# Sectoral Guideline No.1 December 2013

## Ministry of Environment & Sustainable Development

## Department of Environment

# Guideline on the content of an Environment Impact Assessment Report For Construction of Marinas

**This Guideline is not a legal document. It serves as an environmental guidance and provides a template for the preparation of a comprehensive EIA Report. Copies of this guideline are available at the Department of Environment and on the website at http://environment.gov.mu.**

# PREFACE

Environment Impact Assessment (EIA) is a process and a tool which is used to identify, predict and evaluate both the positive and negative potential environmental impacts of a proposed development. It encourages promoters to take into consideration environmental factors to ensure proper site selection at the very inception stage of a project proposal. It is based on the precautionary principle, sustainability and the prevention approach. EIA should not be perceived as a hurdle for economic development. A project planning, properly and thoroughly undertaken, will eliminate obstacles to the project which may give rise to adverse environmental impacts that may be costly to mitigate or control.

This sectoral environmental guideline on the content of an EIA report concerns the Construction of Marinas and is designed to assist proponents and consultants in the preparation of a comprehensive EIA document. It is not exhaustive, but provides the essential structure and the detailed requirements of the EIA report.

This guideline complements the Planning Policy Guidance 2004 (Design Guidance Marina Development) of the Ministry of Housing and Lands.

Proponents are advised to refer to Part IV of the Environment Protection Act 2002 for necessary information on EIA in general.

# 1.0 Introduction

## 1.1 Background

EIA is a tool which is used to identify, predict and evaluate both the positive and negative environmental impacts of a proposed development. It requires a multi-disciplinary approach and compares alternatives, including any alternative manner in which the project can be implemented. It aims at the best combination of economic, social and environmental benefits.

Marinas vary from large protected water bodies containing hundreds of boats to a 'dry' marina consisting of boat launching facilities and dry standing or boat garages only. Associated facilities are sometimes from the bare essentials to boat yards, boat repair services and boat sales. Typically a marina is a harbour of refuge where boats can remain during all weather conditions including cyclone events. Boats are typically moored on fixed or floating jetties. Consideration for efficient boat launching and retrieval is necessary as well as a host of services.

Marinas can be offshore, recessed, built- in and land-locked. Offshore marinas are generally the least costly and minimize dredging. However, they may require expensive breakwaters. Recessed marinas allow for balance of dredged and fill material. Built-in marinas require shoreline stabilization and water quality is a critical factor. Land - locked marinas can be more costly. Water quality is critical and flushing configuration is required.

The construction of marinas may entail dredging for the creation of navigational channel sand turning basins. Dredging works are normally associated with environmental impacts like sedimentation and destruction of the habitats amongst others. Impacts during the construction phase relate to destruction of beach ecosystems, disposal of waste, noise and dust, risks of erosion, siltation and changes to water quality. The operational phase require considerations for domestic water supply and utilities, management of solid waste and wastewater, contingency planning in case of fuel and chemical spill and navigational traffic issues, amongst others.

This Ministry commissioned a study to conduct a Strategic Environmental Impact Assessment (SEIA) for the Identification of Potential Sites for Marinas, Ski Lanes and Bathing Areas in Mauritius in 2005. The Executive Summary of the report can be consulted on this Ministry's website on http://environment.gov.mu, whereby the components of a fully-fledged marina and potential sites identified for marinas in Mauritius are indicated. Priority consideration will be given to those sites already identified under the study.

The SEIA has identified 6 potential sites for marina development at Grand Baie, Poste de Flacq, Anse Jonchée, Mahebourg Ville Noire, Souillac and Grande Rivière Noire, (Annex 1), based on:

- Marine engineering characteristics;
- Infrastructure availability;
- Socio-economic factors;
- Marine ecology;
- Terrestrial environment.

The six sites chosen are not necessarily the six best sites determined by ranking. They are the best sites located at each of the strategic envelopes around Mauritius.

Under Item 9 of Part B of the Fifth Schedule of the Environment Protection Act (EPA) 2002,"*Construction of Marinas"*is a scheduled undertaking and warrants an EIA. The EIA report should contain a true and fair statement and description of the undertaking as proposed and should be in line with Section 18 of the EPA.

A proponent applying for an EIA licence should submit to the Department of Environment (Environmental Assessment Division, 2nd Floor, Ken Lee Tower, Barracks Street, Port Louis) 15 printed copies of the EIA report and in such additional copies as may reasonably be required by the Director of Environment and 2 soft copies in conformity with the Guidelines for Submission of EIA report in Soft Copy Version (Annex II). A processing fee of Rs15,000 is currently applicable.

## 1.2 Objective of the EIA Guideline

The objective of this guideline is to assist proponents and consultants in the preparation of a comprehensive EIA document that contains the necessary information, while addressing all the environmental aspects to enable a proper assessment. It also aims to encourage a consistent approach for a timely processing without the necessity to request for additional information.

***Note:*** *This guideline is by no means exhaustive and should be complemented with other relevant documents such as the Planning Policy Guidance (PPG) of the Ministry of Housing and Lands, Outline Planning Schemes of the concerned Local Authority, SEIA for the Identification of Potential Sites for Marinas in Mauritius and the relevant acts and regulations.*

## 2.0 Structure and Content of the EIA Report

Cover Page
Table of Contents
Non-technical Summary
Chapter 1-Introduction
Chapter 2-Policy, Legal and Administrative Framework
Chapter 3-Site Description and Surrounding Environment
Chapter 4- Description of the Existing Baseline Conditions
Chapter 5- Project Description
Chapter 6-Categorisation and Method for Identification of Environmental Impacts
Chapter 7-Impacts and Proposed Mitigating Measures
Chapter 8- Public Consultation
Chapter 9- Alternatives
Chapter 10- Environmental Monitoring Plan and Environmental Management Plan
Chapter 11-Expertise of Consultant/ Consultancy Team
Chapter 12- Conclusions
Appendices and Supporting Documents

## Cover Page

This should clearly indicate the title of the proposed project as listed under Part B of the Fifth Schedule of Environment Protection Act 2002 (as amended); location of the project; name of the proponent and consultant/ consultancy firm and the date.

