Environmental Impact Statement

Planning Application PR.16297

School of Medicine & Medical Centre

Parcel 60804/147

Submitted to:

The Director of Planning, Department of Planning
Turks and Caicos Islands Government
Providenciales, Turks and Caicos Islands

Submitted by:

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For:

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6 April 2023

1.0 INTRODUCTION AND OVERVIEW

1.1 Introduction

Section 1 provides an introduction and non-technical summary.

Section 2 provides an overview and project description; lists aims and objectives of the environmental impact assessment (EIA); and the methods and analyses as to how the assessment was conducted is detailed.

Section 3 provides the findings of an ecological terrestrial survey of the site.

Section 4 covers the legislative and regulative environment.

Section 5 details the corporate structures, components; and provides justifications, benefits, and programmes.

Section 6 covers the comprehensive waste management programme.

Section 7 assesses the socio-economic realm.

Section 8 gives an analysis of construction and operational matters.

Section 9 is the emergency mitigation plan.

Section 10 is the conclusion.

1.2 Non-Technical Summary

The proposed development, a Medical Clinic/School of Medicine and Pharmacy, being assessed under this impact assessment is put forward by Doctors Rufus Washington Ewing and Dawn Adele Perry Ewing, both citizens of the Turks and Caicos Islands. The development is proposed on 1.3 acres of land. It is a historic opportunity for the Turks and Caicos Islands, bringing together medical education, research, and patient care thereby creating the next generation of local doctors, nurses and other health professionals that are trained here in the Turks and Caicos Islands. The proponents are working in collaboration with the Turks and Caicos Islands Government.

The development registered as Planning Application PR.16297 has already obtained the relevant and necessary Outline Development Permission (ODP) from the Turks and Caicos Islands Planning Board through the Department of Planning. Notwithstanding that there are no conditions on the grant of consent or the Outline Development Permission dated 3rd November 2022 relating to the requirement for an environmental impact assessment (EIA), the applicant later received a terms of reference (TOR) for an EIA to be carried out on the proposed development from the Department of Environment and Coastal Resources (DECR).

The proposed building has six (6) Floors with all ancillary Facilities:

Level 1

- Reception/Lobby, Pharmacy
- Mechanical, Electrical, Etc.
- Operations (Observations, Lab, Examinations, etc.)

Level 2
- Canteen
- Lecture & Teaching Rooms
- Toilets.
- Anatomy Lab
- Storage
- Library

Level 3
- Lecture Rooms
- Clinicals
- Student Locker Rooms
- Lunch Room
- Storage
- Toilets

Level 4
- Offices/Administration
- Faculty
- Conference
- Research
- Toilets

Level 5
- Group Study
- Conferencing
- Toilets
- Prep Room
- Storage

Level 6
- Amenity/Leisure Space
- Ancillary MEP Equipment

The proponents of this development are the owners of the Omnicare Medical Clinic and Pharmacy already operational on Providenciales. Apart from the obvious benefits in terms of medicine, the proposed development could become an economic engine for the community of The Bight, Providenciales, and the wider Turks and Caicos Islands.

The developer was issued a comprehensive Terms of Reference (TOR) for an environmental impact assessment to be conducted for the proposed development. Internationally renowned and local consultants with extensive knowledge and experience within the Turks and Caicos Islands and the wider Caribbean have conducted this assessment. Notwithstanding the extensive TOR, it must be realized that the site on which the development is proposed is relatively small, inland and away from the coast, and located within a community that requires an injection of investment and rejuvenation. Also, the proposed development is a type of the greatest necessity and positive contribution to a community. In these very special circumstances, much effort has been focused on waste generation, storage and disposal.

In summary, negligible environmental impacts are associated with this proposed development and overriding justifications are given for Detailed Development Permission and a Building Permit to be granted.

2.0 HISTORICAL OVERVIEW AND PROJECT DESCRIPTION

2.1 Historical Overview

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

The development is proposed within The Bight community, immediately on the edge of the old settlement of The Bight. These lower lying areas to the north of the old settlement were commonly and formerly known as "Sandy Land", which was used for subsistence farming and the construction of wells for extraction of potable water (*See Figure 1*). In accordance with the Turks and Caicos Islands Government Block Plan the correct parcel number is 60804/147 and comprises a total of 1.3 acres of land which is a relatively small acreage (*See Figure 2*).

***Figure 1*: The Site for Development is highlighted in the Foreground with the ever-expanding Old Settlement in the Background. Also annotated in writing is the Old Settlement and the site currently used for the local "Fish Fry" event.**

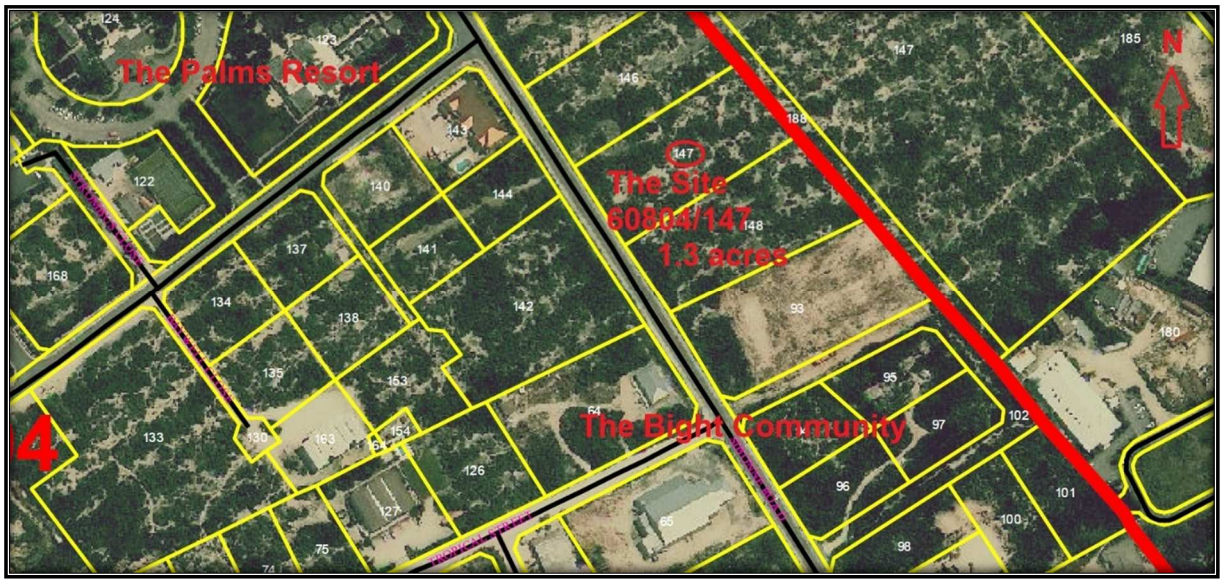

***Figure 2*: Site Location, Block Number, Boundaries and Acreage.**

Further on the periphery of the old Bight settlement or the surrounding areas including the Sandy Lands, The Lower Bight and Grace Bay areas contain the bulk of the economic wealth in the Turks and Caicos Islands; Beach Resorts catering to tourists, the Islands' leading economic sector or economic generator (*See Figures 3 and 4*).

***Figure 3*: Grace Bay Beach (World's Best Beach)/Princess Alexandra National Park can be seen in the background with Some of the Major Resorts built on its borders. The site for development is in the foreground**.

***Figure 4*[1]: The key location of the Proposed School of Medicine and Clinic in relation to the Grace Bay Resort area and the many possibilities envisioned. The site is in the Foreground.**

Regarding Grace Bay Beach, CNN Travel noted "Attracting all these high-end branded resorts and generating enormous wealth and an essential tax base for the Turks and Caicos Islands Government is the 'goose that lays the golden egg' – Grace Bay Beach, the world's number one beach". The writer went on to state, "Picture a warm, pristine paradise. White-sand beaches. Turquoise-tinged water clear as gin. And you've got the No.1 beach in the world for 2022, according to Tripadvisor users". (CNN travel, Unlocking the World, Wednesday February 23, 2022).

2.2 The Proposed Development

The proposed development involves the construction of a Medical Clinic/School of Medicine and Pharmacy, which has already obtained the relevant and necessary Outline Development Permission (ODP) dated 3rd November 2022 from the Turks and Caicos Islands Planning Board through the Department of Planning.

[1] https://edition.cnn.com/travel/article/tripadvisor-awards-best-beaches-2022/index.html#:~:text=Grace%20Bay%20Beach%3A%20This%20stretch,beach%2C%20according%20to%20Tripadvisor%20users.

