
Environmental Management Plan

**ABACO CLUB INVESTMENTS LLC
MEMBERS DOCKING FACILITY**

**LITTLE HARBOUR
GREAT ABACO
THE BAHAMAS**



**ISLANDS
BY
DESIGN**

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Abaco Club Investments LLC

MEMBERS DOCKING FACILITY

Little Harbour
Great Abaco
The Bahamas

Environmental Management Plan

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A COPY OF THIS ENVIRONMENTAL MANAGEMENT PLAN SHALL BE KEPT ON SITE AND BE AVAILABLE TO ALL STAFF ASSOCIATED WITH THIS PROJECT.

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**Abaco Club Investments LLC
MEMBERS DOCKING FACILITY**

1.0 INTRODUCTION

Islands By Design Ltd. (IBD) has prepared this document as an Environmental Management Plan (EMP) for the development of The Members Docking Facility for the Abaco Club, located at Little Harbour, Great Abaco. See Figure 1- Site Location Map.

This EMP supplements the December 2014 Environmental Impact Assessment (EIA) prepared by Islands By Design Ltd. (2014) for the same property.

This EMP was created to ensure that the development, operation, and maintenance of The Members Docking Facility for the Abaco Club, proceeds with adequate controls that protect the long term health of the environmental resources of the project site and immediate vicinity. This EMP addresses several areas of concern as follows:

- 1) Demolition of existing timber docks
- 2) Construction of new timber docks
- 3) Ecological Monitoring
- 4) DOCKING FACILITY Operations and Management

IBD has prepared this Environmental Management Plan (EMP) according to the general guidelines and recommendations of the Bahamas Environment, Science & Technology Commission (BEST).

2.0 DOCKING FACILITY DEVELOPMENT

2.1 Demolition

2.1.1 Terrestrial timber structure demolition

The construction of The Members Docking Facility will require the demolition and removal of one existing derelict timber pier. All terrestrial demolition will be conducted in accordance with **Appendix 2**, appended to this EMP.

2.1.2 Marine Timber Pier Demolition

The construction of The Members Docking Facility will require the demolition and removal of one existing derelict timber upland structure. Marine demolition will be conducted in accordance with **Appendix 3**, appended to this EMP.

3.0 DOCKING FACILITY CONSTRUCTION

3.1 Field Environmental Controls

The Developer and Contractor shall be responsible for keeping construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Monitoring of all water resource areas affected by construction, activities shall be the responsibility of the Owner and Contractor. The Contractor shall not discharge or permit discharge into the waters of canals, waterways, ditches, etc., fuels, oils, bitumen, garbage, sewage, or other materials which may be harmful to fish, wildlife, or vegetation, or that may be detrimental to outdoor recreation. The Contractor shall be responsible for investigating and complying with all applicable Government laws and regulations governing pollution of waters.

3.2 General Construction

Construction-related impacts to surface water run-off will be near field and brief in duration. During the construction of the Members Docking Facility, turbidity curtains will be employed should turbidity be observed. Best management practices will be applied during the operation of marine and land-based equipment to avoid the potential for hazardous materials or hydrocarbons to be spilled into the coastal waters.

Typically, the construction of pile-supported fixed piers, floating docks, and similar structures cause little disturbance of the bottom. If the bottom is silt, or when jetting is required, turbidity curtains shall be employed around the perimeter of the immediate work area, with similar conditions for monitoring as discussed for disposal operations. General mitigative actions to be implemented for the construction project, which are written into the Contractor's specifications, include the following:

At no time shall the Contractor be permitted to anchor on, dredge, lay cables or pipe on, or otherwise adversely impact any hard bottom or Seagrass resources.

The Contractor is responsible for identification and avoidance impacts to all hard bottom and other marine resources within the immediate vicinity of the work.

4.0 DOCKING FACILITY OPERATIONS

4.1 Best Management Practices

The Members Docking Facility will adopt Best Management and Industry Practices and will require minimum standards to prohibit potentially unsafe practices in and around the Facility. These BMP's would prohibit vessel repair, painting, bottom cleaning, and sewage discharges within the Facility.

4.2 Management and Control of Hazardous Substances

Clean-up procedures regarding oil pollution and spill control are detailed below.

No fueling activities shall occur at the facility. No other products that are incompatible with fuel and oil will be transferred.

