Arab Republic of Egypt
Cabinet of Ministers
Egyptian Environmental Affairs Agency (EEAA)
Environmental Management Sector

Environmental Impact Assessment

GUIDELINES FOR DEVELOPMENT OF PORTS, HARBOURS AND MARINAS

SEAM Project

Environmental Impact Assessment

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Prepared by

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EXECUTIVE SUMMARY

These guidelines identify some important factors to be considered when preparing an environmental impact assessment (EIA) for ports, harbours and marinas.

Early effective consultation and technical discussions with relevant government agencies should precede the preparation of the EIA.

High priority should be given to:

- Considering environmental factors in site selection
- Evaluating alternative sites
- Ascertaining the suitability of the intended location.

There should be an early evaluation of alternative sites, taking into consideration the specific requirements presented in Part 4 of these guidelines.

The analysis of alternative design, processing and management practices should consider the environmental implications of each. The justification for the selection of the preferred options should consider biophysical, social and economic factors, and consistency with ecological sustainability principles.

The assessment process should focus on key environmental issues. These issues should be identified early in the EIA process, usually at a planning focus meeting and through consultation with the community. The assessment process should clearly identify the environmental (including biophysical, social and economic) costs and benefits of the proposal. The level of analysis carried out should reflect the level of significance of the impacts and the information used should be accurate and presented clearly and concisely. The emphasis should be on quality of the assessment, rather than quantity of data.

Key issues for ports, harbours, marinas and related facilities usually include:

- coastal changes
- traffic issues
- marine fauna and flora issues
- hydrological and water quality issues
- noise and visual problems

For each of the impacts identified, the EIA should present a mitigation measure which will reduce the significance of the impact to an acceptable level. The magnitude of any residual impacts should also be clearly identified.

The EIA should also outline the commitment to ongoing environmental management of the development, in the form of an Environmental Management Plan (EMP). The EMP should incorporate a management strategy, which demonstrates that sound environmental practice is being followed and a monitoring plan, which assesses environmental performance determines how successful the mitigation measures have been.

1 PURPOSE AND SCOPE OF THE GUIDELINES

1.1 Background

The purpose of these guidelines is to outline issues to be considered in the production of an environmental impact assessment (EIA) for the construction of ports, harbours, marinas and other related facilities. However, as each development is unique, some of the issues described here may not be applicable in some cases. Therefore, each project should be carefully assessed to identify the key issues and an EIA prepared to assess these, using these guidelines for assistance. Key issues will differ from project to project specific key issues may be identified through a planning focus meeting and through consultation with the community.

The issues presented here are equally applicable in preparing an EIA or in preparing a Compliance Action Plan (CAP). They will also assist in identifying those issues which are of most concern to the relevant government agencies.

These guidelines do not cover the issues concerned with the operation, maintenance and extensions of ports, harbours, marinas and other related facilities. A separate EIA will be needed to cover these aspects.

These guidelines are of key importance in preparing an environmental impact assessment for ports, harbours, marinas or related facilities whether on the horeline' of a sea or any other water-body. However, the following supporting materials have to be considered: *Environmental Guidelines for Development in the Coastal Areas (EEAA, 1996). Guidelines for Egyptian Environmental Impact Assessment (EEAA, 1996). EIA Guidelines for Coastal Development Projects in the Red Sea, GEF Project (TDA/EEAA/RSG, 1998). Ports and Lighthouses (constructing, permitting, organization, maritime services, etc.) are also to be considered.*

1.2 Ports, harbours, marinas and related facilities covered by these guidelines

Ports and harbours can range from small facilities accommodating trailer boats for local subsistence fishing, to deep draft ports capable of handling super-tankers. Ports refer to developments accommodating large deep draft ships requiring basin and channel depths of 10m and more. Harbours refer to facilities designed for light draft vessels needing basin and channel depth of 5 to 10m. Marinas are identified as shore-side facilities for mooring recreational boats, and include water-based as well as land-based facilities for boats and boat-users.

Whatever its size or configuration, a port, harbour or marina will have some common attributes. Their primary purpose is the provision of a sheltered area for boating or shipping-related activities. Their basic functions include providing access to the sea, generating economic benefits, and supporting subsistence and recreational activities. Objectives are to provide safe and sufficient facilities for fishing, shipping trade, or transportation.