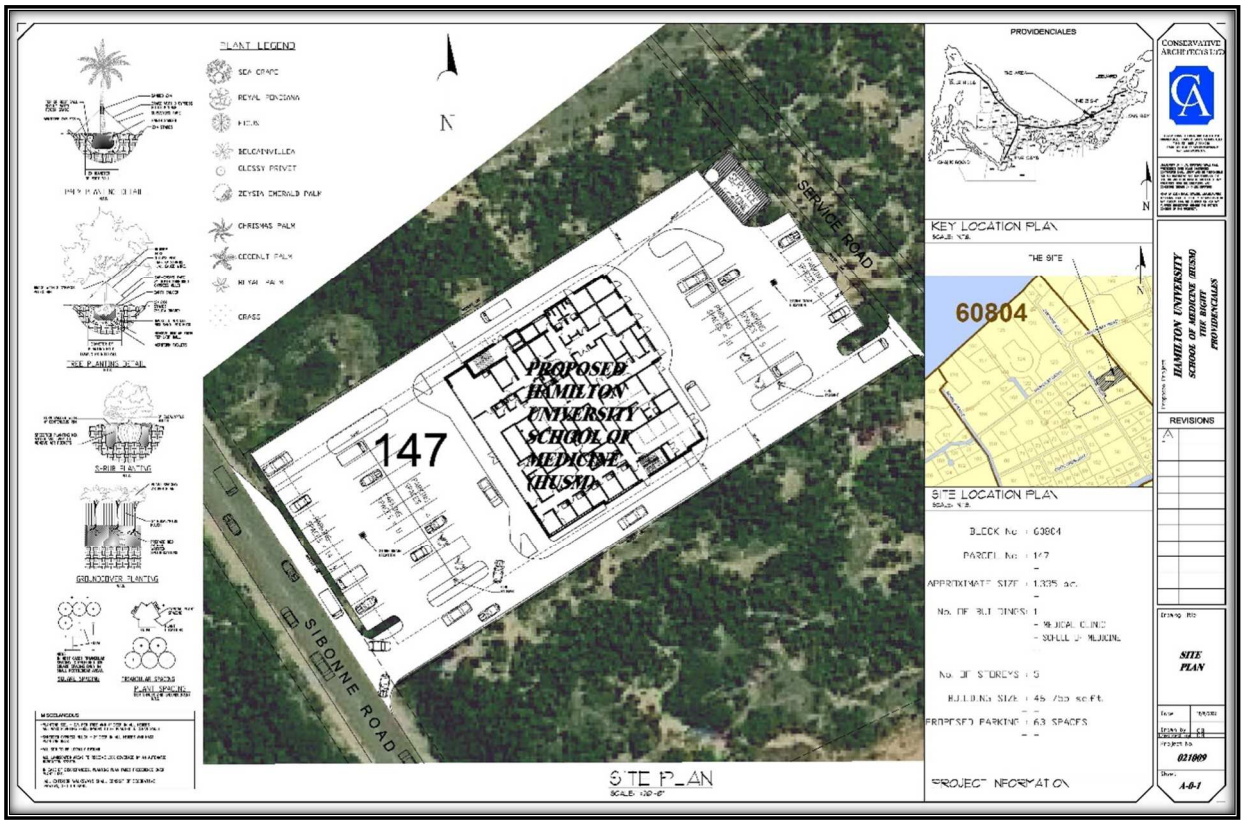

***Figure 5*: Site Plan Showing Overall Development of the Site.**

***Figure 6*: Schematic Design.**

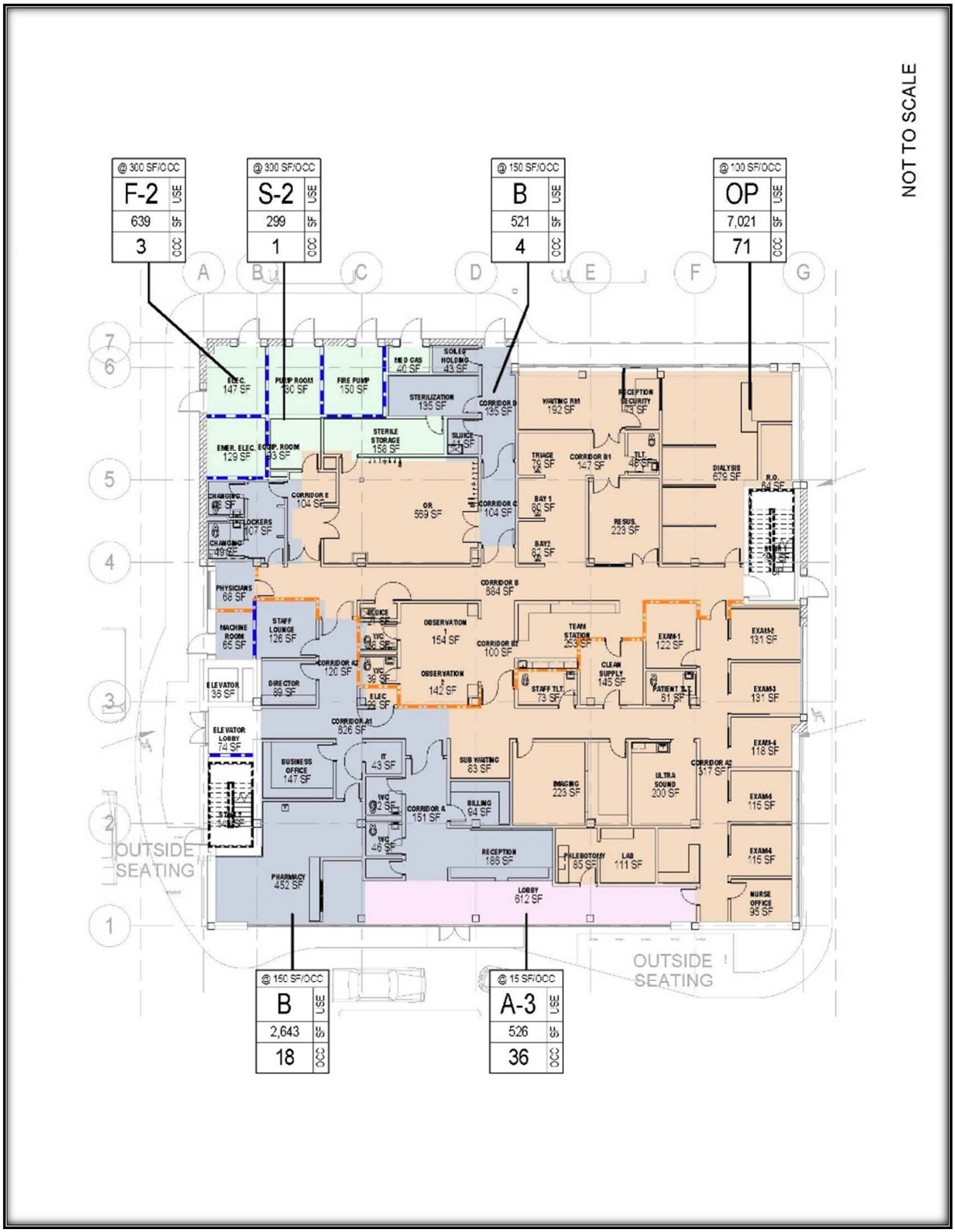

***Figure 7*: Level 1 - Reception, Lobby, Pharmacy, Operation Rooms (Observations, Lab, Examinations, Etc.)**

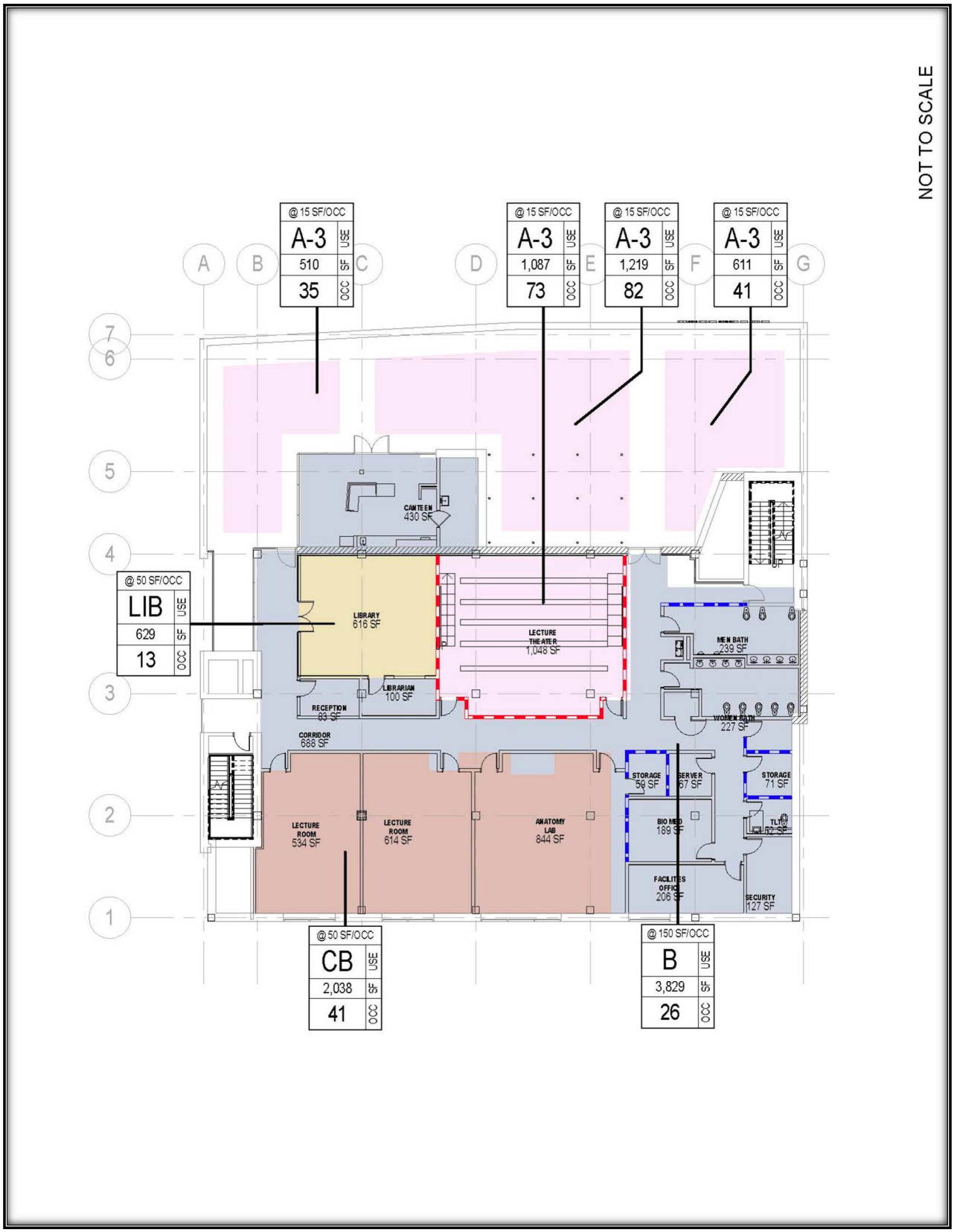

***Figure 8*: Level 2 – Canteen, Lecture & Teaching Rooms, Toilets, Anatomy Lab, Storage, Library, Etc.**

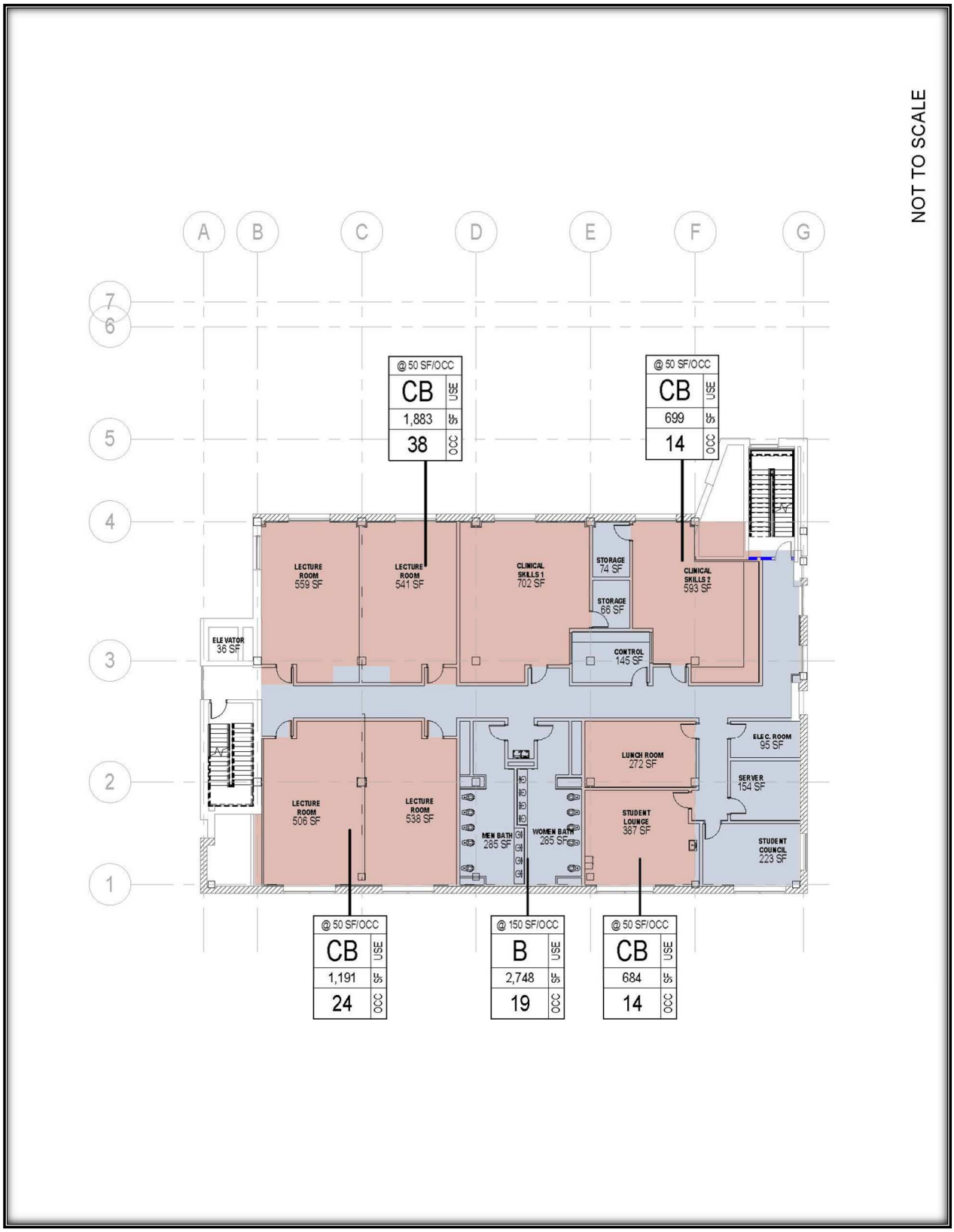

***Figure 9*: Level 3 – Lecture Rooms, Clinicals, Student Locker Rooms, Lunchroom, Storage, Toilets, Etc.**

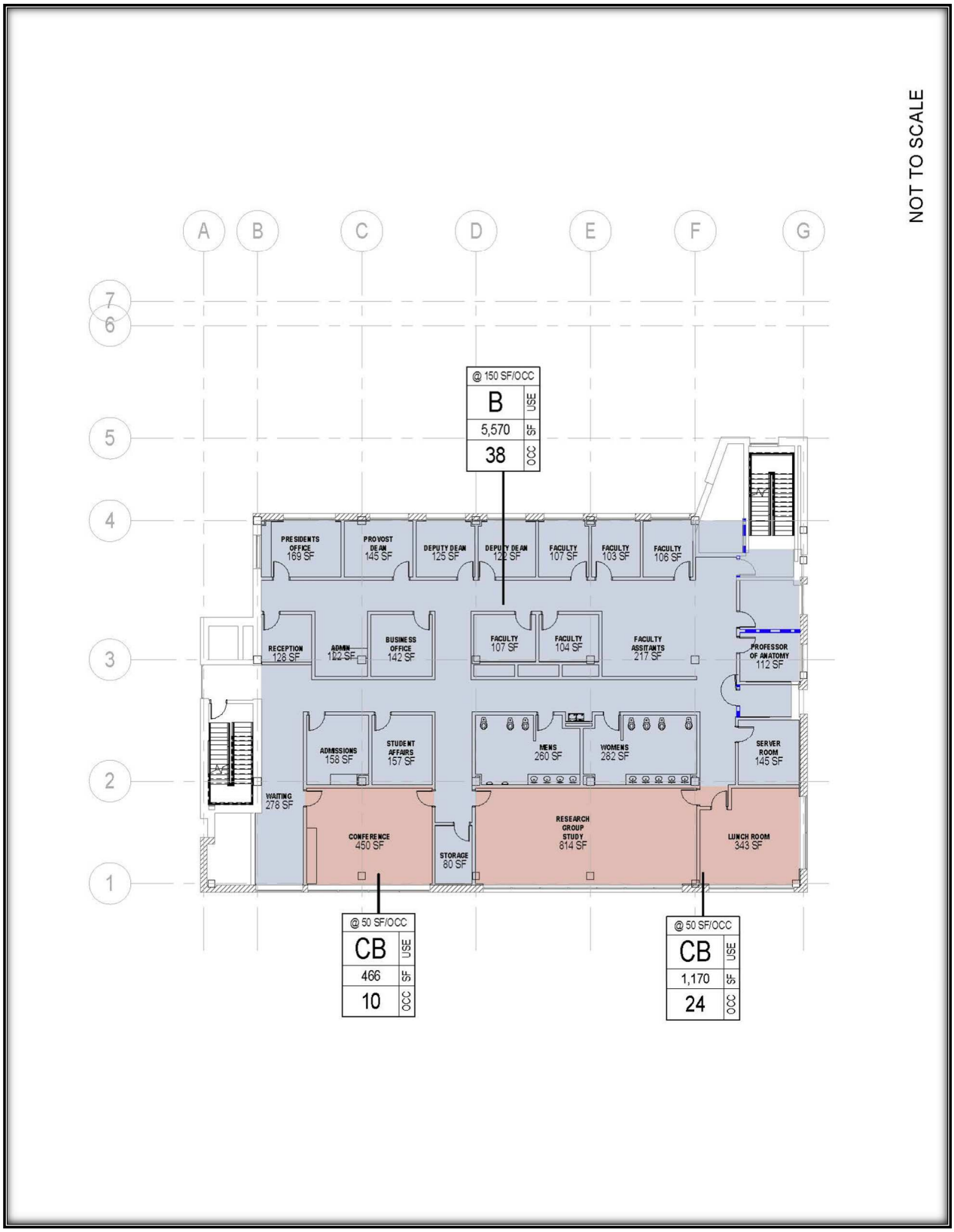

***Figure 10*: Level 4 – Offices / Administration, Faculty, Research, Conference, Toilets, Etc.**

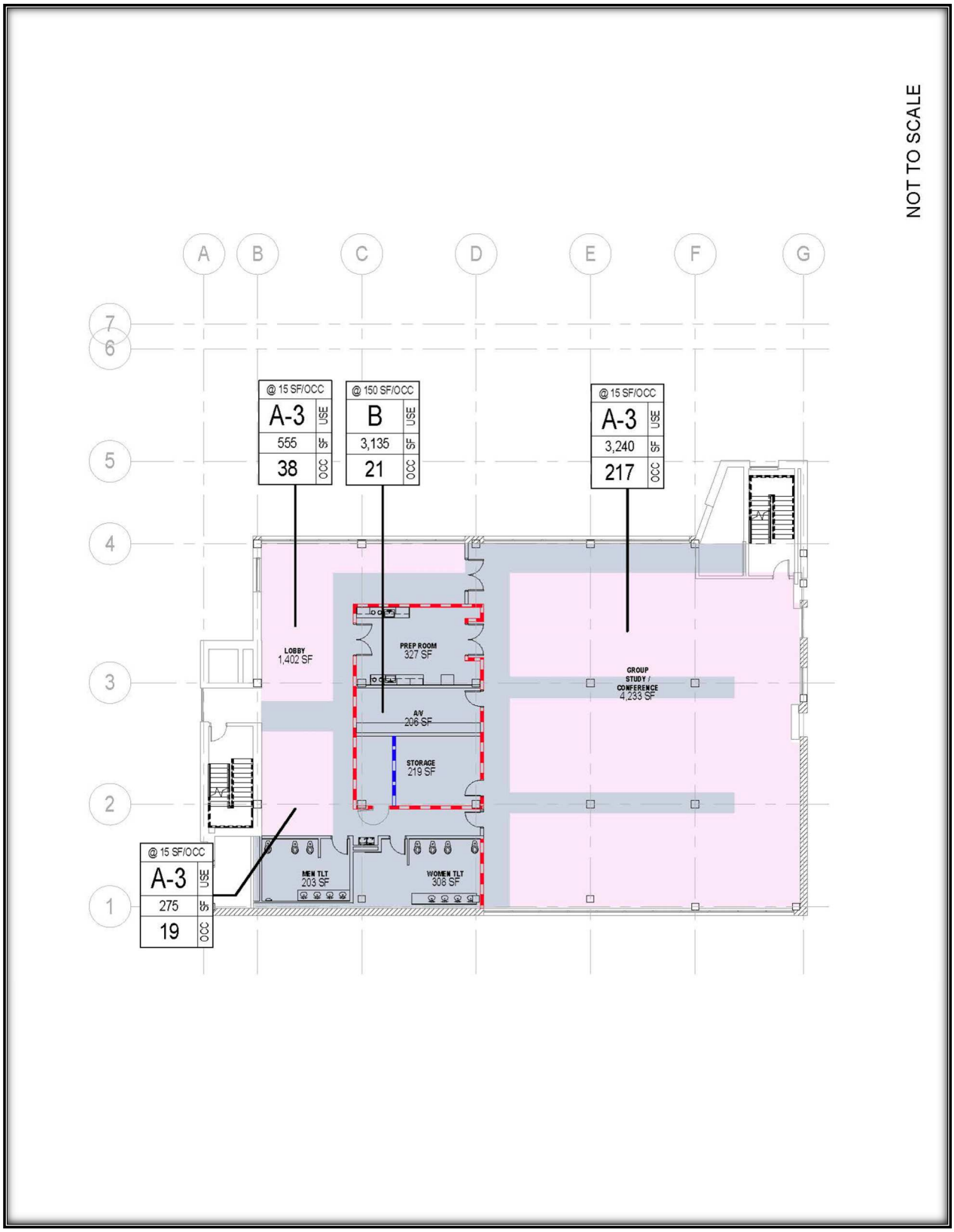

***Figure 11*: Level 5 – Group Study, Conferencing, Toilets, Prep Room, Storage, Etc.**

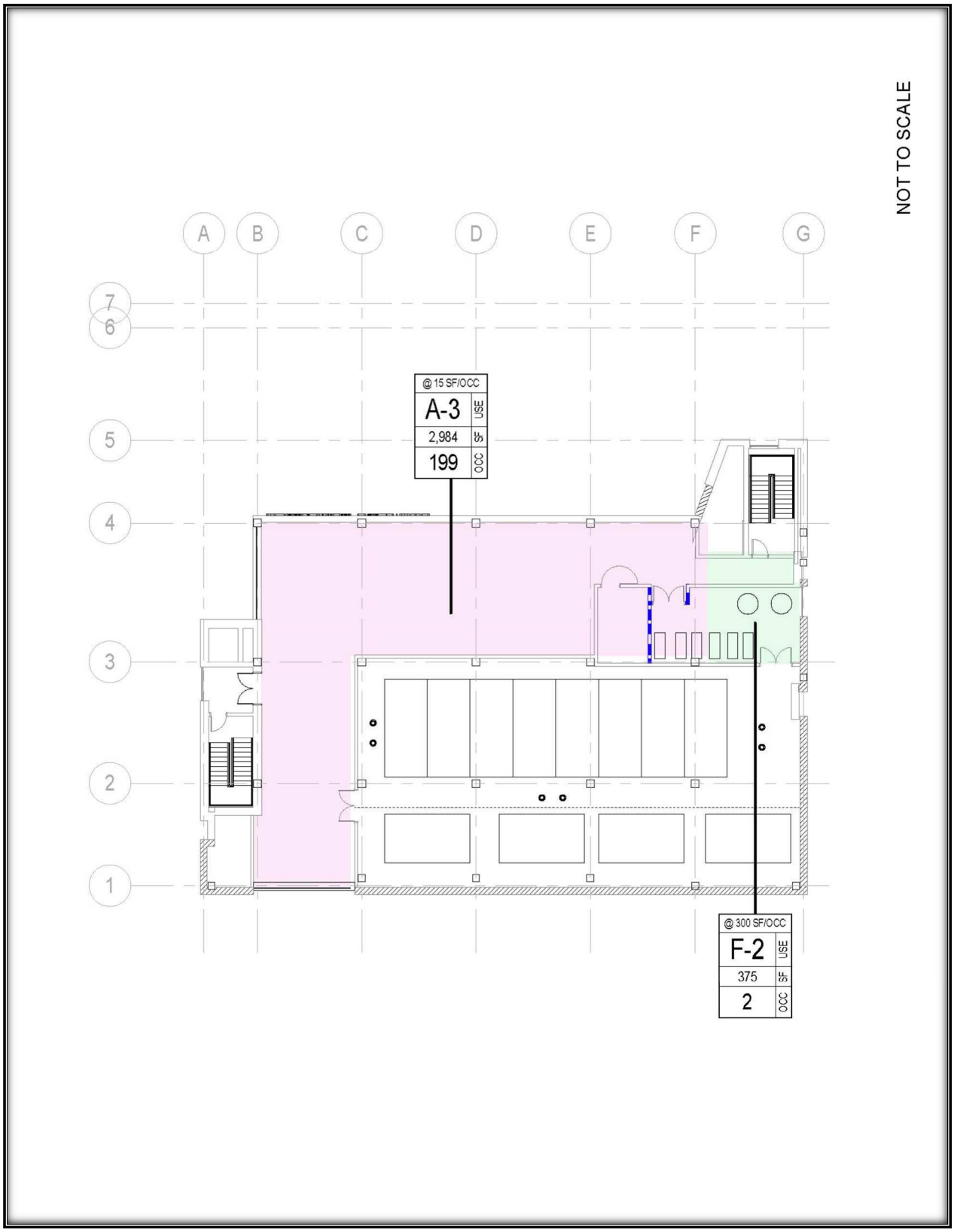

***Figure 12*: Level 6 – Leisure, Amenity/Leisure Space, Partial Roof Space, Mechanical, Heating & Cooling Equipment.**

2.3 Aims and Objectives of the Assessment

This environmental impact statement (EIS) will provide the findings of the environmental impact assessment (EIA), the areas of which are detailed in the terms of reference (TOR). In doing so, the statement will present findings justifying why Detailed Development Permission and Building Permit should be granted to the owner of parcel 60804/147 for the proposed development.

The objectives are primarily as follows:

- For the owner(s) of the subject parcels to construct their development as approved in their Outline Development Permission.
- That the proposed development is economically beneficial to the developer, The Bight community, the TCIG and the citizens of the Turks and Caicos Islands.
- That the proposed development positively impacts the nearby and surrounding infrastructure and natural environment.
- That the development integrates and harmonizes/complements The Bight community.
- That any potential environmental or developmental impacts are negligible and mitigated against.

  The statement derogates from the prescribed format of the generic TOR without compromising the integrity of reporting while addressing all the concerns and requirements. The specialists have been constantly reminded of what is proposed, i.e., a Medical Clinic and School of Medicine. One must be reminded that:
- The site is substantially inland and away from the coast.
- The area within which the development is proposed is badly in need of a rejuvenation project such as that which is proposed.
- The development is a type which is essential for a community and is listed as number three (3) of the seventeen (17) hierarchical "United Nations Sustainable Development Goals"[2].

2.4 Overview of the EIA

As mentioned earlier in the abstract or summary of the EIA, there are no conditions on the grant of consent or the Outline Development Permission dated 3rd November 2022 relating to the requirement for an environmental impact assessment (EIA), the applicant later received a Terms of Reference (TOR) for an EIA to be carried out on the proposed development from the Department of Environment and Coastal Resources (DECR). The TOR as presented has been accepted by the applicant and the applicant has made much effort to focus on providing a sufficient study/assessment and information to enable the examiners to get a thorough understanding of the development, associated impacts, and how they are to be mitigated against. The EIA focuses heavily on waste generation and management. If screening or scoping exercise of the matters to be addressed has been carried out by the Department of Planning and the Department of Environment and Coastal Resources (DECR), the developer is unaware of such an exercise and did not participate in that process.

2.5 Impact Assessment Methods/Analyses

Site-specific field studies were carried out to compile baseline data on the terrestrial ecology of the site and the built natural environments. Quantitative and qualitative methods and processes have been used in data analyses. Photographs, including those from a drone, were also taken. Desk studies and other literary research was carried out, including but not limited to research of the TCI National Parks Ordinance; Planning Ordinance; TCI Building Code and Development Manual;

[2] United Nations, Department of Economic and Social Affairs, Sustainable Development. https://sdgs.un.org/goals

TCI Land Use Zoning Plan for Providenciales; Turks and Caicos Islands National Vegetation Mapping Report; and Review of aerial photographs.

3.0 BASELINE STUDIES

3.1 Terrestrial Ecological Survey

During March 2023, staff from Sustainable Ecosystems International (SEI) conducted an ecological assessment on an approximately 1.335-acre site on Princess Road (aka Sibonne Road), Providenciales, where a Medical School and Clinic is proposed to be constructed on currently vacant land.

The property, Parcel #60804/147 (Figure 13) is rectangular in shape, has approximately 165 feet (165') of frontage on the east side of Princess Rd, and extends approximately 360 feet (360') toward the northeast. It is approximately 1,600 feet (1600') south of Grace Bay and the boundary of the Princess Alexandra National Park, and is bounded by vacant lands on the north, south and east sides.

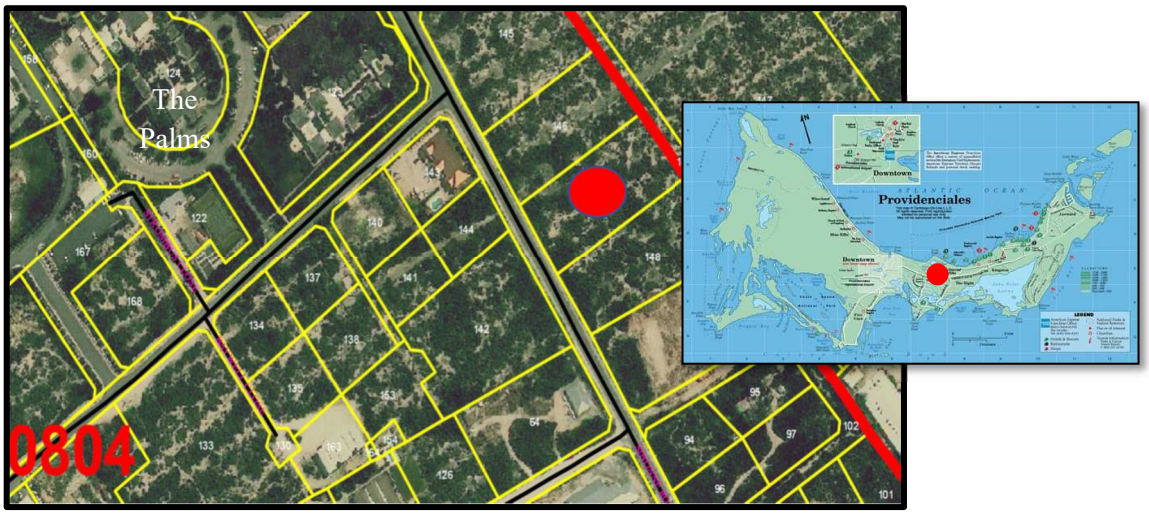

***Figure 13*:** Location Map

Methods: The assessment involved a desktop investigation, analysis of recent Google Earth aerial photography (Figure 14) and observations during pedestrian transects throughout the property. A hand-held Garmin GPSMap78SC Global Positioning System (GPS) was used to locate property corners and record the approximate locations of notable flora and/or fauna, and an Olympus Stylus TG0870 digital camera was used to document conditions as they existed on March 11, 2023. The Turks and Caicos Islands Government's list entitled "The Schedules" was used as the reference source for floral and faunal species of note.