On a second page**:**

- Contact details and address of the proponent;
- Contact person (address, phone/mobile, email and fax number);
- The person responsible with contact details: address, phone/mobile, email and fax number;
- The team responsible for the preparation of the EIA report;
- The name of the consultant/s or consultancy firm, as applicable;

- The duly appointed legal representative of proponent (if any);
- The signature of the proponent or his duly appointed legal representative;
- The signature of all the principal consultants who have prepared or have assisted in the preparation of the EIA report;
- The main Directors, the Company Registration Number/ Business Registration Number (BRN);and
- Company Number as per Certificate of Incorporation.

## Table of Contents

This should indicate all the topics and chapters dealt with in the EIA report, their relevant sections and respective page numbers. It should indicate the tables, figures, acronyms and annexures among others.

## Non-technical Summary

This should be a concise and short overview of the project in simple and non-technical language and should include the title of the project; a brief outline of the project and its location; a summary of the potential environmental impacts and proposed mitigative measures; outcome of public consultations; and conclusions.

## Chapter 1-Introduction

This chapter should include, inter alia, the type, size of the project, its location, scale and scope of works; project's aim, justification; the promoters 'experience in similar projects; benefits to local communities and employment opportunities.

## Chapter 2-Policy, Legal and Administrative Framework

**2.1***"Construction of Marinas*" is a scheduled undertaking requiring an EIA. This section of the EIA should indicate compliance of the project with the relevant plans, policies, national laws, standards, guidelines, regulations and /or subsequent relevant amendments, and the protection of sensitive areas and how these are being addressed. These include, inter alia:

- The EPA 2002, the National Environmental Standards, Guidelines and Regulations under the EPA e.g. Guidelines for Coastal Water Quality;
- Pas Géométriques Act, State Land Act,Wildlife and National Parks Act, Rivers and Canals Act, Forests and Reserves Act, Local Government Act, Fisheries and Marine Resources Act, the Maritime Zone Act, Beach Authority Act, Tourism Authority Act;
- Plans and policies such as the National Oil Spill Contingency Plan, the Integrated Coastal Zone Management Framework (2010),SEIA for the Identification of Potential Sites for Marinas, Ski Lanes and Bathing Areas in Mauritius in 2005, Study on Environmentally Sensitive Areas for Mauritius and Rodrigues, National Climate Change Adaptation Policy Framework for the Republic of Mauritius (2012), National Development Strategy, Coastal Development Guidelines prepared by the Ministry of Housing and Lands e.g. Planning Policy Guidance 2004 (Design Guidance for Coastal Development, Design Guidance Marina Development);

**2.2**The promoters/consultants should ensure that the necessary permits/clearances/authorizations from relevant authorities have been obtained including clearance from the Ministry of Housing and Lands and authorization from the Prime Minister's Office for any development in the public domain, clearance from Forestry Services for felling down of any trees as well as any authorization from the Customs Department and Immigration Office (as applicable).

**2.3**Proponents should submit:

- Proof of ownership of land with copy of the Title Deed or a certificate issued by a notary expressing his opinion as to the owner's title;
- In case of state land, Lease Agreement or valid Letter of Reservation for the said activity;
- For concession of the sea, an authorization from the Prime Minister's Office under section 21C (3) of the Maritime Zone Act; and
- Particulars of any consultation held with the public in the area where the undertaking is to be located.

# Chapter 3- Site Description and Surrounding Environment

## 3.1 Site and Surrounding Environment

This chapter should provide a detailed investigation of the site, the surrounding environment and the sensitivity of the site. It should include, inter alia, the following:

a) Location of the site;

b) Exact land extent. The site should be indicated on a **Context Map of a scale of 1:10,000 or as appropriate** along with aerial photographs and/ or satellite images;

c) Comprehensive **legible Site Location Plan of a scale of 1:5,000 or as appropriate, drawn and duly certified by a Sworn Land Surveyor** with appropriate landmarks as reference points. It should clearly provide indication of:

- Distance from the nearest settlement boundary;
- Nearest residential areas/built up environment and any existing development in the vicinity;
- Environmentally sensitive areas (if any);
- Water bodies (if any);
- Cultural and heritage sites( if any);
- Designated sites of interest; and
- Future/ forthcoming development projects.

d) Existing land use and constraints;

e) Description of the site characteristics in terms of site location (GPS coordinates of the boundaries delimiting the site), landform, topography (supplemented by 1.0m interval contour map in case the site is sloppy), geology, soil type and characteristics, presence of any watercourse and natural drain, any environmentally sensitive area, present and past land use, vegetation cover, flora and fauna, amongst others;

f) A full terrestrial ecological survey describing the types, distribution and abundance of flora and fauna, Environmentally Sensitive Areas (sand dunes, inter-tidal mud flats, wetlands, mangroves, rivers), any protected, rare or endangered species, location of habitats (areas for feeding, refuge, reproduction or nesting for migrating species);

g) Description of the shore types (sandy, muddy, rocky, cliffs, mixed, calcareous lime stone shore),length of the shoreline, beach frontage and their characteristics, landform, topography, elevation, magnitude of slope, slope stability, erosion, escarpments and landslide risks supplemented by 0.5m-2m interval contour map;