Throughout the remainder of this document, these facilities are referred to by the generic term port. The facilities present may include:

1. Berthing, mooring and docking facilities such as jetties, wharves, pontoons, moorings, wet-berths, ramps, holding piles.
2. Navigation and safety facilities such as harbors, channels, breakwaters, groins, wave barriers, navigational markers.
3. Facilities for ship wreck, dry storage facilities such as hard stands, stacks (partly or wholly enclosed), racks, cradles, hoists, cranes, straddle-carriers, fork-lifts.
4. Boat maintenance, repair and construction facilities such as dry-docks or floating docks, slip-ways, mechanical and electrical or instruments workshops, storerooms (including for chemicals), boat washing facilities.
5. Services such as refueling facilities, fuel storage, pump-out facilities, waste collection, treatment or disposal facilities, water storage and supply facilities, fire control services, amenities.
6. Parking, passenger or heavy vehicle access, public access, landscaping.
7. Commercial and retail service facilities, provisions and food outlets, boat sales.
8. Ferry, boat hire and charter services.
9. Related tourist or accommodation facilities, boat club facilities.

2 SITESELECTIONPROCEDURES

These must consider whether:

1. The land use is permissible.
2. Environmentally sensitive areas are avoided.
3. The use is compatible with nearby land uses.
4. Initial site investigations indicate the site is fundamentally suitable for ports.

2.1 Site selection

Site selection is an important tool in ensuring that the facility operates in an environmentally acceptable manner. While operational and market considerations are important factors in selecting sites, the environmental and social characteristics of the location should also be given high priority. Careful site selection will:

1. Reduce the potential environmental impacts and consequently, the need for impact mitigation and ongoing management measures.
2. Reduce levels of public controversy and
3. Avoid potential delays in the approval process.

2.2 Permissibility of proposal

At a very early stage in the site selection process, it is essential to consult with the appropriate local and national authorities to ensure that the proposal is permissible under the relevant planning controls. If the proposal is not permissible under the zoning, then discussions should be held with authorities concerning the appropriateness of changing the zoning, or seeking an alternative site.

2.3 Initial site assessment

An initial site assessment allows a number of different potential sites to be compared with one another. In this way, sites that are obviously unsuitable can be identified at an early stage and discarded. It can also provide information that will help to ensure that the facility is operated in an environmentally acceptable manner. It is therefore recommended that this exercise is carried out before committing to a particular site, or before proceeding with the more detailed assessment required by the EIA.

The initial site assessment can include a walk-through survey of the site, the collection of key information and basic mathematical or computer modelling of the site.

This initial site assessment should focus on the characteristics of the site itself, as well as the surrounding environment. Issues to consider in an initial site assessment are shown in Table 1 on page 3, although this list is not necessarily exhaustive. In addition to biophysical factors, the location assessment should also consider community amenity. Conflicts often arise when the community perceives that its amenity is being threatened, such as changes to coastal morphology, damage to marine or terrestrial fauna and flora, increased traffic and noise or water quality impacts. Any potential conflicts and possible options for resolving them should be considered as early as possible. In general, if ports are designed to manage traffic, parking and noise impacts, there will be wider location options.

When assessing if a proposed site is acceptable, consideration should be given to its compatibility with surrounding land uses. Consideration may need to be given to acquiring sufficient land to provide adequate on-site separation from nearby sensitive land uses. Such separation can help minimize impacts and maintain the amenity of the surrounding areas. Factors to consider in determining appropriate separation distances include:

1. The character of the surrounding environment and its sensitivity to impact.
2. The characteristics of the impacts, in particular their predictability.
3. Proposed impact mitigation and management strategies and their predictability.

However, separation distances should not be viewed as the primary means of ameliorating impacts as this can lead to unnecessary land sterilization. Instead, separation distances should be thought of in the context of a location attribute providing confidence that the amenity of existing land uses can be maintained. The EEAA does not accept impact reduction solely by separation distances for coastal erosion, loss of habitat, or water pollution. Therefore, the role of site separation as an impact mitigation measure should simply reinforce the impact mitigation measures provided by other means.

3 SUMMARY OF EIA REQUIREMENTS

A summary of the specific requirements for an EIA for a port is provided below. These requirements are discussed in more detail in Part 4. It should be noted that all issues identified will not have the same degree of relevance for all proposals and, depending on the characteristics of the proposal, some of the requirements may be more relevant than others. Each individual EIA should be tailored to the specific proposal and should focus on the key issues.

