any contaminated areas to appropriate cleanup standards. Where contaminated soil and groundwater is known to occur, the Project will either conduct an appropriate level of cleanup in advance of the project, such as is occurring at the Sheraton Laundry site in consultation with the Hotel Corporation, or as part of the construction project. Plans for addressing contaminated soil and groundwater will be included as part of the Environmental Management Plan in the Contaminated Sediment and Soil Management Plan.

9.1.1.5 Fire and Hurricane

In order to manage the potential risks associated with fires and hurricanes at the project site, Baha Mar Ltd will install updated fire suppression systems

throughout the resort facility. Below is a brief description of the planned system:

Combination Automatic Sprinkler and Fire Standpipe System

- The building will be fully sprinklered in accordance with the Bahamas Code and the International Building and Fire Code and NFPA. Systems will be hydraulically calculated and designed to Light or Ordinary Hazard requirements as occupancy dictates.

- The combination standpipe sprinkler system will include fully automatic fire pump, fire reserve storage tank, jockey pump arrangement, and Siamese connection. As an alternate a second auto fire pump will be provided for backup. The quantity of FSP riser required will be provided in accordance with the Bahamas Code and NFPA standards for proper hose coverage.

- The fire suppression water supply for each hotel will be provided with a tank dedicated to fire only, located at the BO1 level. The automatic fire pumps will receive their suction supply from the cistern tank. The fire reserve capacity at each building tank will provide 30 minute fire pump capacity for each building's fire protection system.

- Sprinkler supply at each floor will be provided with an approved shutoff valve, flow switch, and a drain/test connection to drain riser. All sprinkler and standpipe control valves, sectionalizing valves, and all water flow devices will be supervised and connected to the building fire alarm system.

- The podium levels will be divided into individual sprinkler fire zones of 50,000 sq. ft. each maximum.

- In addition to the sprinkler connections, at each floor, 2-1/2 inch fire department hose valves will be provided.

- The sprinkler systems will be hydraulically calculated to the following parameters:

Hazard Classification

- Guest Rooms: Light hazard, 0.10 gpm/sq. ft. over 1,500 sq. ft. or appropriate subdivision.
- Storage, Mechanical Equipment Rooms, Kitchens: Ordinary hazard, 0.15 gpm/sq.ft. over 1,500 sq.ft.
- Gaming Areas and Eating Areas: Light hazard, 0.10 gpm/sq.ft. over 1,500 sq.ft.
- Water Curtains (at multiple floor slab openings): 3.0 gpm/lineal foot.

Additionally, Baha Mar Ltd will construct a new fire and police department which will be approximately 40% larger than the existing facilities. To manage hurricane risks Baha Mar Ltd has developed the Emergency Response Plan included as Attachment 10 to the EMP. The new buildings will comply with the Bahamas Building Code requirements for wind loading and life safety systems for new hotels and high rise buildings. The design of the new facilities will also take into consideration potential storm surge and wave heights to protect critical building systems.

9.1.2 Natural Environment Mitigation Measures

9.1.2.1 Terrestrial Ecosystem Impacts

As described in Section 1, the impact of development of the Central Services Facility at the Gladstone Road location will be determined once the plan has been developed and approved. In order to provide mitigation for project-related wetland impacts, Baha Mar Ltd has committed to establishing a wetland park/reserve on the 71.4-acre Volpi parcel between Atlantic Avenue and Skyline Drive. As provided in the Amended and Restated Heads of Agreement, this parcel will be designated by the Government as a “no build zone”, to be used as a public park for appropriate recreational use. Baha Mar will commit to improving, beautifying, and developing the parcel as a wildlife and wetlands sanctuary. Baha Mar will also establish a trust for perpetual maintenance of this wetlands and wildlife sanctuary.

9.1.2.2 Aquatic Impacts

As described above the irrigation measures for the project facilities have been designed to reuse treated wastewater to eliminate the need to rely on RO systems, the WSC or the freshwater lens for irrigation purposes. The use of both freshwater and salt water for irrigation purposes will also minimize impacts from irrigation water percolation on existing brackish waterbodies such as Hobby Horse Pond and man-made ponds on the Golf Course.

Baha Mar Ltd will improve the overall water quality of the Hobby Horse Pond by removing the direct discharges currently associated with the Total Energy Plant. Additionally, Baha Mar Ltd will install a boardwalk system to create opportunities for bird watching, walking, jogging and enjoying the indigenous species as well as remove the invasive species that have colonized in the vicinity of the Hobby Horse Pond which will improve the overall health of the ecosystem.

9.1.2.3 Protected Habitat Impacts

While the presence of protected plant species within the project limits has been confirmed, no designated protected habitats exist within the project limits. Four protected tree species were observed within the project limits. Baha Mar Ltd will preserve these protected tree species to best of their ability. Baha Mar will employ a qualified arborist to survey and mark any protected tree species occurring within the construction area in accordance with its *Protected Tree Species Preservation Plan and Protocol* (Appendix H). During the construction process Baha Mar's Environmental Monitor will oversee the protection of the flagged trees. Where native tree removal is required, Baha Mar Ltd will obtain tree removal permits as necessary. While negative impacts to these tree species will be minimized by surveying and marking trees prior to the development of the golf courses, removal will be necessary in some cases. Baha Mar Ltd will re-use these trees to the extent possible during the re-vegetation of the development area.

9.1.3 Socioeconomic Mitigation Measures

9.1.3.1 Land Use Mitigation Measures

Baha Mar Ltd has worked with the Department of Physical Planning to establish a new zoning order for the Cable Beach area to reflect the relocation of West Bay Street and the new core building heights.

9.1.3.2 Visual and Aesthetic Mitigation Measures

As described in Section 1, the existing hotels and infrastructure in the Cable Beach area does not reflect the Bahamian culture and style and lacks the aesthetic value of the indigenous architecture and culture. The proposed Baha Mar Resort Project is being designed to capture the flavor and feel of The Bahamas. Baha Mar will feature Caribbean-inspired design elements that fuse the area's Colonial, European and African influences with the region's lush natural landscapes and waterscapes. The entire Baha Mar Resort complex is being designed to be visually attractive and it is believed that that future views will generally considered a positive change in the visual landscape. Therefore no additional mitigations are proposed.

9.1.3.3 Relocation Impacts Mitigation Measures

Baha Mar Ltd is relocating the existing businesses on West Bay Street in the vicinity of the proposed project area to new facilities as described in Section 1. The relocation of these businesses and facilities is interpreted as a benefit to those businesses, therefore no additional mitigation measures are proposed.

9.1.3.4 Traffic Impact Mitigation Measures

As described in Section 8.4 there may be potential impacts to traffic from the construction of the project. Mitigation Measures for each of the impact scenarios are describe din further detail below.
The recommended mitigation measures to improve junction performance under the 2012 With Project condition are described below:

- **JFK Drive/Prospect Road/Tonique Williams-Darling Highway.** This junction is projected to operate approaching capacity on the southbound approach in the AM Peak Hour and the eastbound approach in the PM Peak Hour in the 2012 With Project conditions. Increasing signal length to 90 seconds and optimizing the signal timing will reduce the RFC value to 0.81 or better on all approached during the AM peak hour and 0.76 or better on all approaches in the PM peak hour.
- **JFK Drive/Gladstone Road.** This junction operates is projected to operate above capacity with Year 2012 No Build conditions, resulting in RFC levels as high as 1.24 in the AM peak hour . This is well above the capacity of the junction, indicating the extensive queuing and delay will occur. It is evident that major traffic congestion will occur at this junction and increases in capacity are justified regardless of the Baha Mar project. Ratio of Flow to Capacity values this far above 1.0 indicate that major capacity increases will be required to achieve acceptable operation. Construction of a roundabout is recommended whether or not the Baha Mar project and associated roadway modifications are implemented. Initial testing of potential improvements indicates that a signalised junction will not provide sufficient capacity, even with an additional lane added to each approach. The analysis indicates a roundabout would be effective to accommodate the high volumes of traffic and turning movements at this junction, resulting in an RFC less than 0.83 on all approaches in the AM and PM peak hours. The design of this junction is being reviewed as part of the design process of the Gladstone extension.

9.1.3.5 Economic Impact Mitigation Measure

As described in Section 8.5, the project will result in a net benefit to the local and national economy therefore no additional mitigation measures are proposed.

9.1.3.6 Cultural Resources Impact Mitigation Measures

An in-depth and formally permitted archaeological survey will be performed to fully establish the historic and prehistoric characterization of the Project area. An *Archaeological Permit for Development Projects in the Bahamas* is necessary for the conducting of non-collection survey (including historic background research and systematic pedestrian survey of a project area), archaeological collection survey (systematic archaeological pedestrian survey

including surficial collection of artifacts), and archaeological testing (systematic subsurface test excavations to determine presence of prehistoric or historic archaeological resources). It is expected that archaeological investigations or excavations will precede activities of construction, demolition, or significant alteration of nationally significant sites, whether previously identified or potential.

Baha Mar Ltd will conduct an archaeological survey within the Project area for the express purpose of locating and testing prehistoric and historic archaeological sites that have not been previously recorded and relocating and testing the Lake Cunningham prehistoric cave site and its vicinity (the focus being on the wooded areas in the western and southern portions of the Baha Mar Development Site and near the margins of wetlands and Lake Cunningham lakeshore), and providing documentation on the potentially historic structures at the Bahamas Gaming Board location. This supplemental survey will provide information on potentially significant archaeological cultural resources within the Project through a combination of testing and mitigation prior to Project direct or indirect adverse impacts. Baha Mar will provide this documentation to the Antiquities, Monuments, and Museums Corporation and will consult with AMMC on any recovery or preservation measures that may be necessary.

9.2 Periodic Management Measures, Implementation and Monitoring Plans

Baha Mar Ltd has developed an Environmental Management Plan (EMP) to provide a clear, consistent, and integrated approach to comply with the environmental aspects, activities, and requirements associated with the execution, operation, and eventual decommissioning of the Baha Mar Resort Project.

The scope of this EMP is to develop a comprehensive management system of supporting plans that will be the framework of this EMP and to establish a method to regularly review and revise this EMP to ensure continual improvement of the Project's environmental performance. The EMP framework will incorporate the various environmental impact prevention plans, mitigation plans and monitoring procedures to be implemented by Baha Mar Ltd and its contractors during construction and operation of the Baha Mar Resort Project planned for Cable Beach, The Bahamas. The EMP has been prepared to support the EIA.

This EMP is the management system developed to implement a comprehensive program for managing environmental compliance by the Project Owner, and Owner's contracted entities during the planning, execution, operation, and decommissioning of the Project. This EMP will receive the widest possible distribution to ensure that it's available to Project personnel so that the requirements of the EMP are effectively integrated and implemented.

The objectives of the EMP are to:

- define the specific requirements for environmental compliance with the Bahamian government, permit conditions, and other applicable environmental documents that contain environmental requirements;

- identify the responsibilities and actions required by all parties (i.e., Baha Mar Ltd, contractors) during project execution and operation to maintain compliance with the environmental requirements; and
- provide the necessary procedures for communication, documentation, and review of environmental compliance activities.

The Owner will use contractors throughout the life of the project. Project staff and contractors (i.e., to include their sub-contracted entities) are all responsible for being fully cognizant of, and complying with, the environmental commitments, procedures, restrictions, and guidance identified in this EMP. Contractors are required to co-operate fully in implementing any project-specific procedures and guidelines developed with regard to environmental compliance and will be held contractually responsible for failure to comply.

Project staff and contractors must also be aware that they are accountable for any of their actions that result in significant environmental matters, including matters that arise from non-routine regulatory agency inspections or investigations, and, when necessary, Project staff and contractors shall be responsible for taking necessary corrective action(s). They will be required to immediately report these actions to the Owner's Project Manager and Environmental Manager.

The EMP is included as Appendix to the EIA. The EMP contains a description of the management system that will be utilized to avoid or minimize impacts to the environment.

The EMP contains the following management plans, monitoring plans, and operation and maintenance manuals:

- Attachment 1: Construction Spill Prevention, Control and Countermeasures (SPCC) Plan;
- Attachment 2: Integrated Spill Control, Response, Pollution Prevention and Stormwater Management Plan;
- Attachment 3: Contractor Health and Safety Plan;
- Attachment 4: Sediment, Erosion and Stormwater Control Plan;
- Attachment 5: Golf Course Management Plan;
- Attachment 6: Contaminated Sediment and Soil Management Plan;
- Attachment 7: Waste Minimization Plan;
- Attachment 8: Construction Management Plan;
- Attachment 9: Worker Safety Plan;
- Attachment 10: Emergency Plan;
- Attachment 11: Security Plan; and,
- Attachment 12: Invasive Species Management Plan

The EMP will be a living document that will be continually updated throughout construction and operation of the project to ensure environmental hazards are controlled to the maximum extent practicable.

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TABLES

Table 1
Master Parcel Plan Description
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Area (Acres)	Parcel Elements	Quantity	Units
1	Hotel Podium	11.6	Casino Hotel	1,060	Rooms
			Rosewood Hotel	100	Rooms
			Hyatt Hotel	600	Rooms
			Morgans Hotel	200	Rooms
			Hotel Condo	320	Units
			Casino Floor	100,000	sf
			Entertainment Village	200,000	sf
2	Convention Center/Residential/Site	6.0	Convention Center	300,000	sf
			Residential	61	Units
3	Parking	1.2			
4	Central Utility Plant	1.0		1	Unit
5	Future Development	5.1	Residential	85	Units
			Retail/Restaurant	9,563	sf
6	Convention Center Site	4.1	Future Expansion Area		
7	Future Development	2.5	Residential	83	Units
			Retail/Restaurant	9,375	sf
8	Main Lake	3.8			
9	Show Lake	2.5			
10	Rosewood Canal	0.8			
11	Future Development & Hotel Expansion	3.0	Casino Hotel Expansion	500	Rooms
12	Golf Course Canal	1.0	Future canal		
13	Future Development	2.9	Residential	96	Units
			Retail/Restaurant	10,875	sf
14	Future Development	0.9	Residential	36	Units
15	Future Development	1.8	Residential	72	Units
16	Future Canal	1.9			
17	Future Development	0.5	Retail	1,875	sf
18	Future Development	8.8	Hotel	1,000	Rooms
			Residential	150	units
19	Relocated Uses	1.7	Bank	10,641	sf
20	Commercial District	4.3	Office	30,000	sf
			Bank and Retail	17,832	sf
			Police and Fire Station	13,000	sf
21	Future Development	6.5	Office/Residential	73,860	sf
			Retail	22,863	sf
22	Future Development	7.6	Residential/hotel	251	Units
			Retail/Restaurant	28,500	sf
23	Convention Center Expansion/Future Devp	2.5	Convention Center	111,000	sf
24	Future Development	4.3	Residential	142	Units
			Retail/Restaurant	16,125	sf
25	Entertainment Show Canal	0.8			
26	Beach	16.9	Pools, Pavilions, Patios	10,000	sf
27	Cable Beach Resort Site	21.2	Sheraton Hotel	700	Rooms
			Wyndham Resort	559	Rooms

Table 1
Master Parcel Plan Description
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Area (Acres)	Parcel Elements	Quantity	Units
28	Future Canal	2.9			
	Jack Nicklaus 18-Hole Golf Course	229.3	Golf Course and Practice Area	229.3	Acres
			Clubhouse and Restaurant	12,000	sf
			Golf Maintenance Building	10,000	sf
			Future Residential Sites	600	Units
	Central Services Facility	70	Reverse Osmosis Plant (If Needed)	1	Unit
			Wastewater Treatment Plant (If Needed)	1	Unit
			Laundry Facility	88,000	sf
			Warehouse	150,000	sf
			Parking lot with Employee Services	1	Unit
			Nursery	1	Unit
			Fuel Station	1	Unit
			Standby Generating Facility	1	Unit

Table 2
Approximate Number of Employees that will be Accommodated at the Commercial Village Facilities
Baha Mar Resort Project
Nassau, Bahamas

Building	Approx. Employees
Scotiabank	30
Fidelity Bank	15-20
Police & Fire Station	35-40
Baha Mar Development	100
Commonwealth Bank	40-50

Table 3
Estimated Parking Requirements for Relocated Facilities within the Commercial Village
Baha Mar Resort Project
Nassau, Bahamas

Building	Approx. gross sf	Ratio	Total required
Scotiabank	12,780 sf	1/250	50
Fidelity Bank	4,800 sf	1/250	19
Police & Fire Station	13,000 sf	1/300	43
Baha Mar Development	30,000 sf	1/300	100
Commonwealth Bank	10,641 sf	1/250	66 existing

Table 4
Design Wastewater Demands
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Area (Acres)	Parcel Elements	Quantity	Units	Unit Flow Rate (GPD)	Total Flow (GPD)
1	Hotel Podium	11.6	Casino Hotel	1,060	rooms	350	371,000
			Rosewood Hotel	100	rooms	350	35,000
			Hyatt Hotel	600	rooms	350	210,000
			Morgans Hotel	200	rooms	350	70,000
			Hotel Condo	320	units	400	128,000
			Casino Floor	100,000	sf	0.20	20,000
			Entertainment Village	200,000	sf	0.50	100,000
2	Convention Center/Residential/ Site	6	Convention Center	300,000	sf	0.15	45,000
			Condominium	61	units	400	24,400
3	Parking Structure	1.2				N/A	N/A
4	Central Utility Plant	1		1	unit	5,000	5,000
5	Future Development	5.1	Residential	85	units	400	34,000
			Retail/Restaurant	9,563	sf	0.10	956
6	Convention Center Site	4.1	Future Expansion Area				TBD
7	Future Development	2.5	Residential	83	units	400	33,200
			Retail/Restaurant	9,375	sf	0.10	938
8	Main Lake	3.8				N/A	N/A
9	Show Lake	2.5				N/A	N/A
10	Rosewood Canal	0.8				N/A	N/A
11	Future Development & Hotel Expansion	3	Casino Hotel Expansion	500	rooms	350	175,000
12	Golf Course Canal	1	Future canal			N/A	N/A
13	Future Development	2.9	Residential	96	units	400.00	38,400
			Retail/Restaurant	10,875	sf	0.10	1,088
14	Future Development	0.9	Residential	36	units	400.00	14,400
15	Future Development	1.8	Residential	72	units	400.00	28,800
16	Future Canal	1.9				N/A	N/A
17	Future Development	0.5	Retail	1,875	sf	0.10	188
18	Future Development	8.8	Hotel	1000	rooms	350	350,000
			Residential	150	units	400	60,000
19	Relocated Uses	1.7	Bank	10,641	sf	0.10	1,064
20	Commercial District	4.3	Office	30,000	sf	0.10	3,000
			Bank and Retail	17,832	sf	0.10	1,783
			Police and Fire Station	13,000	sf	0.10	1,300
21	Future Development	6.5	Office/Residential	73,860	sf	0.10	7,386
			Retail	22,863	sf	0.10	2,286

Table 4
Design Wastewater Demands
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Area (Acres)	Parcel Elements	Quantity	Units	Unit Flow Rate (GPD)	Total Flow (GPD)
22	Future Development	7.6	Residential/Hotel	251	units	400.00	100,400
			Retail/Restaurant	28,500	sf	0.10	2,850
23	Convention Center Expansion/ Future Development	2.5	Convention Center	111,000	sf	0.10	11,100
24	Future Development	4.3	Residential	142	units	400.00	56,800
			Retail/Restaurant	16,125	sf	0.10	1,613
25	Entertainment Show Canal	0.8				N/A	N/A
26	Beach	16.9	Pools, Pavilions, Patios	10,000	sf	0.20	2,000
27	Cable Beach Resort Site	21.2	Sheraton Hotel	700	rooms	350.00	245,000
			Wyndham Resort	559	rooms	350.00	195,650
28	Future Canal	2.9				N/A	N/A
	Jack Nicklaus Golf Course	229	18-Hole Golf Course	229	Acres	N/A	N/A
			Clubhouse and Restaurant	12,000	sf	0.1	1,200
			Golf maintenance building	10,000	sf	0.1	1,000
			Residences	600	units	400	240,000
	Central Services Facility	70	Reverse Osmosis Plant (If Needed)	1	unit	2,000	2,000
			Wastewater Treatment Plant (If Needed)	1	unit	2,000	2,000
			Laundry Facility	1	unit	164,000	164,000
			Parking lot, Nursery, Fuel Station, Standby Generating Facility, Warehouse			TBD	TBD
TOTAL							**2,787,802**

Table 5
Design Potable Water Flows
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Area (Acres)	Parcel Elements	Quantity	Units	Unit Flow Rate (GPD)	Total Flow (GPD)
1	Hotel Podium	11.6	Casino Hotel	1,060	rooms	350	371,000
			Rosewood Hotel	100	rooms	350	35,000
			Hyatt Hotel	600	rooms	350	210,000
			Morgans Hotel	200	rooms	350	70,000
			Hotel Condo	320	units	400	128,000
			Casino Floor	100,000	sf	0.20	20,000
			Entertainment Village	200,000	sf	0.50	100,000
2	Convention Center/ Residential/Site	6	Convention Center	300,000	sf	0.15	45,000
			Residential	61	units	400	24,400
3	Parking Structure	1.2				N/A	N/A
4	Central Plant	1		1	unit	5,000	5,000
5	Future Development	5.1	Residential	85	units	400	34,000
			Retail/Restaurant	9,563	sf	0.10	956
6	Convention Center Site	4.1	Future Expansion Area				TBD
7	Future Development	2.5	Residential	83	units	400	33,200
			Retail/Restaurant	9,375	sf	0.10	938
8	Main Lake	3.8				N/A	N/A
9	Show Lake	2.5				N/A	N/A
10	St. Regis Canal	0.8				N/A	N/A
11	Future Development & Hotel Expansion	3	Casino Hotel Expansion	500	rooms	350	175,000
12	Golf Course Canal	1	Future canal			N/A	N/A
13	Future Development	2.9	Residential	96	units	400.00	38,400
			Retail/Restaurant	10,875	sf	0.10	1,088
14	Future Development	0.9	Residential	36	units	400.00	14,400
15	Future Development	1.8	Residential	72	units	400.00	28,800
16	Future Canal	1.9				N/A	N/A
17	Future Development	0.5	Retail	1,875	sf	0.10	188
18	Future Development	8.8	Hotel	1000	rooms	350	350,000
			Residential	150	units	400	60,000
19	Relocated Uses	1.7	Bank	10,641	sf	0.10	1,064
20	Commercial	4.3	Office	30,000	sf	0.10	3,000