Results: The investigation revealed that the property consisted entirely of a palm-dominated Dry Broadleaf Evergreen Shrubland (DBES) (a.k.a. coastal scrub) community (Photo 1). Trees and shrubs were generally less than seven feet (7') in height. The property did not contain any wetlands and no evidence was observed indicating the current or recent presence of any blue holes, sinkholes, dissolution holes, caves, banana holes, wells, or other notable geologic features. The

property does not front on Grace Bay. No current or former buildings were on the subject property, or on the adjoining properties.

***Figure 14*:** Aerial Photograph showing approximate Property Boundaries
Photo Source: Google Earth Date of Photo: September 24, 2022

***Photo* #1:** Typical Conditions – Dry Broadleaf Evergreen Shrubland
Date of Photo: March 11, 2023

The site contained silver-top palms (*Coccothrinax inaguensis*), sea grape (*Coccoloba uvifera*), seven-year apple (*Genipa clusiifolia*), cinnecord (*Vachellia choriophylla*), pork and dough boy (*Vachellia acuifera*) and (*Stenastomum myrtifolia*) were abundant woody species. Tall orchids (*Encyclia altissima*), and air plants, including *Tillandsia utriculata, T. flexuosa, T. circinnata* were common components of the understory. Groundcover herbaceous species were mostly non-existent. Vines included prickly brier (*Smilax havanensis*) and wild apricot (*Passiflora pectinata*).

Paths and animal trails being used by free-roaming dogs were common on the property. The property was relatively free of garbage and debris, and populations of pest plant species (e.g., *Leucaena leucocephala*) were limited to a narrow corridor along the Princess Road frontage.

No current or formerly used bird nests were observed, but the survey was not conducted during typical nesting season for most bird species.

Individuals of eight plant species and two bird species that are listed in "The Schedules" were observed on the property (Table 1) during the assessment, which was conducted during the morning hours of March 11, 2023.

The habitat on the property is potentially suitable for the presence of other floral and faunal species listed in "The Schedules" (e.g., migratory species for birds, flowering season for plants), and it is likely that surveys conducted at other times of the year could reveal the presence of additional species, some of which may be included in 'The Schedules'.

It is noted that the degree of endemism (Table 1, Column 3) is related to the spatial distribution of a species, rather than a reference to the rarity of the species. Most of the species listed in Table 1 are locally common. Although individuals of these species are not protected, efforts to salvage them prior to land clearing is recommended, as their populations on Providenciales are diminishing.

Table 1

Floral and Faunal Species identified in "The Schedules"
observed on the subject property on March 11, 2023

Common Name	Scientific Name	TCI Designation	Comparative Abundance on the site
Plants			
Catesbaea foliosa	Catesby's Lilythorn	Lucayan Archipelago Endemic Plant	Rare
Encyclia altissima	Tall Orchid	Native Plant of Special Conservation Concern	Abundant
Coccothrinax inaguensis	Silver-top Palm	Lucayan Archipelago Endemic Plant	Abundant
Euphorbia inaguaensis	Wild Thyme	Lucayan Archipelago Endemic Plant	Common

Guaiacum sanctum	Lignum vitae	Native Plant of Special Conservation Concern	Rare
Lantana involucrata	Sea Sage	Lucayan Archipelago Endemic Plant	Common
Pilocereus royenii	Dildo Cactus	Native Plant of Special Conservation Concern	Rare
Vachellia acuifera	Pork & Dough Boy	Native Plant of Special Conservation Concern	Common
Vachellia choriophylla	Cinnecord, Leatherleaf Casha	Native Plant of Special Conservation Concern	Abundant
Animals			
Zenaida macroura	Mourning Dove	Protected Bird	Rare
Mimus polyglottos	Northern Mockingbird	Protected Bird	Rare

4.0 LEGISLATIVE AND REGULATIVE CONTEXT

4.1 Turks and Caicos Islands Constitution (2011)

The TCI Constitution (2011) provides for the protection of the environment for the present and future generations while promoting justifiable economic and social development.

4.2 Environmental Charter – Turks and Caicos Islands

- To recognize that all people need a healthy environment for their well-being and livelihoods and that all can help to conserve and sustain it.
- To use our natural resources wisely, being fair to present and future generations.
- To identify environmental opportunities, costs and risks in all policies and strategies.
- To seek expert advice and consult openly with interested parties on decisions affecting the environment.
- To aim for solutions which benefit both the environment and development.
- To contribute towards the protection and improvement of the global environment.
- To safeguard and restore native species, habitats and landscape features, and control or eradicate invasive species.
- To encourage activities and technologies that benefit the environment.
- To control pollution, with the polluter paying for the prevention or remedies.
- To study and celebrate our environmental heritage as a treasure to share with our children.

4.3 TCI Development Plan/Master Plan

Under Section 1.0 (Executive Summary) of the National Physical Development Plan 2020 for the Turks and Caicos Islands, the proposed development accords with number 2 (Resilience, Sustainability + multi-functionality) of the five (5) guiding principles for land use and development for the ten years.

Additionally, the proposed development also accords with Section 2.1.2 (Promote Sustainable Development Goals), the third bulleted point.

The proposed development being within the community, particularly an old settlement area, is consistent with the provisions of the National Physical Development Plan, 2020 in terms of rejuvenation of economic activity within the old settlement areas.

4.4 Climate Change Adaptation

Global Climate Change can have a direct catastrophic impact on the Islands' natural capital, from natural hazards such as hurricanes and sea level rise, and heavily expose other environmental vulnerabilities faced by these Islands. When examined, the Turks and Caicos Islands are very vulnerable for the following reasons:

- Key economic sectors dependent solely on limited natural resource (Example – tourism and fishing).
- 100 percent Import Economy - especially of strategic imports such as food and fuel.
- Susceptibility to economic fluctuations and events of the US economy.
- High energy costs.
- Serious vulnerability to extreme climate events.
- Increasing pressures on coastal and marine environments and resources.
- Small domestic markets.
- Limited economic diversification possibilities.
- Inability to influence international prices.
- Uncertainties of supply or Imports.
- Shifting rainfall patterns and hurricanes.

During 22nd April, 2022, the Hon. Minister for Tourism, Environment, Fisheries and Marine Affairs, Culture and Heritage, Agriculture, Religious Affairs and Gaming signed the ***Turks and Caicos Islands Climate Change Charter***. Other signatories were Fortis TCI, Provo Water Company Ltd., Turks and Caicos Hotel and Tourism Association, and Turks and Caicos Reef Fund. ***This was to acknowledge that each has an important role to play in addressing climate change amongst other important obligations***.

Keynote speaker at the event, Deputy Premier of Bermuda, Walter Roban stated that he was encouraged by the regional conversation around the impacts of Climate Change and that the Turks and Caicos Island's Climate Change Charter had not only set the standard but was one that he would take back to Bermuda to inform the drafting of their own Charter. "It is important that the same work you have put into attracting development, you put into environmental protection. That the same enthusiasm with which you craft proposals for international development, you must put the same energy into environmental investment and protection, internally and internationally. This is the new philosophy that we must pursue," said Roban. He continued to motivate for robust environmental policy that would enhance and not hinder the livelihoods of the Caribbean region, including green energy solutions, improved air quality and effective land management. "We, we the Caribbean, must become the strong voices in the campaign for Climate Action. We must become our own advocates in the global fight against Climate Change," said Roban. (The Sun Newspaper, TCI., Mon, May 02, 2022).

The close relationship between tourism, the Islands key economic sector, and the natural resource base demands strategic sustainable management. It is the prime reason for Climate Change Adaptation being integrated into the planning and design processes of the proposed development. The examination of all the following have been carried out and are continuing with the design processes of the proposed development for implementation during construction and operation:

- The height of the finished ground floor levels for the building above the mean sea level must far exceed the minimum allowable requirements provided in the TCI Building Code to avoid inundation of flood waters which may be caused by rising sea levels.
- The Building Technologies to be used in the construction must be certified for use by a qualified and experienced Structural Engineer with the relevant and necessary business license to ensure the aforementioned and compliance with the TCI Building Code.
- Improving energy efficiency. Energy in the Turks and Caicos Islands is produced mainly through burning fossil fuels products such as gas and diesel oil. Diesel is used in the generators at the electricity supply plant, liquefied petroleum gas (LPG) is used for cooking, while gasoline (petrol) and diesel oil are used for transportation. These account for overwhelmingly the total carbon dioxide emissions in the Islands. The TCI Climate Charter encourages the transfer of technology and cooperation to reduce greenhouse gas emissions, especially from energy, transport, industry, and waste management, which together produce nearly all greenhouse gas emissions attributable to human activity.
- The Building Technology used in the exterior and interior walls and cladding must ensure efficient use of energy and climate resilience.
- Utilization of energy efficient appliances and utilities.
- Use of renewable energy sources.
- Recycling of waste.
- Establish effective systems of waste collection.
- Effective and efficient waste-water treatment system.
- Water conservation.
- Recycling of grey water.
- Low flush toilets.
- Efficient and effective AC Systems in the buildings for cooling.

4.5 Physical Planning Ordinance and Regulations (Planning and Building Requirements)

Outline Development Permission has already been granted for the proposed development and the applicant is awaiting approval of the environmental impact statement (EIS) in order to proceed with submission of the Detailed Planning Application for receipt of Detailed Development Permission and issuance of a Building Permit to commence construction forthwith. The applicant had intended to commence construction during the month of January 2023 for Commissioning during June 2024.

4.6 TCI Development Manual

All relevant planning standards for the proposed development have been complied with, including the following:

- The height of the building is in conformity and does not detract from the surrounding built character of the area.

- The proposed development is compliant with the building setback requirements.
- The aesthetics, including architectural design is modern and designed to its function.
- The garbage storage facility shall be fully enclosed and of a suitable height to prevent scavenging by feral animals.
- An adequately sized mechanical wastewater plant will be provided for the proposed development to sufficiently dispose of the wastewater.
- All transmission lines, including utility lines, will be placed underground in conduit and to the requirements and standards of the relevant suppliers.
- Upon completion of the development, the entire site will be revegetated and landscaped with native vegetation.
- All other relevant planning standards provided within the TCI Development Manual, 2014 will be followed.
- Outline Development Permission has been granted by the Physical Planning Board.

4.7 TCI Building Code

The proposed development will be carried out in strict compliance with the provisions of the TCI Building Code. Renowned Structural Engineer, Mr. Peter Kerrigan of EDS, has been retained to ensure strict compliance. Mr. Anthony Walkin of Conservative Architects is the Architect of Record. Other mechanical, electrical and plumbing engineers have been retained to ensure compliance and maintain the integrity of means of escape, fire safety, structural design, use of building materials, water and sanitary requirements, stairways and balconies, environmental health, etc.
Upon completion of the development, an Occupancy Certificate (Completion Certification) will be required from the Director of Planning prior to operation of the facility.

4.8 Environmental Health Ordinance

Although not specified in the TOR, it is critical to adhere to the Environmental Health Ordinance during construction and operational phases of the proposed development in the following ways, some of which will be detailed elsewhere in this report:

- Solid waste management (storage and disposal).
- Landscaping and green waste.
- Medical waste.
- Hazardous waste zone.
- Liquid waste management (storage, treatment and disposal).
- Stormwater discharge and drainage.
- Fire and safety requirements (Sections 4,5 and 6, of the TCI Building Code) – This relates to many areas, including but not limited to pull stations and hoses for fire, extinguishers, full and comprehensive exit plans for emergency, muster station for fire and/or emergency, etc.
- BOH facilities (laundry facilities and chemical waste).
- Vector and pest control.

4.9 Coast Protection Ordinance

Under the Coastal Protection Ordinance, “coast” means land bordering on the sea or any tidal water and having its seaward boundary at the low water mark. The proposed development is inland and away from the coast.

4.10 Mineral (Exploration and Exploitation) Ordinance and Subsidiary Legislation

All aggregate and other construction materials that will be used in the construction will be purchased from approved local suppliers on the island. Any sand generated from trenching and/or digging will be used in the development for refilling and compaction on the site. The project will be completed as per the approved drawings to a high standard, and all measures detailed in this environmental statement will be implemented to ensure zero or minimal environmental impacts.

4.11 Marine Pollution Ordinance and Regulations Thereunder

The proposed development will be inland and away from the coast. No marine vessels or ships will be used in the construction of the development.
The proposed construction and operation of the development will not cause any environmental harm or negative environmental impact, whether: a) means of livelihood for persons; b) damage to mangroves, coral reefs or beaches; c) damage to the marine environment; d) tourist attractions or the health and wellbeing of citizens and residents.

Containers for collection and storage of solid waste will be provided on the site, within the confines of the parcel boundaries. During construction, portable latrine(s) will be provided and maintained on site by one of the approved local Sanitary Companies for liquid waste disposal. The contractor will be required to maintain acceptable environmental health and safety standards during construction. Containers of oils and other similar effluent will be collected, bagged, and disposed of separately at the public landfill facility. There will be zero tolerance for the depositing of any garbage, rubbish, litter, or derelict article that could eventually make its way into the coastal or marine environment. This includes any broken bottles or other glass or ceramic articles.

All waste generated during construction, whether from daily food and beverage consumption of those working at the site or construction waste, will be containerized and disposed of at the public landfill site daily. A lidded refuse bin will be provided and easily accessible to workers with clear instructions for immediate disposal. Inspections will be made at the end of the day to ensure that no waste remains behind on the jobsite.

4.12 Fisheries Protection Ordinance and Regulations

Fishing activities or the taking of marine products from the ocean are not associated with the proposed development. The proposed development will not have any environmental impact on the island's fisheries. There will not be any disturbance to coral and other parts of the seabed.

4.13 National Parks Ordinance

The parcels for development are not located within the boundaries of a Sanctuary; Nature Reserve; Historic Site; or National Park. There is no evidence that any of the protected areas are within the confines of the parcel or any documented sites of special scientific or ecological interest. The few rare plants (Catesby's Lilythorn, Lignum vitae, and Dildo Cactus) existing on the parcel will be tagged and relocated elsewhere to a nursery existing on the Island.

5.0 PROJECT DESCRIPTION AND OPERATION

5.1 Proponents of the Proposed Development

The proponents/applicant of the proposed development is the Hamilton Education Foundation, a Turks and Caicos Islands Limited Liability Company. The Hamilton Education Foundation Ltd. will do business as the Hamilton University School of Medicine (HUSM), a for profit medical school.

The Hamilton Education Foundation Ltd. and HUSM is a subsidiary of the Medinco Group Ltd., a Turks and Caicos Islands limited liability company wholly owned by Dr. Rufus Ewing, Dr. Dawn Perry Ewing, and Stuart Ewing.

5.2 Financing

- Seed financing from Medinco Group Ltd.
- Private Equity.

5.3 Partnerships

- MOU with the TCI Hospital and TCI Community College.
- International Hospital and University Partnerships – US, Canada, UK and the Caribbean.

5.4 Description of the Proposed Project

The summary of the facilities within the building and contained on the six (6) floors are as follows (also see Figures 5-12:

Level 1
- Reception/Lobby.
- Pharmacy.
- Mechanical, Electrical, Etc.
- Operations (Observations, Lab, Examinations, etc).

Level 2
- Canteen.
- Lecture & Teaching Rooms.
- Toilets.
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- Lecture Rooms.
- Clinicals.
- Student Locker Rooms.
- Lunch Room.
- Storage.
- Toilets.

Level 4
- Offices/Administration.
- Faculty.
- Conference.
- Research.
- Toilets.

Level 5
- Group Study.
- Conferencing.
- Toilets.
- Prep Room.
- Storage.

Level 6
- Amenity/Leisure Space.
- Ancillary MEP Equipment.

5.5 Vision and Mission

- A leading Caribbean University producing excellent physicians and researchers with global reach and impact.
- To establish HUSM:
  - Caribbean academic health sciences institution.
  - Technology-driven and transformative quality medical education.
  - Innovative health research.
  - Equitable and comprehensive health care services to diverse populations.
  - Champion local, regional and global health challenges.
- To diversify the TCI tourism-based economy into Educational and Medical Tourism.

5.6 Project Justification

The information provided within this environmental statement provides the justifiable planning, environmental, tourism, economic, educational, and strategic national grounds of Governmental importance to validate why detailed development permission and building permit should not be withheld. Other benefits of the development are as follows:

HUSM will address some of the pressing public health issues that are facing our society today. These include but are not limited to:

- The inadequate capacity in human resources for health to drive the national health agendas, particularly the global and local shortage of primary care and specialist physicians, but also their inaccessibility to novel health care innovations, Continuing Medical Education opportunities and information technology and digital health especially in developing countries.

- The paucity of information for the formulation of effective national health policies due to inadequate research and low level of maturity of information and data management systems.

- The fragile health systems and issues of inadequate access to quality and essential health care services.

- Existing epidemics such as Noncommunicable diseases (NCDs) and the new and emerging public health threats, including the health impact of the climate crisis.

- In addressing the health challenges and its determinants, the medical education, health research and health care delivery programs of HUSM will be executed on the foundations of diversity, equity and inclusion.

- The Hamilton University Medical Center will operate a ***medical tourism program*** using primarily US-based physicians most of whom will be HUSM visiting faculty.

5.7 The Programme / Offerings:

HUSM will offer a 4-year medical education program leading to an MD degree awarded by the University.

- Three semesters per academic year.
- 75 medical students per semester.
- Basic medical sciences – First two years at HUSM in the Turks and Caicos Islands.
- Clinical Sciences – 3rd & 4th years in the Caribbean (Jamaica & TCI), USA, Canada, & UK).
- Early clinical exposure in the TCI in longitudinal community-based programs and simulation centers.
- For the first 5 years, there will be a total of 450 students in the Turks and Caicos and 900 students overall in the steady state.

Global Health Research Collaborative.

- Global Surgery & Health Benefits.
- Global Health Equity and Determinants of Health.
- Digital Health & Information Systems.
- Health Research & Medical Conferences, & Coronal Mass Ejection (CMEs).
- The opportunity to host both local and international medical conferences in the Turks and Caicos Islands at HUSM and hotel conference facilities will establish Turks and Caicos as a medical conference destination and further promote HUSM as global university.

International Medical Education & Specialist Care and Treatment Partnerships.

- HUSM will deliver its medical education program using both permanent and visiting faculty. The latter will form a significant part of HUSM operations in an effort to contain cost, but also enable partnerships with prominent US and UK based universities.
- The Hamilton University Medical Center will operate a medical tourism program using primarily US-based physicians most of whom will be HUSM visiting faculty.

HUSM will partner with other entities for the development of student accommodations and long stay affordability and quality hotel accommodation for:

- HUSM visiting faculty.
- HUSM specialist phyiscians to support the medical tourism program.
- Family members of HUSM students.
- Attendees at HUSM international and local medical and research conferences.

6.0 WASTE GENERATION AND MANAGEMENT

Project information was gathered through discussions with the project proponents and their consultants. The site was also visited for an assessment of the status of the physical environment and to assess the immediate surrounding of the proposed project.

The site investigation took into consideration all those factors such as the hydrology and surface geology, drainage systems that may be in place, water resources and availability of this resource. The assessment also considered the sanitation status in the area as well as typical socio-economic activities around the proposed site. Also investigated were the public services provided in the area including the drainage systems, water supply/abstractions, power supply and access roads.

6.1 Environmental Setting

Temperature: The temperatures are high throughout the year: the daily average is around 23.5 degrees Celsius (74.5 degrees Fahrenheit) in winter and 28 degrees Celsius (82 degrees Fahrenheit) in summer. The temperature averages around 75 degrees Fahrenheit.