h) Details of any existing structure within the site and vicinity;

i) The state of the marine environment along with a full marine ecological survey, describing the types of flora and fauna and indicating on maps Environmentally Sensitive Areas(corals, sea grasses, fishing reserve/marine park, mangroves, islets) and fishing areas;

j) Marine engineering characteristics such as natural shelter, water depth/bathymetry, presence or absence of corals, reefs and reef passes and channels, distance to pass, distance from reefs, entry conditions and navigation, quality of entry conditions, existing marine services and protective structures;

k) A map showing the zoning of the lagoon and indicating swimming areas, mooring zones, ski lanes, boat lanes, motorized and no-motorized zones as applicable. The GPS coordinates of the boundaries delimiting the site should also be provided;

l) A Bathymetric Map of the site and its surroundings **of a scale of 1:25,000 or as appropriate** in each direction along the coast of the proposed site;

m) Description of the hydrographic conditions to include wave regime (patterns, height, frequency and direction), currents direction and speed, tidal water levels including the probability of extreme conditions and potential for waves and surges;
n) Description of the sedimentology in terms of present onshore and offshore sand movement, erosion and accretion;
o) Vulnerability of the site to natural hazard, sea surges or climate change impacts like sea level rise, inundation or flooding.

### 3.2 Description of the present socio economic values of the site and its surroundings

- Socio-cultural value of the site;
- Socio-economic importance of the site e.g. recreational, any public beach and public access, any agricultural activity; fishing activity, nautical activity;
- Socio economic profile of the local community;
- Historical and cultural heritage value of the site.

## Chapter 4: Description of the Existing Baseline Conditions

This is a record of the site condition used as a benchmark against which to measure environmental changes following the implementation of the project. For the collection of baseline information, proponents/consultants should provide the sampling points locations, test parameters and methodologies. Some factors to be considered in describing the baseline environment should, inter alia, include:

a) Baseline data on the basic land and hydrographic condition of the site, inter alia, in terms of soil conditions (soil classification, suitability for method of sewage disposal);water quality, streamside condition (as applicable), presence of any borehole, river, marshland, drain, height of water table and areas vulnerable to erosion and other impacts from natural hazards or climate change; and

b) Data on the marine and freshwater ecological environment of the site, relevant meteorological data such as annual average rainfall (frequency, duration and quantity), strength and direction of prevailing wind(velocity and intensity), tidal regime and existing nuisances such as odour and noise level.

## Chapter 5- Project Description

This chapter should provide a detailed description of all the activities that would be carried out and should include amongst others:

### 5.1 General Requirements

a) A general description of the project and the different components;
b) Type of marina, its design, size and scale;
c) Detailed **Site Layout Plan drawn to a readable scale of 1:500 or as appropriate,** indicating**:**

- Site boundaries as per Title Deed or Lease Agreement;
- All existing development/ structure on site (if any) ;
- The layout of the marina and number of berthing slots, and details of any platform or other structures;
- All proposed structures to be put on land with setbacks from site boundaries and High Water Mark (HWM); existing and proposed accesses with width, parking facilities, wastewater disposal structures, etc.;

d) Detailed **Building Layout Plans drawn to a readable scale of 1:100 or as appropriate** indicating elevations, plot coverage and building footprint;
e) Detailed architectural drawings **drawn to a readable scale of 1:100 or as appropriate usually on A3 size** in respect of all buildings/structures associated with the marina to be put up on the land-based part of the site;
f) Detailed description of the different project components including any dredging works envisaged.

### 5.2 Marine Engineering Aspects

a) Detailed methodology and scope of works including the type of machinery and equipment to be used for construction of breakwaters, sea walls, reclaimed land and so on; disposal of dredged material and or reuse of same;
b) Dredging works envisaged, including scope, quantum of dredged materials and mode of disposal;
c) Any land reclamation work envisaged and if so, to indicate exact location on a plan drawn to appropriate scale, giving a description of the site as at present including biodiversity;
d) Any maintenance dredging work required and frequency;
e) Coastal works envisaged i.e. hard and soft structures; and
f) Proposed internal works in the marina e.g. floating jetties, moorings, boat ramps.

### 5.3 Terrestrial Engineering Aspects

a) Detail methodology and scope of works and type of machinery;
b) Transportation and mode of storage of construction materials;
c) Details on proposed access roads including width, length, etc.;
d) Legible plan showing the road networks including the entry and exit;
e) Details on the presence of watercourses, natural drains, canals, etc., within the site and measures envisaged to safeguard the watercourses;
f) Availability of statutory services;
g) Any provision for drains and management of storm water runoff;
h) Details on the design, capacity of the proposed drainage network indicating the final point of evacuation;
i) Legible plan showing the proposed drainage network;
j) Type and capacity of fuel. It's mode of storage, siting and distance from HWM or other infrastructure;
k) Fuelling facilities for vessels;
l) Generation of solid waste and wastewater; and
m) Mode of disposal of solid waste and wastewater.

### 5.4 Climate Change Issues

a) Details on the engineering design of the marina taking into consideration the vulnerability of the site to natural hazard, sea surges or climate change impacts like sea level rise, inundation or flooding; and
b) Details justifying how the development will be climate proof.

### 5.5 Eco-friendly Measures and Sustainability

The environmental design and performance of the project should be based on a number of criteria, including energy and water efficiency, indoor environment quality and resource conservation.

a) Details on measures adopted to make sustainable use of resources such as energy consumption e.g. renewable energy source (solar energy and photovoltaic cells, solar lighting), energy saving devices and efficient lighting (low energy bulbs, bulbs with sensors) and water conservation e.g. water saving devices and rain water harvesting and use of eco-friendly materials (paints and coatings);
b) Buildings to be designed to minimize use of energy;
c) Details on the technology for the refrigeration and air conditioning systems which should be energy efficient, ozone-friendly with an Ozone Depleting Potential value of zero and climate friendly.