Table 5
Design Potable Water Flows
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Area (Acres)	Parcel Elements	Quantity	Units	Unit Flow Rate (GPD)	Total Flow (GPD)
	District						
			Bank and Retail	17,832	sf	0.10	1,783
			Police and Fire Station	13,000	sf	0.10	1,300
21	Future Development	6.5	Office/ Residential	73,860	sf	0.10	7,386
			Retail	22,863	sf	0.10	2,286
22	Future Development	7.6	Residential/Hotel	251	units	400.00	100,400
			Retail/Restaurant	28,500	sf	0.10	2,850
23	Convention Center Expansion/ Future Devp	2.5	Convention Center	111,000	sf	0.10	11,100
24	Future Development	4.3	Residential	142	units	400.00	56,800
			Retail/Restaurant	16,125	sf	0.10	1,613
25	Entertainment Show Canal	0.8				N/A	N/A
26	Beach	16.9	Pools, Pavilions, Patios	10,000	sf	0.20	2,000
27	Cable Beach Resort Site	21.2	Sheraton Hotel	700	rooms	350.00	245,000
			Wyndham Resort	559	rooms	350.00	195,650
28	Future Canal	2.9				N/A	N/A
	Jack Nicklaus Golf Course	229	18-Hole Golf Course	229	Acres	N/A	N/A
			Clubhouse and Restaurant	12,000	sf	0.1	1,200
			Golf maintenance building	10,000	sf	0.1	1,000
			Residences	600	units	400	240,000
	Central Services Facility	70	Reverse Osmosis Plant (If Needed)	1	unit	2,000	2,000
			Wastewater Treatment Plant (If Needed)	1	unit	2,000	2,000
			Laundry Facility	1	unit	164,000	164,000
			Parking lot, Nursery, Fuel Station, Standby Generating Facility, Warehouse			TBD	TBD
TOTAL							**2,787,802**

Table 6
Estimated Electrical Energy Requirements
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Area (Acres)	Parcel Elements	Quantity	Units	Connected Load (KW)	Demand Load (KW)
1	Hotel Podium	11.6	Casino Hotel	1,060	Rooms	4,498	1,180
			Rosewood Hotel	100	Rooms	3,472	626
			Hyatt Hotel	600	Rooms	2,814	685
			Morgans Hotel	200	Rooms	3,942	627
			Hotel Condo	320	Units	1,110	550
			Podium	524,653	sf	8,365	4,182
2	Convention Center/ Residential Site	6.0	Convention Center	300,000	sf	5,198	2,599
			Residential	61	Units		
4	Central Plant	1.0		1	Unit	7,000	5,600
19	Relocated Uses	1.7	Bank	10,641	sf	300	240
20	Commercial District	4.3	Office	30,000	sf		
			Bank and Retail	17,832	sf		
			Police and Fire Station	13,000	sf		
			Retail/Restaurant	16,125	sf		
27	Cable Beach Resort Site	21.2	Sheraton Hotel	700	Rooms	5,500	1,380
			Wyndham Resort	559	Rooms		
	Jack Nicklaus 18-Hole Golf Course	229.3	Golf Course and Practice Area	229.3	Acres	2,100	850
			Clubhouse and Restaurant	12,000	sf		
			Golf Maintenance Building	10,000	sf		
			Future Residential Sites	600	Units		
	Central Services Facility	70	Reverse Osmosis Plant (If Needed)	1	Unit	700	560
			Wastewater Treatment Plant (If Needed)	1	Unit	300	240
			Laundry Facility	88,000	sf	300	240
			Warehouse	150,000	sf	150	120
			Parking lot with Employee Services	1	Unit	150	120
			Nursery	1	Unit	15	5
			Fuel Station	1	Unit	10	3
			Standby Generating Facility	1	Unit	N/A	N/A
	Pools, Pavilions, Patios					300	240
	Water Features					400	320
	Canal Circulation		165,000 cubic yards, 3 day turn-over, 25' pumping head = 75 kw			75	60
	Irrigation Pumping		150 Hp for Golf, 150 Hp for Site, operates 1/3 of annual hours.			200	160
	Site Lighting					9,125	4,280
Total						**56,024**	**24,867**

Table 7
Water Re-Use and Water Balance
Baha Mar Resort Project
Nassau, Bahamas

		Phase I Development - 2010	Total Build Out Development - 2015
Potable Water Supply		1,868,397	2,787,802
Reuse from WWTP		1,868,397	2,787,802
Salt water for golf course		277,778	277,778
Total Production		**4,014,572**	**5,853,382**
Potable demand - non-golf course, non-irrigation		1,868,397	2,787,802
Potable demand – golf course		-	-
Salt water demand – golf course		277,778	277,778
Reuse demand – golf course		722,222	722,222
Irrigation demand – site		399,000	463,500
Irrigation demand – roads		100,000	100,000
Total Demand		**3,367,397**	**4,351,302**

Notes:
1. All flows are in gallons per day US, annual average daily flow.
2. Ultimate development numbers are based upon Tables 4 and 5. Actual numbers will be updated based on final design.

Table 8
Comparison of Project Alternatives
Baha Mar Resort Project
Nassau, Bahamas

	Meets Project Selection Criteria		
Required Project Elements	**Proposed Project**	**Refurbish Alternative**	**Alternate Undeveloped Location**
Location on a world class beach in a recognized resort Island location.	Yes	Yes	Yes
Proximity to an International Airport that provides a direct connection from the airport to the resort in 15 minutes or less.	Yes	Yes	No
Regenerate the Cable Beach Area	Yes	No	No
Optimizes Baha Mar Resorts existing assets	Yes	No	No
A “Las Vegas Style” Casino	Yes	Yes	Yes
A Convention Center	Yes	No	Yes
On site resort amenities including pools and water features, restaurants, retail and craft shops, entertainment venues, and other attractions.	Yes	No	Yes
A wide variety of hotel rooms and hotel types and sizes for resort, casino, and convention guests	Yes	No	Yes
A signature golf course as part of the resort.	Yes	No	Yes
Utilize Existing Infrastructure	Yes	Yes	No
Increase Local Employment during Construction	Yes	Limited	Yes
Increase Local Employment During Operation	Yes	No	Yes
Increased tax revenues for The Bahamas	Yes	No	Yes
Increase income for the local economy	Yes	No	Yes

Table 9
Qualitative Comparison of Central Service Facility Alternatives
Baha Mar Resort Project
Nassau, Bahamas

	CSF at Volpi Parcel	**CSF at Christie Parcel**	**CSF at Gladstone Road**
Water Capacity Demands to be met	Yes	Yes	Yes
Sanitary Capacity Demands to be met	Yes	Yes	Yes
Property Available	Yes	No	Yes
Degree of visibility (from 1 mile distance)	Low	Low	Low
Existing landscape quality	Good/ Moderate Development	Good/ Moderate Development	Good/Low Development
Compatibility with Existing land use	Commercial/ Residential/ Natural	Residential/ Natural	Industrial/ Natural
Surrounding land uses	Commercial/ Residential	Commercial/ Residential	Commercial/ Undeveloped
Filling Requirements	Large amounts of fill required	Large amounts of fill required	Possible fill for site activity
Wetland Areas	High	Low	Low
Vehicular traffic	Moderate	Moderate	Low
Flood Potential	Moderate	Moderate	Moderate
Adequate Space to Conduct All Operations	Limited	Limited	Adequate

Table 10
Construction Methods
Baha Mar Resort Project
Nassau, Bahamas

Land Use	SF	Units	Opening Date	Construction Method	Excavation Method	Excavation Depth	Dewatering Method
Sheraton	315,000	700	Dec-07	Interior Renovation of existing Hotel	N/A	N/A	N/A
Wyndham	382,500	559	Apr-08	Interior Renovation of existing Hotel	N/A	N/A	N/A
Hyatt	331,000	600	Dec-14	19- Story Structural Concrete Frame, The foundation of the hotel is supported by the Podium structural system. The skin of the building will be a composite of masonry stucco and glass. Or panelized system of composite material EIFS and glass	Machine excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
Casino Hotel	507,000	1,060	Oct-14	22-Story Structural Concrete Frame. The foundation of the hotel is supported by the Podium structural system. The skin of the building will be a composite of masonry stucco and glass. Or panelized system of composite material EIFS and glass	Machine excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to40' deep	Groundwater will be pumped as required and injected into a disposal well
Morgans Hotel	153,000	200	Dec-14	11-Story Structural Concrete Frame. The foundation of the hotel is independent of the Podium structural system. The skin of the building will be a composite of masonry stucco and glass. Or panelized system of composite material EIFS and glass	Machine excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
Rosewood Hotel	177,000	100	Dec-14	8- Story Structural Concrete Frame. The foundation of the hotel is supported by the Podium structural system. The skin of the building will be a composite of masonry stucco and glass. Or panelized system of composite material EIFS and glass	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
Podium	764,855		Dec 14-	2-Story Structural Concrete Frame. The Podium houses all Support and Front of House activities inclusive of Restaurants Casino, Club, Retail, Spa. The foundation of the Podium supports the 4- Hotels The roof of the Podium shall be a "garden type" finish inclusive of hard and soft landscaping	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
100 Morgans Hotel Condo Units	150,000	100	Dec-14	7- Story Structural Concrete Frame. The foundation of the hotel is supported by the Podium structural system. The skin of the building will be a composite of masonry stucco and glass. Or panelized system of composite material EIFS and glass	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
100 Rosewood Hotel Condo Units	150,000	100	Dec-14	13-Story Structural Concrete Frame. The foundation of the hotel is supported by the Podium structural system. The skin of the building will be a composite of masonry stucco and glass. Or panelized system of composite material EIFS and glass	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well

Table 10
Construction Methods
Baha Mar Resort Project
Nassau, Bahamas

Land Use	SF	Units	Opening Date	Construction Method	Excavation Method	Excavation Depth	Dewatering Method
Hyatt Hotel Condo Units	331,000	120	Dec-14	19-Story Structural Concrete Frame, The foundation of the hotel is supported by the Podium structural system. The skin of the building will be a composite of masonry stucco and glass. Or panelized system of composite material EIFS and glass	Machine excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
229 Residential units	196,500	61	Dec-14	3-Story Structural Concrete Frame. The Foundation of the Time Share is supported by the Convention Center Structural System. The skin of the building will be a composite of Glass Masonry and Stucco	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
Casino (excl restaurant/ kitchen)	67,908		Dec-14	1-Level Structural Concrete Frame. The Casino is part of the Podium structure The skin of the building will be a composite of Glass and will be open areas adjacent to Restaurants, Cafes, retail, etc Masonry and Stucco. The Interior will include high level of lighting, security and power.	Part of Podium Construction	Part of Podium Construction	N/A
Club	40,000		Dec-14	The Club is a part of the Podium Structure. It is a "disco/nite club" environment and the construction will be applicable to the intent of the use.	Part of Podium Construction	Part of Podium Construction	N/A
Spa	32,000		Dec-14	The Spa is part of the Podium Structure	Part of Podium Construction	Part of Podium Construction	N/A
Convention Center	321,473		Dec-14	2-Level Composite Concrete and Structural Steel. The skin of the building will be a composite of Concrete, Masonry, Glass and Stucco There will be one level of car parking in the lower level of the Convention Center	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
Entertainment Village	200,000		Dec-14	One story building which is part of the Podium structure. The skin will be multiple finishes due to the different theming of each retail ownership. The retail village sits within the Morgans" hotel footprint. There will be some freestanding structures of typical construction adjacent to the Morgans Hotel.	Part of Podium Construction	Part of Podium Construction	N/A
Fire/Police/ Bank relocations	60,832		Dec-11	See previous submitted Text	Machine Excavation	The excavation will vary between 3'-0"to 6'-0" utilizing shallow footing foundations	Groundwater will be pumped as required and injected into a disposal well
Central Utility Plant	43,560		Jul-13	One Story stand alone building. The Structure will be a composite of concrete and steel. The exterior skin shall be a composite of block, metal, glass and stucco.	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep Installation of	Groundwater will be pumped as required and injected into a disposal well

Table 10
Construction Methods
Baha Mar Resort Project
Nassau, Bahamas

Land Use	SF	Units	Opening Date	Construction Method	Excavation Method	Excavation Depth	Dewatering Method
						300' deep wells	
Salt Water Canals and Lagoons	435,600		Dec-14	Salt Water lakes and canals approximately 6'-0" to 10'-0" deep. The lakes and canals vary in width. The excavated material will be utilized as fill for the overall development. There will be Fresh water pools and an interconnecting river ride. The fresh water structures will be concrete construction. The salt water canals and lakes will be a composite of concrete, steel and sand	Machine Excavation	The excavation of the Salt Water lakes and canals will be between 6'-0" and 10'-0" deep. The excavation of the Fresh Water structures will vary between 3'-0" and 7'-0" deep. Installation of sheet piling at the perimeter of the salt water lakes and canals or slope excavation with an applicable surface treatment	Dewatering of the Salt Water lakes and canals will be performed utilizing sump pumps and discharging to either a previously excavated section of lake, canal or a discharge well.
RO Plant (if need)	50,000		June-14	One story stand along building. The structure will be a composite of concrete and steel. The exterior skin shall be a composite of steel and block.	Machine Excavation	The excavation will vary between 3'-0" to 6'-0" utilizing shallow footing foundations Installation of 300' deep wells	Groundwater will be pumped as required and injected into a disposal well
Golf Course			Dec-13	229 acre 18 hole golf course. The development will utilize paspalum grass which is a salt resistant strain of grass for the fairways and roughs. Bermuda grass will be used on tees and greens which requires fresh water. The golf course will construct several lakes for irrigation, which may be lined. A two story club house will be constructed of concrete steel, block and stucco. A one story maintenance facility will be constructed of concrete and steel	Machine Excavation	The golf course will be graded to be a balanced site. The excavation for the lakes will vary between 6'-0" and 10'-0" deep	Groundwater will be pumped as required and injected into a disposal well
Laundry	88,000		Jun-14	One story stand alone structure. The structure will be a composite of concrete and steel. The exterior shall be a composite of steel and block.	Machine excavation	The excavation will vary between 3'-0"to 6'-0" utilizing shallow footing foundations	Groundwater will be pumped as required and injected into a disposal well
Warehouse	150,000		Jun-14	One story stand alone structure. The structure will be a composite of concrete and steel. The exterior shall be a composite of steel and block	Machine excavation	The excavation will vary between 3'-0"to 6'-0" utilizing shallow footing foundations	Groundwater will be pumped as required and injected into a disposal well t
WWTP (if needed)			June-14	One story stand alone structure. The structure will be a composite of concrete and steel. The exterior shall be a composite of steel and block	Machine excavation	The excavation will vary between 3'-0" to 6'-0" utilizing shallow footing foundations	Groundwater will be pumped as required and injected into a disposal well

Table 10
Construction Methods
Baha Mar Resort Project
Nassau, Bahamas

Land Use	SF	Units	Opening Date	Construction Method	Excavation Method	Excavation Method	Excavation Method
Roads			Sep-12	2.5 miles double carriage way road construction 1.5 mile of reroute of West Bay street and 1mile of Gladstone Road connector. Road shall be constructed of Asphalt material with concrete curbs and sidewalks The roads shall be landscaped on both sides of the road including landscaping in the median. The scope of the Road work shall also include installation of Water, Sewer Electrical, Phone and cable utilities	Machine Excavation	The excavation will vary between 3'-0"to 6'-0" utilizing shallow footing foundations	Groundwater will be pumped as required and injected into a disposal well
Bridges			Dec-14	There will be 3-bridges constructed in the core project area. The main bridge will enter the center of the project and will span over the main lake. The other two bridges shall span over the canals and will be the main entrance to the Rosweood Hotel and the Morgan Hotel. The bridges will be constructed utilizing poured concrete or a "Conspan" precast concrete material.	Machine Excavation	The excavation of the foundation will be relative to the depth of the auger cast piles which will be 20' to 40' deep	Groundwater will be pumped as required and injected into a disposal well
Core Project Road and Parking			Dec-14	The core project roads and parking lots shall be constructed of Asphalt material with concrete curbs and sidewalks. The roads and parking lots shall also be constructed to collect rainfall and distribute to lakes at the golf course	Machine	The excavation will vary between 3'-0" to 6'-0" for utility installation	Groundwater will be pumped as required and injected into a disposal well

Note:
1. All excavated material will be utilized on the project.

Table 11
Comparison of Environmental Consequences
Baha Mar Resort Project
Nassau, Bahamas

	Proposed Project	Refurbishment Alternative	Alternate Location Alternative
Area coverage	686 acres	300 acres	650 acres
Percent of Project in Developed Areas	44%	100%	0%
Percent of Project in Undeveloped Areas	56%	0%	100%
New Roadway Construction	Realignment of West Bay Street	No roadway construction	New roadways needed to reach remote site
Power Generation Impact	20 MW back-up, Removal of TEP	TEP and decentralized back-up generators	Independent power generation required
Additional Construction Jobs Created	Approximately 5000	Negligible	Approximately 5000
Additional Permanent Jobs Created	Direct – 2,500	0	Direct – 2,500
Shoreline Impacts	Jetty Removal	Jetty Remains	Jetty Remains, new development along currently undeveloped shoreline

Table 12
Key Government Organizations and Legislation
Baha Mar Resort Project
Nassau, Bahamas

Government authority	Authorizing Act	Charge
MINISTRY OF HEALTH AND SOCIAL DEVELOPMENT Department of Environmental Health Services	The Environmental Health Act, Chapter 217 and the Environmental Health Regulations (1998)	Coastal environment including marinas and harbors, land use plans and physical planning, pollutant discharge and permitting.
MINISTRY OF AGRICULTURE, AND MARINE RESOURCES Departments of Agriculture and Fisheries.	Fisheries Resource Act Chapter 225 (1993).	Protection of fisheries, wildlife, plants, and birds; veterinary services; coastal environment: dredging between low and high water mark; oil pollution assessment and remediation; establishing marine reserves; climate change
MINISTRY OF WORKS AND TRANSPORT Department of Physical Planning, Town Planning Council, and Building Control Unit	Conservation and Protection of the Physical Environment of The Bahamas Act (No. 12) 1997 Public Works, Chapter 21 Town Planning Act R.S. 1965	Water use as it relates to land use and building plans, water sewerage, approves permits for new structures after review, harvesting of protected trees species, excavation and removal of sand from beaches & dunes.

Table 13
Saffir-Simpson Tropical Cyclone Scale
Baha Mar Resort Project
Nassau, Bahamas

Category	Mean Pressure (mb)	Sustained Wind Speeds (m/s)
1	980 or more	33.0 – 42.0
2	965 – 979	43.0 – 49.2
3	945 – 964	49.3 – 58.1
4	920 – 944	58.2 – 69.5
5	Less than 920	> 69.5

Table 14
Predicted Wave Height Calculations for Cable Beach
Baha Mar Resort Project
Nassau, Bahamas

Wave Parameter	Value	Absolute Range	Range of Final Values	Notes
10-Year Wave Runup	0.6 feet		0.50 – 0.63 feet	Average of results from FEMA RUNUP model assuming ±5% uncertainty in significant wave height and period.
100-Year Wave Runup	1.3 feet		1.00 – 1.71 feet	Same as above
10-Year Wave Setup	0.8 feet	Not computed		Average of results from FEMA RUNUP model assuming ±5% uncertainty in significant wave height and period.
100-Year Wave Setup	0.8 feet	Not computed		Same as above
10-Year Overland Flow	At shoreline – 9.5 feet msl At 27 feet – 8 feet msl At 80 feet – no wave effect	Not computed		Computed using FEMA WHAFIS3 program.
100-Year Overland Flow	Elevation as function of distance from shore: At shoreline – 13 feet msl At 27 feet inland – 11 feet msl At 75 feet – 9.5 feet msl Within inland low-elevation zone – 8.5 feet msl	Not computed		Same as above
10-year flood elevation (overall)	6.3 feet msl Higher elevation at shoreline			Based on maximum of wave setup, wave runup, and overland flow – see figure below
100-year flood elevation (overall)	8.5 feet msl 9 feet and higher within 100 feet of shore			Based on maximum of wave setup, wave runup, and overland flow – see figure below

Table 15
Sea Level Rise Factors
Baha Mar Resort Project
Nassau, Bahamas

Climate Change Induced Sea Level Rise by 2050		0.14 feet to 1.2 feet by 2050		This estimate is based upon internationally accepted projected increases in sea level due to thermal expansion of the ocean and melt of ice on land. While there is now evidence of the intensity of hurricanes increasing due to climate change, this factor is not included in the analysis because of considerable uncertainty in the future magnitude of the intensity increases. Our projections also do not consider the recently reported possible increases in ice melt compared to earlier estimates.

Table 16
Predicted Stillwater and Storm Surge Elevations at Cable Beach
Baha Mar Resort Project
Nassau, Bahamas

Stillwater Parameter	Value	Absolute Range	Range of Final Values	Notes
10-Year Storm Surge	4 feet msl	+/- 1.4 feet (this is mean absolute error (MAE) based upon past use of the SLOSH model at 523 other sites. MAE is the average of the absolute values of the differences of predicted and actual.	2.6 ft msl – 5.4 ft msl	Based upon joint probabilities of hurricanes of various categories traveling various directions and the estimated elevations at Cable Beach resulting from such storms. The elevations were the "Maximum Envelopes of Water" (MEOW) elevations reported in the Storm Surge Atlas for the Northern and Central Bahamas by Rolle and the US National Hurricane Center for a storm of a specified category and direction.
100-Year Storm Surge	6 feet msl	+/- 1.4 feet	4.6 feet msl– 7.4 feet msl	See above
Tidal Influence	+1.5 feet (3.1 feet is Spring Range at Nassau, average range occurring at time of Spring Tides, from NOAA)	+0.5 feet (reviewing tidal predictions for Nassau, maximum range sometimes 4 feet)	1.5 feet – 2.0 feet	Tides appear to be relatively symmetrical around msl at Settlement Point so assumed also case at Nassau.