Rainfall: The climate of the project site is identifiable with that of the wider Turks and Caicos Islands. The Turks and Caicos receives little rainfall. However, much of this rainfall is clustered in the rainy season from May to November. The chart below uses data from 2012-2015.

The Turks and Caicos Islands Tourism Authority advises that the average monthly rainfall ranges between 2 inches and 3.7 inches (TCI tourist Board Website). The Tourist Board further advises that much of the rainfall is clustered between the month of May and November.

The proposed site is a flat area, with resultant scrub brush foliage that reflects this rainfall scenario. Most of the surrounding land is being developed and related landforms have been interfered with by human economic and settlement activities.

Water Resources: There are no permanent surface water ponds and other surface water bodies in the proposed project area. The local water utility company, Provo Water Company, has a piped water utility line that passes the proposed site and is readily available for use at the site.

Sanitation and Water Quality: The area surrounding the proposed site is characterized by sparse settlement, with only commercial or tourism-related developments and neighbouring plots that await further development.

The proposed development parcel will have provision for connection to a mechanical wastewater treatment plant, instead of any conventional septic tanks and soak away systems.

The proposed project will include water collection and harvesting provision to conserve water, and to ensure there is a backup supply should the need arise.

Human and Economic Development: The facility will be built in an area surrounded by activities such as tourism establishments, commercial and other multi-family residential premises. Hamilton University's project is expected to expand the health outcomes and general welfare of the residents of Providenciales and the Turks and Caicos Islands in general. It is expected to provide economic opportunities and activities that are associated with hospitals.
Environmental Impact and Mitigation: The proposed development is expected to enhance socio-economic undertakings around the university's environs.

General Overview: The proposed Hamilton University Medical School and Clinic development being set up as an educational entity is not projected to have any significant impacts on the physical environment, however it is still felt that there is need to have proper mitigation measures for any impacts that may be identified.

Table 2: Probable or identifiable risks or Environmental issues are included in the table below:

Environmental Issue	**Relative Impacts**	**Remarks**
Soil Quality	Low Impact	Loosening of soil cover during site clearing and land preparation for construction
Air Quality	Low Impact	Minor dust nuisance impact during site clearance Exhaust from vehicles during construction and materials delivery
Drainage	Low Impact, i any at all	The project will have onsite Wastewater/Sewage treatment facility Storm water runoff provisions implemented
Water Quality and Quantity	Low	It is estimated that there will be minimum effects to the surrounding community during construction that result through poor drainage, and stagnant waters, Water and Wastewater emanating from the building upon occupation and Storm water from open surface run-off.
Land-use and settlement	Low	Land use trends have already been determined.
Vegetation	Low	No major effect since the area is undeveloped and with minor shrub coverage

Topography	None	
Health and safety	Medium	Contingency measures on health and safety measures will be taken into consideration.

Construction and Operation: The management of solid waste within the Turks and Caicos Islands is delegated to the Environmental Health Department, under the direction of the Director of Environmental Health (Chief Environmental Health Officer). The governing statute that provides any form of guidance is the Public and Environmental Health Ordinance.

6.2 Solid Waste Management During Construction

Construction and demolition waste or debris is any kind of debris from the construction process or more specifically debris generated during the construction, renovation and demolition of buildings, roads, or other infrastructure works. The management of waste during the construction phase of the project is a critical aspect of the construction process. Construction and Demolition (C&D) waste may be classified into three categories:

1. Non-Hazardous,
2. Hazardous,
3. Semi-hazardous.

Construction waste can be categorized as follows: Design, Handling, Worker, Management, Site condition, Procurement and External. Examples of this type of waste that may be applicable to this project will include steel reinforcement, premixed concrete, pipes and wires, etc.

Steel reinforcement is used for structural integrity in construction projects. The main reasons steel is wasted on a site is due to irresponsible beam fabrication issues. This is generally the result for sites that do not have adequate design details and standards and can result in waste from the short ends of bars being discarded due to improper planning of cuts. In many instances, companies choose to purchase preassembled steel reinforcement pieces. This reduces waste by outsourcing the bar cutting to companies that prioritize responsible material use.

Premixed concrete: Generally concrete has one of the lowest waste indices when compared to other building materials. Many site managers cite the difficulties controlling concrete delivery amounts as a major issue in accurately quantifying concrete needed for a site.

Pipes and wires: It is often difficult to plan and keep track of all the pipes and wires on a site as they are used in so many different areas of a project, especially when electrical and plumbing services are routinely subcontracted. Many issues of waste arise in this area of the construction process because of poorly designed details and irresponsible cutting of pipes and wires leaving short, wasted pipes and wires.

Improper material storage: The second leading cause of construction waste production is improper material storage. Exposure to the elements and mishandling by persons are due to human error. Part of this human error can lead to illegal dumping and illegal transportation of volume of waste from a jobsite.

Construction Waste Management is a component of Sustainable Development, which is being pushed by increased concern about man's impact on the environment. Management of the construction processes to reduce, reuse, recycle, and properly dispose of waste will have a significant impact on the final cost of any project, the quality of the project, the development time frame, and importantly its environmental impact.

Building debris, rubble, earth, concrete, steel, timber, and mixed site clearance materials are among the most common materials generated by the various construction activities such as land clearance or excavation, land formation, building construction, and site clearance (among the other activities).

Although the disposal of waste generated during construction is usually very simple, it is nevertheless necessary to properly dispose of it. For instance, cement, plaster, and bricks are typically crushed and reused as fill.

Waste prevention alternatives, includes measures to reduce, reuse, and/or recycle waste generated, dubbed the "three Rs" of construction waste management. In keeping with the principles of sustainable construction, a waste hierarchy has been extensively embraced as a guide for construction managers. According to the waste hierarchy, reducing trash creation is often the most effective environmental remedy.

When further reduction is impossible, products and materials can occasionally be repurposed for the same or a different purpose. If this is not possible, the value should be recovered from waste by recycling, composting, or waste energy recovery. If none of these options are suitable, garbage will be disposed of in the most environmentally friendly manner possible.

The economic and environmental benefits of reducing, reusing, and recycling garbage are the two main reasons for doing so. Environmental benefits include reducing the risk of immediate and future pollution and harm to human health, while economic benefits include cheaper project costs, greater business patronage, and a reduced risk of trash.

6.3 Temporary Sanitary Facilities

A number of site services are usually required to pursue construction operation on any project. These site services include the following items:

- ✓ Sanitary Services
- ✓ Water
- ✓ Electricity

In most settings there is typically an installation cost associated with these services. This cost is accompanied by a usage component based wholly on consumption. Installation costs can be quite expensive if the tie-in point is a good distance away from the construction site, and in some cases alternate methods of supply must be considered.

It is anticipated that as is the norm, temporary connections to electricity will be requested from the relevant utility company. With regard to water supply, the proposed site is contiguous to a water service line, and as such, connection to a mains supply is practical. Failing this, on-site storage in bulk tanks with on demand delivery can suffice to supply the requisite water supply needs.

Sanitary services: In countries with municipal sewerage systems, developers have the option to simply tie-in to the provisions of the serving utility. As above, there is usually a usage cost for the sanitary sewer system. These costs are based on local rates for industrial or commercial facilities.

In the Turks and Caicos Islands, with the absence of such municipal sanitation systems, development proponents such as Hamilton University School of Medicine are required to procure or otherwise provide through the local rental markets, portable sanitary facilities (toilets) for use during construction.

Portable toilets and the concomitant vacuum truck emptying services provide satisfactory, government approved services to address public health concerns at construction sites.

The project site shall be provided with an adequate and sufficient number of toilets and washing facilities for all personnel engaged at the site, including any visitors, or suppliers at the work Site. These facilities shall be strategically located in designated major work areas. Waste from these facilities shall be collected and transported to an offsite treatment plant.

Hamilton University Medical School shall establish and maintain clean conditions on the worksite during the duration of the construction of the project for all personnel and any Subcontractors.
The temporary sanitation facilities will include maintained hand washing stations adequately replenished with water, hand cleaner and paper towels, and emptied trash receptacles.

Hamilton University School of Medicine will maintain a clean work site with temporary sanitation facilities and well-organized trash collection and removal.

As necessary and where practical, the project shall provide segregated male and female facilities with locks for privacy.

All used water discharged from the temporary toilets, sanitary appliances, and washing facilities shall be disposed of by way of temporary sanitary facilities. As such, no water shall be discharged into any drain, well, or on any body of soil, or into the surrounding environment.

Used water from the temporary toilets, sanitary appliances and washing facilities will be collected in holding tanks and shall be disposed of by a collection tank by a licensed waste collector (LWC). The LWC will be engaged to carry out regular preventive and breakdown maintenance of sanitary facilities provided at the construction site to ensure proper functionality, therefore preventing any waste or soiled water overflow.

The Hamilton University School of Medicine shall follow the United States, Occupational Health and Safety Agency *OSHA Guidelines/Standard 1910.141(c)(1)(i),* for Restroom and Sanitary requirement for workplaces as there are no applicable local regulations with regards to the provision of the number of temporary sanitary facilities as below:

Table 3: Restroom and Sanitary Requirements for Workplaces.

Number of Employees	Minimum Number of Water Closets
1 to 15	1
16 to 35	2
36 to 55	3
56 to 80	4
81 to 110	5
111to150	6
Over 150	(*)
*1 additional fixture for each additional 40 employees	

6.4 Liquid Waste Management

Liquid Waste Management is the handling of liquid waste generation through human activity in a systematic way that ensures proper disposal of any liquid waste, wastewater or sewage. The management of Liquid Waste is of critical importance to ensure environmental protection.

To understand liquid waste, it is necessary to carry out a simple classification. Classification of Liquid Disposal may be as follows:

a. **Sanitary Sewage**: Human waste and wash water are found in sanitary sewage, which generally comes from a house or neighborhood. Latrine, washing and bathing, laundry, toilet, and kitchen sink waste are all included. Water makes up 99.9% with 0.1 percent organic and inorganic contaminants.

b. **Storm Sewage**: Surface runoff that runs into municipal sewers after severe rainstorms are referred to as storm sewage. This type of sewage frequently comprises mud, branches, and other rubbish, which must be screened away by filters at plants where sewage treatment is given. Some suspended and dissolved particles might also be included along with biological debris, and additional materials that it collects as it moves around the surface of Earth.

c. **Industrial sewage**: Industrial sewage is generated by manufacturing operations. Pharmaceutical production, paper and textile manufacturing, chemical processing, and oil and gas refining are just a few of the businesses that create industrial sewage. The chemical content in this sewage is generally rather high.

d. **Mixed Sewage**: Mixed sewage is a mixture of two or three different sewage types. During its journey to the plant where sewage treatment will be given, storm mess can mingle with sanitary sewage, or else a conventional treatment plant for sewage may receive an infusion of industrial wastewater from a neighboring facility.

Some liquid wastes have very few contaminants and only require minor treatment. Others are severely polluted and will need to be treated aggressively before being disposed of. As an example of treatment processes, Root-zone treatment would be insufficient for sanitary sewage with high bio-solid content, since it would have a high biological oxygen demand (B.O.D)

6.5 Wastewater

Wastewater management systems, and more specifically the surface run-off drains, will carry additional flows of liquids from hard surfaces, such as parking areas or any other such hard surfaces created on the site. Surface run-off typically has the potential for carrying solid materials into any surface water bodies and may eventually cause isolated flood events.

An inappropriate or poorly sized wastewater treatment system does have the potential to generate undesirable odours that can affect the comfort of the neighbouring properties, depending on the wind direction. The facility usage is not expected to generate significant amount of wastewater or a volume that cannot be handled by a properly sized, operated and maintained facility. However, it is expected that volumes which are produced will be reused or recycled on site.

6.6 Control of Air, Dust, Water and Noise Pollution

Dust

Dust occurring during construction has been scientifically described as Construction Dust Emission (CDE). This emission takes place from a range of onsite activities. These include such activities as drilling, loading, and unloading, excavation of earth or movement, onsite open-air material storage, cutting and filling, and material transportation. In most cases these activities can lead to detrimental impacts on people.

For instance, in China, construction dust has been said to be 27% responsible for causing human health damages when compared to other factors of construction pollution. The construction activities for Hamilton University School of Medicine are not expected to produce significant effects on air quality. It is anticipated that there will not be any major impacts during the construction phase.

To prove our hypotheses, site clearing was monitored on two sites along the Leeward Highway on Providenciales (within denser populated communities surrounding them) with similar topography and soil type as other sites on island. It was found that no major dispersal of dust occurred that required mechanical or technological interventions.

The proponents can acknowledge that minor impacts will be felt during the initial site clearance phase, and as a result from slight excavation when leveling, stone cutting on site and from building material handling including deliveries of sand to the site. This, however, can be mitigated by site wetting or other physical interventions, such as covering soil stockpiles, etc.

Water will be applied to the site at regular intervals during the clearing process and managed to ensure that there is no excess water applied to the site. This action will prevent any dust from becoming airborne. Additional mitigation measures that will be employed are the use of barriers like fencing/hoarding to contain dust and debris, the use of covering of sand and any waste during transport to prevent dust being airborne. The proponents will ensure regular inspection of the site to check the effectiveness of mitigation measures.

Noise

Noise is defined by Environmental Health Practitioners as unwanted/undesirable sound that can affect job performance, safety, and health. Psychological effects of noise include annoyance and disruption of concentration. Physical effects include loss of hearing, pain, nausea, and interference with communications when the exposure is severe.

Construction activities will involve the use of light machinery and other miscellaneous sources of noise for construction at the site (concrete mixers, workers, trucks). This is not likely to cause any significant degradation of the local environment or produce noise at a decibel level that results in undue hardship. Additionally, noise will be mainly limited to the construction site and will be limited in duration to daytime/working hours only. Construction noise levels produced are not likely to highly exceed the ambient/background levels which will be for a short time.

Water

During site clearance, runoff and drainage from the works area would be the main sources of potential water quality impact. Site runoff and drainage may contain increased loads of suspended solids and contaminants. Sources of these pollutants from the site include runoff and erosion from exposed soil surfaces, earth working areas and stockpiles; release of grouting and cement materials with rain wash; wash water from dust suppression sprays; and fuel and lubricants from the maintenance of construction vehicles and mechanical equipment.

However, as the proposed site has no surface water bodies, and given that all construction activities of the project will be land-based, direct impacts on water quality are minimal or will not arise.

The proponents consider that most construction activities at any work area may generate surface run-off which may cause adverse water quality impacts if not properly controlled or mitigated. Considerations for mitigation measures shall be made, where necessary, to reduce the possibility of water quality impacts.

Again, it can be concluded that effects on water quality from the construction activities are likely to be minimal, and provided that site boundaries are well maintained and good construction practices are implemented to ensure that litter, fuel and any solvents used are properly stored and handled, there should be little to no impacts.

6.7 Control/Storage of Fuels and other Dangerous Substances

Chemical hazards are present in most construction site environments, and these arise from a variety of sources. These sources include fuel that may be stored for use on site, chemicals used in the construction process, and that may be held or stored on site. Exposure to hazardous chemicals or substances can cause a variety of human health effects (both minor and more serious) and environmental contamination. Chemicals or dangerous substances may be any of the following:

- ✓ Dust, fumes and fibers
- ✓ Liquids and mists
- ✓ Gases and vapours

To ensure control of hazardous substances, the proponents shall employ a number of measures to ensure that workers and the environment are protected. These include the use of engineering controls. Engineering controls include the use of processes such as ventilation, substitution of materials, changing the process of use or enclosure/isolation.

6.8 Emergency Mitigation Plan Related to Environmental Health

The proposed Medical School development is primarily a training or educational institution and may not have significant environmental impacts like that of manufacturing, processing, or industrial type industries. Still, there is a need to have proper mitigation measures.

Following this, the report below identified what it considered would be any major environmental aspect and have identified some and included in tabular form.

Table 4: Major Environmental Aspects.

Environmental Parameter	Prediction of Impact	Mitigation Measures
Fire	Destruction of physical structure Destruction of sensitive information	Firefighting and/or fire suppression systems shall be provided as a part of the building structure. The system shall be designed to meet TCI Fire Ratings and Standards or international best practices where applicable. Regular Testing for functionality
	Safety Hazard for Patients, Staff of the institution and visitors	Documented, designated, and planned evacuation routes and procedures including muster points. Regular training of personnel to ensure awareness of measures and procedures to be taken in emergency
Health and Safety	Hazards that cause injury, impairment, or death to personnel	Construction phase regulated and checked for safe working conditions and processes. Appropriate signs and warnings installed on site at various locations. Personnel provided with necessary personal protective equipment (PPEs)
	Poor handling of medical waste and chemicals	All chemicals or any other products utilized in the facility shall be kept with secured chain of custody and under strict supervision. All medical waste and biological or hazardous waste shall be collected, treated, and held or securely stored under controlled conditions until same can be properly collected for disposal as per local requirements.
Solid Waste	Risk of contamination	All waste shall be collected and properly disposed of. Medical waste shall be separated or segregated, treated, and disposed of by incineration according to Environmental Health guidelines.
	Risk of air pollution	No incinerator shall be on site to produce noxious plumes
	Contamination of air	The mechanical ventilation (HVAC) system shall have proper segregation to ensure that there is no mixing of air between clinical and non-clinical areas.

		Necessary and properly rated ventilation filters shall be employed on all vents servicing critical areas of the facility
Noise	During the Construction period	There is predicted to be no major noise nuisance or disturbance to neighbouring properties. Precautions shall be taken to ensure that there is no undue noise disturbance. PPEs shall still be provided to workers, to ensure that health and safety consideration are countenanced
	During Operation	As necessary PPEs shall be provided to workers who operate or work near any noise producing equipment
Domestic Water Supply	Risk of faulty or broken pipes resulting in flooding of internal areas	All plumbing shall be prepared according to TCI Building Code and Guidelines. Properly rated piping shall be employed throughout the project, using the proper fittings and properly fastened to prevent leakage. Water cisterns, properly sized, shall be employed to ensure a minimum of 3 days' supply in the event of a disruption in supply
Wastewater Disposal	General health hazards and possible risk of contamination if left untreated.	Wastewater treatment plant shall be provided to treat the water to reach at a minimum tertiary treatment standard prior to reuse or final discharge
Storm Water Drainage	Risk of Flooding to the development	Building shall be finished above grade. Storm water disposal/drainage wells to contain water and prevent collection or pounding shall be employed
Electricity Supply	Risk of Electrocution and Fire Hazards	The electrical network shall be properly designed and grounded. Electrical connection checked to minimize and episodes or unconnected ends that may cause sparks or fires. Properly sized and rated circuit breakers or interrupters shall be provided to minimize any fire event
Geology	Insignificant	No measure required
Fauna and Flora	Insignificant	No specific measure required
Hydrology	Contaminated water spills to soils or surface waters	Waste treatment equipment properly designed and sized to receive and treat discharges will be employed to handle wastewater. No surface water has been identified in the development site

6.9 Potential Impacts and Management of Solid and Medical Waste during the Operational Phase

Environmental Impacts

The report has previously established that the proposed facility is not within a densely populated area but sits within a mixed residential and commercial zone. It is proposed that there will be minimum impact on the environment from the development. All waste that will be generated from the project will be properly treated and disposed of. Effluent waste from the proposed facility will be discharged into a properly designed and sized onsite wastewater treatment plant, given that there is no municipal receptor.

Solid waste generated from the proposed facility will be collected in on-site bins and will be removed through contracted services. The more difficult to handle medical waste will be separated at source, treated on site through established procedures such as heat sterilization (autoclaving), and collected in properly sized bins for collection and final disposal by incineration by the Environmental Health Department.

Some details of anticipated impacts resulting from the project are presented below.

Impacts on Air Quality- Minimum impact on air quality is anticipated during the construction phase of the development. This impact will result mainly from dust from excavation, land leveling and material handling activities.

Noise Pollution- Noise is unwanted/undesirable sound that affects enjoyment, job performance, safety, and health. The construction activity will include the use of equipment that will produce/emit noise. These sources are not likely to produce any significant deleterious effect on the enjoyment of the environment or degradation of the environment. Where there is an impact, the noise levels are not expected to exceed ambient background noise levels for extended periods of time.