### 5.6 Traffic Implications

Details on the traffic to be generated.

### 5.7 Other Aspects

a) Proposed implementation schedule;
b) Duration of works (construction and operation phases);
c) Capital investment;
d) Employment opportunities.

# Chapter 6- Categorisation and Method for Identification of Environmental Impacts

The consultant should identify impacts which may, inter alia, be categorized as**:**
**Negative** (e.g. degradation of the ecosystem, conflict among existing businesses) **/positive (**e.g. job creation, tourism and people influx**); direct (**e.g. displacement of people) **/ indirect** (e.g. reduction in living standards for the displaced people); **short term**(e.g. noise and dust from construction works and vehicular movement)**/long term** (e.g. degradation of aquatic habitats which might affect the aquatic food webs); **recurring (**e.g. noise from motor driven boats) **/ non-recurring (**e.g. noise from drilling), **cumulative (**e.g. destruction of sea grass or mangroves affecting aquatic food web and thus commercial fishery) **/non-cumulative** whereby impacts do not accumulate in space and in time; **reversible** (e.g. erosion and sand deposition, beach nourishment) **/ irreversible (**e.g. elimination of wildlife habitats like destruction of corals and sea grass beds).

Proponents/consultants should demonstrate methods used to identify impacts which may, inter alia, include interaction matrices, Geographic Information Systems (GIS), modelling, ranking and weightage.

# Chapter 7- Impacts and Proposed Mitigating Measures

Impacts on the environment may occur during land clearing and site preparation, construction, as well as operational phase of the project. The proponent/consultant should propose feasible precautionary and mitigative measures to reduce the adverse impacts and enhance the positive impacts.

## 7.1 Impacts during site preparation phase

### 7.1.1 Terrestrial

#### 7.1.1.1 Loss of biodiversity

Removal of vegetation and felling of trees may cause loss of natural habitat and degradation or destruction of environmentally sensitive areas like wetland and sand dunes. The proposed mitigating measures should include preservation and transplantation of trees, and compensation measures.

#### 7.1.1.2 Machinery /Equipment

Machinery / equipment, stand-by generators and diesel storage tanks on-site may pose the risks of hydrocarbon spills and contamination of soil, underground /surface water and lagoon.
Necessary mitigating measures should be included in the EIA report to address the above impact.

#### 7.1.1.3 Noise and dust nuisances and air emissions from machinery and transport vehicles

Dust generated by earth-moving machinery, wind blowing upon the cleared site and stockpiled materials may be a cause of concern. In addition, vehicles and earth-moving equipment also emit exhaust fumes. Machinery and transport vehicles are also associated with noise nuisances.

Mitigating measures should be taken so as not to cause any nuisance by way of dust and air emissions to the nearby residents, beach users, public and surrounding environment. These include, amongst others, water spraying of stockpiles, access road and the construction site; regular maintenance of all heavy machine and vehicles.

Noise reduction options include, amongst others, fencing to screen noisy operations, the maintenance of machinery and installation of silencers to reduce noise emission.

#### 7.1.1.4 Preservation of drains and watercourses

Tampering with natural watercourses and drains can have the potential risks of flooding of the site and its adjoining areas.
Natural watercourses and drains should be preserved and maintained.

#### 7.1.1.5 Solid waste/ demolition waste

Solid waste may include green wastes from land clearing, demolition debris and inert construction materials, amongst others.

Best Management Practices to minimize solid waste and demolition waste include inter alia:

- Stockpiling of solid waste in a central area, away from water bodies;
- Re-use of demolition waste as backfill material;
- Collection, transportation and disposal of solid waste and demolition waste to the satisfaction of the Local Authority.

#### 7.1.2 Marine

Impacts on the marine ecosystem relates mostly to the loss of biodiversity. The mitigating measures should include proposals for the translocation of benthic organisms identified in the marine ecological survey that are likely to be affected by the project. These include, amongst others:

- Any live sedentary organisms should be hand-picked and transferred from the project site to safer areas in the lagoon prior to start of works.
- All rubbles that are supportive of live coral should be manually and carefully displaced in an appropriate locality for their growth.

No mangroves should be destroyed during the course of the development.

## 7.2 Impacts during construction phase

### 7.2.1 Terrestrial

#### 7.2.1.1 Machinery /Equipment

Machinery / equipment, stand-by generators and diesel storage tanks on site have the risk of hydrocarbon spills and contamination of soil, underground /surface water and lagoon.
Necessary mitigating measures should be included in the EIA report to address the above impact.

#### 7.2.1.2 Noise and dust nuisances and air emissions from machinery and transport vehicles

Dust, noise and air emissions during the construction phase from stockpiled materials, trucks, excavators (in case of inland marina), loaders, bulldozers, piling machine and cranes can be a source of nuisance to the nearby residents, beach users, public and surrounding environment.

Mitigating measures include, amongst others, water spraying of stockpiles, access road and the construction site; regular maintenance of all heavy machine and vehicles.

Noise reduction options include, amongst others, fencing to screen noisy operations, the maintenance of machinery and installation of silencers to reduce noise emission.

#### 7.2.1.3 Solid waste and construction debris

Solid waste may comprise domestic solid waste and construction waste materials, amongst others.