Table 17
Surface Water and Sediment Sampling Results – Golf Course Ponds
Baha Mar Resort Project
Nassau, Bahamas

Analyte	Pond 1 Result	Pond 2 Result	Units
Surface Water			
Total Suspended Solids	45	73	mg/L
Total Volatile Suspended Solids	36	98	mg/L
Chloride	870	750	mg/L
Nitrogen, Kjeldahl	3.0	1.7	mg/L
Phosphorus, Total	0.12	0.25	mg/L
Total Organic Carbon	16	10	mg/L
Nitrogen, Total	3.0	1.7	mg/L
Dissolved Organic Carbon	14	7.1	mg/L

Table 18
Summary of Existing Air Emissions Sources
Baha Mar Resort Project
Nassau, Bahamas

Location	Type	Make	Model Number	Age of Unit	BTU/hr	Capacity	Capacity Units	Capacity (HP)	Fuel Type
Sheraton	Emergency Generator	Katolight	D1500FR23	5		1500	KW	2011.5	Diesel
Sheraton	Emergency Generator	Cummings	VT-1710-GS	23		500	KW	670.5	Diesel
Sheraton	Emergency Generator	Caterpiller	SSR-4	22		470	KW	630.27	Diesel
Wyndham Resort	Emergency Generator	Cummings	6CT8.3GC	16		125	KW	167.625	Diesel
Wyndham Resort	Emergency Generator	Cummings	6CT8.3GC	16		125	KW	167.625	Diesel
Wyndham Resort	Emergency Generator	Cummings	CC434D	16		250	KW	335.25	Diesel
Wyndham Resort	Emergency Generator	Caterpiller	PN5N5075 (SR-4)	16		300	KW	402.3	Diesel
Wyndham Resort	Emergency Generator	Cummings	PN3052039	16		750	KW	1005.75	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3412	18		400	KW	536.4	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3512	14		500	KW	670.5	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3508	14		900	KW	1206.9	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3516	8		1600	KW	2145.6	Diesel
Total Energy Plant	Boiler	Cleaver Brooks	100-80 (Ser. L.80192)	26	3,347,000	3,347,000	BTU/hr	3.347	Diesel
Wyndham Resort	Boiler	Cleaver Brooks	100-100		418,500	100	HP	0.419	Diesel
Wyndham Resort	Boiler	Kewanne	H35-100.0			100	HP	0.318	Diesel
Sheraton	Boiler	Fulton	ICS-60			2070	MD LBS STEAM/Hr	0.191	Diesel
Sheraton	Boiler	Fulton	ICS-60			2070	MD LBS STEAM/Hr	0.191	Diesel
Sheraton Energy Plant	Boiler	Cleaver Brooks	200-150 (Ser L-88564)	18	3,277,000	3,277,000	BTU/hr	3.277	Diesel
Sheraton Energy Plant	Boiler	Cleaver Brooks	CB 200-250	18		250	HP	0.795	Diesel

Table 19
Summary of Background Noise Levels at the Site (L90)
Baha Mar Resort Project
Nassau, Bahamas

Receptor Location	Daytime (dBA)	Nighttime (dBA)
Location 1	38	48
Location 2	40	40
Location 3	43	40
Location 4	32	40

Table 20
At Risk Species That May Potentially Occur in the Bahamas
Baha Mar Resort Project
Nassau, Bahamas

Scientific Name	Common Name	Risk Category	Habitat
Cesonia irvingi	Key Gnaphosid Spider	At risk, data deficient	Terrestrial
Charadrius melodus	Piping plover	Vulnerable	Near shore, beaches
Coccothrinax inaguensis	Thatch palm	At risk, data deficient	Coastal areas in scrub on sandy or limestone soils
Dendrocygna arborea	Black-billed wood-duck	Vulnerable	Coastlines, lagoons, estuaries, FW bodies, mangroves, swamps, marshes, bogs
Dendroica kirtlandii	Kirtland's warbler	Vulnerable	Shrublands, temperate mixed forest
Epicrates striatus fosteri	Bimini boa	Vulnerable/Threatened?	Forests
Geocapromys ingrahami	Bahamian hutia	Vulnerable	Lowland tropical rainforest, rocks, and shrublands
Guaiacum officinale	Commoner lignum vitae	Endangered	Coastland areas, lowland dry forest, woodland and thickets
Guaiacum sanctum	Hollywood lignum vitae	Endangered	Lowland dry forest
Mustelis canis	Dusky smoothhound	Low risk	Continental shelf, oceanic
Swietenia mahagoni	American mahogany	Endangered	Dry or moist forest, often on limestone
Tachycineta cyaneoviridis	Bahama swallow	Vulnerable	Swamps, marshes, bogs, monsoon and dry forest, urban
Trachemys steinegeri	Central Antillean slider	Low risk	Terrestrial, fresh water
Trachemys spp. (includes T. terrapen)	Freshwater turtles	Status unknown; at least one species introduced; one possible endemic	Terrestrial, freshwater
Zanthoxylum flavum	Yellow sanders	Vulnerable	Thickets and woodland on rocky limestone

Table 21
Avifaunal Species and Individual Abundance and Status
Core Project Site, New Providence January 16 to January 20, 2006
Baha Mar Resort Project
Nassau, Bahamas

Total Individuals Observed	1,190
Total Species Observed	65
Total Permanent Breeding Resident Individuals	886
Total Winter Breeding Resident Individuals	324
Total Permanent Breeding Resident Species	37
Total Winter Breeding Resident Species	28

Table 22
Avifaunal Species and Individual Abundance and Status
Gladstone Road Parcel, New Providence July 31 to August 4, 2006
Baha Mar Resort Project
Nassau, Bahamas

Total Individuals Observed	84
Total Species Observed	16
Total Permanent Breeding Resident Individuals	72
Total Summer Breeding Resident Individuals	12
Total Permanent Breeding Resident Species	14
Total Summer Breeding Resident Species	2

Table 23
Existing AM Peak Hour Capacity Analysis Results
Baha Mar Resort Project
Nassau, Bahamas

		Ratio of Flow to Capacity (by approach)				
Junction Name	**Junction Control**	**SB**	**WB**	**NB**	**EB**	**Junction Performance**
JFK Dr / Gladstone Rd	Signalised	n/a	**0.89**	**0.92**	0.76	Approaching capacity
JFK Dr / Prospect Rd/Tonique Williams-Darling Highway	Signalised	**1.02**	0.37	0.68	**0.95**	Over capacity
Prospect Rd / Prospect Ridge Road / Sandford Dr	Signalised	0.24	0.14	**0.**76	0.69	Under capacity
West Bay St / Atlantic Ave	Roundabout	n/a	0.40	0.39	0.20	Under capacity
West Bay St / Skyline Dr	Roundabout	n/a	0.39	0.20	0.31	Under capacity
West Bay St / Prospect Rd	Roundabout	n/a	0.31	0.53	0.31	Under capacity

Table 24
Existing PM Peak Hour Capacity Analysis Results
Baha Mar Resort Project
Nassau, Bahamas

		Ratio of Flow to Capacity (by approach)				
Junction Name	**Junction Control**	**SB**	**WB**	**NB**	**EB**	**Junction Performance**
JFK Dr / Gladstone Rd	Signalised	n/a	0.81	**0.95**	0.26	Approaching capacity
JFK Dr / Prospect Rd/Tonique Williams-Darling Highway	Signalised	**0.88**	0.43	0.36	**0.93**	Approaching capacity
Prospect Rd / Prospect Ridge Road / Sandford Dr	Signalised	0.76	0.28	**0.93**	**1.oo**	Over capacity
West Bay St / Atlantic Ave	Roundabout	n/a	0.32	0.32	0.22	Under capacity
West Bay St / Skyline Dr	Roundabout	n/a	0.52	0.18	0.22	Under capacity
West Bay St / Prospect Rd	Roundabout	n/a	0.35	0.34	0.27	Under capacity

Table 25
Existing Water Treatment Systems
Baha Mar Resort Project
Nassau, Bahamas

	Wyndham Resort	**Sheraton Resort**	**Nassau Beach Hotel**
Water Source	Freshwater Intake Wells	Freshwater Intake Wells	Brackish water intake well
Number of Units	Three	Four	One
Total Production Capacity	194,000 gallons per day	288,000 gallons per day	79,000 gallons per day
Location of Brine Discharge	Discharge to outlet pipe in Goodman's Bay	Discharge to deep injection well	Discharged to Lake behind Total Energy Plant
Back-Up Water Supply	Connected to WSC System for emergency water provision	Connected to WSC System for emergency water provision	Connected to WSC System for emergency water provision

Table 26
Existing Wastewater Demands
Baha Mar Resort Project
Nassau, Bahamas

Source	**Waste Water (GPD)**
Sheraton Resort	240,000
Wyndham Nassau Resort & Crystal Palace Casino	280,000
Nassau Beach Hotel & Total Energy Plant	150,000
Existing Hotel Totals	**670,000**

Table 27
Waste Generation Rates - Existing Facilities
Baha Mar Resort Project
Nassau, Bahamas

	Container Type	Container Volume (cubic yards)	Number of Containers	Frequency of Removal	Average Monthly Volume of Waste (cubic yards)	Average Annual Volume of Waste (cubic yards)
Sheraton	Compactor	30	1	Every 2 Days	450	5,400
	Open Top (Engineering, Laundry, Warehouse, Golf Course)	25	4	Weekly	400	4,800
Straw Market	Rear Load	4	1	Weekly	16	192
Wyndham	Compactor	30	1	Every 2 Days	450	5,400
	Open Top	25	1	Every 2 Days	375	4,500
	Rear Load (Engineering)	4	1	Weekly	16	192
Nassau Beach Hotel	Compactor	30	1	Every 2 Days	450	5,400
	Open Top (Engineering, Warehouse)	25	2	Weekly	200	2,400
Tennis Courts	Rear Load	4	1	Weekly	16	192
Total					**2,373**	**28,476**

Table 28
Summary of Existing Resort Electrical Generation Sources
Baha Mar Resort Project
Nassau, Bahamas

Location	Type	Make	Model Number	Age of Unit	BTU/hr	Capacity	Capacity Units	Capacity (HP)	Fuel Type
Sheraton	Emergency Generator	Katolight	D1500FR23	5		1500	KW	2011.5	Diesel
Sheraton	Emergency Generator	Cummings	VT-1710-GS	23		500	KW	670.5	Diesel
Sheraton	Emergency Generator	Caterpiller	SSR-4	22		470	KW	630.27	Diesel
Wyndham Resort	Emergency Generator	Cummings	6CT8.3GC	16		125	KW	167.625	Diesel
Wyndham Resort	Emergency Generator	Cummings	6CT8.3GC	16		125	KW	167.625	Diesel
Wyndham Resort	Emergency Generator	Cummings	CC434D	16		250	KW	335.25	Diesel
Wyndham Resort	Emergency Generator	Caterpiller	PN5N5075 (SR-4)	16		300	KW	402.3	Diesel
Wyndham Resort	Emergency Generator	Cummings	PN3052039	16		750	KW	1005.75	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3412	18		400	KW	536.4	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3512	14		500	KW	670.5	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3508	14		900	KW	1206.9	Diesel
Total Energy Plant	Electrical Generator	Caterpiller	3516	8		1600	KW	2145.6	Diesel

Table 29
Existing Energy Consumption
Baha Mar Resort Project
Nassau, Bahamas

	Year	Annual Consumption (KWH)	Annualized KWH Price	Total Annual Cost with Fuel Adjustments
Sheraton Resort	2005	12,524,364	$1,160,341.84	$2,757,911.69
Wyndham Resort and Crystal Palace Casino	2005	22,848,000	$2,935,968.00	$5,188,834.16
	2004	22,488,000	$2,889,708.00	$4,322,312.02
Nassau Beach Hotel	2004	16,046,400	$2,061,962.40	$2,707,167.72

Table 30
Potable Water Demand
Baha Mar Resort Project
Nassau, Bahamas

Description	Total Flow (GPD)
Existing Wyndham Resort & Crystal Palace Casino	194,000
Existing Sheraton Resort	288,000
Existing Nassau Beach Hotel	79,000
Total Existing Hotels Flow	**561,000**
Proposed Core Project	1,868,397
Potential Future Development	919,405
Potential Total Build Out Flow	**2,787,802**

Table 31
Wastewater Demands
Baha Mar Resort Project
Nassau, Bahamas

Description	Total Flow (GPD)
Existing Wyndham Resort & Crystal Palace Casino	280,000
Existing Sheraton Hotel	240,000
Existing Nassau Beach Hotel & Total Energy Plant	150,000
Total Existing Hotels Flow	**670,000**
Proposed Core Project	1,868,397
Potential Future Development	919,405
Potential Total Build Out Flow	**2,787,802**

Table 32
Lagoon Screening Model Scenarios and Results
Baha Mar Resort Project
Nassau, Bahamas

	Scenarios					
	1	**2**	**3**	**4**	**5**	**6**
Simulated Conditions						
Precipitation / Evaporation	Average		April		August	
Nitrogen Inflow Concentration (millimoles / m^3)	2.5	0.54	2.5	0.54	2.5	2.5
Phosphorus Inflow Concentration (millimoles / m^3)	0.5	0.13	0.5	0.13	0.5	0.5
Inflow (m^3/day)	1850	1850	4200	4200	1850	4200
Results						
Nitrogen (millimoles / m^3)	5.0	3.3	2.8	1.2	6.5	4.2
Phosphorus (millimoles / m^3)	0.55	0.55	0.14	0.14	0.49	0.50
Chlorophyll a (mg / m^3)	5.5	3.6	3.1	1.3	7.1	4.7
Phytoplankton growth-loss ratio	5.2	4.6	5.2	4.6	5.1	4.5

Table 33
Results of Surface Water and Sediment Sampling – Hobby Horse Pond
Baha Mar Resort Project
Nassau, Bahamas

Analyte	Result	Units
Surface Water		
Total Suspended Solids	300	mg/L
Total Volatile Suspended Solids	190	mg/L
Chloride	2,400	mg/L
Nitrogen, Kjeldahl	1.6	mg/L
Nitrite Nitrogen	0.059	mg/L
Nitrate Nitrogen	0.34	mg/L
Phosphorus, Total	0.17	mg/L
Total Organic Carbon	8.3	mg/L
Nitrogen, Total	2.0	mg/L
Dissolved Organic Carbon	8.7	mg/L
Sediment Sample		
Total Petroleum Hydrocarbons	860	mg/kg
Arsenic	17	mg/kg
Chromium	7.6	mg/kg
Copper	99	mg/kg
Lead	27	mg/kg
Nickel	58	mg/kg
Zinc	170	mg/kg
Phosphorus, Total	1300	mg/kg
Ammonia (as N)-Soluble	11	mg/kg

Table 34
US EPA National Ambient Air Quality Standards (1)
(Micrograms per cubic meter [µg/m3])
Baha Mar Resort Project
Nassau, Bahamas

Pollutant	Averaging Period	National AAQS		Significant Impact Level[(2)]
		Primary ($\mu g/m^3$)	Secondary ($\mu g/m^3$)	
SO_2	3-Hour	---	1300	25
	24-Hour	365	---	5
	Annual	80	---	1
NO_2	Annual	100	100	1
PM_{10}	24-Hour	150	150	5
	Annual	50	50	1
CO	1-Hour	40,000	40,000	2000
	8-Hour	10,000	10,000	500
Lead	3-Month	1.5	---	

Notes:
1. All short-term (24 hours or less) values are not to be exceeded more than once per year. All long-term values are not to be exceeded, except for PM10, which is not to be exceeded by the average of the annual averages from three successive years. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.
2. In practice, EPA considers that those source of air pollution that result in air quality impacts less than these levels do not have the potential to cause adverse air quality impacts and, therefore, are not required to perform extensive impact analyses.

Table 35
Summary of AAQS Analysis Results
Baha Mar Resort Project
Nassau, Bahamas

Pollutant	Averaging Period	Max. Baha Mar Impact (ug/m^3)	Background Conc. (ug/m^3)	Max. Total Conc. (ug/m^3)	Ambient Standard (ug/m^3)
PM_{10}	24-hour	5.6	73	78.6	150
	Annual	0.97	20	21.3	50
$PM_{2.5}$	24-hour	5.6	19.3	24.9	35
	Annual	0.97	8.5	9.4	15
NO_2	Annual	7.3	15	22.3	100
	3-hour	267.4	209.5	476.9	1300
SO_2	24-hour	116.9	47.1	164	365
	Annual	20.3	5.2	25.5	80
CO	1-hour	64.4	5,267	5,331	40,000
	8-hour	53.4	3,893	3,946	10,000
Pb	3-month	0.001	ND	0.001	1.5

Table 36
Summary of EPA Model Construction Sound Levels in the Community
Baha Mar Resort Project
Nassau, Bahamas

Construction Phase	EPA Model at 50 Feet	At Nearest Residence [1]
Ground Clearing	84 dBA	58 dBA
Demolition	89 dBA	63 dBA
Excavation	89 dBA	63 dBA
Foundations	78 dBA	52 dBA
Erection	85 dBA	59 dBA
Finishing	89 dBA	63 dBA

Note:
1. Determined by subtracting 20Log (1000 feet/50 feet) from the level at 50 feet.

Table 37
World Bank Criteria – Operational Noise
Baha Mar Resort Project
Nassau, Bahamas

	Maximum Allowable Log Equivalent (hourly measurements), in dBA	
Receptor	Day (07:00 – 22:00)	Night (22:00 – 07:00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Note:
1. Noise abatement measures should achieve either the levels given above or a maximum increase in background levels of 3 decibels (measured on the A scale)[dB(A)]. Measurements are to be taken at noise receptors located outside the project property boundary.

Table 38
World Bank Compliance Evaluation under Typical Facility Operation
Baha Mar Resort Project
Nassau, Bahamas

Site	Recep	Existing Daytime	Sound from Facility	World Bank	Day Total	Change	Existing Nighttime	Sound from Facility	World Bank	Night Total	Change
Core	W1	49	39	55	49	0	49	39	45	49	0
Core	W2	44	39	55	45	1	44	39	45	45	1
Core	W3	41	41	55	44	3	41	41	45	44	3
Core	W4	40	40	55	43	3	40	40	45	43	3
Core	W5	38	35	55	40	2	38	35	45	40	2
Core	S1	34	29	55	35	1	34	29	45	35	1
Core	S2	37	29	55	38	1	37	29	45	38	1
Core	S3	40	28	55	40	0	40	28	45	40	0
Core	S4	38	23	55	38	0	38	23	45	38	0
Core	S5	38	23	55	38	0	38	23	45	38	0
Core	S6	38	23	55	38	0	38	23	45	38	0
Core	E1	56	32	70	56	0	56	32	70	56	0
Core	E2	59	32	70	59	0	59	32	70	59	0
CSF	RN	38	35	55	40	2	35	35	45	38	3
CSF	RM	38	36	55	40	2	35	36	45	39	4
CSF	RS	37	37	55	40	3	34	37	45	39	5
CSF	I1	30	33	70	35	5	27	33	70	34	7
CSF	I2	45	31	70	45	0	42	31	70	42	0
CSF	I3	44	40	70	45	1	41	40	70	44	3

Table 39
World Bank Compliance Evaluation with Emergency Generators
Baha Mar Resort Project
Nassau, Bahamas

Site	Recep	Gen Sound	Existing Daytime	Facility w/Gen	World Bank	Day Total	Change	Existing Nighttime	Facility w/Gen	World Bank	Night Total	Change
Core	W1	31	49	40	55	49	0	49	40	45	49	0
Core	W2	30	44	40	55	45	1	44	40	45	45	1
Core	W3	30	41	41	55	44	3	41	41	45	44	3
Core	W4	30	40	40	55	43	3	40	40	45	43	3
Core	W5	29	38	36	55	40	2	38	36	45	40	2
Core	S1	32	34	34	55	35	1	34	34	45	35	1
Core	S2	37	37	38	55	38	1	37	38	45	38	1
Core	S3	43	40	43	55	40	0	40	43	45	40	0
Core	S4	37	38	37	55	38	0	38	37	45	38	0
Core	S5	33	38	33	55	38	0	38	33	45	38	0
Core	S6	31	38	32	55	38	0	38	32	45	38	0
Core	E1	36	56	37	70	56	0	56	37	70	56	0
Core	E2	36	59	37	70	59	0	59	37	70	59	0
CSF	RN	30	38	36	55	40	2	35	36	45	38	3
CSF	RM	31	38	37	55	40	2	35	37	45	39	4
CSF	RS	30	37	38	55	40	3	34	38	45	39	5
CSF	I1	34	30	37	70	35	5	27	37	70	34	7
CSF	I2	29	45	33	70	45	0	42	33	70	42	0
CSF	I3	22	44	40	70	45	1	41	40	70	44	3

Table 40
Acreages of Ecosystem Types (including Volpi Parcel)
Baha Mar Resort Project
Nassau, Bahamas

Habitat Type	Acreage of Current Habitat	Acreage of Habitat Following Project Construction
Disturbed or Developed	333.3	514.6
Disturbed Pine Wetland	5.4	5.3
Man Made Ponds	19.1	19.1
Open Water	15.5	14.0
Ephemeral Pond Wetland	18.5	12.4
Dry Broad-Leaved Evergreen Forest	94.8	0.0
Dry Broad-leaved Evergreen Shrubland Wetland	14.4	3.6
Red Mangrove Forest Wetland	24.1	8.1
Red Mangrove Shrubland Wetland	107.1	91.4
Cocoplum Marsh Fern Woodland Wetland	5.7	5.7
Buttonwood-Black Sedge Temporal Marsh Wetland	48.3	11.9
Totals	**686.1**	**686.1**

Table 41
Acreages of Ecosystem Types in Resort Core Development Area
Baha Mar Resort Project
Nassau, Bahamas

Habitat Type	Acreage of Current Habitat	Acreage of Habitat Following Project Construction
Disturbed or Developed	180.0	183.0
Red Mangrove Forest Wetland	3.0	0.0
Total	**183.0**	**183.0**

Table 42
Acreages of Ecosystem Types in Jack Nicklaus Golf Course Development Area
Baha Mar Resort Project
Nassau, Bahamas

Habitat Type	Acreage of Current Habitat	Acreage of Habitat Following Project Construction
Disturbed or Developed	136.8	261.7
Man Made Ponds	19.1	19.1
Open Water	13.0	11.5
Dry Broad-Leaved Evergreen Forest	94.8	0
Red Mangrove Forest Wetland	18.5	5.5
Red Mangrove Shrubland Wetland	45.6	29.9
Total	**327.7**	**327.7**