Impacts on Water Quality- Water quality may be compromised during the operational phase if proper supervision is not taken. The proposed block when completed will have full-time occupants, most of whom are health workers and visitors to the facility. The water use is expected to be low during the day save for mornings, evenings and weekends, and used for general domestic purposes which include cooking, cleaning, sanitation, and general washing amongst others. Arising out of this consumption, though minimal in amounts, it is expected that 80% will go out as sewage and will be directed to the waste treatment facility. This will be wastewater rich in the following pollutants:

(i) Bacterial populations
(ii) Biomedical waste
(iii) Organic matter,
(iv) Detergent residuals,
(v) Suspended and settle-able matter,
(vi) Oils and fats

The impacts are likely to originate as follows:

(i) Soil erosion because of construction activities. This may have negative effects to water bodies which are very far from the construction site. This will introduce pollutants suspended solids (turbidity), certain heavy metals (e.g., iron, manganese) and humic matter,

(ii) Surface run-off for hard surfaces (roofs, floors, and pavements) and other sections of the site

that will not be covered with either vegetation or buildings. The effects will be increased suspended soils, biological contamination, and other pollutants such as oils/grease and chemicals,

(iii) The location of the mechanical wastewater plant will be within the main compound area.

Solid wastes will also comprise of contaminants that can have serious effects on both surface water sources and ground water. There is no surface water near the proposed site. On site solid waste holding may cause pollutants to infiltrate into the ground water. Suitable waste management measures and installation of suitable handling infrastructure will be required to be incorporated into the project.

Impacts on Topography and Hydrology- It is not anticipated that the development will have any significant effects on the topography and hydrology of the area. The environment of the surrounding area is not likely to be directly affected.

Impacts on Soil and Land Area- It is not anticipated that there will be any critical impacts anticipated on the soil quality. It is expected that any pollution problems will be felt through water quality either at the river or groundwater abstraction that may be undertaken. Changes in the capacity of the soil to retain water and other soil structural characteristics are also likely to occur.

Contamination of soil may result from the following:

1. Building footing excavation during the construction phase will bring poorer sub-surface soil to the surface.
2. Storage of building materials that may introduce "foreign" components to the soil.
3. Dumping of wastes such as oils/grease, food wastes and other solid wastes without due consideration of nature and potential dangers.
4. Due to site clearance activity, the development area may be susceptible to water and wind after the vegetation is removed unless suitable measures are undertaken before the heavy rains.

6.10 Impacts on Public Health and Safety

Health
Main health effects during the construction could result from building materials' dust, and particularly cement. Others may originate from lack of proper protective equipment during finishing such as paint solvents and glues/adhesives. This is the responsibility of the building contractor to ensure potential cases are reduced. After commissioning, wastes originating from the building (sewage and solids) may be a health hazard to the residents and the surrounding community if not properly handled.

Safety
Construction work is generally a threat to the workers in terms of accidents such as falling from raised levels, body injury by equipment and accidents (on-site and off-site) by material delivery trucks. Again, the contractor is responsible for reducing related cases by providing the workers with gloves, helmets, overalls and other protective gear. Construction machines should be inspected thoroughly to avoid accidents. A first aid box should be provided. One person who is well trained should be available to administer first aid in case of an accident. After commissioning, the key safety issues to address will include risks of fire to the property, the facility users and the surrounding community.

The management of health-care waste does require increased attention and diligence to avoid adverse health outcomes associated with poor practice, including exposure to infectious agents and toxic substances. During the operation of Hamilton University all necessary protocols and procedures for medical waste management shall be followed.

All solid and medical waste generated by Hamilton University will be properly followed from the point of generation at source to collection, storage and final disposal. This process will ensure that there is a chain of custody notification made to the Environmental Health Department for all waste to be disposed of. This is particularly in relation to the hazardous waste materials that may be generated. The World Health Organization has proposed several methods of doing so, and Table 5 – Daily Data Collection Form is one of the methods used to follow waste through to the point of final disposal (See table below).

Table 5 - Daily Data-Collection Form

Date: _____
Name of Data Collector: _____
Name of Health Facility: _____
Number of Occupied Beds: _____
Number of Outpatients: _____

✓				
✓ Department	✓ Type of Waste	✓ Weight (Kg)	✓ Volume (litre)	✓ Notes
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓
✓	✓	✓	✓	✓

*World Health Organization (WHO)

Key elements in improving health-care waste management include the promotion of practices that reduce the volumes of waste generated and ensuring proposer waste segregation. Hamilton University will develop a complete waste management plan that will provide waste segregation as outlined beforehand.

Critical too is the development of strategies and systems along with strong oversight and regulation to incrementally improve waste segregation, destruction and disposal practices with the aim of meeting national and, where this is absent, the best international standards.

Hamilton University will carry out the safe and environmentally sound treatment of hazardous health care wastes by autoclaving, microwaving, steam treatment and other available methods in combination with incineration to ensure medical waste is properly treated and disposed of.

6.11 Potential Impact to Neighbouring Developments

Health-care waste contains potentially harmful microorganisms that can infect hospital patients, health workers and the public. Other potential hazards may include drug-resistant microorganisms which spread from health facilities into the environment.

Treatment and disposal of healthcare waste may pose health risks indirectly through the release of pathogens and toxic pollutants into the environment. The disposal of untreated health care wastes in landfills can lead to the contamination of drinking, surface, and ground waters especially in the instances where those landfills are not properly constructed or lined**.** Currently this is the reality of the Turks and Caicos Islands.
Adverse health outcomes associated with health care waste and poor waste management practices include sharp-inflicted injuries, toxic exposure to pharmaceutical products, in particular, antibiotics and cytotoxic drugs released into the surrounding environment, and to substances such as mercury or dioxins, during the handling or incineration of health care wastes. Additionally, chemical burns arising in the context of disinfection, sterilization or waste treatment activities and air pollution arising as a result of the release of particulate matter during medical waste incineration among others may occur.

Hamilton University understands the sensitivity of the area and has fully assessed the surrounding or neighbouring communities and does not propose to include an onsite incinerator. Currently, existing practices demit medical waste disposal to the Environmental Health Department. That entity currently has an incineration facility and the expertise to collect and dispose of medical waste away from the proposed development site.

Human wastes
As the Turks and Caicos Islands has no provision for a municipal sewerage facility, on site treatment is mandatory. Human waste from toilets will be disposed of by a mechanical sewage treatment plant. However, as necessary chemical sterilization of such wastes will be made since they will be emanating from a hospital facility.

Other Solid Wastes
Hamilton University shall establish a system of separating solid wastes into various categories, including food wastes, papers, plastics, obsolete equipment, and metal parts, etc., with each category being managed appropriately. Some solid wastes such as plastic bottles may require recycling while others may require land-filling related actions.

Disposal of Plastic Waste
Disposal of plastic waste has emerged as an important environmental challenge and its recycling is facing roadblocks due to its non-degradable nature. Because plastic does not decompose biologically, the amount of plastic waste in our surroundings is steadily increasing. Plastic waste is often the most objectionable kind of litter and will be visible for months in landfill sites without degrading. Plastic is a durable substance and resists easy disposal. It is hard to recycle, noxious to burn, and bulky to transport. Once placed in a landfill, the actions of sun, wind, water, and time can pry it loose to enter the environment again as pollution. As such plastic wastes will be sterilized, stored, and collected by licensed plastic disposal and recycling companies.

Other Waste Management actions
Office/kitchen waste (e.g., food remains) should be isolated from paper, plastics, textiles, and wooden refuse generated on the premises. Storm drains and wastewater collection systems including any deep well discharge systems will clearly be mapped and shown on the facility designs. An approved wastewater recycling system to allow water reuse for irrigation/landscaping purposes have been countenanced as well.

Solid wastes (including garbage, papers, packaging materials, plastics, fats/oils) will be generated. Hamilton University will provide for suitable solid waste collection receptacles to be placed at strategic locations at the premises. An accessible area with a concrete slab will also be provided for collection and storage of the various solid waste categories awaiting disposal.

Surface run-off from open surfaces should mix with the wastewater. In this regard, storm water disposal wells will be provided to allow storm water management. Systems of rainwater harvesting will be put in place to also assist in addressing this matter.

6.12 Potential Impact to Neighbouring Developments

It is estimated that during operation, the impacts to neighbouring developments will be minimal. It is anticipated that on completion of the project, given the design of the facility, there will be no aesthetically unappealing aspects of the project.

6.13 Mitigation and Monitoring

Solid and Medical Waste Management
Solid wastes, including papers, plastics, polythene materials, and food remains among others, will be generated from the proposed building. Dumping around the site interferes with the aesthetic status of the area. Other effects could be breeding of pests (rats, snakes, insects etc.) or invasion by scavenging birds. This has direct effects on the surrounding community.

Disposal of solid waste off-site could also be a social inconvenience if done in the wrong places. The off-site effects could be aesthetic, pest breeding, pollution of the physical environment, invasion of scavengers and informal recycling communities. Related effects could be disease outbreaks in addition to other inconveniences. Appropriate measures to deal with waste generated will be instituted.

The Hamilton University facility is anticipated to produce two types of wastes:

(a) **Healthcare waste** (HCW) which is all the waste generated by medical activities. It embraces activities of diagnosis as well as preventive, curative and palliative treatments in the field of human medicine. In other words, all the wastes produced by the operating theatre, laboratories, patient rooms for e.g., syringes, blood wastes, serum, plasma, scalpel blades, cultures, and contaminated laboratory wastes, surgical wastes, etc. are considered as healthcare waste.

(b) **Domestic waste** from kitchens, consultation rooms, patients' rooms, for example paper, tissues, left-over food.

Medical waste generally does pose a growing problem worldwide. If not properly managed it can jeopardize the health of staff, patients, disposal workers and anyone else encountering the materials discarded by hospitals, teaching hospitals and other healthcare sites. As such, Health-care waste needs sound management. These management practices include in some cases finding alternatives to incineration.

As stated previously, wastes emanating from the facility/development will fall in different categories. These again will range from those of a medical nature to materials such as plastics, food, and human waste. The healthcare waste (HCW) that is generated by Hamilton University will follow an appropriate and identified stream from its point of generation until its final disposal/treatment.

A colour-coding system will be put in place and the same will aim at ensuring an immediate and clear identification of the hazards associated with the type of HCW that is handled or treated.

Table 6: Colour-coding System for Identification of Hazardous Waste.

Type of Waste	Colour-Coding/ Marking	Type of Container
Highly Infectious Waste	Yellow/Red	Strong/leak-proof
Other Infectious waste, pathological/anatomical waste	Yellow	Leak-proof bag/container
General Waste	Black	Plastic bag
Chemical/Pharmaceutical Waste	Brown	Plastic bag/Container

General health care waste shall be identified and handled with the same consideration as would all other waste from a medical facility. Black Plastic bag waste, which is general waste, will be collected in the general waste stream. This stream of waste does not require any special handling or treatment and can be disposed of in the regular/domestic waste stream.

Conversely, Yellow-bagged waste will then be disposed of by burning in an incinerator. If an incinerator is not available, arrangements will be made for off-site transport of these wastes based upon an established system consisting of consignments from point of receipt to discharge for traceability purposes to other incinerators owned by the Ministry of Health & Wellness.

Biomedical waste or hospital waste is any kind of waste containing infectious (or potentially infectious) materials generated during the treatment of humans or animals as well as during research involving biologics. Some 20 to 25 percent of the total waste generated by healthcare establishments may be regarded as hazardous and may create a variety of health and environmental risks if not properly managed and disposed of in an appropriate manner.

Incineration is the only method providing complete destruction and neutralization of the medical waste ideally at the source. Modern hospital waste incinerators that lead to substantial reductions in the formation, emission and exposure to toxic substances from waste incineration, are currently commercially available from manufacturers.

6.14 Environmental Health Monitoring

The Policy and Law review revealed that there currently exists no specific legislation or statutes that govern medical waste, and the Turks and Caicos Islands Government, Environmental Health Department was found to have no published policy or guidelines that govern the same. There was no documented plan found or guiding document for management of medical waste. The TCIG has over the past years provided for disposal of medical/hazardous waste. In this stead, it does provide and operate a medical/waste incinerator and offers a collection and disposal service for health care facilities operating in the islands.

Hamilton University will comply with any Environmental Health (TCIG) guidance or requirements for the disposal of biomedical or hazardous waste and will avail itself of the service that is offered for collection and disposal.

Through work with the Environmental Health Department, Hamilton University will build a comprehensive system of waste management that will address responsibilities, resource allocation, handling and disposal of medical waste.
Finally, Hamilton University will work with the Environmental Health Department to establish an educational programme for training and raising awareness of the risks related to health-care waste, and of safe practices to medical waste handling (to include environmentally friendly management options) to protect people from hazards when collecting, handling, storing, transporting, treating or disposing of waste.

6.15 Conclusion and Recommendations

The proposed Hamilton University development is therefore compatible with the current land use patterns of the development area. It is anticipated that the development will consider at best all measures necessary to ensure that activity undertaken with the potential to adversely impact the environment, the safety and ultimate comfort of neighbouring land users will be mitigated.

The project as proposed has been found to integrate appropriate mitigation measures to ensure that the aforementioned issues are countenanced, and that there is compliance with all relevant ordinance and planning guidelines. It is anticipated that the proposed development can co-exist with the neighbouring properties. Further it is anticipated that with the proposed mitigation measures, no physical environmental feature is likely to suffer deleterious impacts from the construction or operation of the Hamilton University development.

A comprehensive environmental management programme has been presented as a part of the report and includes appropriate measures and actions through construction and operation of the proposed Hamilton University.

Recommendations
Subsequent to the above conclusion, the following recommendations have been listed to ensure the prevention and mitigation of any adverse impacts that may be identified to emanate from the proposed Hamilton University:

As much as is practical, site clearance should be limited to a working footprint to ensure that there is topographical cover to eliminate or prevent soil erosion by wind and water or dust nuisances as a result of loose soil cover.
As much as is practical, excavated earth will be reused on site as site leveling material or road development fill or base material.

Excavated earth not reused on site and other debris will be required to be safely disposed of at approved waste disposal sites.

Where necessary, reinstatement plans will be implemented to ensure that there is no adverse aesthetically unappealing impacts as a result of the development. Workers on site, and visitors to the site during construction will be required to be provided with personal protective equipment (PPE) to be worn at all times during work hours or as long as those persons are present on site.

Dry construction materials and excavated earth stored on the development site will be kept moist to prevent dust nuisances and ambient particulate dispersal during construction and site cleanups.

All equipment used on the site is to be properly maintained and operating in good working condition to ensure compliance with noise controls and oil and liquid waste management guidelines.

Ensure compliance with all relevant ordinances, regulations and guidelines throughout the development of the project.

Ensure that all waste emanating from the project during construction and during operation is properly segregated, handled and disposed of according to recommended guidelines or local/international best practices when guidelines do not exist.

Hamilton University will undertake regular audits for variables such as noise, hazardous waste management, etc., during the operational phase.

The proposed facility, Hamilton University, will provide direct benefits to the local economy during both the construction and operation phases. During the construction phase in particular, direct employment opportunity will exist for persons so skilled to assume/take up positions. It is also noted that direct and indirect benefits will accrue during the construction and operational phase for people who would in turn open small businesses to service the site and the facility once operational.

The proponents are positive that the right environmental impact mitigation measures will be put in place at all stages to ensure that the health and safety of both persons and the environment will be protected. The proponents are fully aware of the impact that a poorly planned and designed project can have. This impact is not only on the intended occupants of the proposed development, but also affects wider societal health, damages local ecosystems and landscapes.

Table 7: Summary Table – Management Area, Phase, Strategy, Indicator, Monitoring, Performance, Action.

Environmental Management Area	Project Phase	Mitigation/Management Strategy	Monitoring Indicator	Monitoring	Performance	Corrective Action
Noise Pollution/Management	Construction	Noise to be managed through Administrative Control and Equipment Control during Construction All equipment is to be properly maintained, ensuring efficient operation. Checks prior to start-up to ensure performance is as required and Maintenance schedules to be followed. Where necessary implement use of noise dampening on equipment where there is excessive noise generation. Carry out construction activities according to Planning guidelines and any international best practice guidance where	Complaints during construction from adjacent premises and nearby communities	Daily Inspection of works on construction site. Service logs for equipment on site for extended periods	No complaints during construction from adjacent premises and nearby communities	Investigate any case of excessive noise that may arise. Implement corrective measures prior to restarting any site work. Scheduling of noise generating activities to reduce noise nuisances.

		there are no local statutes to regulate construction.				
Air Pollution	Construction	Delivery Trucks to be covered before and at entering the work site. Loose Soils to be sprayed. Soil stockpiles sprayed or covered. Dusty building materials to be kept moist or covered.	Complaints from adjacent properties	Continuous monitoring throughout	No complaints during construction from adjacent properties	Adjust management strategies to reduce dispersal
	Operation	Control of Point Sources of emission	Complaints from adjacent properties during operation	Continuous monitoring throughout	No complaints during operation	Implementation of technology changes to address concern
Water Pollution	Construction	Proper storage, handling and disposal of oil and oily (other) waste from machinery. Prohibit servicing of vehicles and machinery on site	Complaints from adjacent properties	Continuous monitoring throughout construction phase	No complaints during operation	Implement wastewater collection programme. Water storage and discharge mechanisms.

		Minimize soil washdown of vehicles and equipment without wastewater capture or holding areas.				
	Occupation	Avoid unnecessary waste and spillage of water. Sewerage pipes to discharge waste to an approved sewage treatment plant system Leachate discharge from solid waste holding bins into treatment system.	Complaints from adjacent properties Water impoundment on property Pest proliferation	Continuous monitoring during operational phase	No complaints during operation No pest proliferation	Implement wastewater capture and holding mechanisms. Implement pest control programmes.
Waste Management and Sanitation	Construction	Control of on-site sanitation facilities Construction debris and other materials to either be recycled off site or disposed of at approved disposal site. Soil debris is re-used for other areas such as site levelling and site contouring, etc.	Complaints from adjacent properties Waste pileups on site Aesthetics Pest Proliferation	Continuous monitoring throughout	No complaints during operation No pest proliferation	Implementation of waste management programme to include waste reduction, reuse, and recycling strategies.

		Unused excavated earth to be disposed of properly.				
	Operation	Separation or segregation of waste Engagement of approved refuse handling contractor		Continuous monitoring Annual waste audit	Facilities in place upon commissioning	Implementation of waste management system.
Health and Safety	Construction	Provide adequate/sufficient sanitary facilities for workers. Eliminate any stagnant surface water. Include Pest control activities and measures for remediation. Enforcement of PPEs/Use of PPE Hoarding to ensure isolation of site from surrounding community/site security. Traffic Controls for equipment entering and leaving the site.	No occupational Health or safety related incidents on site No proliferation of pests on property PPEs in use on site by all persons	Incident logs Pest control application	Continuous observance of pest situation on site Pest control programme implemented	Health and safety programme developed. Pest control programme in place Provision of necessary PPEs to staff/workers

	Operation	Site utility services made as safe as possible and built to code	Implement property security arrangement. Drainage from the site, water supply network and power conduits should be made as safe as possible,		Continuous reporting Regular Health and safety audits	Reporting of health/safety violations Reporting of Health and Safety accidents Compliance with health and safety protocols
Soil Erosion	Construction	Control of earth digging or other works on site Site contouring to address drainage	Siltation of on-site drainage systems Silting of seasonal or any surface water body	Continuous throughout construction phase	No observation of silt loading in any onsite drainage system No observation of erosion channels from water movement	Cover loose soil. Create retaining walls around areas where loss is observed
	Operational	Maintain free of any debris or materials any onsite drainage systems. Compact all loose soils.		Continuous throughout operational phase	No observation of siltation. No observable erosion on site	Revegetate site area

7.0 SOCIO-ECONOMIC

7.1 Socio-Economic Context of the Turks and Caicos Islands

The Turks and Caicos Islands are presently doing well economically, and this is a massive opportunity that has presented itself and fits in well with the TCIG's strategy to sustain growth and remain/building resilience. This project also has a direct linkage to the tourism/hotel industry and the development of the indigenous people. The proposed development is being carried out by an indigenous Turks and Caicos Islands citizen.