Summary of EIA requirements

A. Executive summary

B. Legislative framework

1. Analysis of relevant legislation (National, Regional and International).
2. List of approvals and licenses required.

Table 1. Matters to be Considered in Initial Site Assessment

Operational Requirements	■ Does the site provide sufficient land area for present and future requirements? ■ Is this an efficient site relative to the market? ■ What other developments are in the immediate area? ■ Can services be efficiently supplied to the site (e.g. power, water)? Are there any existing services nearby?
Topographic & meteorological assessment	■ Are the rainfall patterns or prevailing wind directions likely to cause management difficulties? ■ Are the local climatic conditions (e.g. air movement. rainfall) in combination with the topography likely to result in microclimatic conditions which will adversely increase impacts on the community?
Water Issues	■ Are there any site constraints which make on-site water management difficult (including both process water and storm-water)? ■ Are there risks of surface water pollution because of the proximity or pathways to water-bodies? Can any required separation distances from water-bodies under any existing legislation or guidelines be complied with? ■ Are there risks of groundwater pollution because of shallow or rising groundwater tables, or proximity to groundwater recharge areas, or areas with a high vulnerability to pollution? ■ Is the site susceptible to flooding? ■ Is a groin, breakwater or channel diversion required? ■ Is reclamation proposed? ■ Will regular maintenance and/or dredging be required? ■ Will water quality be affected due to limited tidal flushing or current? ■ Where will the fresh water supply be coming from?
Flora and fauna issues	■ Are any coral reefs present? Are these likely to be affected by the development? ■ Can clearing of natural vegetation be avoided? ■ Can clearing of vegetation of high significance be avoided (e.g. vegetation used for visual screening, riparian vegetation. Vegetation used as' corridors for the movement of fauna)? ■ Are threatened flora or fauna species. Populations and ecological communities or their habitats likely to be affected? ■ Will a development application for vegetation clearing be required? ■ Will wetlands, littoral rainforest or sea-grass be affected?
Geological or soils issues	■ What is the beach area like (sandy, rocky, etc.)? How wide is it? What is the area behind the beach like (e.g. sand dunes, cliffs, etc.)? ■ Are there any topography or geological characteristics, which will cause difficulties in managing impacts (subsidence, slippage, seismic)? ■ Are the soils/sands highly erodable? Identify any potential sediment management problems. ■ Is bank erosion likely? ■ Are there existing soil problems resulting from dredging works (e.g. contaminated soils, acid sulfate or saline soils)?
Transport issues	■ Can the standard and capacity of the road network accommodate traffic likely to be generated by the proposal? ■ Can truck traffic avoid residential areas, hospitals, schools and commercial areas? ■ If inadequacies exist, can the road network or traffic management be changed to minimize any impacts particularly on residential areas? ■ Are there parking or access constraints?
Community issues	■ Is the proposal likely to be compatible with surrounding existing or proposed land us Particularly any residential. Special uses (such as schools, hospitals, community buildings), a sites of outstanding natural or environmental value or high tech industries? ■ Will nearby aqua-culture, fish breeding or fishing grounds be affected? ■ Is there likely to be a problem in meeting sustained compliance with dust, noise or water quality requirements due to the proximity and nature of nearby land uses? ■ Is the proposal likely to pose health risk? ■ Is the proposal likely to affect the heritage found or likely to be found on the site? ■ Is the site highly visible? Will there be significant visual impacts? ■ Will access to public land or waterways be restricted?
Cumulative issues	■ Is the proposal at this site likely to contribute to any existing cumulative problems?

C. Description of the proposed development

1. Location and planning context
2. Site description and local information
3. Objectives of the proposal
4. Description and layout of the proposed port and associated facilities
5. Site preparation and construction
6. Infrastructure considerations
7. Other similar facilities in the locality
8. Consideration of alternatives and justification for the preferred alternative

D. Description of the existing environment - baseline Data

1. Land surface issues
2. Coastal changes.
3. Hydrological issues
4. Water quality and waste management issues
5. Air quality
6. Noise
7. Visual problems
8. Flora and Fauna issues
9. Social issues
10. Land transport and parking issues
11. Water transport issues
12. Heritage issues
13. Hazardous materials
14. Economic issues

E. Prediction of impacts and evaluation of significant environmental impacts

1. Overview of the affected environment
2. Overview of the methodology used to identify and prioritize issues.
3. Outcome of the prioritisation process
4. Impact assessment.

F. Mitigation measures and monitoring plan

1. Mitigation measures and monitoring plan.
2. Compilation of mitigation measures.

G. Environmental management plan

1. Environmental management strategy.
2. Monitoring programme.

4 SPECIFIC REQUIREMENTS FOR EIA

A. Executive Summary

An executive summary should be provided in the EIA and be available separately. The summary should give a short overview of the proposal, the potential environmental impacts and proposed mitigation measures. The summary should incorporate a clear map or aerial photograph showing the location of the development and should be written in non-technical language to facilitate understanding by all readers.