Table 43
Acreages of Ecosystem Impacts at Gladstone Road Central Services Facility Area
Baha Mar Resort Project
Nassau, Bahamas

Habitat Type	Acreage of Current Habitat	Acreage of Habitat Following Project Construction
Disturbed or Developed	7.68	61.09
Disturbed Pine Wetland	5.41	5.25
Ephemeral Pond Wetland	18.48	12.35
Dry Broad-leaved Evergreen Shrubland Wetland	14.38	3.63
Red Mangrove Shrubland Wetland	7.16	7.16
Buttonwood-Black Sedge Temporal Marsh Wetland	48.27	11.90
Total	**101.38**	**101.38**

Table 44
Impacts to Land Uses in Development Areas
Baha Mar Resort Project
Nassau, Bahamas

	Land Use Area	Future Land Use Area
Mixed Developed	183.0	284.4
Golf Course	155.9	327.7
Undeveloped	347.7	74.0
Total	**686.1**	**686.1**

Table 45
Baha Mar Resort Project Proposed Phase 1 Structures and Elevations
Baha Mar Resort Project
Nassau, Bahamas

Parcel Number	Description	Parcel Elements	Maximum Height of Structure (feet to roof)
1	Hotel Podium	Casino Hotel	321
		Rosewood Hotel	130
		Hyatt Hotel	321
		Morgans Hotel	153
		Hotel Condo	78
2	Convention Center/Residential/Site	Convention Center	78
		Condominium	78
3	Parking Structure		TBD
4	Central Plant		TBD
5	Parking/Future Development	Condominium	TBD
		Retail/Restaurant	TBD
6	Convention Center Site	Future Expansion Area	TBD
7	Residential/Future Development	Condominium	TBD
		Retail/Restaurant	TBD
8	Main Lake		NA
9	Show Lake		NA
10	Rosewood Canal		NA
26	Beach	Pools, Pavilions, Patios	NA
27	Cable Beach Resort Site	Sheraton Hotel	100
		Wyndham Resort	160
28	Future Canal		NA
	Jack Nicklaus Golf Course	18-Hole Golf Course and clubhouse	2 story

Table 46
Year 2012 No Build AM Peak Hour Capacity Analysis Results
Baha Mar Resort Project
Nassau, Bahamas

		Ratio of Flow to Capacity (by approach)				
Junction Name	**Junction Control**	**SB**	**WB**	**NB**	**EB**	**Junction Performance**
JFK Dr / Gladstone Rd	Signalised	**1.21**	**1.26**	**1.26**	0.80	Over capacity
JFK Dr / Prospect Rd/Tonique Willimas-Darling Highway	Signalised	0.79	0.38	0.55	0.72	Under capacity
Prospect Rd / Prospect Ridge Road / Sandford Dr	Signalised	0.21	0.15	0.55	0.55	Under capacity
West Bay St / Atlantic Ave	Roundabout	n/a	0.49	0.52	0.18	Under capacity
West Bay St / Skyline Dr	Roundabout	n/a	0.47	0.31	0.37	Under capacity
West Bay St / Gladstone Rd	Roundabout	n/a	0.39	0.28	0.60	Under capacity
West Bay St / Prospect Rd	Roundabout	n/a	0.36	0.32	0.35	Under capacity
Prospect Ridge Road / Gladstone Road	Signalised	0.06	0.32	0.23	0.54	Under capacity

Table 47
Year 2012 No Build PM Peak Hour Capacity Analysis Results
Baha Mar Resort Project
Nassau, Bahamas

		Ratio of Flow to Capacity (by approach)				
Junction Name	**Junction Control**	**SB**	**WB**	**NB**	**EB**	**Junction Performance**
JFK Dr / Gladstone Rd	Signalised	**1.09**	**1.09**	**1.09**	**0.**84	Over capacity
JFK Dr / Prospect Rd/Tonique Williams –Darling Highway	Signalised	0.64	0.33	0.30	0.62	Under capacity
Prospect Rd / Prospect Ridge Road / Sandford Dr	Signalised	0.61	0.29	0.73	0.84	Under capacity
West Bay St / Atlantic Ave	Roundabout	n/a	0.38	0.40	0.20	Under capacity
West Bay St / Skyline Dr	Roundabout	n/a	0.63	0.17	0.24	Under capacity
West Bay St / Gladstone Rd	Roundabout	n/a	0.37	0.17	0.39	Under capacity
West Bay St / Prospect Rd	Roundabout	n/a	0.40	0.22	0.19	Under capacity
Prospect Ridge Road / Gladstone Road	Signalised	0.25	0.45	0.38	0.69	Under capacity

Table 48
Project Trips Generated during the AM and PM Peak Hour
Baha Mar Resort Project
Nassau, Bahamas

Land Use	AM Peak		PM Peak	
	Inbound Trips (veh/hr)	Outbound Trips (veh/hr)	Inbound Trips (veh/hr)	Outbound Trips (veh/hr)
Hotels, Casino, Condos, and Time Share	42	1,057	398	507
Retail, Spa	0	0	182	281
Office	37	1	4	21
Convention Center	36	3	74	34
Employee Drop Off/Jitney	426	272	401	494
CSF and Remote Parking Trips	769	147	384	757
Total	**1310**	**1480**	**1,443**	**2,094**

Table 49
Year 2012 With Project, AM Peak Hour Capacity Analysis Results
Baha Mar Resort Project
Nassau, Bahamas

		Ratio of Flow to Capacity (by approach)				
Junction Name	**Junction Control**	**SB**	**WB**	**NB**	**EB**	**Junction Performance**
JFK Dr / Gladstone Rd	Signalised	**1.87**	**1.87**	**1.87**	**1.11**	Over capacity
JFK Dr / Prospect Rd/ Tonique Williams-Darling Highway	Signalised	**0.87**	0.49	0.55	0.80	Approaching capacity
Prospect Rd / Prospect Ridge Road / Sandford Dr	Signalised	0.34	0.39	0.51	0.36	Undercapacity
West Bay St / Atlantic Ave	Roundabout	n/a	0.55	0.65	0.75	Under capacity
West Bay St / Skyline Dr	Roundabout	n/a	0.55	0.37	0.70	Under capacity
West Bay St / Cable Beach Resort Entrance	Roundabout	n/a	0.79	0.66	0.83	Under capacity
West Bay St / West Podium/ Commercial Village	Roundabout	0.83	0.64	0.70	0.04	Under capacity
West Bay St / Gladstone Rd Main Podium	Roundabout	0.46	0.60	0.58	0.83	Under capacity
West Bay St / East Podium	Roundabout	0.26	0.59	n/a	0.79	Under capacity
West Bay St / Breezes Entrance	Roundabout	0.56	0.61	n/a	0.83	Under capacity
West Bay St / Prospect Rd	Roundabout	n/a	0.52	0.54	0.73	Under capacity
Baha Mar Golf Club Entrance West of Gladstone Rd	Unsignalised	Free Flow	-	Free Flow	0.12	Under Capacity
Baha Mar Golf Club Entrance East of Gladstone Road	Unsignalised	Free Flow	0.20	Free Flow	-	Under Capacity

Table 50
Year 2012 With Project, PM Peak Hour Capacity Analysis Results
Baha Mar Resort Project
Nassau, Bahamas

		Ratio of Flow to Capacity (by approach)				
Junction Name	**Junction Control**	**SB**	**WB**	**NB**	**EB**	**Junction Performance**
JFK Dr / Gladstone Rd	Signalised	**1.85**	**1.85**	**1.85**	**1.43**	**Over capacity**
JFK Dr / Prospect Rd/ Tonique Williams-Darling Highway	Signalised	0.80	0.41	0.41	**0.89**	**Approaching capacity**
Prospect Rd / Prospect Ridge Road / Sandford Dr	Signalised	0.34	0.39	0.51	0.36	Under capacity
West Bay St / Atlantic Ave	Roundabout	n/a	0.51	0.51	0.79	Under capacity
West Bay St / Skyline Dr	Roundabout	n/a	0.83	0.23	0.50	Under capacity
West Bay St / Cable Beach Resort Entrance	Roundabout	n/a	0.63	0.67	0.5	Under capacity
West Bay St / West Podium/ Commercial Village	Roundabout	0.64	0.39	0.83	0.42	Under capacity
West Bay St / Gladstone Rd Main Podium	Roundabout	0.56	0.83	0.83	0.73	Under capacity
West Bay St / East Podium	Roundabout	0.19	0.71	n/a	0.61	Under capacity
West Bay St / Breezes Entrance	Roundabout	0.55	0.76	n/a	0.60	Under capacity
West Bay St / Prospect Rd	Roundabout	n/a	0.63	0.62	0.76	Under capacity
Baha Mar Golf Club Entrance West of Gladstone Rd	Unsignalised	Free Flow	-	Free Flow	0.06	Under Capacity
Baha Mar Golf Club Entrance East of Gladstone Road	Unsignalised	Free Flow	0.30	Free Flow	-	Under Capacity

Table 51
Phase 1 Construction Period Economic Impact
Baha Mar Resort Project
Nassau, Bahamas

Wages	**5 Year Cumulative**
Direct	$293,243,065
Indirect	$48,965,416
Induced	$61,597,527
Total Wages	**$403,806,008**
Employment	**5 Year Average**
Direct	1,929
Indirect	395
Induced	498
Total Employment	**2,822**
GDP	**5 Year Cumulative**
Direct	$293,243,065
Indirect	$154,627,631
Induced	$80,616,725
Total GDP	**$528,487,421**

Table 52
Operations Economic Impact
Baha Mar Resort Project
Nassau, Bahamas

	20 Year Cumulative
Visitors	**11,632,185**
Wages	**20 Year Cumulative**
Direct	$4,205,990,732
Indirect	$1,002,347,554
Induced	$937,500,892
Total Wages	**$6,145,839,178**
Wages	**20 Year Cumulative**
Direct	5,293
Indirect	1,213
Induced	1,351
Total Wages	**7,857**
GDP	**20 Year Cumulative**
Direct	$8,336,658,268
Indirect	$1,223,517,416
Induced	$1,720,831,624
Total GDP	**$11,281,007,310**

Table 53
Direct Baha Mar Employment and Wages
Baha Mar Resort Project
Nassau, Bahamas

Period	Direct Resort Employees	Annual Payroll
Existing (2005)	2,211	$40,922,458
Construction (2006-2010)	1,929[1]	$58,648,613
Project Completion (2010 and beyond)[2]	5,293	$210,299,536

Notes:
1. Includes demolition of Nassau Beach Hotel and Wyndham J and F Towers
2. Includes Phase 1 Development Program Only

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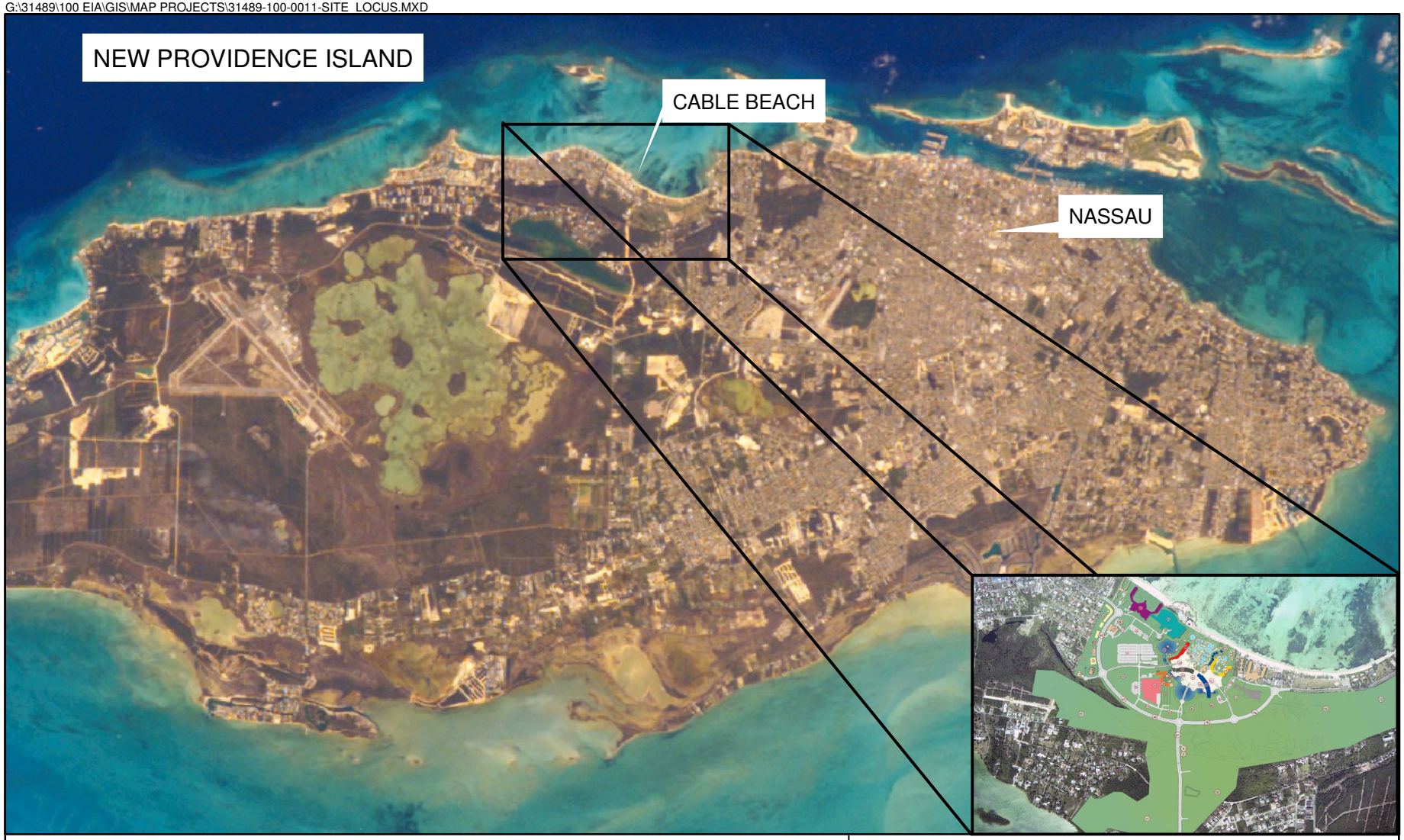

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.
3. INSET IS AN ARTISTIC RENDERING DEVELOPED BY MICHAEL HONG ARCHITECTS STUDIO.

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HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR JOINT VENTURE, LTD.
CABLE BEACH
NASSAU, BAHAMAS

PROJECT STUDY AREA

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 1

G:\31489_BAHA-MAR\GLOBAL\CAD\DRAWINGS\31489-120-002B_EIA FIG 2 [2012-0723].DWG

Mondrian Hotel		
Rooms	200	
Condo Units	100	
Hyatt		
Rooms	600	
Condo Units	120	
Casino Hotel		
Rooms	1060	
Rosewood Hotel		
Rooms	100	
Condo Units	100	
Timeshare		
Residential units	56	
Sheraton Hotel		
Total guest rooms	700	
Wyndham Hotel		
Total guest rooms	550	
TOTAL UNITS	3,586	

Casino gaming	93,973 sf
Convention facility	
B01 Level	224,070 sf
L01 Level	53,148 sf
TOTAL	277,218 sf
TOTAL AREA	3,317,639 SF
PARKING	1,896 Spaces

LEGEND:

CENTRAL SERVICES FACILITY
1. Surface parking for employees (2,000 spaces)
2. Laundry facility for combined development
3. Central warehouse building for hotel supplies
4. Reverse osmosis plant
6. Electrical sub-station
7. Emergency generators plant
8. Wastewater treatment plant

GOLF COURSE/WETLANDS
10. Future development
11. 18-hole Jack Nicklaus signature golf course, back 9
12. Ditto first 9, including golf practice facility and clubhouse with outdoor sports facility (tennis courts, etc.)

COMMERCIAL VILLAGE
13. Future development site
14. New police/fire station (42 parking spaces)
15. Relocated bank (Fidelity)
16. Relocated bank (Commonwealth) (61 parking spaces)
17. Relocated bank (Scotia Bank)
18. Surface parking spaces for users of Commercial Village and for use by public visiting main development during evenings and weekends (165 parking spaces)
19. Corporate offices
20. Retail

EXISTING HOTELS
21. Radisson hotel to be refurbished as Sheraton
22. Wyndham hotel to be reduced (by demolition of two eastern towers) and progressively refurbished
23. Sheraton parking (170 spaces)
24. Straw Market
25. Existing Radisson laundry and chiller building

WEST OF MAIN ENTRANCE ROAD/LAKE
13. Future development sites
26. Canals
27. Show lake
28. West of Main Entrance (867 spaces)
29. Surface parking (132 spaces)
30. Taxi/valet parking
31. Timeshare units (56 in number); convention center incorporating facility for receiving goods from back-of-house for delivery to hotels, and parking at grade to elevation 72'-5"
32. Surface parking (269 spaces)

CORE
33. 20 acres of gardens pools and beach) existing Nassau Beach hotel to be demolished)
34. W is now = Morgans Hotel; 200 rooms and 100 condo units
35. Westin is now = Hyatt 600 rooms and 120 condo units
36. Caesars is now = Casino Hotel 1060 rooms
37. St. Regis is now = Rosewood Hotel 100 rooms and 100 condo units
38. Shared podium to hotels, including casino, restaurant, retail, spa, club, meeting/banquet facilities and all back-of-house facilities; and including retail village overlooking show lake
39. West drop-off/porte cochere
40. Main drop-off/porte cochere
41. East drop-off/porte cochere; no parking

EAST OF MAIN ENTRANCE ROAD/LAKE
13. Future development sites
42. Future development; expansion site for casino hotel
43. Future development
44. Private vehicle and pickup waiting (50 spaces)
45. Rosewood

ROADS
46. Diverted West Bay Street
47. JFK Connector
48. Other areas (10 spaces)

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPNAY
CABLE BEACH
NASSAU, BAHAMAS

PROJECT MASTER PLAN

BAHA MAR

SCALE: AS SHOWN
MARCH 2011

FIGURE 2

SITE AREA TABULATION **2006 0221 MHAS**

RESORT AREA	ACRES
1 CASINO PODIUM	11.6
2 CONVENTION CENTER/ TIMESHARE/SITE	6.0
3 PARKING STRUCTURE	1.2
4 CENTRAL PLANT	1.0
5 PARKING/ FUTURE DEVELOPMENT	5.1
6 CONVENTION CENTER SITE	4.1
7 TIMESHARE/FUTURE DEVELOPMENT	2.5
8 LAKE	3.8
9 ENTERTAINMENT SHOW CANAL	2.5
RESORT AREA SUB TOTAL	37.8

SITE AREA	
10 CANAL	0.8
11 FUTURE DEVELOPMENT & HOTEL EXPANSION	3.0
12 FUTURE CANAL	0.5
13 FUTURE DEVELOPMENT	2.9
14 FUTURE DEVELOPMENT	0.9
15 FUTURE DEVELOPMENT	1.8
16 FUTURE CANAL	1.9
17 FUTURE DEVELOPMENT	0.5
18 PARKING/FUTURE DEVELOPMENT	8.8
19 RELOCATED USES	1.7
20 COMMERCIAL DISTRICT	4.3
21 FUTURE DEVELOPMENT	6.5
22 FUTURE DEVELOPMENT	7.6
23 CONVENTION CENTER EXPANSION/FUTURE DEVELOPMENT	2.5
24 FUTURE DEVELOPMENT	4.3
25 CANAL	0.8
26 BEACH	16.9
27 CBR SITE	21.2
28 CANAL	2.9
SITE AREA SUB TOTAL	90.3

TOTAL LAND AREA **127.6**

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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APPROXIMATE SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR JOINT VENTURE, LTD.
CABLE BEACH
NASSAU, BAHAMAS

DIAGRAMMATIC MASTER PLAN

BAHA MAR

SCALE: AS SHOWN
MARCH 2011

FIGURE 3

G:\131489\100 EIA\GIS\MAP PROJECTS\131489-100-0014-DIAGRAMMATIC.MXD

G:\31489\100 EIA\GIS\MAP PROJECTS\31489-100-0013-ARTISTIC_2.MXD

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ARTISTIC RENDERING DEVELOPED BY MICHAEL HONG ARCHITECTS STUDIO.
4. ARTISTIC RENDERINGS FOR ILLUSTRATIVE PURPOSES ONLY, MAY NOT REFLECT FINAL DESIGN COMPONENTS.

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ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR JOINT VENTURE, LTD.
CABLE BEACH
NASSAU, BAHAMAS

BAHA MAR

ARTISTIC RENDERING OF PROJECT FACILITIES

SCALE: UNKNOWN

MARCH 2011

FIGURE 4

G:\31489\100 EIA\GIS\MAP PROJECTS\31489-100-0015-AREA10_CANAL.MXD

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ARTISTIC RENDERING DEVELOPED BY MICHAEL HONG ARCHITECTS STUDIO.
4. ARTISTIC RENDERINGS FOR ILLUSTRATIVE PURPOSES ONLY, MAY NOT REFLECT FINAL DESIGN COMPONENTS.

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ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR JOINT VENTURE, LTD.
CABLE BEACH
NASSAU, BAHAMAS

ARTISTIC RENDERING OF ST. REGIS CANAL

BAHAMAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 5

Designer : Nicklaus Design

Baha Mar Scorecard

HOLE	1	2	3	4	5	6	7	8	9	OUT	10	11	12	13	14	15	16	17	18	IN	TOTALS
Black	405	219	385	427	582	349	445	203	562	3577	411	594	467	181	437	582	459	240	413	3784	7361
PAR	4	3	4	4	5	4	4	3	5	36	4	5	4	3	4	5	4	3	4	36	72

NOTICE: THIS PLAN IS INTENDED AS A VERY PRELIMINARY SPACE PLANNING EXERCISE TO PROVIDE AN OWNER WITH A CONCEPTUAL LAYOUT FOR ROUTING A PROPOSED GOLF COURSE, BASED UPON A TENTATIVE REVIEW OF SITE INFORMATION PROVIDED TO NICKLAUS DESIGN. THE LAYOUT DEPICTED IS ONLY OFFERED AS AN INITIAL SUGGESTION, WILL TYPICALLY BE MODIFIED SEVERAL TIMES BY THE OWNER AND NICKLAUS DESIGN IN THE NORMAL COURSE OF THE DESIGN PROCESS, AND SHOULD NOT BE RELIED UPON FOR LAND PLANNING OR PERMITTING PURPOSES. THE RELEASE OF THIS PLAN DOES NOT CONSTITUTE ANY REPRESENTATION OR WARRANTY THAT THE SITE DEPICTED WILL BE SUITABLE FOR A GOLF COURSE OR THAT THE PROPOSED COURSE CAN BE DESIGNED AND CONSTRUCTED ACCORDING TO THE PRELIMINARY ROUTING. A FINAL ROUTING FOR THE GOLF COURSE WILL BE DETERMINED SUBJECT TO FURTHER REVIEW OF SITE CONDITIONS BY NICKLAUS DESIGN STAFF AND THE INPUT, REVIEW AND APPROVAL OF OWNER, THE PROJECT ENGINEERS AND LAND PLANNERS, AND LAND USE AND OTHER REGULATORY AGENCIES HAVING JURISDICTION OVER THE SITE.