This area of medical tourism is also one of the areas of focus for the diversification of our economy amongst agriculture, arts and culture, technology, and the blue economy. This industry, a Medical School and Research Centre must be used to improve general health care domestically.

"Teaching hospitals bring together medical education, research, and patient care in a unique environment where the next generation of doctors, nurses, and other health professionals are trained. They foster an environment of discovery and the latest advances in medicine."3

There will be immeasurable positive contributions to the economy of the TCI in terms of transportation, warehousing and storage, hotels, rental accommodation and apartments, food services, direct employment (medical staff – doctors, nurses, faculty members, administrative staff), visiting doctors, conferencing, students, etc. This is in addition to the patient care, education, research work that will positively contribute to the perception and advancement of the health care industry.

This facility must be seen as an "anchor institution" for the social and economic development and economic vitality of not just The Bight, but Providenciales and the wider Turks and Caicos Islands.

Post the Covid-19 pandemic, the Turks and Caicos Islands' economy has been rapidly expanding. With the assistance from The Caribbean Public Health Agency (CARPHA) and The Pan American Health Organization (PAHO), and human resource assistance from Cuba in the form of medical professionals, the Turks and Caicos Islands "did exceptionally well" (Hon. Shaun Malcolm, Minister for Health and Human Services Briefing, 24th March 2023). During 1st April 2023 all Covid-19 travel restrictions were removed.

"Building on the record breaking first half of the year, Q3, historically our slowest quarter, gained a whopping 319% over Q3 last year ($158,905,323 vs. $37,891,750), with year-to-date sales volume up over 150% over the first three quarters of last year ($496,710,829 vs. $198,330,657). These numbers represent historic events, of course, and with Canada and other countries now open for travel, we expect a strong fourth quarter with the caveat that all this great sales volume is resulting in constriction of inventory."4

At the 2023 Turks and Caicos Islands Economic Empowerment Conference, which was held at the TCI Beaches Resort, 24-25th March 2023, the Hon. Premier of the TCI indicated that following the covid-19 pandemic, the Turks Caicos Islands is currently experiencing a nominal economic growth rate of 13 percent. The TCI has done very well with the

[3] https://www.aamc.org/news-insights/teaching-hospital-sustainability

[4] TURKS & CAICOS REAL ESTATE MARKET REPORT 3rd QUARTER COMPARISON 2021, Sotheby International Realty

opportunities presented to it. The TCI debt/borrowing ratio is less than 1 percent. The TCI has a debt of less than a million dollars. He further stated that the Islands Gross Domestic Product (GDP) is expected to increase by 5 percent this year (2023). The Premier estimated the population of the Turks and Caicos Islands to be 49,300 persons.

The Hon. Premier pointed to the future and stressed the following:

- Strategies must be put in place to sustain growth and to remain resilient.
- Comprehensive stakeholder engagement must be the way forward.
- The natural environment must be protected. Everything in the TCI is linked to the natural environment – Tourism, Construction, Real Estate, Commerce, Law, etc.
- The TCI Government will be investing heavily in infrastructure (Waste management, Security, Lighting, Roads). Half a billion dollars will be spent over the next ten years and will have no impact on the TCIG recurrent revenue. The TCIG has huge reserves.
- Spending on renewable energy will be increased.
- **Continued development of linkages to the tourism/hotel industry.** The Orange Economy was referred to as an example[5].
- Subsidizing the vulnerable rather than being exposed to growing poverty.
- Social cohesion and economic justice must be fostered.
- Strengthen the TCI economic balance.
- Sustainability requires proactivity.

The Turks and Caicos Islands National Physical Development Plan, 2020, p.79 recommended Health and Education as amongst Finance and Insurance as alternative industries to be pursued towards diversification of the economy towards creating resilience, sustainability and multi-functionality.

7.2 Direct/Indirect Benefits

"Medical tourism occurs when consumers elect to travel across international borders with the intention of receiving some form of medical treatment."[6]

A recent Economic Commission for Latin America and the Caribbean (ECLAC) Caribbean meeting found that the benefits of hosting Offshore Medical Universities (OMUs) could prove especially significant for some of the smaller economies of the subregion[7]. Amongst the factors favouring the Turks and Caicos Islands is its location and close proximity to the USA. The Medical School will provide a series of distinct economic benefits including the expenditures by students and faculty as they spend on accommodation, travel, personal expenses and other goods and services; and TCIG fee and taxation, etc.[8]

During construction and operation, wherever possible, every effort and priority will be given to the recruitment of citizens of the Turks and Caicos Islands. During operation of the development, apart from the economic benefits already mentioned in earlier chapters, the proposed development will have ripple economic effects in terms of:

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[5] https://investincolombia.com.co/en/articles-and-assets/articles/what-is-the-orange-economy

[6] https://www.google.com/search?q=medical+tourism&oq=medical+tourism&aqs=chrome..69i57j0i512l2j46i175i199i512j0i512j46i512j0i512j46i175i199i512j0i512l2.4213j0j15&sourceid=chrome&ie=UTF-8

[7] September 26, 2017, ECLAC

[8] Offshore Medical Universities Provide Economic Benefit to Caribbean Host Countries, 27 September 2017. https://www.cepal.org/en/news/offshore-medical-universities-provide-economic-benefit-caribbean-host-countries

- Expenditures at hotels and retailers/shops and restaurants by visiting doctors, professors, students, other professionals in the medical profession for medical conferencing.
- Expenditure on taxis and VIP limousine services and other forms of transportation.
- Expenditure on tours, excursions, and other recreational facilities.
- Potential purchases of any properties while on island.
- Accommodation tax.
- Environmental tax.
- Payment of salaries and wages.
- Payment of government fees - work permits; insurance contributions [(National Health Insurance Board (NHIB) and National Insurance Board (NIB), vehicle licensing, etc.].
- Rental for housing.
- Other ripple effects.

Apart from payment of wages and salaries to staff, Government taxation and contributions, fees and license, the construction of the entire development will generate other expenditures, including the following:

- Equipment rental companies.
- Purchasing of cement and aggregate.
- Building materials.
- Other.

Prior to construction and during operation of the development, additional expenditures will be generated, including the following:

- Fees paid to attorneys, architects, planners and environmental consultants.
- Enhancement of the local area and increase in property values.
- Tourism interest and benefits to Government from publicity.
- Local maintenance companies being employed.
- Other.

Specific businesses that may be created as a direct result of the proposed development are as follows. These are businesses that do not have to be provided by the hospital itself.

- Landscaping.
- Cleaning and Sterilization.
- Taxi Services.
- VIP Services.
- Construction & Maintenance Trades and Supplies.
- Ambulance Services.
- Security.
- Etc.

8.0 OTHER CONSTRUCTION AND OPERATIONAL CONCERNS

8.1 Traffic Flow, Safety Circulation

There will be minimal and low impacts caused by construction traffic. The present ambient noise levels of traffic generated is unlikely to be substantially different with the proposed development. The impact of traffic will be negligible. The only perceived times when traffic and management will be required will be during the Islands' Fish Fry, which is located on the same road and within close proximity. The operators of the facility will work with organizations of the Fish Fry and the Police to ensure that there are no obstructions and safety risks to either operation.

During the construction phase, the contractor will give special attention to threats posed by movement of heavy vehicles, machinery, and equipment to avoid accidents, spillage, noise and dust nuisances or degradation of asphalt surfaced roads. Heavy vehicles transporting fill to the area will be covered to prevent dust nuisances. All drivers will be required to exercise caution, sensitivity, and restriction to speeds of 10 miles per hour when driving through residential areas.

8.2 Water and Electrical Demand and Source (Construction and Operation)

Electricity, telecommunications, and cable television services will be placed underground in conduit and to the standards and requirements of the relevant suppliers. Underground piped water, provided by Provo Water Company is currently provided to the locality.

8.3 Landscaping (Initial Phase and Maintenance/Operation)

Much care will be taken to ensure retention or relocation of rare plants on the site. This will be carried out in consultation with the DECR.

8.4 Construction Methods and Program, including Phasing of the Development

The proposed development will be constructed as a single-phase development.

8.5 Site Security and Hoarding

The entire parcel will be enclosed with environmentally friendly green hoarding, which will be removed prior to an occupancy certificate being sought and obtained. A reputable security company will be retained to cover the security of the site, materials, and equipment.

8.6 Storage of Materials and Equipment

Materials and equipment will be stored within the confines of the parcel boundaries. Consideration will not be given to the unsightly storage of equipment and/or machinery, which may appear injurious and/or unsightly. Efforts will be made to store equipment and/or machinery away from the boundaries of adjoining properties. Stockpiling of any materials including aggregate and sand will require regular wetting to prevent any dust nuisances to the adjoining properties. Construction hours will be limited to starting not earlier than 7:30 a.m. for noise-generating equipment and/or machinery and finishing not later than 6:30 p.m.

8.7 Temporary Sanitary Facilities

Temporary sanitary facilities will be established onsite. The contractor will be required to maintain acceptable environmental health and safety standards during construction (See Chapter 6).

8.8 Access and Staging

This will be managed to prevent any obstructions, congestion, visual impacts, or nuisances to the existing residents.

8.9 Control of Air, Dust, Water and Noise Pollution (See Chapter 6)

The storage of materials and equipment will be within the confines of the parcel boundaries. Consideration will not be given to the unsightly storage of equipment and/or machinery, which may appear injurious and/or unsightly. Efforts will be made to store equipment and/or machinery away from the boundaries of adjoining properties. Stockpiling of any materials including aggregate and sand will require regular wetting to prevent any dust nuisances to the adjoining properties. Construction hours will be limited to starting not earlier than 7:30 a.m. for noise-generating equipment and/or machinery and finishing not later than 6:30 p.m. Use of noise-generating equipment will be strictly prohibited on Sundays.

9.0 EMERGENCY MITIGATION PLAN

The purpose of the EIA and submission of this EIS is to ensure that social and environmental impacts, risks, and liabilities are effectively managed during construction and operation of the proposed development. Mitigation and impact management were effectively implemented from the onset of the planning and design stages, to avoid negative impacts or keep any potential impacts to a minimum. Site investigations were conducted to identify and evaluate ecological assets that warrant protection.

The contractor will always be at a high level of emergency preparedness and readiness to deal with accidents, evacuation in the event of a storm and any other incidents. The emergency plan will include the establishment of a network of communications with police, medical and ambulance and fire services. The first-aid kit will be permanently kept on the construction site in a strategic location easily accessible to all workers.

At the end of each day during construction, a chain barrier will be locked in place at the entrance to the site to prevent unauthorized access and for security reasons. The building contractor will be held to best practice performance requirements.

Fire extinguishers will be fixed on all heavy machinery i.e., tractors, bulldozers and trucks for the unlikely event of a fire. Appropriate instructions about fire risks must be given to all construction staff prior to commencement of construction. No hazardous materials, waste, fuels, lubricants or substances will be stored on the construction site or in the vicinity. All vehicles, equipment and machinery will be refueled by a fuel/maintenance truck owned and operated by the contractor, which will be called to the construction site on a needs basis. There will be no contamination or pollution of soil or water.

The contractor must be responsible for ensuring that there is absorbent material available onsite to manage and clean up any accidental spillages of oils, fuels, lubricants, or other hazardous substances. Upon completion, the contractor will be required to reinstate all areas affected by construction to their original condition. Revegetation will be required not only in areas affected by the road construction, but also in areas used for the parking and storage of machinery during the day. The area for daily parking of vehicles must be allocated by the contractor and approved by the Directors of Planning and DEMA. Reinstatement and revegetation must also occur in the aforesaid areas.

10.0 CONCLUSION

The proposed development offers a momentous opportunity for the applicant, the TCIG and the citizens of the Turks and Caicos Islands. The development is consistent with the TCI Development Plan 2020 goals and objectives and that of other international conventions towards making small island states more resilient and multi-functional. It is anticipated that the Planning Board will seize upon the opportunity to approve the proposed development.

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During these global changing times, it is my goal to work tirelessly within my community to ensure a sense of place, environmental sustainability, social responsibility and economic prosperity for all, whilst simultaneously maintaining a personal life with family and friends.

WORK EXPERIENCE

2012 – Present **Owner,** Paradise Solutions
Sales Associate, Century 21
Adviser, Beach Enclave Resorts
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2010 – 2012 **Under Secretary,** Ministry of the Environment and District Administration, Turks and Caicos Islands Government, Turks and Caicos Islands

2003 - 2010 **Director of Planning,** Department of Planning, Turks and Caicos Islands Government, Turks and Caicos Islands

2000 – 2003 **Deputy Director of Planning,** Department of Planning, Turks and Caicos Islands Government, Turks and Caicos Islands

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1994 – 1995 Oxford Brookes University, Oxford, England
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Specialization: ***Environmental Impact Assessment and Management***

1991 – 1994 Oxford Brookes University, Oxford, England
*****B.A. (Hons) Town and Country Planning**
Specialization: ***Environmental Design***

1988 – 1990 Central Manchester College of Technology, Manchester, England

BTEC National Diploma in *Land Administration

TRAINING

2010 – 2021 Century 21 Online courses and training in Real Estate
1996 – 2010 Extensive and invaluable experience gained from managing the phenomenal growth of the Turks and Caicos Islands, one of the fastest growing economies within the Caribbean
2004, March 21 – 26 "White Water to Blue Water Conference", Miami, Florida, USA
2000, November 20 – 24 Certificate course in "Introduction to Environmental Health Impact Assessment", Castries, St. Lucia, Sponsored by CEHI, Centre Hospitalier Universitaire de Quebec, Health Canada
2000, July 16 – 20 Planning Workshop 2000, Caribbean Conference for Town & Country Planning, Barbados
1998, March 09-11 Certificate course in "Advanced Topics in Environmental Impact Assessment", Taught by L.W. Canter and S.F. Atkinson, Irving, Texas, USA
1998, May 18 –22 Workshop on "Siting and Design of Tourism Facilities", Tobago, Trinidad and Tobago, sponsored by UNEP/USAID and organized by Caribbean Hotel Association
1991, March 04 – 22 Certificate course in "Public Sector Investment Planning, Programming and Management", Grand Cayman, Cayman Islands, sponsored by Caribbean Development Bank

MAJOR PUBLICATIONS

- *Turks and Caicos Islands Development Manual (1996 to 2010), most notably:*
  - *Introduction of the Standards and Procedures for EIA.*
  - *Development of typical/mandatory conditions that may be placed on various types of development.*
  - *Planning Standards for various residential locations on the Islands.*
- *"Architectural Heritage of the Turks and Caicos Islands"*, Turks and Caicos Islands 2002-2003 Annual Visitors Guide
- *Various Publications on **Paradise Solutions' Facebook page***
- *Presenter at many Seminars on Planning and the Environment, including "Introduction of EIA into the Planning Process – 1995"*
- *A Dissertation with Distinction: "The impacts of development on the landscape of the Turks and Caicos Islands. To what extent has there been a change." Supervised by **Ms. Riki Therival**, Lecturer, Author and one of the World's leading experts in EIA and SEA.*

MAJOR PROJECTS

- 2008 – 2010 Preparation of *"**Turks and Caicos Islands National Sustainable Development Plan (2008 – 2018)**"*
- *Introduction of Environmental Impact Assessment (EIA) and Procedures into the TCI Development Manual*
- *Overseen the period of the greatest physical development within the Turks and Caicos Islands as Director of Planning.*
- *Environmental Impact Statement (EIS), Shrimp Facility, Parcels 60514/5,9 and 11 (109 acres), Providenciales, Turks and Caicos Islands, 2015.*

- *Environmental Impact Statement (EIS), Large Dwelling Home and Groyne on Parcels 61005/28,29, Providenciales, Turks and Caicos Islands, 2013.*
- *Environmental Impact Statement (EIS), Groyne and Beach Creation, Parcel 60506/42, Providenciales, Turks and Caicos Islands, September 2013.*

- *Environmental Impact Statement (EIS), Construction of a Service Road to Access Parcel 60606/77 (Cay), September 2014.*
- *Environmental Impact Statement (EIS), Infill Development & Beach Enhancement, Parcels 61002/105-108, 111-113, May 2013.*
- *Environmental Impact Statement (EIS), Service Station, Leeward Highway, Parcel 60812/12, November 2014.*
- *Environmental Impact Statement (EIS), Service Station, Parcel 60810/10, Providenciales, Turks and Caicos Islands, December 2015.*
- *Environmental Impact Statement (EIS), Service Station, Parcel 60707/183, Providenciales, Turks and Caicos Islands, March 2019.*
- *Report of the State of Leeside Estates, Long Bay, Providenciales, Turks and Caicos Islands, December 2014.*
- *Environmental Impact Statement (EIS), Boutique Hotel Development, Long Bay Beach, Parcels 61113/410 and 411, August 2021.*
- *Master Plan, The Port at Bellefield Landing, North Caicos, Turks and Caicos Islands, November 2021.*

AFFILIATIONS

Turks and Caicos Real Estate Association (TCREA)

REFERENCE:

MR. OSWALD WILLIAMS
Planning Consultant/Former Director of Planning
Tel. 649 231 0371

Lorne Angelo Robinson

Brief background:

Lorne Robinson is a career public Health professional 25 years of experience in the field of public health. Lorne has served for 12 years as the Director of the Turks and Caicos Islands Government Environmental Health Department, that has direct responsibility for Solid Waste Management in the Turks and Caicos Islands.

He has overseen and been the focal point for three studies carried out on the Waste Management system and has worked with a consultant team brought in by him to address the development of a Solid and Liquid Waste Management within the Turks and Caicos Islands.

He left the field of Public Health and is currently based in Providenciales and working as a Hospitality professional, where he has applied public health principles to the hospitality industry, he started her career working as a trainee public health inspector and oversaw waste management operations throughout the Turks and Caicos Islands.

Motivated by his mission to help individuals with whom he works achieve success in their job areas, he has developed several new leaders in his current field.

Career and educational Highlights are as follow:

University of the Technology, Jamaica Bachelor of Health Science (Environmental Health)	1998 – 2000
Barbados Community College, Barbados Certificate in the Inspection of Meat & Other Foods	1997
West Indies School of Public Health, Jamaica Diploma in Public Health Inspection	1992 – 1995
College of the Bahamas, Nassau, Bahamas Associates Degree in History	1989 – 1992
Turk & Caicos High School High School Class 1 Diploma and 8 O'Level Passes	1983 - 1988

Professional Certifications

Certificate in Hospitality Supervision	2015
Certificate in Management Leadership – Performance Management, Chartered Management Institute	2012
Affiliate Member, Chartered Management Institute	2011 –
Disaster Risk Reduction Leadership and Strategic Planning Training Course BVI	2011-
Malaria Workshop, Jamaica	
TCI Government Leadership Development Program, National School of Government	2009
Caribbean Community Pandemic Influenza Workshop, Kingston, JA	2009
Poultry Compensation Workshop, Panama	2008
Avian Influenza Workshop, Argentina	2006
WHO Global Salm –Surv (Salmonella Surveillance) Level 111 Training Course CAREC/PAHO/WHO	2005
2nd International Conference On Food Safety & Occupational Health Food Hygiene Bureau in association with the Chartered Institute of Environmental Health (CIEH UK), Kingston Jamaica	2003
Regional Training Course In Landfill Monitoring Techniques CEHI, St Lucia	2002
Training in the Application of HAACP To National Food Service Establishment CEHI, Bahamas	2002
Certification/Training in Laboratory Techniques for Landfill Monitoring CEHI, St Lucia	2002
Performance Appraisal Training and Education Programme Turks and Caicos Islands Government	2001

ServSafe Certification Food Protection Management Certification
NRA 2000

Certification/Introduction to Environment Health EIA
CEHI, St Lucia 2000

Effective Supervisory Management Skills for 21st Century 1999
MDR Bahamas Ltd

Employment History

Chairman, Board of Public and Environmental Health
2017-2021

General Manager, The Oasis at Grace Bay 2017 - Present

Operations Manager, Private Estates, Parrot 2016 - 2017

Custodial Manager/Executive Housekeeper, Parrot Cay 2014 - 2016

Assistant Executive Housekeeper, Parrot Cay 2013 - 2014

Chief Environmental Health Officer 2001 - 2012

Environmental Health Officer 1996 - 2001

Public Health Trainee, TCI Government 1988 - 1996

Policies
TCI National Food Safety Policy

Draft Initial Sanitation Standards for Fish Processing Establishments

Sanitation Standards for Beauty and Barber Shops

TCI National Food Importation Standards

TCI National Requirements for Animal Importation

TCI National Standards for Meat and Meat Products Importation

TCI National Standards for Plant and Plant product Importation

Professional Associations and Boards

Chairman of Communicable Disease Surveillance Committee	2010 - 2012
Member TCI Water and Sewerage Board	Since 2001
Caribbean Water and Waste Water Association	Since 2003
Chairman of Public and Environmental Health Board	2001 - 2008
Member of TCI Physical Planning Board	2001 - 2004

National & Community Involvement

Social

Former President and Secretary and Current Member Kiwanis Club of Grand Turk	Since 1990

D. GREG BRAUN, CEP

CERTIFIED ENVIRONMENTAL PROFESSIONAL
Jupiter, FL 33478
(561)-575-2028; mobile: (561)-758-3417
e-mail: dgregbraun@aol.com

AREAS OF SPECIALIZATION AND EXPERIENCE

Natural Resource Surveys, Coastal Ecology; Habitat Assessments, Estuarine and Avian Ecology, Wetland and Habitat Restoration; Environmental Planning and Permitting

EXPERIENCE HIGHLIGHTS

Terrestrial and Marine Assessment, Long Island, The Bahamas - Performed site assessments in landside and marine environments for a proposed resort development on Long Island.