Measures to minimize the above impacts include:

- Sorting out at source and proper collection of all recyclable wastes for eventual recycling;
- Composting of all green and biodegradable wastes;
- Disposal of other solid wastes and non-compostable wastes to the satisfaction of the Local authority.

#### 7.2.1.4 Wastewater

Wastewater from the workforce during the construction phase can be a potential impact causing ground/ surface water and lagoon pollution.
Mitigating measures include the provision of on-site wastewater disposal facilities and carting away to the satisfaction of the Wastewater Management Authority.

### 7.2.2 Marine

#### 7.2.2.1 Machinery

Machinery for dredging, excavation and piling works have the risk of hydrocarbon spills and risks of contamination of soil, underground /surface water and lagoon.

Dust, noise and vibration are also nuisances associated with machinery.

Necessary mitigating measures should be included in the EIA report to address the above impact, including amongst others, all machinery should be in good running conditions, regular servicing and maintenance.

#### 7.2.2.2 Dredging

Dredging to create, deepen or maintain marinas and navigational channels involves a number of environmental effects like destruction to corals and marine habitats, siltation, sedimentation, turbidity and entrainment of sediment plume.

Mitigating measures should include:

- Selection of excavation and dredging methods with minimal suspension of sediments and destruction of benthic habitat;
- The type and amount of dredged material;
- Proper siting of dredged spoils away from sensitive resources and habitats and propose safe disposal methods for the dredged materials;

The site and its adjoining areas should be effectively protected against sediment entrainment with geo-textile screen of appropriate mesh size, installed in double layers in the lagoon and regularly maintained.

## 7.3 Impacts during operation phase

Impacts during the operation phase essentially relate to damage of the marine ecosystems associated with anchoring, solid waste and wastewater generation, amongst others.

### 7.3.1 Marine Environment

Impacts to the marine environment include amongst others, obstruction to boat movement and public amenities/ public beach in the area, damage to the marine ecosystem by anchoring as well as coastal water quality degradation.

The mitigating measures should include the clear demarcation of navigational channels with buoys so as not to interfere with boat movements.

Structures like jetties may cause changes to tidal flushing and current patterns and cause erosion problems.
Poor disposal practice of sewage from recreational and commercial boats can add nutrients to the water and cause eutrophication and poor water quality conditions.

The mitigating measures should include Best Management Practices to minimize impacts on water quality e.g. use of environmentally neutral materials for construction.

### 7.3.2 Water Quality

The intrusion of salt water inland creates a dis-equilibrium effect and may adversely affect the greenery of the area. The extent of sea water intrusion should be verified as this may have negative impact on the vegetation. Saline water ingress also affects the water table and the fresh water quality.

The above impact should be addressed in the EIA report along with the proposed mitigating measures.

### 7.3.3Solid Waste

Solid wastes from a marina facility may comprise of food wastes and non-biodegradable wastes such as empty containers, plastics (fishing line, bottles and food containers). The EIA report should characterize the waste according

to their source, composition and generation rates (daily and monthly basis). A waste management programme that considers best practices like prevention, reduction at source, reuse, recovery and recycling with facilities for receiving recyclable waste materials (bottles, cans, paper, plastic, organic material, etc.) should also be included.
Collection, transportation and disposal should be to the satisfaction of the Local Authority.

### 7.3.4 Wastewater Management

Wastewater generated from marina facilities may comprise of wastewater from domestic sewage, food service, bathrooms and equipment maintenance shops. The EIA report should indicate, inter alia:

- Source, type and expected volume of wastewater generated on a daily basis;
- The maximum number of workers to be employed on site;
- The physical, chemical and biological characteristics of wastewater, method of collection, treatment and disposal, the design calculations, drawings and dimensions of wastewater disposal system. Wastewater disposal system should be located at least 30 m from any existing watercourses;
- Toilet pumping facilities.

Proponent should ensure that wastewater is disposed to the satisfaction of the Wastewater Management Authority.

## 7.4 General Impacts

### 7.4.1 Noise Impact

The ambient noises emanating from marinas are from a combination of boat propellers, engines, pumps, generators and other equipment within vessels and other equipment. Mitigating measures should be proposed for noise nuisances. Noise reduction options could include, amongst others, installation of silencers, selection of equipment with lower sound power levels and electric motors such as compressors, pumps and stand-by generator to be housed in sound proof enclosures.

### 7.4.2 Storm Water Management

If the marina is associated with significant land based activity, then due consideration should be given to the management of storm water. Storm water runoff which contains suspended sediments, petroleum hydrocarbons and other pollutants can contaminate the lagoon.

The EIA report should, include, inter alia:

- Detailed design, specification and layout of surface drains for storm water disposal indicating position of oil water separators and grease traps (at refueling facilities, workshops, parking areas, fuel storage and containment areas) and final evacuation;
- Proposed means to treat any contaminated storm water;
- Designated specific enclosed areas for maintenance activities such as painting, engine repairs;
- Give consideration for sustainable materials which minimize surface run-off, e.g. porous concrete, grass;
- Indicate their intention for achieving sustainable water consumption on site through water conservation measures like rainwater harvesting, use of tap with sensors, amongst others.

### 7.4.3Traffic Implications

A detailed assessment of the traffic in terms of the impact area, condition and size of roads, number of machineries on site, transportation lorries during the construction phase, vehicles during the operation phase for clients , traffic generated by incoming vehicles with trailers during the site preparation, construction and operation phases should be included.
Detail on any damage to local roads due to operation of heavy machinery; access points, routing and parking requirement.

Detail on any upgrading and construction of access roads to the site.

A Traffic Impact Assessment (TIA) may be requested by the Traffic Management and Road Safety Unit (TMRSU).