NOTICE: ALL GOLF COURSE FEATURES SHOWN ON THIS PLAN ARE FOR ILLUSTRATIVE PURPOSES ONLY.

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ARTISTIC RENDERING DEVELOPED BY NICKLAUS DESIGN.
4. ARTISTIC RENDERINGS FOR ILLUSTRATIVE PURPOSES ONLY, MAY NOT REFLECT FINAL DESIGN COMPONENTS.

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APPROXIMATE SCALE IN FEET

HALEY & ALDRICH

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ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR JOINT VENTURE, LTD.
CABLE BEACH
NASSAU, BAHAMAS

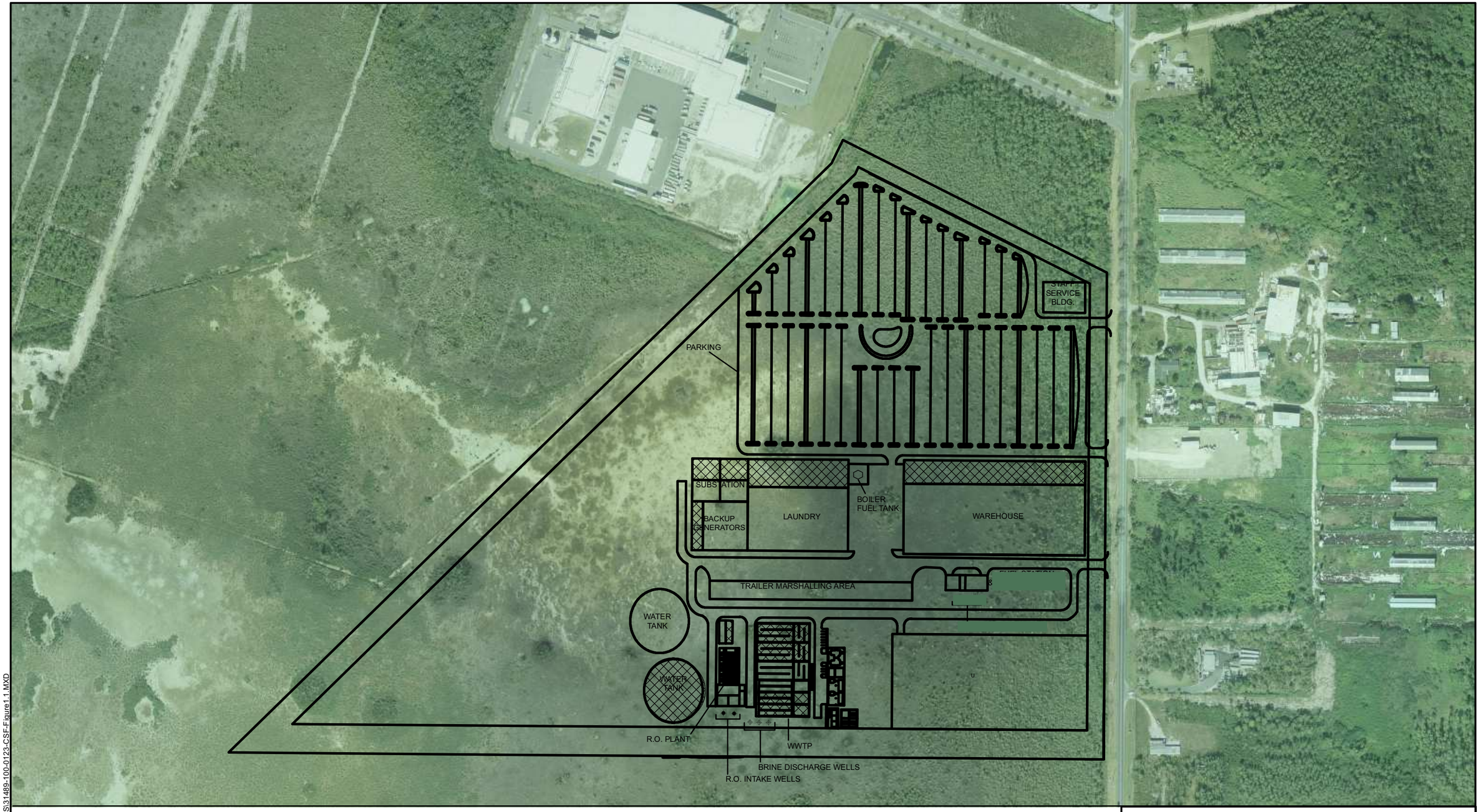
BAHA MAR

JACK NICKLAUS GOLF COURSE LAYOUT

SCALE: AS SHOWN
MARCH 2011

FIGURE 6

G:\31489\100 EIA\GIS\MAP PROJECTS\31489-100-0016-GOLF.MXD



LEGEND:

- PROPOSED FACILITY LOCATION
- PROPOSED FUTURE EXPANSION

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

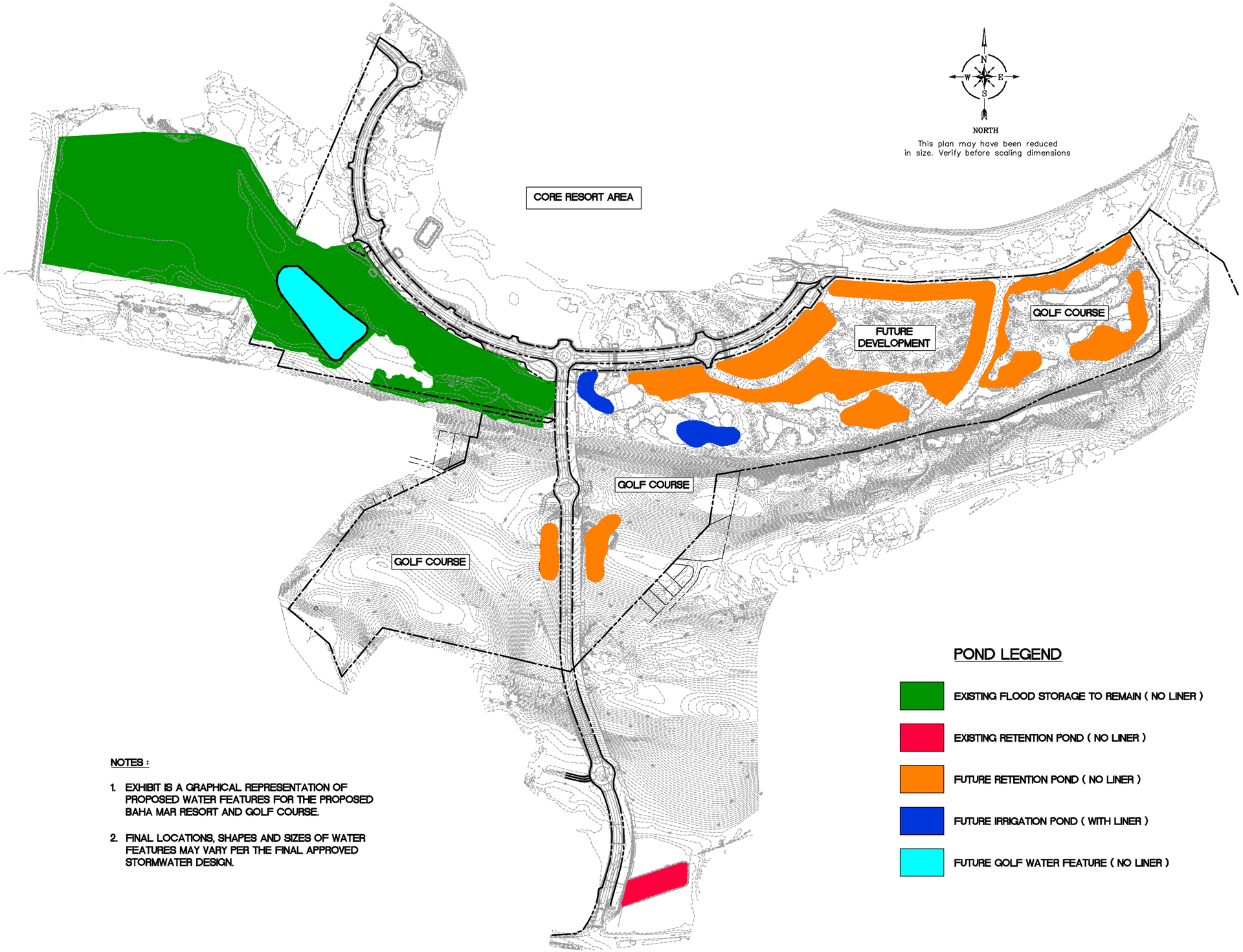
BAHA MAR

CENTRAL SERVICES FACILITY MASTER PLAN

SCALE: AS SHOWN
MARCH 2011

FIGURE 7

G:\314891\100 EIA\GIS\MAP PROJECTS\314891-100-0123-CSF-Figure1.1.MXD



NOTES :

1. EXHIBIT IS A GRAPHICAL REPRESENTATION OF PROPOSED WATER FEATURES FOR THE PROPOSED BAHA MAR RESORT AND GOLF COURSE.
2. FINAL LOCATIONS, SHAPES AND SIZES OF WATER FEATURES MAY VARY PER THE FINAL APPROVED STORMWATER DESIGN.

POND LEGEND

- EXISTING FLOOD STORAGE TO REMAIN (NO LINER)
- EXISTING RETENTION POND (NO LINER)
- FUTURE RETENTION POND (NO LINER)
- FUTURE IRRIGATION POND (WITH LINER)
- FUTURE GOLF WATER FEATURE (NO LINER)

FILE NAME: G:\PROJ\06344001\CIVIL\SHEETS\FIGURE 8A.DWG
TIME: 20 JUL 2012 - 9:29AM USER: JEFFR

BAHA MAR
THE BAHAMIAN RIVIERA

EXECUTIVE ARCHITECT:

DESIGN ARCHITECT:

CONSULTANT:

ARCHITECT OF RECORD:

Signature and Seal

Professional License Number:

DOCUMENT HISTORY:

Revn	Date	Purpose
-		

Baha Mar
Baha Mar Resorts Ltd.
Nassau, Bahamas

KEY PLAN:

TITLE:
Overall Retention Pond Plan

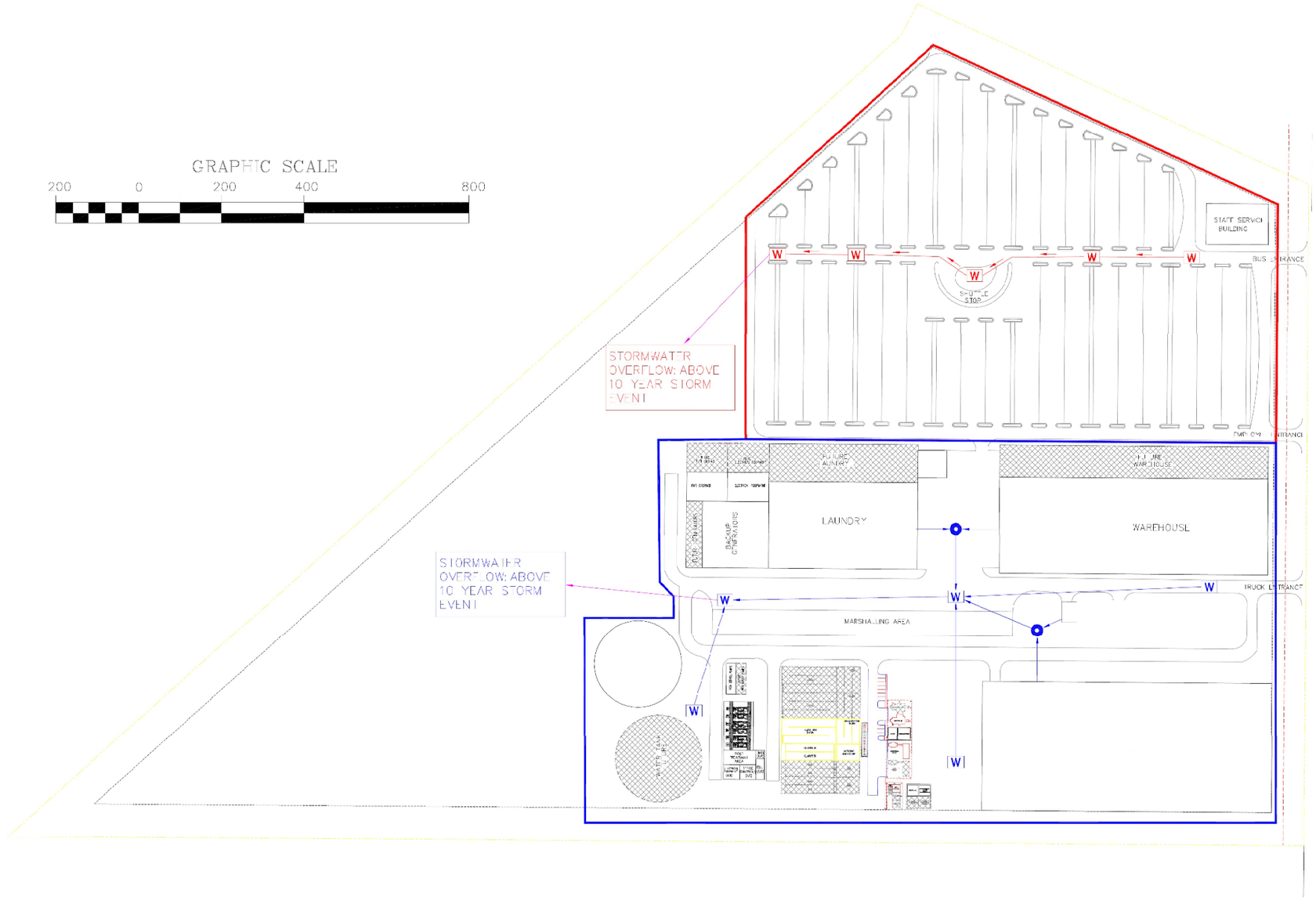
PROJECT NO:	HDE 06344001
DATE:	07-20-12
SCALE:	N.T.S.
DRAWN BY:	JJR
REVIEWED BY:	RAL

DRAWING NUMBER:

Figure 8

GRAPHIC SCALE

200 0 200 400 800



PARKING BASIN: 22.38 ACRES

W STORMWATER DISPOSAL WELL

STORMWATER OVERFLOW

SERVICE AERA BASIN: 33.52 ACRES

OIL/WATER SEPERATOR

W STORMWATER DISPOSAL WELL

STORMWATER FIRST FLUSH

STORMWATER OVERFLOW

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.

N W E S

SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL MANAGEMENT PLAN
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

CENTRAL SERVICES FACILITY STORMWATER SYSTEM LAYOUT

BAHA MAR

SCALE: AS SHOWN
MARCH 2011

FIGURE 9

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 09_RCSF EIS Drainage Exhibit.mxd

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES ONLY - NOT FOR CONSTRUCTION.
2. SOURCE: GOOGLE EARTH PRO IMAGERY AS AVAILABLE ON 18 JANUARY 2012.

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

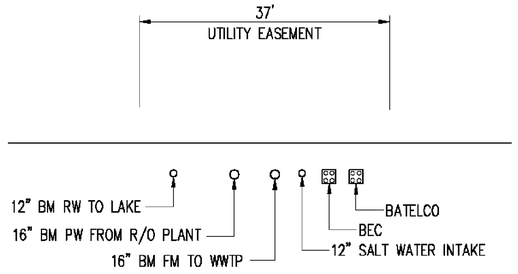
VOLPI PARCEL ON ATLANTIC DRIVE

BAHA MAR NASSAU, BAHAMAS

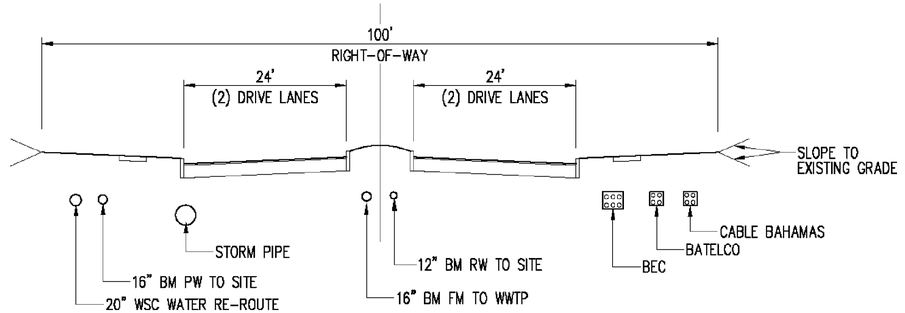
SCALE: UNKNOWN
MARCH 2011

FIGURE 10

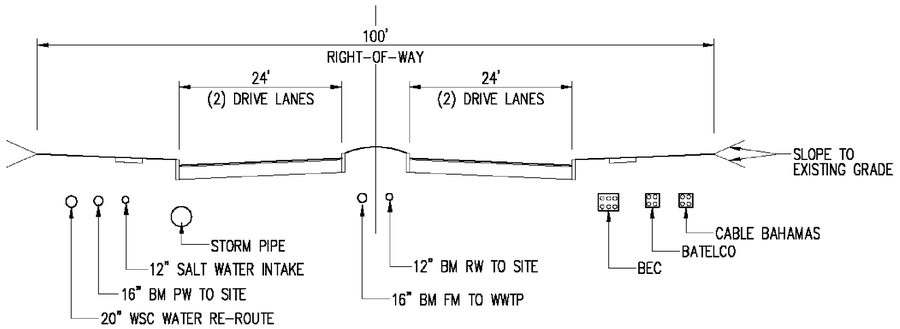
G:\31489_BAHA-MAR\GLOBAL\EIA RESUBMITTAL_2011-NOVEMBER\31489-120-VOLPI PARCEL_FIG 10.DWG



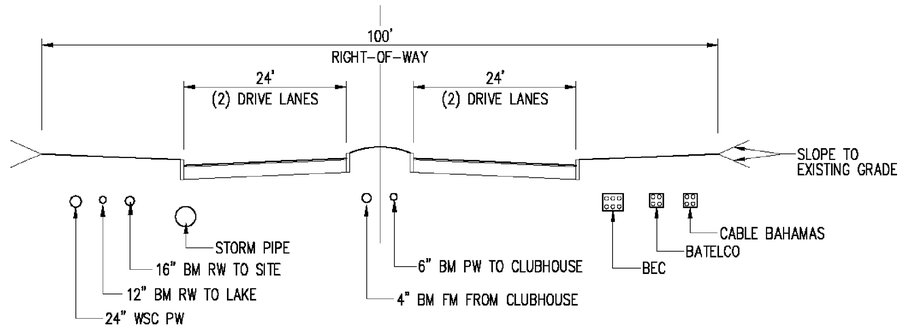
TYPICAL SECTION A–A
UTILITY CORRIDOR
LOOKING WEST



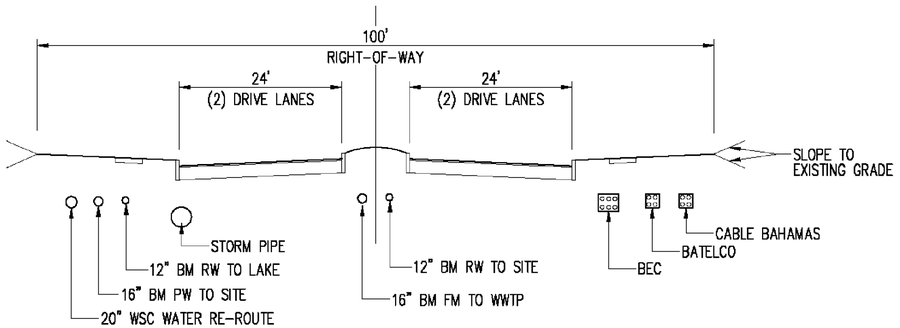
TYPICAL SECTION D–D
WEST BAY STREET
LOOKING WEST



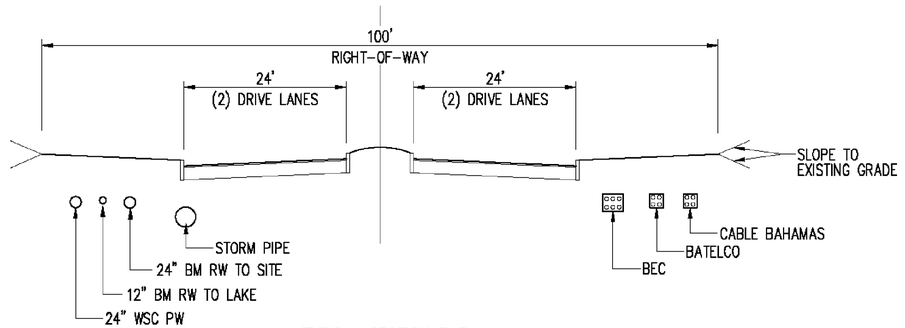
TYPICAL SECTION B–B
WEST BAY STREET
LOOKING NORTH



TYPICAL SECTION E–E
CORRIDOR 7
LOOKING NORTH



TYPICAL SECTION C–C
WEST BAY STREET
LOOKING WEST



TYPICAL SECTION F–F
CORRIDOR 7
LOOKING NORTH

~~LEGEND OF ABBREVIATIONS:~~

BM	BAHA MAR
FM	FORCE MAIN
PW	POTABLE WATER
RW	REUSE WATER
BEC	BAHAMAS ELECTRIC COMPANY
BATELCO	BAHAMAS TELEPHONE COMPANY
WSC	WSC