Terrestrial and Marine Assessment, Blue Conch Holdings, Providenciales, Turks and Caicos Islands - Performed site assessments in landside and marine environments for a proposed resort and residential development on Grace Bay.

Terrestrial and Ornithological Assessments, proposed Photo-voltaic Power Plants, Turks & Caicos – performed site assessments and developed ecological components of Draft and Final Environmental Impact Assessments for proposed solar power generation sites on Providenciales, North Caicos and South Caicos. Provided the ecological components of Public Consultation meetings.

Mangrove Assessment, Norman's Cay, Bahamas – Investigated existing mangrove communities, made recommendations for enhancement of hydrologically-impacted wetlands, conducted baseline surveys to guide engineers on environmental aspects of marina design and coordinated the creation of a living shoreline project that included planting over 4,000 mangroves.

Ecological Assessments, Egg Island, Bahamas – Lead ecologist responsible for qualitative and quantitative assessments of terrestrial, marine and tidally influenced natural resources of a small island in the Bahamas that was being considered for resort development. Developed vegetative community maps and an Environmental Impact Assessment for review by the government of the Bahamas.

Mangrove Assessment, Whale Cay, Bahamas – Conducted qualitative and quantitative assessments of tidally influenced and landlocked mangrove communities on Whale Cay as part of an environmental impact assessment for a proposed marina project.

Environmental Impact Assessment, Bock Cay, Exumas, Bahamas – Conducted landside investigations including qualitative and quantitative habitat mapping on a ~500 acre island proposed for resort development. Field work in development of floral and faunal inventories revealed the presence of various species protected by Bahamas laws and international conservation treaties.

Ecological Evaluations, Children's Bay Cay, Williams Cay, Lee Stocking Island and Madam

Dau's Cay, Bahamas – Lead ecologist conducting investigations of terrestrial and marine habitats on these four small islands in the Exumas. Developed habitat community maps and species lists to assist planners in the design of a resort project and developed Environmental Impact Assessments for review by the Government of the Bahamas.

Ecological Assessment, Bird Cay, Berry Islands, Bahamas – Conducted a cursory assessment of terrestrial and wetland habitats on this ~260-acre cay to determine if there were any ecological issues that would prevent or affect development on the presently-uninhabited, privately-owned island.

Terrestrial and Coastal Assessment, Palmetto Peninsula, Barbuda – Performed vegetative community mapping and qualitative assessment on a 1,200 acre site following Hurricane Irma's path of devastation across Barbuda. Developed flora and fauna lists of species observed, with particular emphasis on species designated as Endemic, Endangered and Vulnerable.

Terrestrial and Marine Assessment, Turtle Tail Drive, Providenciales, Turks & Caicos – Conducted terrestrial and nearshore marine investigations to map and evaluate conditions prior to installation of a shore-perpendicular groyne and upland development. Landside work included mapping locations of numerous endemic plant species to assist in micro-siting proposed facilities to minimize impact on notable species.

Terrestrial and Marine Due Diligence Surveys, Bahamas – Lead ecologist on a multi-disciplinary team evaluating multiple sites for consideration for development as out-island cruise ship destinations. Sites included locations on Andros, the Abacos, the Berry Islands, and Eleuthera. Performed marine investigations and cursory land-side habitat mapping as part of fatal-flaw level analyses.

Terrestrial and Wetland Assessments, Northwest Point, Providenciales, Turks & Caicos – Lead scientist in the mapping of vegetative communities and evaluation of qualitative conditions on three tracts of vacant land in the Northwest Point area of Providenciales.

Ecological Evaluation, Gorda Cay, Bahamas - Conducted an ecological survey of this small island in the northern Bahamas. Project included evaluations of nearshore, beach, tidal and upland communities, compilation of flora and fauna lists and preliminary survey for protected species. Specific habitats investigated included nearshore coral communities, seagrasses, tidal mangrove forests and uplands.

Ecological Investigations and Environmental Impact Assessment, North Creek, Grand Turk. – Lead ecologist during the evaluation of marine, lagoon, shoreline and landside habitats and development of an Environmental Impact Assessment for a proposed marina and multi-phase residential development.

Marine and Landside Assessments, Serenity Bay, Antigua – Lead scientist for the mapping and qualitative assessment of nearshore marine communities and landside vegetative community mapping for a potential resort project in southwest Antigua.

Terrestrial Assessment, Rock House, Providenciales, Turks & Caicos – Conducted terrestrial investigations to map habitats, evaluate conditions and develop an Environmental Impact Assessment and Environmental Management Plan for review by the Turks and Caicos Government. Terrestrial work included mapping locations of numerous endemic plant species to assist project planners in minimizing impact on notable species. Provided the ecological

components of the project at a Public Consultation meeting.

Mangrove Restoration and Protected Species Assessment, Barbados - Conducted an intensive assessment of mangroves in the Graeme Hall Swamp to determine the population and habitat preferences of the Barbados sub-species of the Yellow Warbler. Results of this assessment were used in the development of a long-term management plan for the site.

Ecological Evaluation, Pavilions at Unicorn Cay, Eleuthera, Bahamas - Conducted an ecological evaluation of a ~ 1500-acre tract in the eastern Bahamas. Project included evaluations of upland and wetland communities, compilation of flora and fauna lists and preliminary survey for species protected by Bahamian laws and international treaties.

Mangrove Assessment, Ponce, Puerto Rico - Conducted habitat assessment of a wetland community along south shore of Puerto Rico. Mapped forested and herbaceous wetland communities and identified relative habitat values.

Salt Pond Habitat Assessment, Sonesta Resort, Anguilla, British West Indies - Conducted survey of flora and fauna present in a 12-acre salt pond at a resort on Anguilla. Developed plan for habitat enhancement that would improve water quality and biological productivity, reduce odor and insect problems and improve aesthetic perception by resort visitors.

Scrub Island, British Virgin Islands – Conducted upland and marine habitat investigations to determine, document and map the presence, absence and condition of natural resources on Scrub Island. Developed inventories of flora and fauna and compared present conditions with those documented during surveys conducted ± 15 years ago.

Ecological Evaluation, Athol Island, Bahamas - Conducted an ecological survey of an undeveloped island on which the Government of the Bahamas was considering entering into a public/private partnership for limited recreational development. Project included evaluations of upland and wetland communities, underwater areas, compilation of species lists and conducting a survey for nesting birds.

Macao Beach Resort, Bavarro, Dominican Republic – Conducted a bird survey and participated in an environmental assessment of a tract of coastal property that is being considered for the construction of a resort. Assisted in the development of an Environmental Impact Statement and was principal author of the environmental management plan for the property, which includes upland and wetland habitats.

Royal Reef Resort, North Caicos, Turks and Caicos Islands – Conducted landside and marine assessments of existing terrestrial, aquatic and marine habitats associated with development of a resort on this oceanfront tract. Assessment included investigations of potential access routes for navigation to/from Providenciales.

Marine Assessment, True East, Grand Bahama – Conducted underwater investigation of nearshore macrobenthic communities adjacent to a ~ 100-acre property near the southwestern Grand Bahama community of Boodle Bay. Assessment involved mapping of macroalgae and coral habitats and investigation of numerous freshwater vents emanating from subsurface pores in the limestone substrate.

Altamer Resort, Anguilla, British West Indies – Conducted ecological assessments as part of an Environmental Impact Assessment for a proposed resort expansion project. A key component of

responsibility was the development of a Conservation and Management Plan for a ~ 40-acre salt pond to be preserved and managed as the Country's first designated bird sanctuary.

Environmental Impact Assessment, Sky Beach, Eleuthera, Bahamas – Conducted terrestrial assessments of existing conditions on a ~ 22-acre site in central Eleuthera. Developed inventories of flora and fauna observed and assessed potential ecological impacts of construction and operation of a 35-unit residential development. Conducted follow-up inspections during construction to monitor compliance with environmental components of governmental approvals.

Ecological Investigations, Holbox, Mexico – Conducted field investigations and analyses of aerial photography to produce a vegetative community map for a ± 10,000 acre coastal barrier island at the northern tip of the Yucatan Peninsula. Field work included qualitative investigations of upland areas, marine communities, and mangrove assemblages in intertidal and interior island areas.

Terrestrial and Marine Assessments, Crystal Cay and Long Cay, Bahamas – Assessed upland and marine habitats on these two small islands near New Providence. Developed a report describing baseline conditions for use in subsequent master planning for site improvements.

Terrestrial and Marine Assessments, Great Stirrup Cay, Bahamas. – Conducted quantitative and qualitative assessments of terrestrial and underwater communities to assist in minimizing ecological impacts of proposed construction activities associated with improvements by Norwegian Cruise Line.

Marine Assessments, Coco Cay, Bahamas. – Lead scientist on the evaluation of a + 215-acre tract of submerged resources adjacent to Coco Cay. Mapped and provided a qualitative assessment of coral reef/hardbottom, seagrasses and coastal rock communities and provided ecological components of an Environmental Impact Assessment for a proposed cruise ship pier for review by the government of the Bahamas.

Marine and Terrestrial Assessments, South Caicos, Turks and Caicos Islands – Conducted marine and landside assessments of existing marine and upland habitats associated with development of resorts on South Caicos. Results of the investigations were included initially in a Strategic Environmental Impact Assessment that was provided to the TCI Government; then conducted follow-up more detailed investigations specifically for the Sailrock project.

Savannah Bay, Anguilla, British West Indies – Conducted terrestrial and marine ecological assessments as part of due diligence and Environmental Impact Assessments for a proposed resort development project. Habitats evaluated included nearshore marine, terrestrial, mangrove wetlands and an open-water salt pond.

West End Assessment, West End Resort, Ltd., Freeport, Bahamas - Project Manager responsible for conducting an ecological assessment and developing an Environmental Impact Assessment which described the existing and future conditions at a 150-acre tract that was subsequently renovated into a marina and waterfront resort.

Blowing Point, Anguilla, British West Indies – Conducted terrestrial and marine ecological assessments and developed ecological components of an Environmental Impact Analysis associated with the relocation of a "Dolphin Discovery" facility.

Ecological Assessment, Bonefish Point, Providenciales, Turks and Caicos – Conducted

quantitative and qualitative assessments in marine and terrestrial ecosystems on a ~ 250-acre tract near the southwestern tip of Providenciales. Developed a report which identified existing habitats and assessed potential ecological impacts that could result from the construction of a resort.

Ecological Assessment, South Ocean Resort and Golf Course, New Providence, Bahamas – Conducted due diligence level investigation of ecological conditions on an abandoned resort property to identify potential ecological constraints for re-development of the property. Identified and mapped the boundaries of environmentally sensitive resources, including several plant species that are protected by regulations of the Bahamas government. Conducted follow-up Environmental Impact Assessment level analyses for construction of a marina and entrance channel.

Ritz-Carlton, Grace Bay, Providenciales, Turks and Caicos – Conducted landside and marine investigations at a former resort site that is being considered for replacement with a Ritz-Carlton resort and residences complex. Project included meetings with governmental officials and development of an Environmental Impact Statement.

Ritz-Carlton, Grand Cayman, Cayman Islands, British West Indies – Conducted quantitative and qualitative ecological assessments in marine, estuarine lagoon, tidal mangrove forest and uplands at a previously existing resort on a 140-acre tract along Seven-Mile Beach. Results from the field assessment were used to assist in environmental planning and obtaining governmental approvals for a proposed Ritz- Carlton resort complex. Also developed a shoreline vegetation plan to use native plants to stabilize the shore, filter surface runoff and provide habitat for birds, fish and other wildlife. Conducted follow-up assessments of the mangrove community after the area was impacted by Hurricane Ivan, and worked with coastal engineers to design a mangrove habitat restoration plan.

Ecological Evaluation, Little Exuma, Bahamas - Conducted landside and waterside ecological assessments at an undeveloped 230-acre tract that stretched across the island from ocean to bay. The project included evaluations of upland and wetland communities, a cursory evaluation of marine habitats and compilation of lists of flora and fauna.

Shoreline Improvement Project, Hobe Sound, FL. – Performed an assessment of existing conditions along a tidal shoreline in a residential community adjoining the Indian River Lagoon. Developed a plan for mangrove management and the replacement of non-native vegetation with aesthetically-friendly native species that would filter upland run-off and provide erosion protection.

Mangrove Habitat Restoration, Myers Ln., Palm Beach County, FL – Acquired, planted and completed monitoring a multi-year shoreline mangrove restoration project required by a FL. Dept. of Environmental Protection Consent Order.

Shoreline Assessments, Port Everglades Dredged Material Management Area, Broward County, FL. – Assisted Boston-based Cashman Dredging, Inc. during their dredging work at Port Everglades. Conducted pre-dredging and post-dredging shoreline assessments along the Dania Cut-off Canal and assisted with mangrove management during the course of the 16-month dredging project.

Floristic Surveys, Martin County, FL. – Completed floristic surveys on 13 County-owned conservation properties by traversing representative vegetative communities on properties ranging in size from under five acres to over 3,500 acres and recording GPS coordinates for the presence

of flora and fauna designated by the State of Florida and/or the federal government as endangered or threatened.

Preserve Area Management, The Arbors, Martin County, FL – Performed qualitative assessment of ecological conditions within upland and wetlands preserves and led a multi-agency project to update the Preserve Area Management Plan to incorporate the principles of the Florida Forest Service's Firewise Communities and the Florida Fish and Wildlife Conservation Commission's Scrub Management Guidelines.

Forensic Mangrove Investigation, Loxahatchee River, Jupiter, FL – Performed site evaluation and served as expert witness on behalf of the Town of Jupiter in legal proceedings regarding unauthorized removal of shoreline mangroves.

Mangrove Resource Survey, Port Everglades, FL – Conducted baseline investigation of mangroves along the shoreline adjacent to the Dania Cut-off Canal Dredged Material Management Area in preparation for its use during dredging at Port Everglades.

Submerged Aquatic Vegetation Investigation, Lake Worth Lagoon, Palm Beach County, FL – Lead scientist to conduct qualitative and quantitative benthic resources in the alignment of a proposed communications cable from the mainland to Peanut Island.

Habitat Enhancement Project, Dredged Material Disposal Island MC2, Martin County, FL. - Obtained grant money and then developed a habitat enhancement plan for an island in the Indian River Lagoon that is used for nesting by wood storks and other state and/or federally protected birds. Obtained the necessary state and federal regulatory approvals, and then coordinated implementation of the plan, which involved removal of invasive pest plants and planting of mangroves and other salt-tolerant native species.

Avian Monitoring, Dredged Material Disposal Island MC2, Martin County, FL. – Conducted avian monitoring during the 2011-2012 nesting season to document the nesting activities of wood storks, brown pelicans and other protected species of birds during and after completion of a shoreline protection project.

Mangrove Habitat Restoration, Land's End Way, Jupiter, FL – Acquired, planted and am currently monitoring a multi-year shoreline mangrove restoration project required by a FL. Dept. of Environmental Protection Consent Order.

Mangrove Restoration, Beach Point Condominium, Palm Beach, FL – Conducted habitat enhancement activities to restore mangrove habitat on privately-owned lands adjacent to Lake Worth Lagoon in central Palm Beach County. Project involved planting and mangrove monitoring over a 5-year period; released by FDEP from further monitoring when success criteria were met prior to monitoring deadline. Subsequent work has involved mangrove maintenance trimming for over a decade.

Mangrove Enhancement, Jupiter, FL. – Conducted a site assessment, developed a mangrove enhancement project; then acquired and planted red mangroves, black mangroves and white mangroves in shoreline communities along a tidal extension of the Loxahatchee River.

Mangrove Monitoring, Jones Creek, Jupiter, FL. – Conducted monitoring over a three-year period in implementation of a Consent Order by the Florida Department of Environmental Protection

regarding restoration of mangroves along a privately-owned shoreline of Jones Creek.

Ecological Assessments, Singer Island, FL – Conducted ecological surveys for threatened and endangered species and aquatic species biodiversity in barrier island ecosystems and provided correspondence and expert witness testimony in proceedings in an effort to preserve a coastal wetland on Singer Island.

Mangrove Trimming, Coastal FL – After earning accreditation as a professional mangrove trimmer, worked with the Florida Dept. of Environmental Protection and Martin County to obtain approvals and then conduct mangrove trimming along public access routes at Pendarvis Cove Park (Martin County), adjacent to South Ocean Boulevard in Palm Beach County and on behalf of numerous property owners in Palm Beach and Martin Counties.

Natural Resources Damage Assessment, Palm City, FL. – Conducted assessments after heavy equipment was used to clear privately-owned wetlands without the approval of the land owner. Mapped boundaries of areas that were illegally cleared and made estimates of the extent of damage to flora and fauna.

Mangrove Assessments, Martin, Palm Beach, Broward and Dade Counties, FL. - Conducted numerous assessments of estuarine communities along the southeast coast of Florida. Projects involved analyses of the extent and quality of red, black and white mangroves and design/permitting of utility projects to minimize impacts to mangroves.

Wetland Assessment, City of Riviera Beach, FL – Lead scientist on the identification and qualitative evaluation of over 25 forested and herbaceous wetlands that were within potentially within the drawdown cone-of-influence of a municipal water supply well field. The project involved investigation of vegetative components and hydrologic indicators of short-term and long-term conditions in each wetland.

Mangrove Restoration, Cudjoe Key, FL – Conducted an evaluation of mangroves on near-shore islands, developed and subsequently implemented a restoration and maintenance plan that included planting over 500 mangroves to improve ecological and shoreline protection features following mangrove alteration that exceeded State of Florida standards.

Protected Species Survey, Gulf Coast Landfill, Lee County, FL. - Conducted wildlife surveys and ecological investigations to determine the potential effects of a landfill expansion project on the Florida Panther and other state-listed and/or federally-listed species. Developed a Biological Assessment for the project for review by the U.S. Fish and Wildlife Service.

Ecological Assessments for International Alzheimer's Foundation, FL. – Conducted ecological assessments at sites in St. Lucie and Highlands Counties being considered for construction of residences for Alzheimer's patients. Assessments included mapping of wetland areas and surveys for threatened and endangered species.

Wildlife and Protected Species Surveys, Brevard County, FL. - Conducted Flora and fauna surveys on a 2,000-acre tract in southern Brevard County. The property included herbaceous and forested wetlands, and improved pasture. Protected species documented included numerous species of wading birds, bald eagles and burrowing owls.

Wetland Jurisdictional Determinations and Assessments, FL. - Conducted wetland jurisdictional determinations and protected species surveys at over 150 sites in peninsular Florida. Ecosystems encountered included herbaceous and forested habitats in freshwater, estuarine and marine areas.

Clients and project sizes have varied from owners of single family residential lots to large publicly-owned conservation lands.