Employees will be trained to become familiar with the provisions, methods, and procedures required to handle any spill emergency and the importance of maintaining environmentally sound operations will be enforced. The Harbormaster or his appointed representative shall demonstrate to each new employee the proper use of all equipment. During the initial period of employment, the new employee shall be supervised to be sure that all procedures are being followed.

The Members Docking Facility personnel shall have complete control, authority, and responsibility to make sure that all requirements are met.

5.0 FIRES, HURRICANES, AND ACCIDENT PREPARDNESS

5.1 Fire Risks

In light of the distance and corresponding EMS services in Marsh Harbour, it will become necessary for the Developer to purchase the necessary equipment, employ staff with the requisite training to undertake fire protection services.

5.2 Hurricane Risks

The official hurricane season extends between June 1 and November 30, with the greatest risk being in August, September, and October. The most destructive hurricanes in recent years have been Andrew in 1992, Lili in 1996, Floyd in 1999 (with winds of 155 mph), Michelle in 2001, Frances in 2004, (140 mph winds), Jeanne in 2004,(115 mph) Irene in 2011 (105mph) and Sandy 2012 (80mph).

Hurricane Intensities - The Saffir-Simpson Hurricane Scale is used to estimate potential property damage and flooding expected along a coast from a hurricane landfall. Each hurricane is rated on a 1-5 scale by the US National Weather Service based on the hurricane's intensity. Wind speed is the determining factor in the scale. Wind velocities are 1-minute averages.

Storm Damages

Hurricanes bring 1) high winds with flying debris; 2) torrential rainfall with flooding; 3) ocean wave battering to coastlines and near shore areas; 4) high energy ocean waves causing seafloor damage; and 5) storm surge flooding, often for considerable distances onto shore. In addition, damaging after-effects include continuing rainfall plus many disruptions to living and operating conditions.

Category	Winds	Effects
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One	74-95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some coastal road flooding and minor pier damage can be expected.
Two	96-110 mph	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of center. Small craft in unprotected anchorages break moorings.
Three	111-130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtain wall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain continuously lower than 5 feet ASL may be flooded inland 8 miles or more.
Four	131-155 mph	More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach. Major damage to lower floors of structures near the shore. Terrain continuously lower than 10 feet ASL may be flooded requiring massive evacuation of residential areas inland as far as 6 miles.
Five	greater than 155 mph	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Major damage to lower floors of all structures located less than 15 feet ASL and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

After a storm, interruptions can be prolonged and costly, particularly on islands. Power, communication services, and fresh water supplies can remain out of service for many days before being restored. Roads can be impassible, and airports remain closed preventing key personnel and essential supplies from returning. Control equipment, computers, office equipment, and essential records may be destroyed or badly damaged. Fuel, animal feed, and other critical supplies may be damaged and replacement supplies undelivered. Motor vehicles and other essential equipment may be inoperable. Housing and office structures may be unsuitable for occupation. Needs may exist for temporary housing and temporary electric power.

Food, water and other personnel living necessities may become exhausted with replacements unavailable for many days or even weeks. Emergency medical and healthcare services and supplies may be slow in returning.

Flooding from intense rainfall and from storm surges can linger for many days, particularly with clogged drains or inadequate drainage. Drowning is a major cause of hurricane deaths. Flooded roads can suffer wash outs and other damages without being obvious to drivers crossing through the flooded areas. Vehicle damages and even death can result. Mudslides sometime kill unsuspecting people and destroy homes.

Electrocutions are another frequent cause of death. Downed power lines can remain energized that cause death when touched, or when people wade through flooded areas. Exposed surfaces of electrical appliances in buildings and equipment, both indoors and outside, can become energized due to undetected and unprotected ground faults, and from damaged grounding circuits. Portable power generators, without proper grounding, can be lethal. Portable gasoline generators can catch fire during fueling.

5.3 Oil Spill Contingency Plan

The Members Docking Facility will not provide fueling operations, however all staff at the facility will be required to be trained in the event of an unlikely hydrocarbon release.

The priorities of the owners and staff of the facility are to;

- Protect the health and safety of the public guests and staff in and around the Members Docking Facility
- Protect the shoreline and marine habitat at Little Harbour and surrounding areas
- Protect against spreading to adjacent cays and other sensitive ecosystems

6.0 STAFF TRAINING

All Facility Management and staff who may be called upon to respond to or render assistance in an emergency situation will receive emergency procedures and equipment training. Management

and staff will be well versed in the first response options applicable to the emergency. The training received will supplement the rationale and intelligent responses made. In order to maintain the adequacy of procedures as laid out in the General Health and Safety Policy, periodic simulated emergencies testing will be carried out.