### 7.4.4 Hours of Operation

The EIA report should include details on the hours of operation. All works should be carried out during normal working hours.

Works in the lagoon should be undertaken at low tide between sunrise and sunset. The operations should be interrupted during rough seas or adverse climatic conditions.

### 7.4.5 Eco-Friendly Practices

These should include, amongst others, use of energy-saving devices, economic compact fluorescent lamps and adoption of eco-friendly practices such as sorting of waste for recycling purposes, rain water harvesting, renewable energy supply (solar energy and photovoltaic cells), solar lamps , green buildings and other similar facilities

### 7.4.6 Climate Change Issues

A vulnerability assessment with respect to climate change issues such as sea level rise, storm surges and other adverse climatic conditions should be provided along with the proposed adaptation and mitigating measures
The marina should be designed to resist the dynamic lateral loads due to wind and sea surges.
An Emergency Preparedness and Response Plan should also be included.

### 7.4.7 Socio-Economic Impacts

The positive socio-economic impacts are influx of tourists in the local area, increased revenue opportunities for local residents, uplifting of the physical infrastructure and so on. The negative socio-economic impacts relate to reduced beach access, limitation of area available for fishing, conflicts between existing businesses and interference with navigation.

Mitigating measures should be considered in terms use of alternative site (location), compensation for loss of livelihood of affected people, amongst others.

### 7.4.8 Visual Impact (visual environment and aesthetics)

This chapter should indicate the intention to incorporate landscaping and embellishment works in the marina project and how the development architecture, materials and paintings will blend with the natural landscape. It should be ensured that the water in the marina is visually clean and mitigating measures should be taken to prevent any pollution by way of oil, litter and sewage.

### 7.4.9 Impact on heritage, historical and cultural features

The impacts on physical and cultural resources should be avoided by encouraging their conservation and enhancement. Measures should be proposed to avoid damaging significant cultural property and beliefs and measures to be taken to protect same, including buffer zones.

### 7.4.10 Contingency planning

A contingency plan for any risk of oil spill should be provided. The EIA report should address provisions for re-fuelling facilities and facilities for maintenance and repair of boats.

### 7.4.11 Safety aspects

Issues relating to the safety of clients and control of entry of vessels should be addressed.

# Chapter 8- Public Consultation

According to Section 19(1) (b) of the EPA, an EIA report shall enclose particulars of any consultation held with the public in the area where the undertaking is to be located.
Consultation is required for information purposes and details on the project are explained to the public.
This section of the EIA report should indicate:

- Any interaction and outcome of consultation with the relevant Ministries/Authorities/Institutions including consultation with the Ministry of Fisheries, Beach Authority, Mauritius Oceanography Institute, Traffic Management and Road Safety Unit (as applicable).
- Stakeholders and communities likely to be affected by the project (NGOs, Force Vive, locally registered fishermen, local inhabitants, beach users etc.).

The following should also be provided:

- Establishment and record of procedure (e.g. notes of meetings, leaflets, public display, questionnaires, letters) by which the interested and affected parties were afforded the opportunity to participate;
- A brief about the interactions detailing the areas of concern, the list of issues identified and how these have been addressed in the EIA e.g. trade off;
- A description of the public participation process followed by a list of stakeholders and their comments, the venues and times of consultation should be included as an appendix. The outcome of consultative meeting should be provided.

# Chapter 9- Alternatives

The EIA report should provide details on any alternative manner in which the undertaking may be carried out to cause less harm to the environment including the 'no-development option'.

# Chapter 10- Environmental Monitoring Plan and Environmental Management Plan

## 10.1 Environmental Monitoring Plan (EMoP)

An Environmental Monitoring Plan (EMoP) is required under Section 18(2) (*l*) of the EPA. This EMoP is indicative and should provide an indication of all the parameters which need to be monitored including noise and air quality, coastal water quality, river water quality, ground and surface water quality, etc.

**Once an EIA Licence is granted, a proper EMoP has to be submitted to the Ministry of Environment & Sustainable Development for approval taking into considerations the list of conditions attached to the EIA Licence as well as the proposals made in the EIA.**

The EMoP puts responsibility on proponent to carry out monitoring exercise to verify:

- Successful implementation and effectiveness of mitigative measures to address impacts as spelt out in the EIA document.
  **Note:** list of all mitigative measures as spelt out in the EIA document and corresponding monitoring exercise to check effectiveness of measures should be submitted in a tabular form.
- Compliance with EIA licence conditions, standards, guidelines and regulations.

The monitoring plan should comprise of baseline environmental parameters of the receiving media of the site and the surrounding environment prior to start of the project.
The following additional aspects, where relevant, should, inter alia, be addressed in the description of the monitoring activities:

- Institutional arrangements for carrying out the work, responsibility for monitoring;
- Indicators to be measured, monitoring methods, equipment and calibration details to be used;
- Specific parameters to be monitored, monitoring locations and control stations; monitoring frequency and duration;
- Standards and guidelines to be used to compare monitoring results;
- Name of environmental consultant and accredited laboratory conducting environmental monitoring, analysis of environmental samples.

### 10.2 Environmental Management Plan (EMaP)

**Section 18(2) (n) of the EPA requires an EIA to include an Environmental Management Plan (EMaP)for the construction phase, in case of a new infrastructure proposal.**
The EMaP should address amongst others: infrastructural layout plans, summary of impacts and mitigative measures, identify clearly the roles and responsibilities for the construction phase, responsibilities on environmental management and protection (provide names, positions, mobile phone, contact numbers and e-mail addresses).