Ecological Assessment, LaBelle, FL. – Conducted protected species surveys and wetland mapping on a 232-acre tract east of LaBelle in northwestern Hendry County. Mapped the location of over 100 burrows of gopher tortoises, obtained State permit for tortoise relocation and managed the relocation effort. Also conducted a five-day survey for scrub jays in compliance with state and federal protocols.

Ecological Assessment, Santa Lucea Tract, Martin County, FL. - Developed a preliminary inventory of plants on a tract of public lands being considered for acquisition by Martin County for the purposes of environmental protection. The oceanfront tract includes beach/dune, maritime hammock, coastal strand and mangrove communities, and several plants listed as threatened or endangered by the State of Florida.

Ecological Assessment, Twin Rivers Park, Martin County, FL. - Developed a preliminary inventory of flora and fauna on the project site, and delineated the boundary of wetland jurisdiction for state and federal regulatory agencies. Inventory included mapping of threatened and/or endangered plants (e.g., *Halophila johnsonii*) and animals (e.g., *Gopherus polyphemus)* and relocation of several gopher tortoises after issuance of permits required by the State of Florida.

Acreage Community Park, Palm Beach County, FL. – Conducted site investigations for potential use by threatened and endangered species. Completed surveys for gopher tortoises, research permitted recipient sites, obtained relocation permit from the Florida Fish and Wildlife Conservation Commission, excavated potentially active burrows and transferred captured tortoises to recipient site.

Wetland Delineation, Delaplane Peninsula, Martin County, FL. – Conducted wetland delineations on a 50-acre tract of waterfront County-owned conservation lands to assist in preparing for habitat improvement activities.

Ecological Assessment, Bahama Breeze, Ft. Pierce, FL – Conducted flora and fauna surveys on this ± 20- acre site on Hutchinson Island. Landside work involved mapping the distribution of gopher tortoises, and working with owner and state regulators to ensure compliance with gopher tortoise protection requirements. Waterside work involved delineating the wetland jurisdictional boundary and mapping seagrasses, including *Halophila johnsonii*, which is protected by the federal Endangered Species Act as a threatened species.

Barley Barber Swamp, Martin County, FL. - Conducted surveys and developed an inventory of flora and fauna present in a 400-acre cypress preserve and led public tours during tenure as ranger. Subsequently designed and had oversight responsibilities for a habitat and hydrologic restoration program. Responsibilities included development and implementation of a water level monitoring and management program during a five-year restoration period.

Bird Surveys, Boca Raton, FL. – Conducted shorebird monitoring as required by state permits for a beach restoration project in southern Palm Beach County. Project involved daily inspections of a ± 1-mile stretch of beach, to ensure that beach nourishment, groin construction and jetty improvements would not result in adverse impacts on birds that are protected by state and/or federal wildlife laws.

Bird Surveys, Indian River County, FL. – Conducted shorebird monitoring as required by state permits for two beach renourishment projects in northern Indian River County. Project involved daily inspections of a several mile stretch of beach during the nesting season, to ensure that beach nourishment did not result in adverse impacts on birds that are protected by state and/or federal wildlife laws. Obtained permits for, and coordinated relocation of several state-listed protected pioneer-zone plants that would have otherwise been impacted by the project.

Osprey Nest Interactions, Peninsular FL. - Coordinated and/or conducted numerous surveys of osprey nests and success of use of alternate nesting structures throughout southern and eastern Florida. In several cases, coordinated the construction, permitting and installation of osprey nesting platforms.

Avian Monitoring, STA 1 East Trash Rake and Rack Replacements, Palm Beach County, FL. – Conducted daily surveys for species protected by the federal Migratory Bird Treaty Act during the ~ 4- month and 7-month construction projects at the S-362 and S-319 Pump Stations. Cumulatively, the projects involved over 85,000 documented bird sightings and nesting by 19 MBTA-protected species, including endangered snail kites, ospreys, limpkins and other wetland-dependent species. Close coordination with state and federal agencies ensured that construction was not delayed as protected birds nested – some as close as within 50 ft of the construction activities.

Bird Surveys, Town of Palm Beach, FL. – Conducted bird monitoring as required by state permits for a beach restoration project in central Palm Beach County. Project involved inspections of a ~ 3.7-mile stretch of beach, to monitor the effects of a beach nourishment project on birds that are protected by state and/or federal wildlife laws.

Bald Eagle Nest Monitoring, Okeechobee County, FL. – Conducted intensive monitoring of bald eagle flight paths and pathways, and reaction to various potential disturbances, and worked with regulatory agencies to develop site-specific primary and secondary protection zones.

Bald Eagle Nest Monitoring, Brevard County, FL. – Conducted monitoring of bald eagle flight paths and pathways, and reaction to various potential disturbances, to ensure that work did not result in abandonment of nesting when it became necessary to conduct utility installation activities during the 2011-2012 nesting season.

Bald Eagle Nest Monitoring, Flagler County, FL. – Conducted intensive monitoring of bald eagle flight paths and pathways, and reaction to various potential disturbances, and worked with regulatory agencies to obtain approval of a site-specific bald eagle protection plan for Nest FL - 007 which is located on a tract of land that is proposed for development. Conducted additional monitoring when it became necessary to conduct construction activities during the 2003, 2004, 2005 and 2006 nesting seasons.

Bald Eagle Nest Monitoring, Martin County, FL. – Initiated Audubon of Martin County's participation in the statewide (FL) Eaglewatch program in 2004 and subsequently coordinated their annual participation for several years. Responsibilities included organizing and training of volunteers, assigning nests and QA/QC on monitoring reports. Also conducted monitoring of nesting bald eagles for Martin County's Environmentally Sensitive Lands Division at Nest MT – 018 during the 2006-07 nesting season.

Piping Plover Assessments, Volusia County, FL – Conducted surveys within Piping Plover Critical

Wintering Habitat Unit # FL-34 to document daily activity patterns and foraging habits and to evaluate plover's responses to various potential human-related and natural disturbances.

Piping Plover Surveys, Martin County, FL – Served as project manager and participated in birds surveys in the vicinity of the St. Lucie Inlet to document the presence, abundance and habitat use by piping plovers and other protected birds; Coordination with Great Lakes shorebird scientists when documentation of banded piping plovers revealed them to be members of the population that nest on state and federal lands on the eastern shore of Lake Michigan.

Piping Plover Surveys, Martin County, FL. - Coordinated the 1991, 1996, 2001, 2006 and 2011 censuses to determine the wintering population and habitat of the piping plover (*Charadrius melodus*) in the Martin County area of southeastern Florida. Project included recruitment and training of volunteers, coordination of field surveys and reporting to U.S. Fish and Wildlife Service.

Sandhill Crane Nesting Survey, Okeechobee, FL. - Conducted ecological field surveys on a 2,400-acre site in Okeechobee County, FL. to document wildlife usage, specifically focused on nesting of Florida Sandhill Cranes (*Grus canadensis pratensis*). Surveys involved monthly field investigations conducted on the ground and by helicopter, and resulted in the documentation of successful nesting by cranes and other protected species.

Bird Surveys and Habitat Enhancement Project, Evergrene, Palm Beach County, FL. – Conducted surveys to determine and document avifauna at Evergrene, then developed and implemented a program to enhance habitat for birds through the installation of nest boxes for owls, woodpeckers, ducks, flycatchers and purple martins. Installed 10 nest boxes in 2003-04, conducted monitoring to document their use, expanded the project to over 30 nest boxes through 2017 as it became apparent that nest sites were a limiting factors in bird abundance for cavity-nesting species.

Ornithological Surveys, Martin County, FL. - Coordinated a 5-year Breeding Bird Atlas project to document nesting habits and habitats of all bird species in Martin County. Project included recruitment of a team of volunteers who conducted the surveys, coordination and peer review of their data and liaison with a network of other coordinators through the state.

Assessment of the Status of Red-cockaded Woodpeckers in Martin County, FL. – Chaired a multi-agency committee focused on determining the historic and current distribution of this federally-endangered species, and seeking to establish and/or maintain a sustainable population of this species in Martin County.

Least Tern Conservation, Martin County, FL. – Led multi-group task committee to document and protect least tern nesting areas. Project included beach-nesting and roof-top nesting terns (and black skimmers) and involved U.S. Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission and conservation non-governmental partners.

Sandhill Crane Conservation, Martin County, FL – Developed a county-wide conservation project for sandhill cranes in Martin County. Developed and provided educational materials about crane ecology (e.g., life history, habitat, diet, threats, etc.), worked with Martin County to install crane crossing signs at selected locations to simultaneously increase driver safety and protect cranes. Recruited and trained a project manager.

Ecological Monitoring, Kissimmee Prairie Sanctuary, Okeechobee County, FL. – Conducted a three-year monitoring program regarding restoration of nesting habitat for the endangered

Grasshopper Sparrow on preserve lands owned and managed by the Audubon Society.

Bird Habitat Improvement Project, Mirasol, Palm Beach County, FL. – Conducted surveys to document bird life at a golf course development in northern Palm Beach County. Installed 10 nest boxes and monitored the boxes to document their use.

Scrub-jay Conservation, Martin County, FL – Initiated a county-wide Scrub-jay conservation project for Audubon of Martin County. Developed and provided educational materials about Scrub-jay ecology (e.g., life history, habitat, diet, threats, etc.), participated in JayWatch training, recruited, trained a project manager, had oversight responsibilities for updating geographic distribution status summaries and serving on the steering committee of the multi-agency Southeast Florida Scrub Ecosystem Working Group.

Protected Species Surveys, Pal-Mar, Martin County, FL. – Conducted ecological surveys to assist Martin County in developing grant applications seeking funding to expand public landholdings of conservation lands. Surveys included documentation of numerous plant and animal species that are protected by state and/or federal laws.

Avian Distribution Analyses, FL. – Served as project manager to initially develop (1998) and subsequently update (2011) the "*Checklist of the Birds of Martin County*" and "*Birding Sites in Martin County*". The projects involved coordination with other noted local bird authorities, querying and analyzing banding databases, developing and circulating draft lists, performing QA/QC on reported sightings, providing presentations to community groups, leading birding outings in search of rare species and finalizing lists for publication. Have also provided peer review on draft bird lists for various conservation land parcels (e.g., Savannas Preserve State Park, Blowing Rocks Preserve).

Scrub-jay Survey, Gables Preserve, Martin County, FL. – Conducted surveys in compliance with state and federal standards on an 80-acre tract of conservation lands owned and managed by Martin County.

Communication Tower Siting, Renovations and Environmental Assessments, Southeast FL. – Conducted assessments of numerous proposed communication tower sites and up-grade sites and evaluated each for potential impacts to threatened and endangered species, birds and consistency with U.S. Fish and Wildlife Service guidelines. Individual sites have varied from intensely-urbanized areas with no environmental sensitivity to improvements of existing towers located on public lands in areas of high environmental sensitivity, including national parks.

Bird Banding, Reporting and Analyses, FL – Provided assistance to a licensed bander at Ankona Raptor Research in St. Lucie County, FL conducting surveys of migrant raptors to document their use of prevailing East-coast on-shore wind current patterns during their southerly migration. Also involved with Federal (Corps of Engineers), State of Florida (Fish and Wildlife Conservation Commission) and non- governmental organization (Cornell-Audubon e-Bird) processing of on-line reporting of sightings of banded birds.

Avian Invasives Ecology, FL. – Analyzed historic data regarding the presence and distribution of non- native birds in the Treasure Coast (FL) area; developed a display board and educational materials regarding avian invasives for a conference poster-session; analyzed the appearance of a new non-native species (Egyptian Geese) and authored a paper in a peer-reviewed journal (Florida Ornithological Society's *Florida Naturalist*) regarding the establishment of this species in eastern Martin County.

Habitat Improvements, Conservation Lands, Martin County, FL – Obtained grant funding from the Florida Department of Agriculture and Consumer Services in the Community and Urban Forests Program, the St. Lucie River Issues Team and the Indian River Lagoon License Plate Trust Fund and served as project manager to hire staff and recruit volunteers to assist in habitat management activities on five properties owned and managed by Audubon of Martin County.

Protected Species Assessments, Red Reef Park, Spanish River Park, South Beach Park and Gumbo Limbo Nature Center, Boca Raton, FL. – Performed protected species surveys to assist in site planning for dune habitat management and visitor access activities. Developed preliminary inventories of flora and fauna on the project sites, and led coordination efforts to ensure protection of the federally-listed beach jacquemontia (*Jacquemontia reclinata*) and other plant species present on ocean-fronting dunes.

Christmas Bird Count, Stuart, FL. – Have had oversight responsibility for the Stuart, FL Christmas Bird Count annually from 1998 through 2011. Responsibilities included recruiting and coordinating a volunteer compiler, recruiting and organizing pre-count orientation sessions, mentoring participants during field surveys, serving as the media liaison and analyzing results to assess short-term and long-term population trends.

ENVIRONMENTAL PLANNING AND PERMITTING

Halpatiokee Regional Park, Martin County, FL. – Developed a Land Management Plan for 500 acres of conservation lands managed by Martin County's Ecosystem Restoration and Management Division. Project involved data collection to develop a Draft Plan, coordination through a public meeting and an Advisory Group of stakeholders and refinement of a Plan that met the requirements of Florida's Division of State lands and the Florida Communities Trust.

Maplewood Nature Sanctuary, Hidden Bay Nature Sanctuary and Four Rivers Nature Sanctuaries, Martin County, FL. – Conducted flora and fauna surveys on several small tracts owned by Audubon of Martin County and subsequently developed Management Plans for environmentally responsible stewardship of the properties. Obtained grant funding to remove invasive pest plants and served as project manager to oversee habitat enhancement projects.

Salt Ponds, Key West FL. – Developed a Strategic Plan for the management of a ± 600-acre tidal ecosystem in Key West Florida. Project involved extensive coordination with various stakeholders, including several governmental entities and conservation groups. Assisted in the development of a grant application, and served as project manager for a $50,000 habitat enhancement project in implementation of the Plan.

Electric Utility Permitting, FL. - Provided environmental assistance in the route selection of numerous electrical construction projects, and obtained State and Federal approvals for over 150 aerial and subaqueous electrical cable installation projects throughout eastern, south-central and south-western Florida. Also obtained approvals for over 20 power plant projects, including plant major expansions in Fort Lauderdale and Martin County, Florida.

Estuarine Restoration, Dade County, FL. - Directed permit condition compliance activities in the Florida Bay area associated with impacts to estuarine and freshwater ecosystems resulting from utility work adjacent to Everglades National Park. Project involved documentation of construction-related impacts to natural areas and monitoring of habitat restoration.

Citrus Blvd Nature Sanctuary, Martin County, FL. – Conducted flora and fauna surveys on a 270-acre nature preserve owned by Audubon of Martin County and subsequently developed a Management Plan for environmentally responsible stewardship of the property. Recruited Eagle Scout candidates and other volunteers to assist with implementation of various components of the Management Plan.

Sonesta-Key Biscayne, Sonesta Beach Resort, Key Biscayne, FL. - Provided assistance to the Sonesta Beach Resort, Key Biscayne by assisting in the design criteria for hotel expansion and obtaining permits from the Florida Department of Environmental Protection - Bureau of Beaches and Coastal Systems.

Hurricane Andrew, Dade County, FL. - Coordinated wetland permit compliance activities for electrical transmission, distribution and power plant restoration activities in the aftermath of the devastating effects of Hurricane Andrew.

Power Plant Canal Dredging, FL. - Obtained state and federal permits and approvals for dredging projects at power plants in Miami, Ft. Lauderdale, Port Everglades, Riviera Beach and Hutchinson Island.

Projects involved coordination concerning a variety of protected species issues, primarily regarding protection of sea turtles and manatees and protection of submerged aquatic vegetation.

Utility Easements, throughout peninsular FL. - Obtained numerous land use approvals from the State of Florida for electric utility projects on state lands. Locations included sovereignty submerged lands, Aquatic Preserves, Outstanding Florida Waters and state-owned uplands including parks and recreation areas.

Habitat Improvement Program, Lake Worth, FL – Conducted field assessments and developed plans for ecologically-sensitive habitat improvements on several tracts of public lands managed by the Lake Worth Community Development Corporation.

ENVIRONMENTAL EDUCATION-TEACHING

Wildlife Training for Landfill Operators, Univ. of FL. – Developed and provided a course to increase the awareness of certified landfill operators about protected species regulations and wetland issues. The curriculum was reviewed and approved by the Florida Solid Waste Training Committee, with attendance, publicity and other administrative services performed by the University of Florida's Center for Training, Research and Education for Environmental Occupations. Updated course materials and taught the class when demand for the course resulted in follow-up classes in 1998, 2000, 2003, 2008, 2009 and 2010.

Wetland Resource Training, FL. - Developed and implemented a wetland training program for electric utility employees to improve compliance with state and federal wetland protection and protected species regulations.

Bird Identification Course Instructor, FL. – Developed and provided Introductory and Advanced Bird Identification courses for Audubon of Martin County and other clients in southeast Florida. The courses, which typically include a combination of classroom presentations and field trips has been updated and provided to the general public and/or select audiences in most years from 1997 through 2020.

EDUCATION

B. S. 1978 Biological Oceanography, Florida Institute of Technology

OTHER TRAINING/EDUCATION

Classification of Wetlands and Deepwater Habitats of the United States, U.S. Fish and Wildlife Service, St. Petersburg, FL.
Environmental Permitting, FL. Chamber of Commerce LEADERship Martin County Leadership for Community-Based Organizations, 1000 Friends of Florida Designing Natural Resource Monitoring Surveys, U.S. Geological Survey, 2009

EMPLOYMENT HISTORY

1998 – Present: Ecologist/Owner, Sustainable Ecosystems International, Jupiter, FL.
1994 - Present: Sr. Scientist, Applied Technology & Management, Inc., W. Palm Beach, FL.
1984-1993: Environmental Coordinator, Florida Power and Light Co., Juno Beach, FL.
1983-1984: Ranger-Naturalist; Barley Barber Swamp Preserve: Martin County, FL 1979-1982: Environmental Technician; Olin Edwards Company, Indiantown, FL

MEMBERSHIPS
National, Florida and Treasure Coast Chapter - Associations of Environmental Professionals
Florida and Martin County Native Plant Societies
Florida Oceanographic Society The Nature Conservancy Bahamas National Trust

CERTIFICATIONS & LICENSES

- Certified Environmental Professional - Certification # 03040418; re-certified annually 2003 - present.
- Professional Mangrove Trimmer, 2006-present – as recognized by the Florida Department of Environmental Protection
- Gopher Tortoise Agent – Florida Fish and Wildlife Conservation Commission Permit # GTA-09- 00102E
- Certified Small Business Enterprise, Palm Beach County, 2011-present
- Certified SCUBA Diver – Professional Association of Diving Instructors

PROFESSIONAL APPOINTMENTS, RECOGNITIONS and CERTIFICATIONS

- Our Florida Reefs, North Working Group, 2013-2016.
- Martin County Chapter, Florida Native Plant Society, Board of Directors, 2011-present, President 2021 & 2022.
- Florida Association of Environmental Professionals, Treasure Coast Chapter, Board of Directors, 2013-2016
- Martin County Coastal Working Group, 2008-present.
- Southeast Florida Scrub Ecosystem Working Group, Steering Committee member, 2008-present.
- Board Member, Audubon of Florida (1996-2004) and Executive Director, Audubon of Martin County (1994-2011).
- Member, Martin County Public Land Acquisition Selection Committee (1989-91, 2002-2014; Chairman in 1991 and 2003-2008).

- Distinguished Service Award in May 2001 by the Martin County Conservation Alliance.
- Recognized for leadership of the Martin County Audubon Society when the organization was selected as Chapter of the Year by Audubon of Florida in 1999 and 2002.
- Madison Who's Who in Executives and Professionals, 2013.
- Manatee Recovery Team, Manatee Regulatory Working Group, 2004-2006
- Member, Board of Trustees, Environmental Studies Council, 2003-2005
- Loxahatchee River Management Coordinating Council, 2004-present, Secretary 2007-2009.
- William T. Hornaday Award for Distinguished Service in Conservation, 2007
- Member, Hobe Sound National Wildlife Refuge Lake Frances Mangrove Swamp Restoration Partnership (2005-2008)