All first time visitors to the site will be accompanied by person(s) familiar with the health and safety policy. All Contractors and sub-contractors will be briefed with the environmental management plan and will be further required to demonstrate that they have the required training and capacity to respond in the event of an emergency occasioned by the works being carried out by their direct staff and employees.

Further environmental training will be provided for all employees to raise an environmental awareness for the betterment of the local and regional community.

7.0 GENERAL HEALTH AND SAFETY

The following policy elements will be applicable to all operations and activities. These elements are directed toward the prevention of all types of accidents and health hazards present on the development site.

7.1 Prevention

The Health and Safety Program will emphasize strategies that preclude or prevent any occurrence that would have an adverse effect on its managers, supervisors, employees, contractors, visitors, and people in the neighboring community.

7.2 Surveillance

The Health and Safety Program will provide for the systematic inspection of facilities and evaluation of safety and health data essential to the planning and implementation of the Health and Safety Program; and the dissemination of this data on a timely basis.

7.3 Protection and Control

Engineering controls shall be the primary method used to eliminate or minimize hazard exposure in the workplace. When such controls are not practical or applicable, personal protective equipment shall be employed to reduce or eliminate personnel exposure to hazards.

Personal protective Equipment (PPE) will be provided, used, and maintained when it has been determined that its use is required and that such use will lessen the likelihood of occupational injuries and/or illnesses. The Office of Health and Safety will recommend and/or provide necessary protective equipment where there is a reasonable probability that the use of the equipment will prevent or reduce the severity of injuries or illness.

A system for the control of hazards will be maintained and will include: engineering controls; use of alternatives that are less hazardous; use of personal protective equipment; and administrative procedures.

7.4 Emergency Preparedness and Response

The Health and Safety Program will seek to identify circumstances which require advance preparation and immediate action, develop and maintain contingency plans and procedures to address these circumstances, and provide and communicate (to those potentially affected and to those who must respond) plans of action for responding to fire, medical, first aid, chemical, violence, adverse weather, and other incidents that may require advance preparation and timely response.

7.5 Education, Promotion and Training

Health and safety awareness will be promoted among managers, supervisors, employees and others (visitors, contractors, community members) through orientation programs and regularly scheduled education and training sessions, as appropriate.

7.6 Noise

Evidence is well established that worker exposure to noise of sufficient intensity and duration can result in hearing damage. Noise-induced hearing loss rarely results from just one exposure; it can progress unnoticed over a period of years. Initial noise-induced hearing loss occurs at the higher frequencies where the consonant portion of speech is found, making communications difficult.

Engineering controls such as mufflers on heavy equipment exhausts or on air release valves are required where possible. If engineering solutions cannot reduce the noise, administrative controls such as increasing the distance between the noise source and the worker or rotation of jobs between workers in the high noise area should be used if possible.

7.7 Housekeeping

All places of employment including outside areas should be kept as clean as the nature of the work allows but must be kept free and clear of debris, trash, scrap, spills or other extraneous materials which could create a health hazard or cause an accident. Proper layout, spacing and arrangement of equipment, facilities, and machinery are essential to good housekeeping, allowing orderly operation and avoiding congestion.

7.8 Drug and Alcohol Policy

For the purposes of the Health and Safety plan, the site of the development is to be considered a site of zero tolerance for drug and alcohol use.

8.0 EMP REVIEW

The manual developed will be reviewed periodically and updated as required to maintain effective response and procedures. All changes and updates will be orchestrated in association with Local Government and other relevant Government Agencies.