The EMaP should clearly spell out the obligation to be imposed on the contractor in the contractual agreement to ensure that there will be no environmental nuisance and pollution in terms of for example sewage disposal for on-site workers, management and disposal of excavated spoils, dredged materials, construction wastes and abatement of dust and noise nuisances amongst others.

### 10.3 Decommissioning

The EPA requires an EIA to include information pertaining to the decommissioning of the project at the end of its life cycle and associated impacts, proposed measures to return the site as far as possible to its former state, or rehabilitation measures.

## Chapter 11- Expertise of Consultant/ Consultancy Team

EIA requires a multi-disciplinary approach and involves expertise in various fields. This chapter should indicate the details about the composition of the consultancy team in terms of academic background, experience, area of study, contact details (complete address, phone and fax numbers).
The members of the study team may include the following specialization/expertise amongst others: engineering (environmental, coastal, civil, mechanical, electrical, chemical); ecology (terrestrial, freshwater and marine); oceanography; soil science and geology (Geotechnical Engineer); solid waste management (versatile in reduce, re-use and recycling); wastewater management; hydrology; meteorology; land surveying (Quantity Surveyors); architecture and planning (versatile in sustainable building design); landscape design (Landscape Architect)

## Chapter12 -Conclusions

The final chapter of the EIA report should deal with the recommendations and conclusions which justify the acceptability of the proposed project in relation to the proposed mitigative measures.

## Appendices and Supporting Documents

These can be, inter alia:

- Extracts of reference documents, relevant laws, regulations and international conventions;
- Data for research work done for the project such as soil test results, biodiversity assessments, results of air and water quality, noise survey ,climatic conditions (surges);
- Copies of clearances/permits obtained;
- Copy of Title Deed and annexes, land surveyors plan with PIN number and notary certificate;
- Particulars of any consultation held with the public in the area where the undertaking is to be located;
- Maps and figures;
- Certificate of Incorporation of the company

**Note:**
Proponents and consultants are requested to ensure that the EIA report contains all salient information as mandated under the Environment Protection Act 2002 and as per the checklist given at **Annex III** of this document. Any missing information may lead to the non-acceptance of the EIA application at the level of the Department of Environment.

The submission of false or misleading information is an offence under Section 85 of the Environment Protection Act.

# Annex I:Potential sites identified for marinas under the SEIA

| Sites | Suitability for marina development (Good, Fair, Poor, Very poor, Fatal flaw) | Sites | Suitability for marina development (Good, Fair, Poor, Very poor, Fatal flaw) |
|---|---|---|---|
| **North** | | **North West** | |
| Grand Baie NE | Good | Port Louis | Existing facilities |
| Grand Baie SW | Good | GRNW Bay East | Good |
| Grand Gaube | Fair | GRNW Bay West | Good |
| **North East** | | Baie du Tombeau | Fair |
| Poste du Flacq | Fair | Mon Choisy | Poor |
| Troud'EauDouce | Fair | Albion | Poor |
| Pointe des Lascars North | Poor | Baie aux Tortues | Fatal flaw |
| Pointe des Lascars South | Poor | | |
| Troud'EauDouce Montague | Very poor | | |
| RochesNoires | Fatal Flaw | | |
| **South** | | **South East** | |
| Souillac | Good | Grand RivièreSudEst River | Good |
| Baie du Cap | Fair | Grand RivièreSudEst | Good |
| BelOmbre | Poor | Bois des Amourettes | Good |
| Beau Champs | Poor | Mahebourg Ville Noire | Good |
| La Prairie | Poor | MahebourgBarachois | Fair |
| St Felix | Very poor | Pointe d'Esny | Fair |
| **South West** | | Treize Cantons | Poor |
| Grand Rivière Noire | Good | AnseJonchée | Very poor |
| Petite Rivière Noire | Fair | AnseBambou | Very poor |
| Baie du Tamarin | Fair | | |
| Les Salines | Very poor | | |

# Annex II- Guidelines for submission of EIA Reports in soft copy version

**1.0 Introduction**

As per Section 18(1) (a) of the EPA 2002, proponents applying for an EIA Licence must submit 15 printed copies and two electronic forms of the EIA reports. The objective for the posting of the soft copy version of EIA reports on the website of the Ministry of Environment and SD is to enable users to access the EIA reports in a more user friendly format.

**Specifications of soft copy version**

1.1 The soft copy version of the report, which should be identical to the hard copy version, should be submitted in electronic file preferably on a CD.

a. The document should be broken into different chapters with each chapter in a separate file. The executive summary also should be treated as a chapter and submitted in a separate file. If a chapter exceeds 50 MB, then it should be further broken down into files of less than 50 MB.

b. The table of contents also should be submitted as a separate file.

All the chapters/headings/appendices listed under the table of contents should have proper naming. This is important to allow the user to know which file he/she is accessing.

e .g .Chapter 10-Mitigative measures

c. The table of contents should provide links to the different chapters including the executive summary and appendices.

d. All filenames must

i. be less than 8 characters
ii. be in small letters
iii. start with a letter

The soft copy version should be page numbered, in the same order as the hard copy and should be submitted in **any one** of the following 2 formats ***with security measures so that the document cannot be edited or printed:***

- HTML format
- PDF format

1.1 All html files must be in htm extensions file format. All image files must be in the gif/jpg extension file format.

1.2 The EA section will open the electronic file in the presence of the applicants in order to ensure that the hard and soft copy versions are absolutely the same. In case the soft copy version does not contain documents, which are present in the hard copy version, the applicants would be called upon to fill in a form. Decision to accept or reject the soft copy version would be taken by the EA Division and the applicants would be informed at a later stage.