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR JOINT VENTURE, LTD.
CABLE BEACH
NASSAU, BAHAMAS

TYPICAL CROSS SECTION - UTILITIES INSTALLED IN RIGHTS-OF-WAY

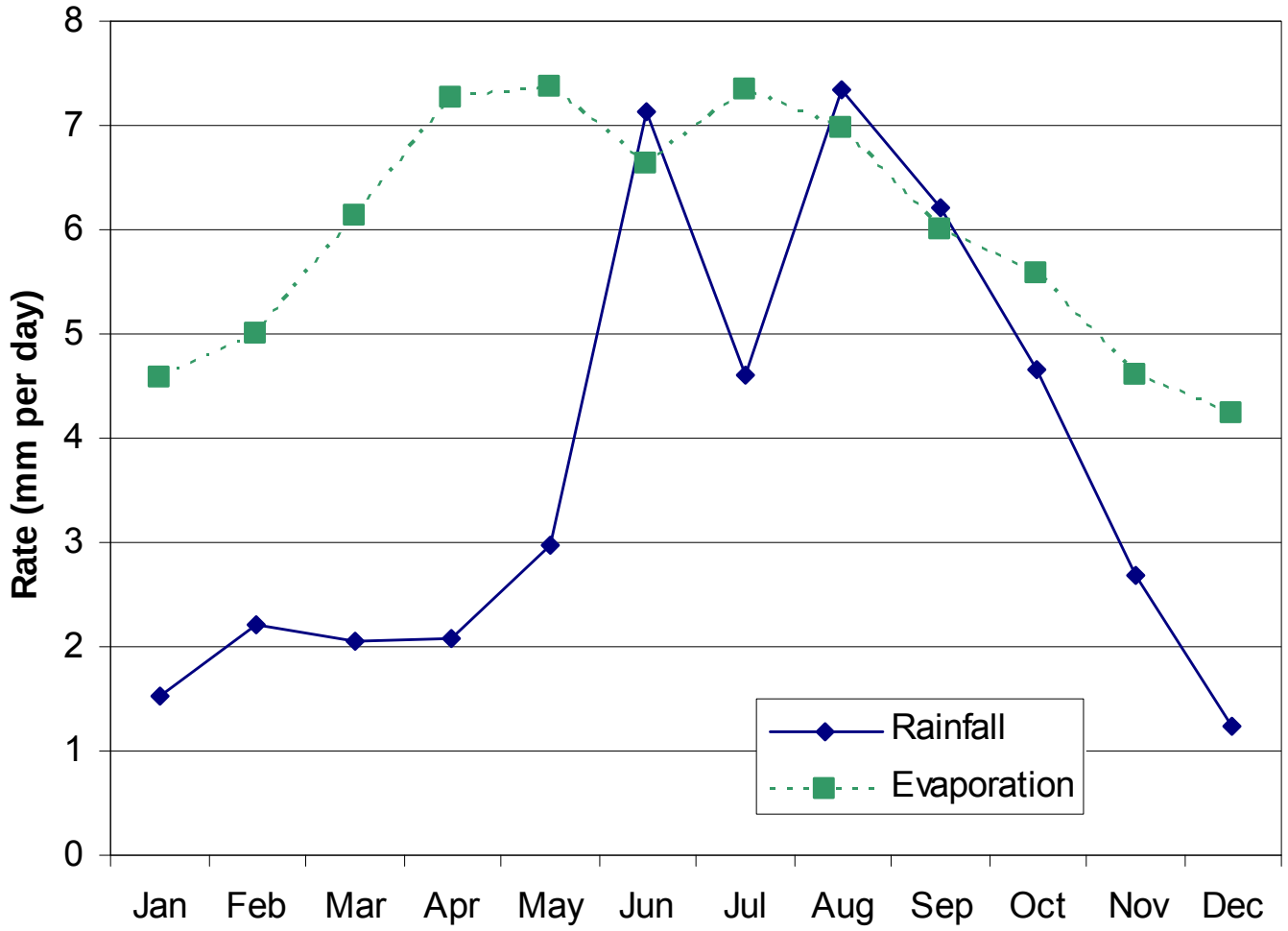
BAHA MAR

SCALE: UNKOWN
MARCH 2011

FIGURE 11

G:\31489\100 EIA\GIS\MAP PROJECTS\31489-100-0119-CROSS_SEC.MXD

G:\31489\100 EIA\Final EIA\Figures\Final\Figure 12.pdf



HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

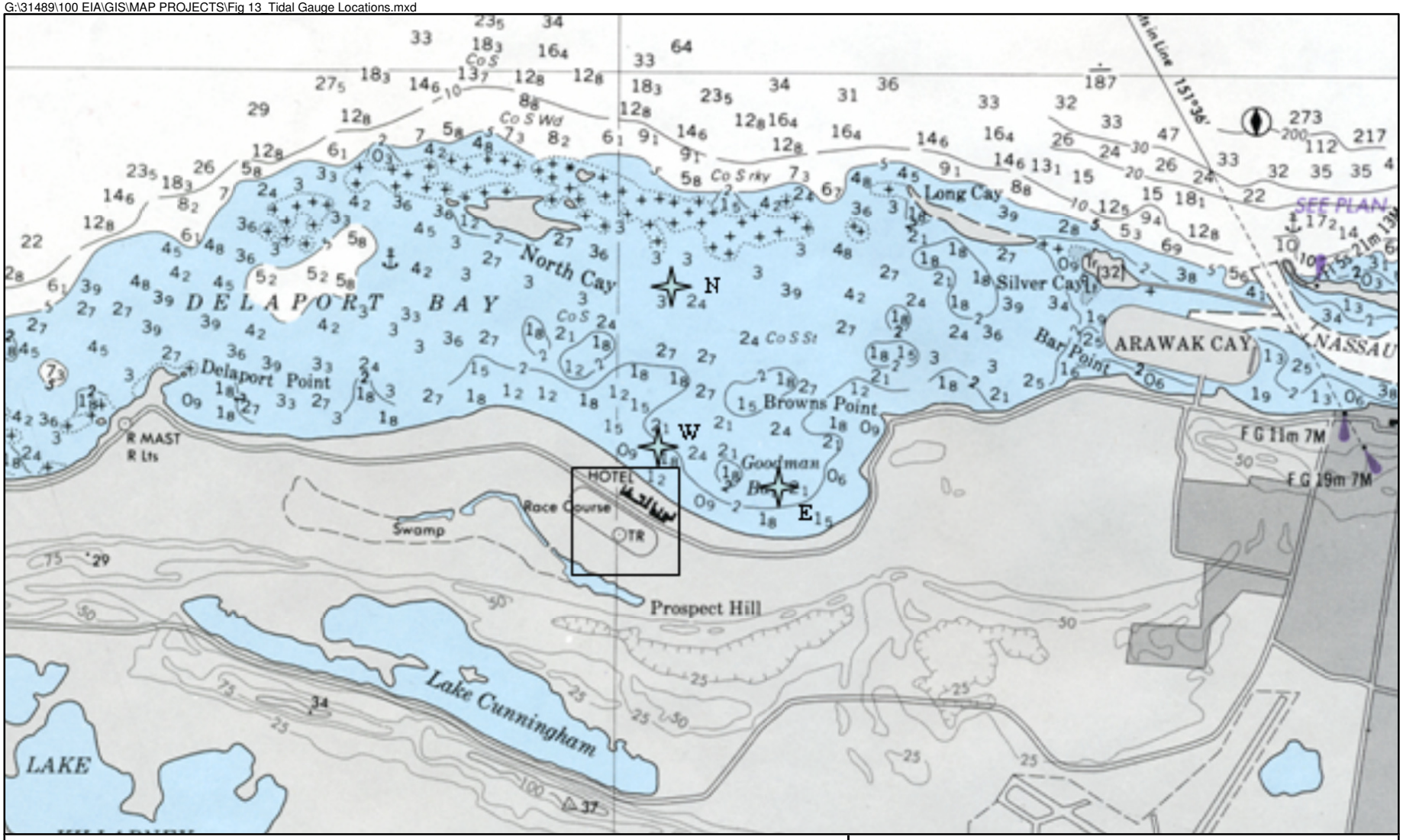
AVERAGE RAINFALL AND EVAPORATION RATES

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 12

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 13_Tidal Gauge Locations.mxd



NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

TIDAL GAUGE LOCATIONS

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 13

NON-NAVIGABLE AREA

NON-NAVIGABLE AREA

LEGEND:

1FT CONTOURS

5 FT CONTOURS

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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0 500 1,000 1,500 2,000

SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

BAHA MAR

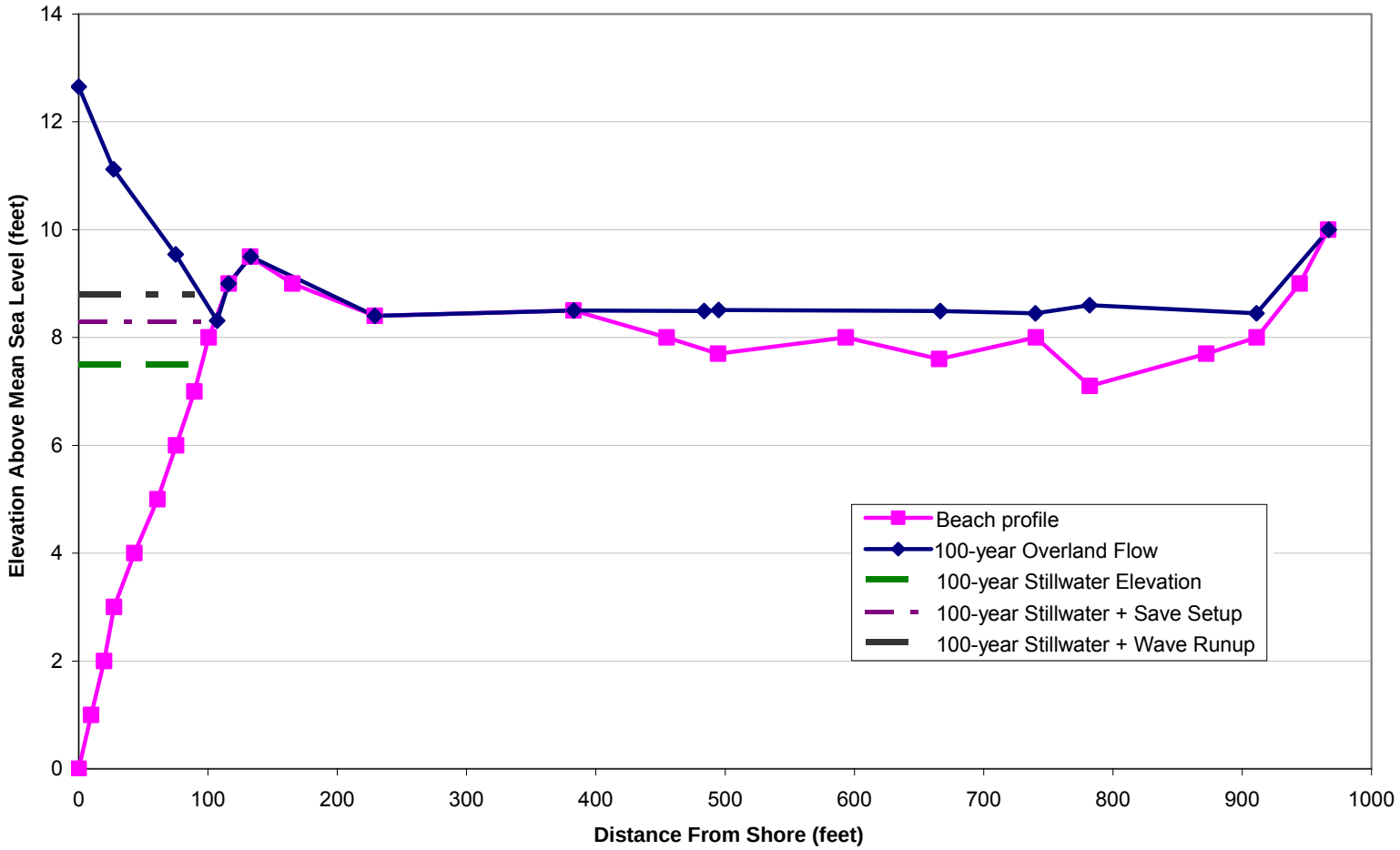
GOODMAN'S BAY BATHYMETRY

SCALE: AS SHOWN
MARCH 2011

FIGURE 14

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig14 Goodmans Bay Bathymetry.mxd

G:\31489\100 EIA\Final EIA\Figures\Final\Figure 15.pdf



HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

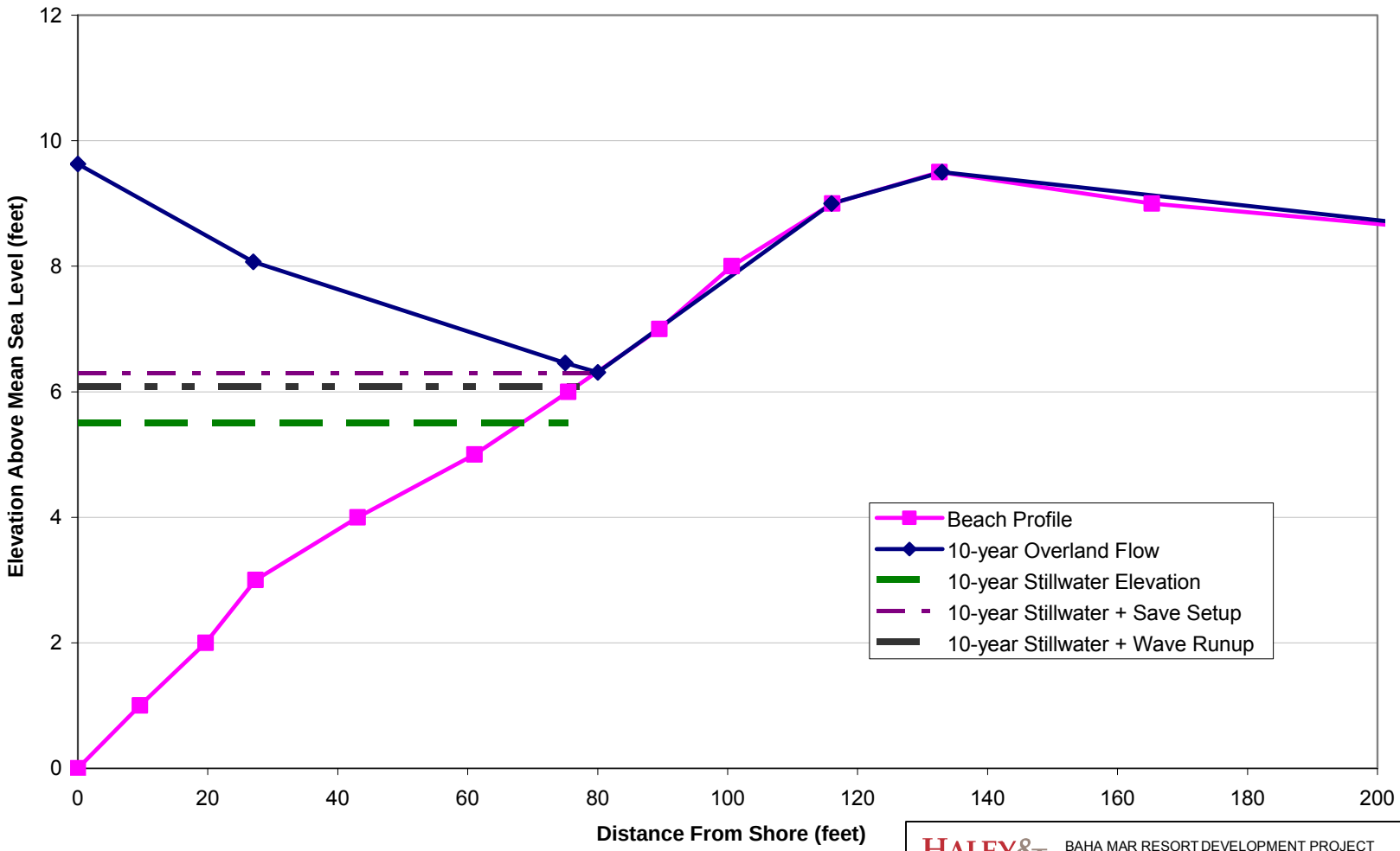
BEACH PROFILE WITH 100-YEAR FLOOD ELEVATIONS

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 15

G:\31489\100 EIA\Final EIA\Figures\Final\Figure 16.pdf



HALEY & ALDRICH

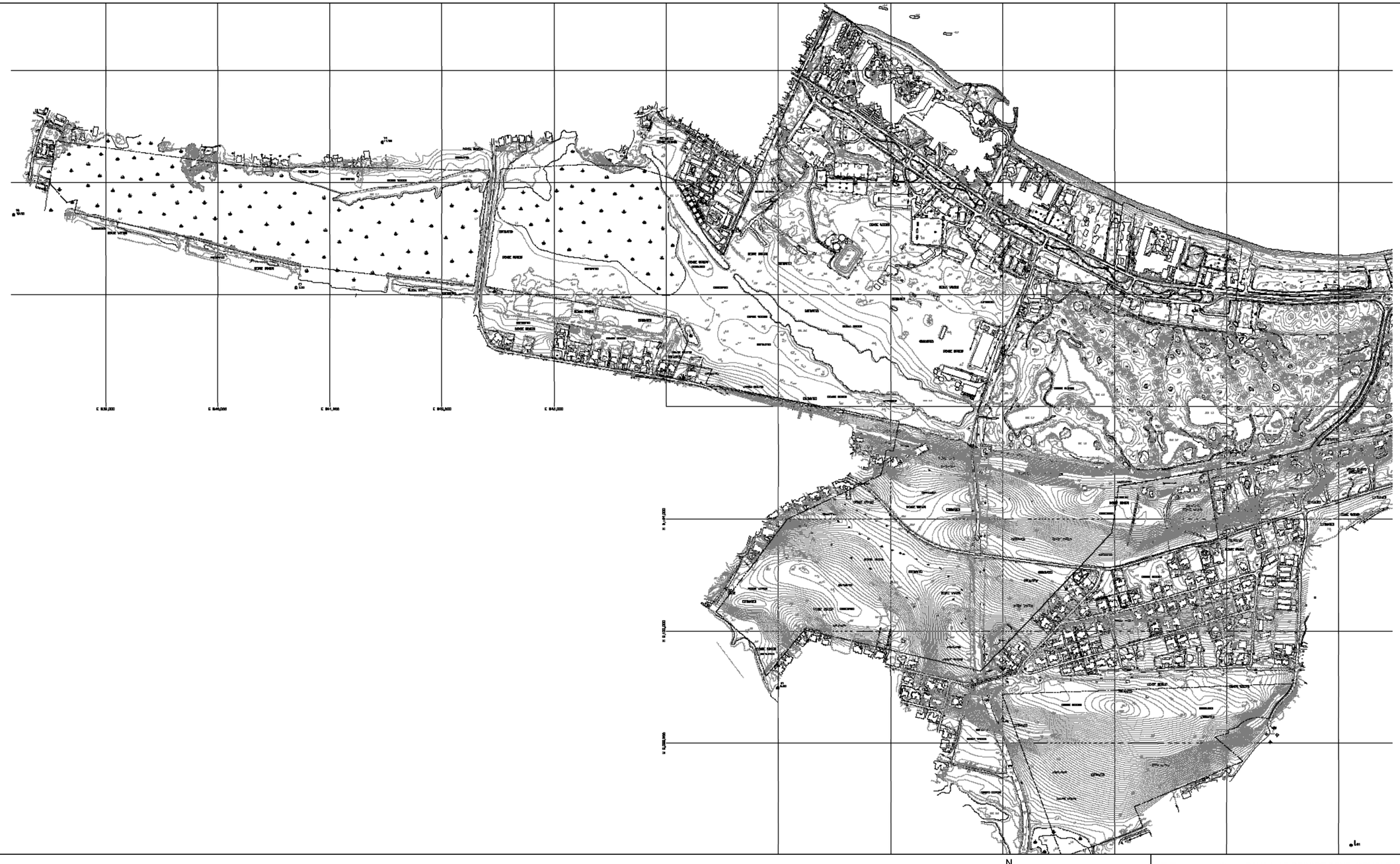
BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

BEACH PROFILE WITH 10-YEAR FLOOD ELEVATIONS

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 16



LEGEND:

- CONTOURS

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.
3. TOPOGRAPHIC SURVEY COMPLETED BY PHOTOGRAMMETRIC METHODS OF BAHA MAR.

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0 500 1,000 1,500
SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

BAHA MAR
NASSAU, BAHAMAS

SITE TOPOGRAPHY

SCALE: AS SHOWN
MARCH 2011

FIGURE 17

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 17_Site Topography.mxd

G:\31489\100 EIA\Final EIA\Figures\Final\Figure 18.pdf

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

SOUND LEVEL MEASUREMENT LOCATIONS

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 18

LEGEND:

- URBAN/DEVELOPED
- MIXED COMMERCIAL/RESIDENTIAL
- RESIDENTIAL
- GOLF COURSE
- UNDEVELOPED
- PARK

NOTE:
ALL LOCATIONS ARE CONSIDERED APPROXIMATE.

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0 550 1,100 1,650
SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

CORE PROJECT EXISTING LAND USE CLASSIFICATIONS

SCALE: AS SHOWN
MARCH 2011

FIGURE 19

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 19_Project Core Existing Land Use Classifications.mxd

LEGEND:

- PROPOSED CENTRAL SERVICE FACILITIES
- MIXED COMMERCIAL/INDUSTRIAL
- MIXED COMMERCIAL/RESIDENTIAL
- PROPOSED RESIDENTIAL
- RESIDENTIAL
- UNDEVELOPED

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.