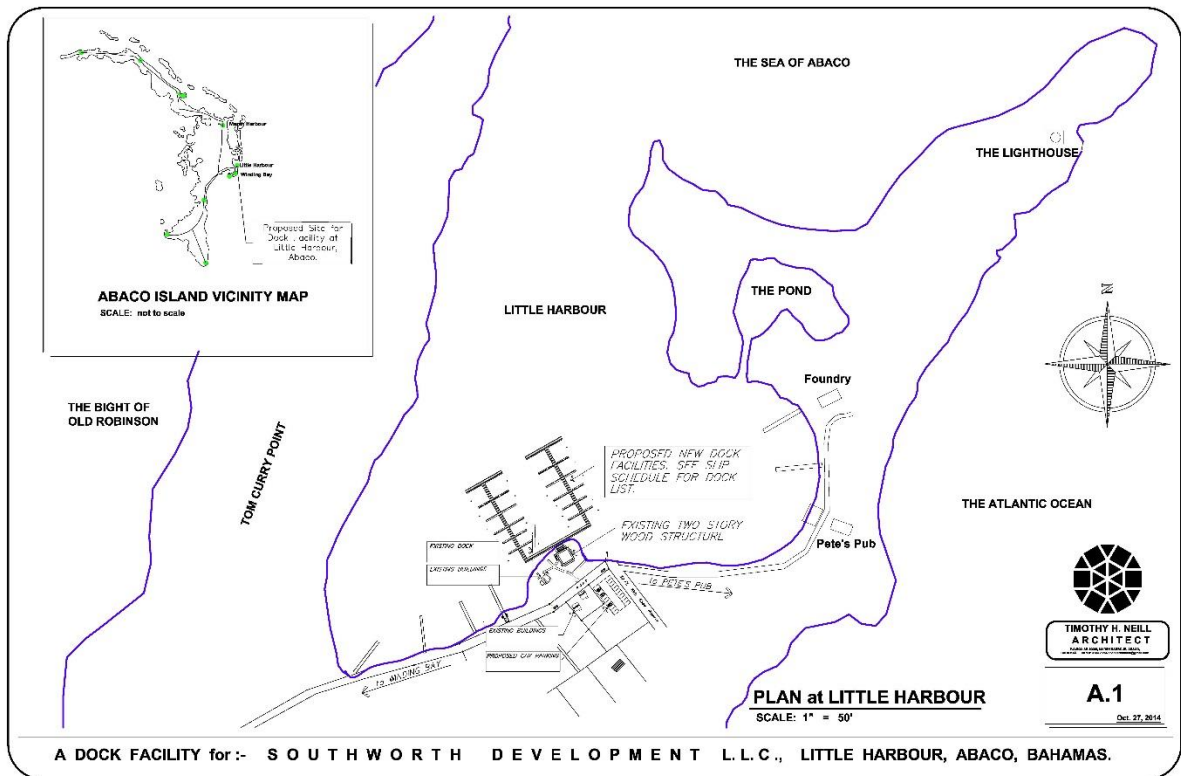
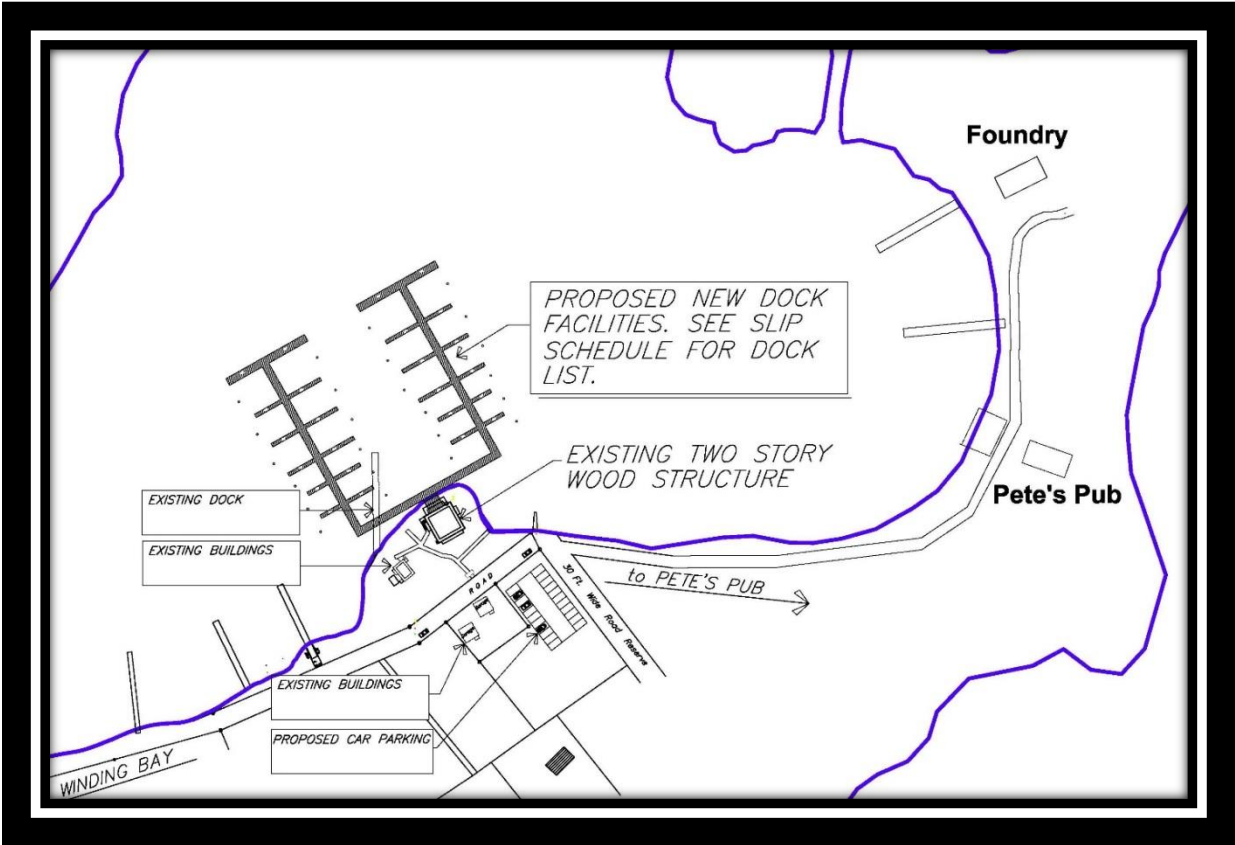