## Annex III- Checklist for accepting EIA applications

| SN | Particulars | Tick |
|---|---|---|
| 1 | Name, address, contact details of the proponent | |
| 2 | Person Responsible: Name, address, contact details | |
| 3 | The EIA duly signed by proponent or his legal representative | |
| 4 | Letter of appointment of the legal representative (as applicable) | |
| 5 | (a) The name and address of the consultant/s or consultancy firm | |
| | (b) Contact person ( address, phone/mobile, email and fax number) | |
| | (c) Qualifications of the consultant/s | |
| | (d) Expertise/experience in the area of study of all the consultants | |
| | (e) EIA duly signed by **all principal consultants** | |
| 6 | Contact person : Name, address, contact details | |
| 7 | List of Main Directors (in case of a company) | |
| 8 | The Company Registration Number / Business Registration Number (BRN) | |
| 9 | Copy of Certificate of Incorporation of the company | |
| 10 | EIA report properly binded | |
| 11 | Format of EIA report is in conformity with the Sectoral Guideline on Construction of Marinas | |
| 12 | No. of printed copies of EIA report(15) | |
| 13 | Soft copy in conformity with guidelines for soft copy version | |
| 14 | Non-technical Summary | |
| 15 | Proof of land ownership (copy of Title Deed / extract of Title Deed / Notary Certificate)/ Lease Agreement/ Valid Letter of Reservation | |
| 16 | An authorization letter from the Prime Minister's Office for concession of the sea under section 21C (3) of the Maritime Zone Act. | |
| 17 | Objective of project | |
| 18 | Project justification | |
| 19 | Compatibility of site with potential sites identified in SEIA | |
| 20 | Site description and surrounding environment | |
| 21 | Extent of land | |
| 22 | Distance of site from settlement boundary and nearest residence | |
| 23 | Number of similar undertakings in the area (context plan) | |
| 24 | A legible context map of scale1:10,000 or as appropriate | |
| 25 | A legible site location Plan of a scale of 1:5,000 or as appropriate, drawn and certified by Sworn Land Surveyor | |
| 26 | A legible Site Layout Plan of a scale of 1:500 or as appropriate indicating the different components of the project and the setback from site boundaries. | |
| 27 | Legible Building Layout Plans of a scale of 1:100 or as appropriate | |
| 28 | Legible architectural plans and elevations of scale of 1:100 or as appropriate | |

| | | |
|---|---|---|
| 29 | Legible plan showing the road networks, the entry and exit | |
| 30 | Legible plan showing the proposed drainage network | |
| 31 | Availability of statutory services & requirements | |
| 32 | Present land use | |
| 33 | Terrestrial ecological survey(flora & fauna) | |
| 34 | Zoning of the lagoon/ estuary | |
| 35 | A bathymetric map of a scale of 1:25,000 or as appropriate | |
| 36 | Marine ecological survey | |
| 37 | Description of existing baseline conditions such as current patterns, tidal regime, shoreline characteristics | |
| 38 | Description of marine environment, including:<br>- Distance from reef<br>- Presence of passes<br>- Presence of navigation channels | |
| 39 | Project description | |
| 40 | Type of marina :( inland, waterfront, etc.) | |
| 41 | Type and number of boats/ pleasure crafts | |
| 42 | Scale of the marina in terms of dimension | |
| 43 | Details on berthing facilities | |
| 44 | Types of jetty | |
| 45 | Methodology and scope of works | |
| 46 | Associated infrastructural works on:<br>- Mainland<br>- Coastal frontage | |
| 47 | Fueling facilities (mode of storage, capacity, siting, distance from HWM or other infrastructures) | |
| 48 | Type of machinery and equipment | |
| 49 | Dredging works envisaged and methodology | |
| 50 | Any maintenance dredging required and frequency | |
| 51 | Amount of dredged materials | |
| 52 | Storage facilities of dredged materials | |
| 53 | Mode of disposal of dredged materials | |
| 54 | Implementation schedule/ duration of works | |
| 55 | Environmental impacts during site preparation | |
| 56 | Mitigating measures: | |
| | Noise | |
| | Dust | |
| | Solid waste | |
| | Loss of biodiversity | |
| 57 | Environmental impacts during construction phase | |
| 58 | Mitigating measures: | |
| | Noise/vibration | |
| | Dust | |
| | Disposal of solid waste including construction debris | |
| | Disposal of wastewater | |
| | Erosion | |

| | | |
|---|---|---|
| | Containment of sediment entrainment/plume –provision of geotextile screens | |
| | Any relocation of benthic organisms | |
| 59 | Environmental impacts during operation phase | |
| 60 | Mitigating measures: | |
| | Mode of disposal of solid waste | |
| | Mode of disposal of wastewater | |
| | Traffic impacts | |
| | Storm water drainage | |
| | Visual impacts and aesthetics | |
| 61 | Risks of ground water contamination/ salt water intrusion | |
| 62 | Eco-friendly measures: | |
| | Sorting of waste/recycling | |
| | Water saving devices | |
| | Energy saving/ renewable energy | |
| 63 | Stakeholders likely to be affected by the project | |
| 64 | Outcome of public consultation | |
| 65 | Alternative manner of carrying out the undertaking | |
| 66 | Any inevitable adverse environmental impact | |
| 67 | Any irreversible and irretrievable commitment of resources | |
| 68 | Oil Spill Contingency Plan/ Emergency Preparedness and Response Plan | |
| 69 | Vulnerability assessment with respect to climate change | |
| 70 | Adaptation measures with respect to climate change | |
| 71 | Environmental Management Plan during construction phase | |
| 72 | Environmental Monitoring Plan | |
| 73 | Decommissioning and rehabilitation measures (if any) | |
| 74 | Permits and clearances already obtained | |