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0 100 200 300

SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL MANAGEMENT PLAN
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

CENTRAL SERVICES FACILITY EXISTING LAND USE CLASSIFICATIONS

SCALE: AS SHOWN
MARCH 2011

FIGURE 20

G:\31489\100 EIA\GIS\MAP PROJECTS\CSF_LandUse.MXD

LEGEND:

- EXISTING CONDITIONS
- AREAS OF ENVIRONMENTAL CONCERN

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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0 500 1,000 1,500
SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

AREAS OF ENVIRONMENTAL CONCERN

BAHA MAR

SCALE: AS SHOWN
MARCH 2011

FIGURE 21

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 21_Areas of Environmental Concern.mxd

LEGEND:

- DISTURBED OR DEVELOPED (344.3 Acres)
- MAN MADE PONDS (19.1 Acres)
- FLOW-WAY OPEN WATER (15.5 Acres)
- DRY BROAD-LEAVED EVERGREEN FOREST (94.8 Acres)
- RED MANGROVE SHRUBLAND WETLAND (100.0 Acres)
- RED MANGROVE FOREST WETLAND (24.0 Acres)
- MARSH FERN WOODLAND WETLAND (5.7 Acres)

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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0 500 1,000 1,500
SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

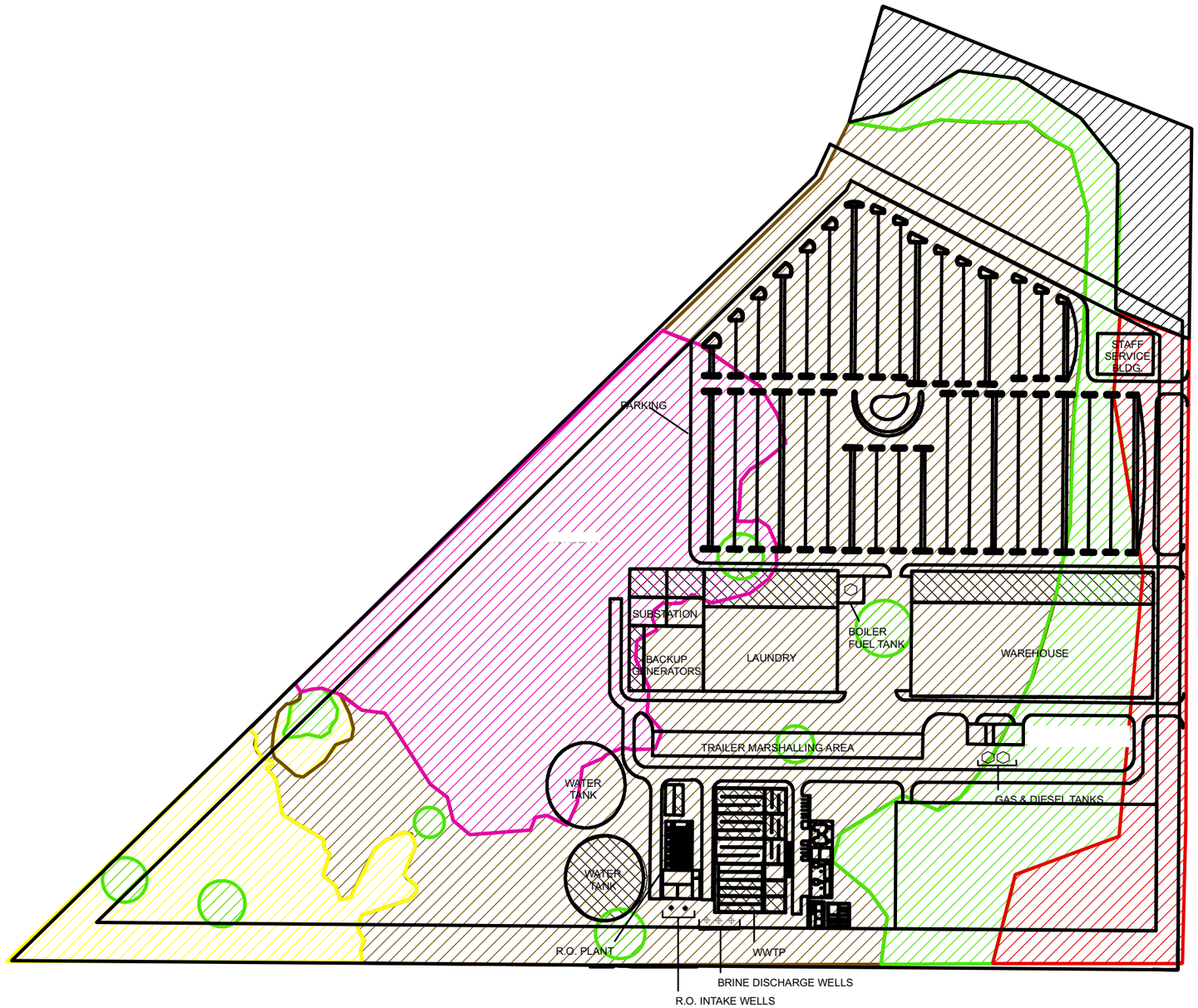
CORE PROJECT BASELINE ECOSYSTEMS

BAHA MAR
NASSAU, BAHAMAS

SCALE: AS SHOWN
MARCH 2011

FIGURE 22

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 22_Core Project Baseline Ecosystems.mxd



LEGEND:

HABITAT COVER TYPE

- DISTURBED AREA
- BUTTONWOOD-BLACK SEDGE TEMPORAL MARSH WETLAND
- DRY BROAD-LEAVED EVERGREEN SHRUBLAND WETLAND
- EPHEMERAL POND WETLAND
- RED MANGROVE SHRUBLAND WETLAND
- DISTURBED PINE WOODLAND

CENTRAL SERVICES FACILITY

- PROPOSED FACILITY LOCATION
- PROPOSED FUTURE EXPANSION

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.
3. FIGURE SHOULD ONLY BE SHOWN IN COLOR.

N W E S

0 50 100 150

SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

BAHA MAR

CENTRAL SERVICES FACILITY BASELINE ECOSYSTEM

SCALE: AS SHOWN
MARCH 2011

FIGURE 23

G:\314891100 EIA\GIS\MAP PROJECTS\314891-100-0123-CSF-Figure3.1.MXD

DELAPORT BAY

GOODMAN BAY

LAKE CUNNINGHAM

West Bay Street

Hampshire Street

West Bay Street

West Bay Street

Oxford Ave

Rugby Ave

Bougainville Ave

Coral Dr

Sea View Drive

Atlantic (private)

Oak Hill Road

Skyline Drive

Skyline Drive

Skyline Drive

Poinciana Dr

Prospect Ridge Road

Prospect Ridge Road

Sandford Drive

Woodland Rd

Lake View Dr

High St

Prospect Road

John F Kennedy Drive

John F Kennedy Drive

Interfield Road

Harrold Road

Theodora Lane

Road

LEGEND:

EXISTING ROADWAY NETWORK

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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0 500 1,000 1,500

APPROXIMATE SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

EXISTING ROADWAY NETWORK

BAHA MAR

SCALE: AS SHOWN
MARCH 2011

FIGURE 24

G:\314891\100 EIA\GIS\MAP PROJECTS\Fig 24_Existing Roads.mxd

UTILITIES ADDED BY HALEY & ALDRICH:

- CHILLED WATER
- CITY WATER
- ELECTRIC
- FLUSH WATER
- FRESH WATER
- GAS
- RO WATER
- SEWER
- STEAM
- STORM

LEGEND

- T1 TRANSFORMER (NUMBER INDICATES AMOUNT OF TRANSFORMERS/SWITCHGEARS ENCOUNTERED)
- GENERATOR OR GENERATOR BUILDING
- CABLE TV
- ELECTRIC
- TELEPHONE
- WATER

N

NOTES:

1. BASE PLAN IS AUTOCAD FILE 090104-SURVEY.DWG DATED 11 OCTOBER 2004.

2. UNDERGROUND UTILITY LOCATIONS ARE BASED ON VERY LIMITED MAPPING, DISCUSSIONS WITH VARIOUS SITE PERSONNEL AND FIELD RECONNAISSANCE. ACTUAL LOCATIONS WILL VARY.

3. FEATURES SHOWN ON THIS FIGURE ARE PROVIDED FOR PRELIMINARY PLANNING PURPOSES ONLY AND SHOULD NOT BE RELIED UPON FOR FINAL DESIGN OR CONSTRUCTION DECISIONS.

0 200 300 400 500 600

SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

EXISTING ELECTRICAL INFRASTRUCTURE

BAHA MAR

SCALE: AS SHOWN
MARCH 2011

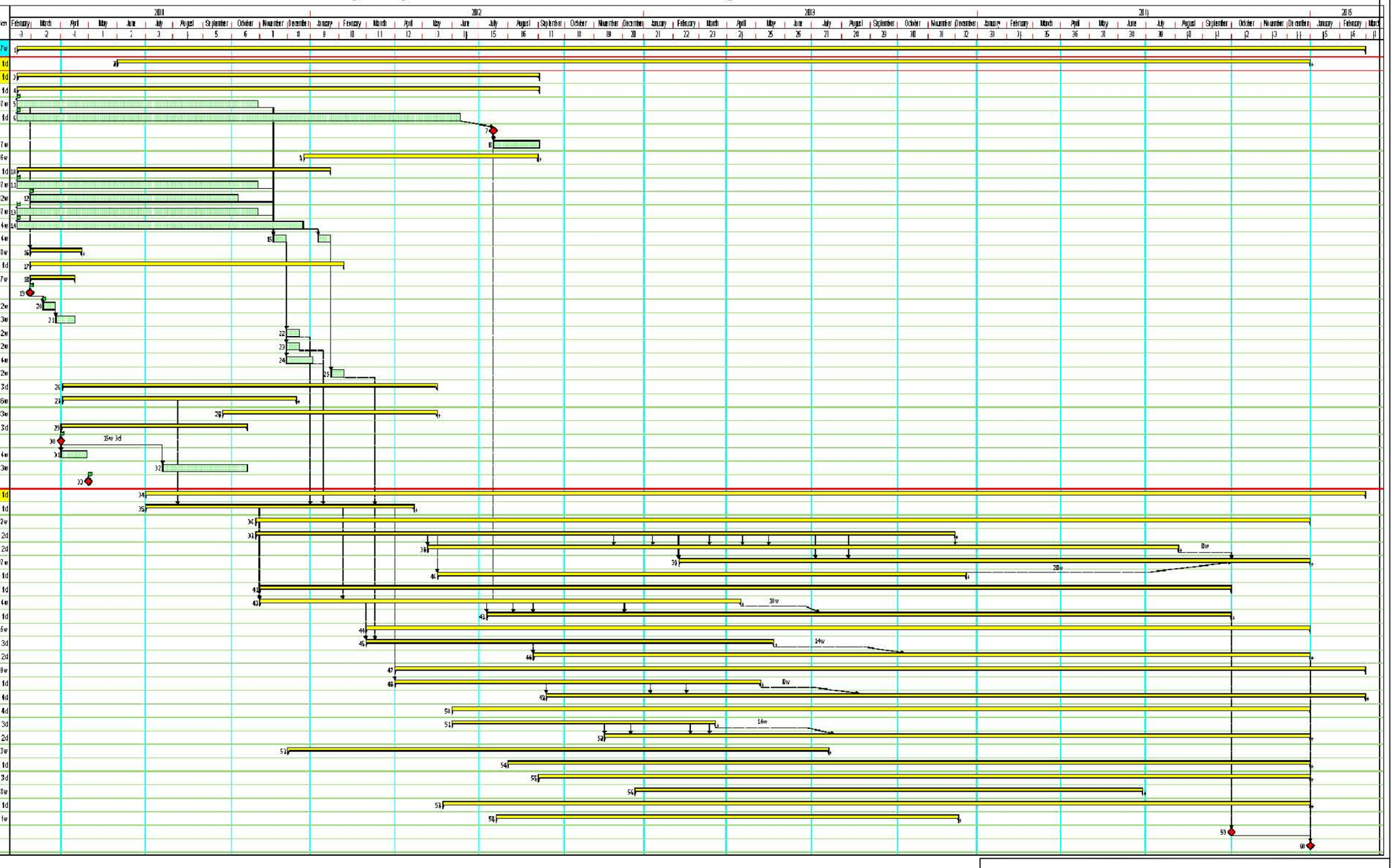
FIGURE 25

G:\314891100 EIA\GIS\MAP PROJECTS\Fig 25_Existing Electrical Network.mxd

Baha Mar Development

Summary Project Schedule: EIA submission Figure 26

Line	Name	Start	Finish	Duration
1	Overall Project Strategy	14 Feb 11	27 Feb 15	207w
2	Key Project Triggers	01 Jun 11	01 Jan 15	183w 1d
3	Site Construction - Early Works Projects	14 Feb 11	03 Sep 12	89w 1d
4	West Bay Street Re-alignment and Corridor 7 construction	14 Feb 11	03 Sep 12	89w 1d
5	West Bay Street Construction	14 Feb 11	26 Oct 11	37w
6	Corridor 7 Construction	14 Feb 11	11 Jun 12	68w 1d
7	Casino hotel at 100ft - Prospect Ridge Road closure	16 Jul 12	16 Jul 12	
8	Final section of Corridor 7 Construction	17 Jul 12	03 Sep 12	7w
9	Expansion of Skyline Substation	19 Dec 11	31 Aug 12	36w
10	Commercial Village Works	14 Feb 11	23 Jan 12	49w 1d
11	Construction of Scotia Bank	14 Feb 11	26 Oct 11	37w
12	Construction of Fidelity Bank	28 Feb 11	07 Oct 11	32w
13	Construction of New Police & Fire station	14 Feb 11	26 Oct 11	37w
14	Construction of Commonwealth Bank	14 Feb 11	16 Dec 11	44w
15	Relocation of personnel	16 Nov 11	23 Jan 12	4w
16	Demolitions by WBS contractor	28 Feb 11	22 Apr 11	8w
17	Small Demolitions by BML	28 Feb 11	06 Feb 12	49w 1d
18	Hobby Horse Grandstand	28 Feb 11	15 Apr 11	7w
19	Demolition Approval received by Antiquities Division	28 Feb 11	28 Feb 11	
20	Grandstand - Asbestos Removal/Soft Strip	14 Mar 11	25 Mar 11	2w
21	Grandstand - Hard Demolition	28 Mar 11	15 Apr 11	3w
22	Police and Fire station	30 Nov 11	13 Dec 11	2w
23	Fidelity Bank	30 Nov 11	13 Dec 11	2w
24	Cecil Wallace Whitfield building (incl Scotia Bank)	30 Nov 11	03 Jan 12	4w
25	Commonwealth Bank	24 Jan 12	06 Feb 12	2w
26	Large Demolitions	04 Apr 11	16 May 12	57w 3d
27	Nassau Beach hotel	04 Apr 11	09 Dec 11	36w
28	Wyndham F tower	22 Sep 11	16 May 12	33w
29	Breezes Waste Water Treatment Plant	01 Apr 11	18 Oct 11	28w 3d
30	Finalise Breezes hotel agreement	01 Apr 11	01 Apr 11	
31	Divert Breezes WWTP pipework	01 Apr 11	26 Apr 11	4w
32	Construct Breezes Waste Water treatment Plant	20 Jul 11	18 Oct 11	13w
33	CCA(Bahamas) commence on site	02 May 11	02 May 11	
34	Core Project works	01 Jul 11	27 Feb 15	187w 1d
35	Piling	01 Jul 11	20 Apr 12	41w 1d
36	Podium	27 Oct 11	24 Dec 14	162w
37	Structure	27 Oct 11	29 Nov 13	107w 2d
38	Services & Fitout installation	07 May 12	05 Aug 14	115w 2d
39	Fit out	07 Feb 13	24 Dec 14	97w
40	Podium facade	17 May 12	12 Dec 13	81w 1d
41	Casino hotel - L26 (25)	01 Nov 11	30 Sep 14	148w 1d
42	Structure	01 Nov 11	15 Apr 13	74w
43	Services / Finishes / Approvals	10 Jul 12	30 Sep 14	114w 1d
44	Convention hotel - L25 (24)	01 Mar 12	24 Dec 14	146w
45	Structure	01 Mar 12	20 May 13	62w 3d
46	Services / Finishes / Approvals	28 Aug 12	24 Dec 14	119w 2d
47	Lifestyle hotel - L17 (16)	02 Apr 12	27 Feb 15	148w
48	Structure	02 Apr 12	06 May 13	56w 1d
49	Services / Finishes / Approvals	11 Sep 12	27 Feb 15	125w 1d
50	Luxury hotel - L12 (10)	01 Jun 12	24 Dec 14	131w 4d
51	Structure	01 Jun 12	19 Mar 13	40w 3d
52	Services / Finishes / Approvals	13 Nov 12	24 Dec 14	108w 2d
53	Centra Utility Plant	01 Dec 11	17 Jul 13	83w
54	Convention Centre	01 Aug 12	24 Dec 14	123w 1d
55	Timeshare	03 Sep 12	24 Dec 14	118w 3d
56	Decentralised plant (BOH)	14 Dec 12	26 Jun 14	78w
57	Beach Experience / Pools	23 May 12	24 Dec 14	133w 1d
58	Golf course	19 Jul 12	04 Dec 13	71w
59	Soft opening of hotels commences	01 Oct 14	01 Oct 14	
60	Core Project substantial Completion	31 Dec 14	31 Dec 14	



Legend: Summary bars | Construction | Key milestones

NOTE:

1. BASED ON PLAN "BAHA MAR DEVELOPMENT" LAST REVISION 1.3A DATED FEBRUARY 7, 2011

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

CONSTRUCTION SCHEDULE

BAHA MAR NASSAU, BAHAMAS

SCALE: UNKNOWN
MARCH 2011

FIGURE 26

G:\31489_BAHA-MAR\GLOBAL\EIA RESUBMITTAL_2011-NOVEMBER\31489-120-0026_SCHED-FIG26 [2011-1116].DWG

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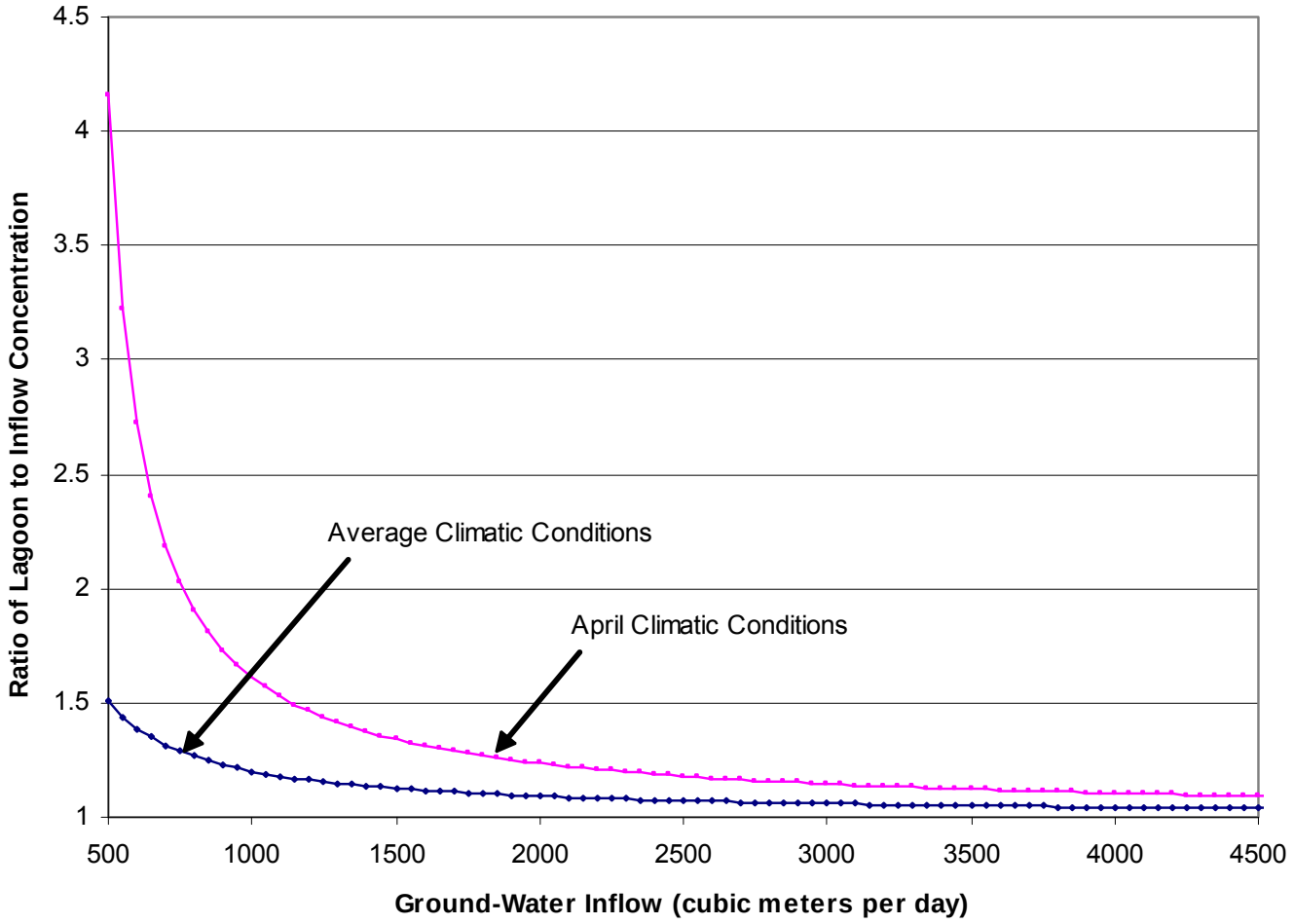


HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

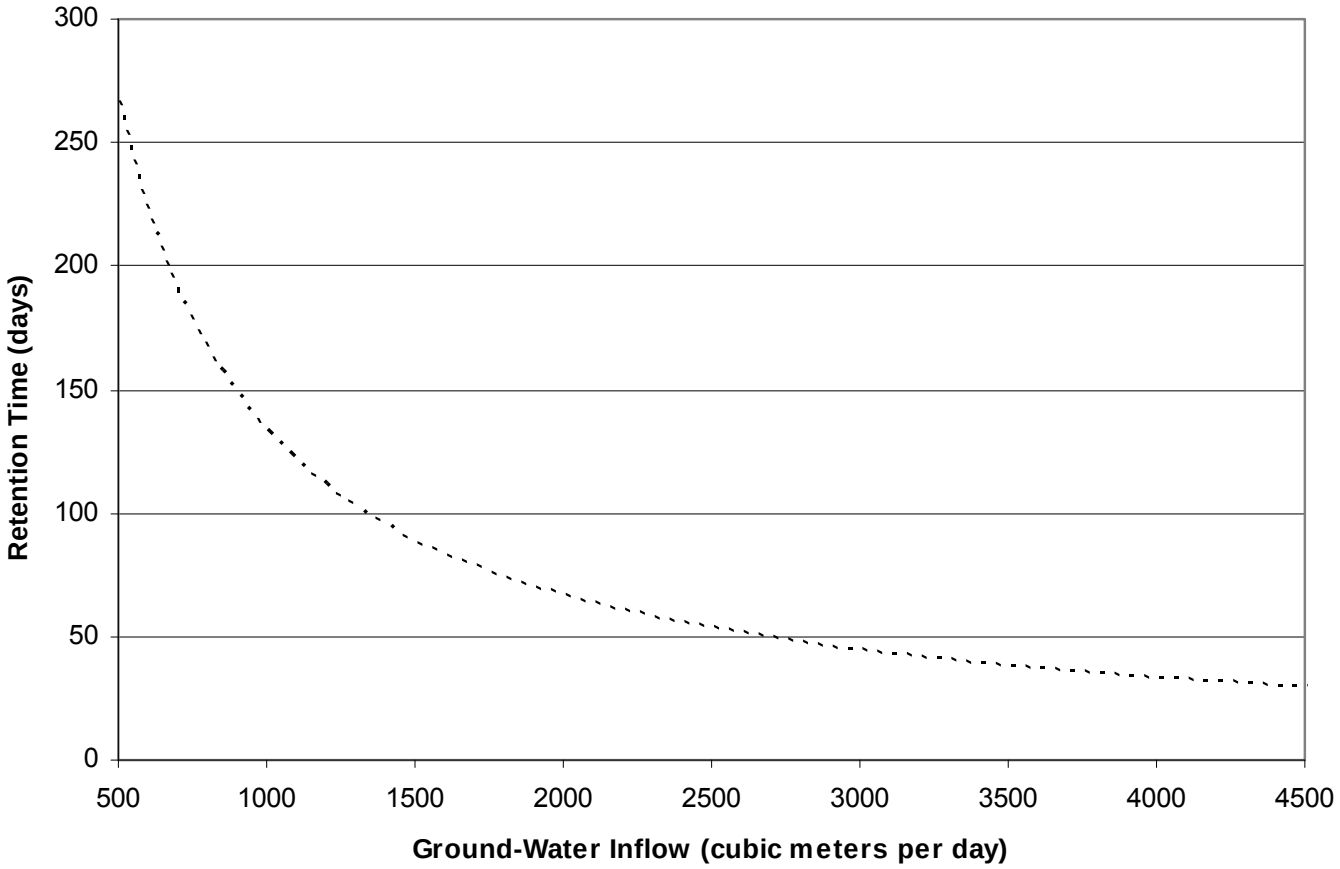
BAHA MAR

LAGOON CHLORIDE CONCENTRATION VERSUS INFLOW RATE

SCALE: UNKNOWN
MARCH 2011

FIGURE 27

G:\31489\100 EIA\Final EIA\Figures\Final\Figure 28.pdf



HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

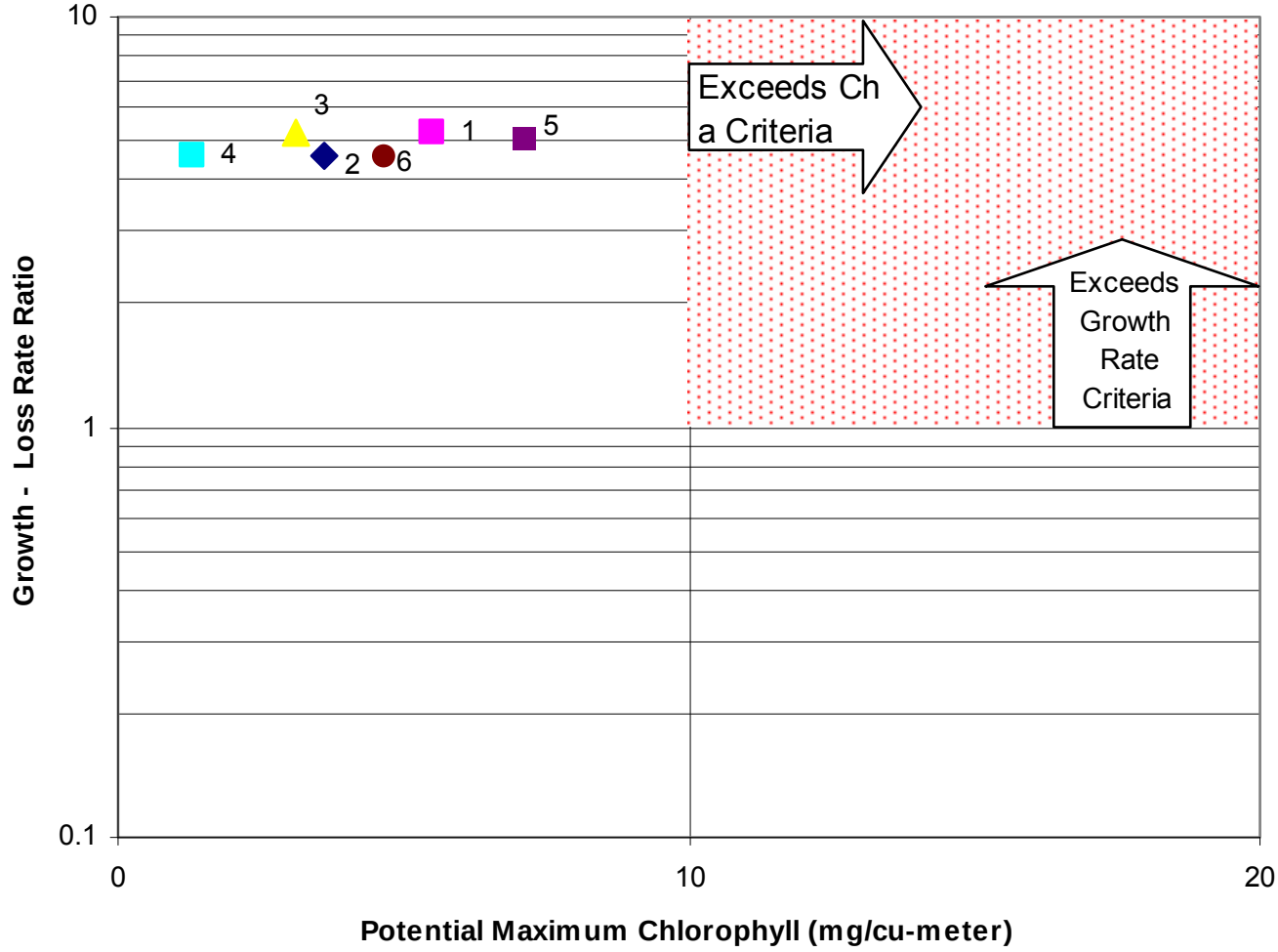
BAHA MAR

LAGOON RETENTION TIME

SCALE: UNKNOWN
MARCH 2011

FIGURE 28

G:\31489\100 EIA\Final EIA\Figures\Final\Figure 29.pdf



HALEY & ALDRICH

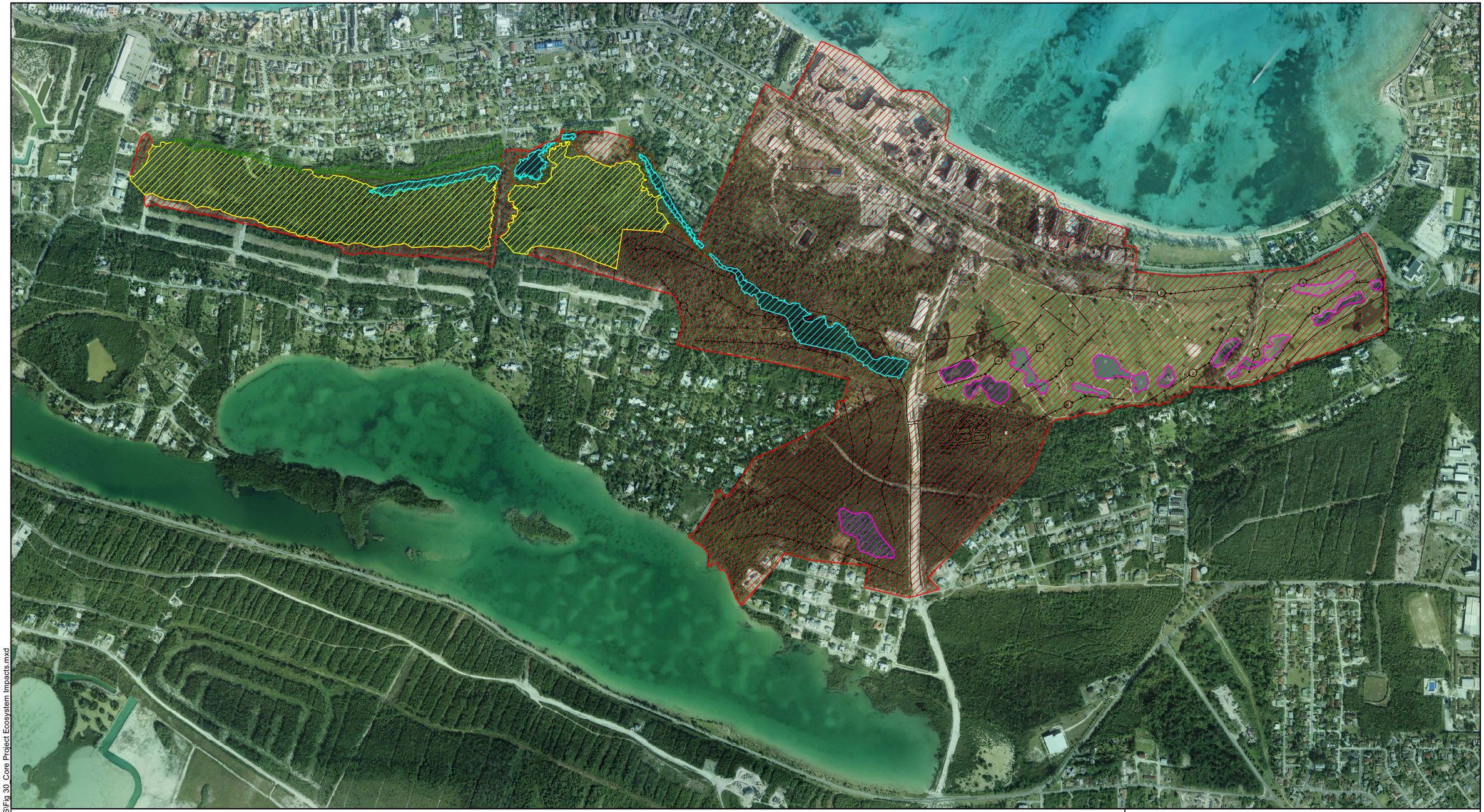
BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

LAGOON SCREENING MODEL RESULTS

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 29



~~LEGEND:~~

- DISTURBED OR DEVELOPED
- MAN MADE PONDS
- OPEN WATER
- RED MANGROVE SHRUBLAND WETLAND
- RED MANGROVE FOREST WETLAND
- MARSH FERN WOODLAND WETLAND

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

BAHA MAR

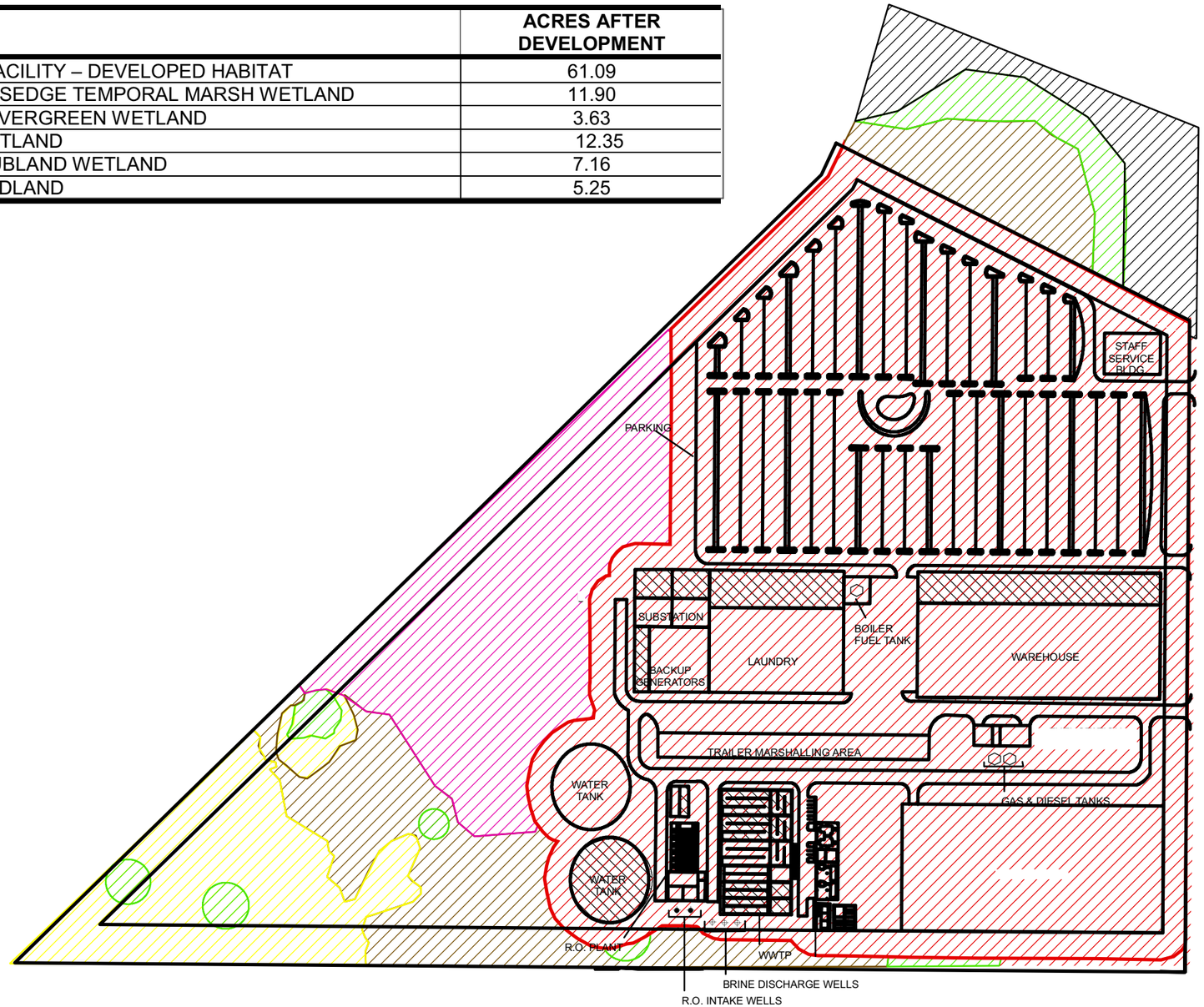
CORE PROJECT ECOSYSTEM IMPACTS

SCALE: AS SHOWN
MARCH 2011

FIGURE 30

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 30_Core Project Ecosystem Impacts.mxd

HABITAT COVER TYPE	ACRES AFTER DEVELOPMENT
CENTRAL SERVICES FACILITY – DEVELOPED HABITAT	61.09
BUTTONWOOD-BLACK SEDGE TEMPORAL MARSH WETLAND	11.90
DRY BROAD-LEAVED EVERGREEN WETLAND	3.63
EPHEMERAL POND WETLAND	12.35
RED MANGROVE-SHRUBLAND WETLAND	7.16
DISTURBED PINE WOODLAND	5.25



LEGEND:

HABITAT COVER TYPE

- DEVELOPED AREA - CENTRAL SERVICES FACILITY
- BUTTONWOOD-BLACK SEDGE TEMPORAL MARSH WETLAND
- DRY BROAD-LEAVED EVERGREEN SHRUBLAND WETLAND
- EPHEMERAL POND WETLAND
- RED MANGROVE SHRUBLAND WETLAND
- DISTURBED PINE WOODLAND

CENTRAL SERVICES FACILITY

- PROPOSED FACILITY LOCATION
- PROPOSED FUTURE EXPANSION

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.
3. FIGURE SHOULD ONLY BE SHOWN IN COLOR.
4. AREAS DENOTED AS FUTURE DEVELOPMENT WERE INCLUDED IN IMPACT AREA CALCULATIONS TO REPRESENT POTENTIAL FULL BUILD-OUT IMPACTS TO BASELINE ECOSYSTEMS.

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0 50 100 150

SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

BAHA MAR

CENTRAL SERVICES FACILITY ECOSYSTEM IMPACTS

SCALE: AS SHOWN
MARCH 2011

FIGURE 31

G:\31489\100 EIA\GIS\MAP PROJECTS\31489-100-0123-CSF-Figure6.1.MXD

DELAPORT BAY

GOODMAN BAY

LAKE CUNNINGHAM

West Bay Street

Hampshire Street

West Bay Street

West Bay Street

Atlantic (public)

Atlantic (private)

Remote Employee Parking

Oxford Ave

Rugby Ave

Skyline Drive

Skyline Drive

Oak Hill Road

All proposed West Bay Street roundabouts

Coral Dr

Bougainville Ave

Sea View Drive

Poinciana Dr

Prospect Ridge Road

Woodland Rd

Lake View Dr

High St

Sandford Drive

Prospect Ridge Road

Prospect Ridge Road

Gladstone Road (Corridor 7)

John F Kennedy Drive

John F Kennedy Drive

Interfield Road

Harrold Road

Theodora Lane

Road

LEGEND:

PROPOSED ROADWAY NETWORK

NOTES:

1. PREPARED FOR CONCEPTUAL DESIGN PURPOSES - NOT FOR CONSTRUCTION.
2. ALL LOCATIONS ARE APPROXIMATE.

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APPROXIMATE SCALE IN FEET

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

PROPOSED ROADWAY NETWORK

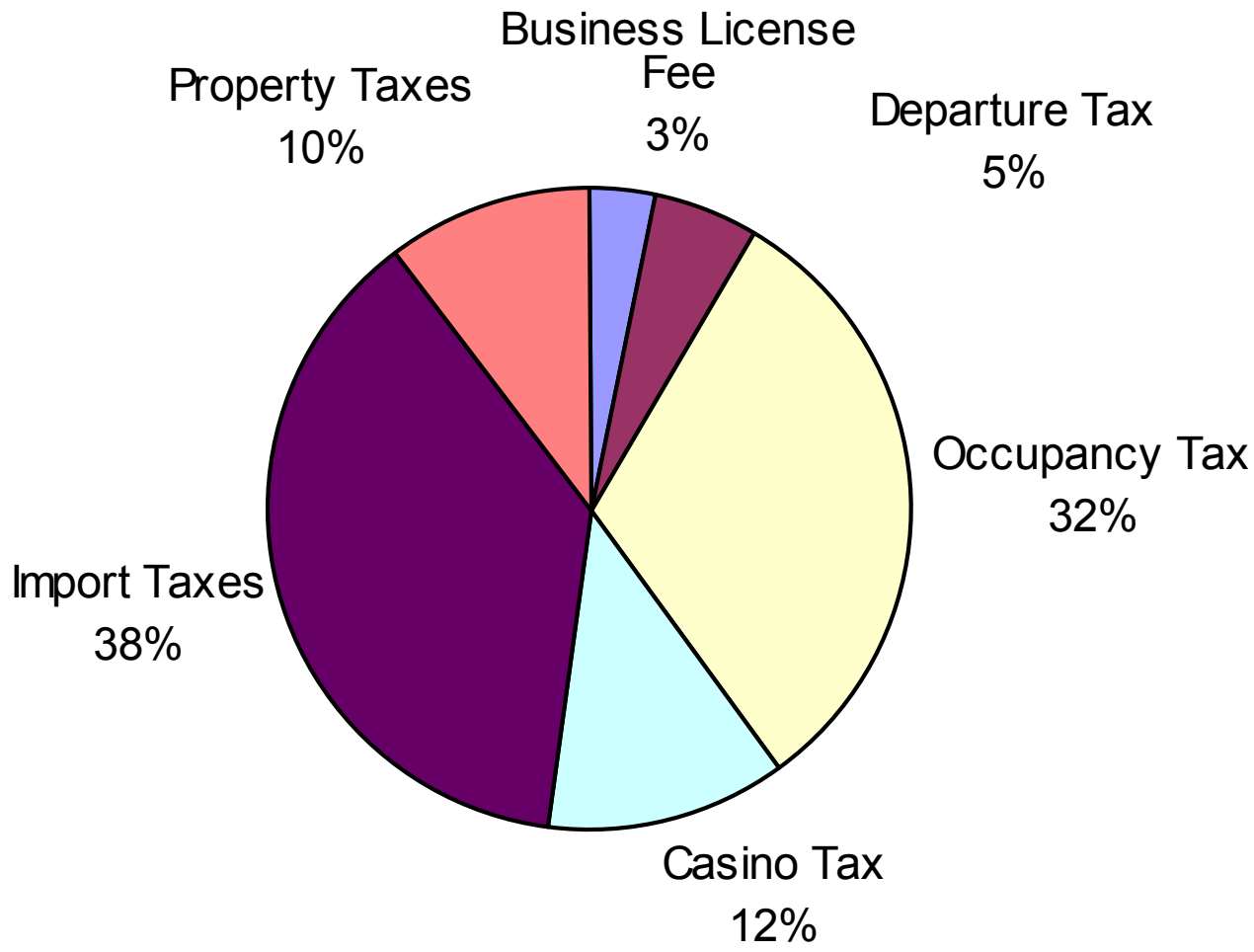
BAHA MAR

SCALE: AS SHOWN
MARCH 2011

FIGURE 32

G:\31489\100 EIA\GIS\MAP PROJECTS\Fig 32_Proposed Roads.mxd

G:\31489\100 EIA\Final EIA\Figures\Final\Figure 33.pdf



NOTES:

1. TOTAL GOVERNMENT RECEIPTS OVER A 20-YEAR PERIOD OF OPERATION WILL EQUAL 4.7 BILLION.

HALEY & ALDRICH

BAHA MAR RESORT DEVELOPMENT PROJECT
ENVIRONMENTAL IMPACT ASSESMENT
BAHA MAR DEVELOPMENT COMPANY
CABLE BEACH
NASSAU, BAHAMAS

20-YEAR CUMULATIVE ECONOMIC IMPACTS

BAHA MAR

SCALE: UNKNOWN
MARCH 2011

FIGURE 33