Figure 1. Site Location Plan

9.0 APPENDICES

Appendix 1: Detailed Land Use Plan



Appendix 2: Demolition Plan - Terrestrial

1.0 These environmental management procedures will apply to all proposed upland timber structures.

2.0 WORK HOURS AND SCHEDULE

Demolition activity shall be conducted between 7:00 a.m. and 6:00 p.m. on weekdays and 9:00 a.m. to 5:00 p.m. on weekends and holidays. Demolition work is expected to take approximately ten days.

3.0 EQUIPMENT /MATERIAL STAGING AND PARKING

Vehicle and equipment parking will initially be located within the property area; however, staging and parking may occur in other areas of the site during the course of demolition activities.

4.0 DEBRIS /STOCKPILE STAGING

Timber debris stockpiles will initially be staged within the area of the site; however, staging may be rotated during the course of demolition activities.

5.0 HAUL ROUTE / ESTIMATED VEHICULAR TRAFFIC

In accordance with the EMP, vehicular traffic will be confined to one exit and one entry point along the haul road. The specific number of daily truck trips will vary based on phasing and project schedule; however, it is estimated that transport truck traffic will be less than 2 trucks per day.

In general, the tasks will include a variety of procedures. The most important aspect in the development of these procedures will be the safe conduct of the work. Contractor's procedures will limit the use of labor to the most controlled and safe conditions and rely upon mechanized means of removal wherever possible. Excavators equipped with appropriate attachments will be utilized. Wherever possible, large structures will be removed to ground level using mechanized means. Subsequent sizing of scrap materials such as steel and rebar and other material processing activities will take place at grade level, hauled offsite and recycled accordingly.

General building/structure demolition will be conducted in a manner that does not interfere with or encroach upon the existing surrounding pedestrian and vehicular traffic during normal activities. Contractor will work within the confines of the site whenever possible. However, depending upon site and structure conditions, alternative methods of demolition and alternative types of equipment may be used to ensure the safest and most efficient means of operation.

In accordance with the EMP, all demolition debris that will not be recycled by Contractor will be loaded into dump trucks and hauled to The Abaco Club at Winding bay for further disposal to a landfill.

6.0 DUST CONTROL MEASURES

Dust control will be considered an important part of the overall project. Contractor will utilize a water truck and/or fire hose during demolition operations. Contractor will direct a localized fine water spray to the source of demolition activities, if required, thereby reducing airborne dust particles. To minimize the run-off of water, the water supply will be used only when necessary.

Appendix 3: Demolition Plan - Marine

1.0 These environmental management procedures will apply to all proposed marine timber structures.

2.0 WORK HOURS AND SCHEDULE

Demolition activity shall be conducted between 7:00 a.m. and 6:00 p.m. on weekdays and 9:00 a.m. to 5:00 p.m. on weekends and holidays. Demolition work is expected to take approximately five days.

3.0 EQUIPMENT /MATERIAL STAGING

The decking and sub-frames of the timber docks will be removed manually; all timber debris together with debris metal fasteners will be loaded onto trucks for disposal. In accordance with the EMP, all demolition debris that will not be recycled by Contractor will be loaded into dump trucks and hauled to a licensed landfill for further disposal.

All socketed pilings will be mechanically extracted and deck loaded in the first instance for final recycle and or disposal by the marine contractor in Marsh Harbour.

Appendix 4: Erosion and Silt Control Plan

1.0 These environmental management procedures will apply to all areas that may be subjected to erosion or siltation.

2.0 Soil erosion and sediment controls are measures which are used to reduce the amount of soil particles that are carried off of a land area and deposited in a receiving body of water.

3.0 The following criteria should be followed;

- Conservation of existing vegetation, including ground cover, on the land or, if cleaning is essential, replanting of vegetation and grass;
- Ensuring that soil and other debris (whether transported by water or wind) do not leave the construction site;
- Minimizing water flow paths and water volumes which traverse development sites, and avoiding where possible sediments leaving the site;
- Ensuring the prompt and effective stabilization and restoration of disturbed lands;
- Minimizing the area and exposure time of disturbed land;
- Minimizing stormwater runoff events from disturbed areas;
- Requiring the monitoring of impacts on receiving water bodies, as a measure of the effectiveness of the control device.

Appendix 5: Photovoltaic Array

Solar P.V Array

Solar power facilities reduce the environmental impacts of combustion used in fossil fuel power generation, such as impacts from greenhouse gases and other air pollution emissions. Unlike fossil fuel power generating facilities, solar facilities have very low air emissions of air pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide, volatile organic compounds, and the greenhouse gas carbon dioxide during operations. In addition to these benefits of solar development, construction and operation of solar facilities creates both direct and indirect employment and additional income in the regions where the development occurs.

1.0 The solar array will include mounting racks, panels and micro inverters.

2.0 The design life of the facility will be approximately 20 years. Therefore, the post-design life is expected to involve rehabilitation, upgrading and modernization of the facility, with a possible expansion i.e. retrofitting and addition of new technology.

3.0 All corrosion and erosion possibilities subject to the environment of the Site and nearby facilities will be carefully considered, and all non-metallic materials in contact with distillate or potable water shall be proven, tested and certified as suitable for its purpose by an internationally recognized testing authority. Non-metallic materials shall also be resistant to high UV exposure and high temperature operation regimes.

4.0 The Solar field designed, manufactured and configured in accordance with a commercially proven design in such a way that the conversion of solar irradiation into electricity is based on high efficiency and achieves high availability and reliability of the solar field.

The following electrical requirements shall be taken into consideration:

- Protection systems to disconnect the Plant in order to minimize damage from faults shall be in place and conform to the Grid Code should the solar array become grid connected during the expected lifetime of the array.
- The Developer will be responsible for protecting the Plant in case the frequency and voltage of the Power Grid System exceeds the limits specified in the Grid Code;
- All MV and LV switchgears, DC equipment and safe AC equipment shall be suitably housed;
- The mechanical protection class of all LV switchgears shall be minimum IP55. DC rectifiers and inverters, including but not limited to uninterruptible power supplies (PPS), shall be minimum IP31;

- All LV main switchgears shall be of the withdrawal type. DC and safe AC distributions may be of fixed installed type;
- The design ambient temperature of the electrical equipment shall be 50°C;
- All electrical equipment shall be routine tested in factories. Type tests will not be repeated if type test certificates of the same equipment are available;

Appendix 6: Blue Flag Criteria

DEFINITION OF A BLUE FLAG MARINA

A Blue Flag marina must be a marina with pontoons or piers for pleasure boats. It can be part of a larger harbour with other activities, if the Blue Flag marina is clearly separated from other harbour activities. The marina can be located in marine or inland waters. The marina must have the necessary facilities to comply with the Blue Flag criteria. The marina must appoint a person to be responsible for communications on all matters relating to the Blue Flag programme. The marina must be accessible for unannounced inspection by FEE.

The Abaco Club at Winding Bay and the Members Docking Facility at Little Harbour will make application to the NGO for inclusion of this facility into the Blue Flag program.

Appendix 7: Construction Schedule

Demolition of the existing marine structures is expected to occur in the fourth quarter of 2015. Commencement of the new docking facility is expected to be completed in two phases. The first phase of 28 slips shall commence in the fourth quarter of 2015 and complete in the first quarter of 2016. The second phase of 16 slips is planned to commence in the fourth quarter of 2016 and complete in the first quarter of 2017.