B. Legislative framework

B.1 Analysis of relevant legislation (national, regional and international)

Appendix A of this document presents a non-exhaustive list of relevant legislation. The legislation from this list or other legislation should be considered during the preparation of the EIA.

B.2 List of approvals and licenses required

All approvals and licenses required for the development must be identified as soon as possible. This will allow the relevant authorities to be contacted and briefed on their involvement and will help ensure an integrated approach to the granting of approvals. Having this list will also avoid delays resulting from missing or incomplete approvals. It will also allow the community to identify authorities responsible for assessment and regulation of the proposal.

C. Description of the proposed development

C.1 Location and planning context

The following information should be provided:

1. Zoning, permissibility and land use constraints
2. Compatibility of the proposal with:
   a) Any strategy such as management plans for coastal areas;
   b) Provisions of any environmental planning instrument or development control plan;
   c) Local rules and regulations applied in the coastal governorates where the proposed port is to be established;
   d) Existing land and water uses both on the site and on adjacent land and water;
   e) Any heritage items or environmental protection areas (including classified waters, wilderness areas, marine and coastal protected areas, national parks, and aquatic reserves) or areas affected by conservation or international agreements.

C.2 Site description and local information

The following information should be provided:

1. Title details, land tenure, owner consent if not the proponent.
2. Where public land is involved, any constraint associated with the form of lease or tenure - where appropriate, an outline provided of the procedures to be followed to satisfy the requirements of the government.
3. The site description and maps, plans or photographs clearly identifying the location of the proposal relative to:
   a) Water-bodies and wetlands;
   b) Vegetation communities;
   c) Infrastructure; roads, utilities including transmission lines, pipelines, submarine cables or easements, bridges, weirs, boat ramps, jetties, wharves, navigation lanes, ferry services, public parking areas, pedestrian paths, wastewater pumpout facilities;
   d) Other land and water uses.

C.3 Objectives of the proposal

There should be a clear statement of the objectives of the proposal having regard to the following:

1. Size and type of port facilities including number and type of berths, and capacity of repair and ancillary facilities.
2. The range of services provided such as boat accommodation, ships or boat provisions and waste management services, ship/boat maintenance, repair, building or sales services, ferry, boat hire or charter services, boat club, tourist or accommodation services.
3. Staging and timing of the proposal and any plans for future expansion.

C.4 Description and layout of the proposed port and associated facilities

The following information should be provided:

1. Maximum land and water area affected by the proposal.
2. On-site plans, layout, photo-montages or similar and cross sections (above and below water) identifying the location of:
   a) existing and proposed facilities and services;
   b) existing and post-proposal physical features such as shoreline characteristics and vegetation communities.
3. A description of works to provide boat access, improved navigation or mooring safety.
4. Water or land-based temporary and permanent boat berthing, mooring or docking facilities.
5. Boat maintenance, repair and construction facilities including boat lifting equipment and slipways.
6. Boating services including wash down areas, pump-out, water supply, refueling and waste collection services, lighting and security.
7. Quantities, use or storage of fuels, chemicals or other hazardous materials.
8. On-site surface water management systems; identification of drainage lines, pollution and sediment control structures and systems.
9. Waste storage and disposal systems, sewage or wastewater treatment plants.
10. On-site parking for vehicles or boat trailers, access roads including for semi-trailers and cranes, level of parking congestion in the area.
11. Commercial and retail facilities including boat, provisions or food sales.
12. Related tourist or residential development.
13. On-site infrastructure including electricity, gas, water supply, fire fighting equipment.
14. Employment during construction and operation.
15. Hours of operation including use of lighting.
16. Landscaping.

C.5 Site preparation and construction

Describe the works required prior to commencement of port operations, including:

1. Timing, staging and hours of construction work.
2. Proposed construction methods, the equipment to be used and methods of transport of the equipment to the site.
3. Pollution control systems such as erosion and sediment control systems, wastewater holding tanks, noise mitigation strategies.
4. Any land clearing or disturbance of underwater vegetation, or disposal of cleared/dredged material.
5. Any earthworks including dredging, reclamation, excavation or landfill; the quantities of material to be moved, the method and site of disposal of excess material, the source of any material to be brought to site.
6. Any bank stabilisation structures such as retaining walls and revetments.

C.6 Infrastructure considerations

The following factors should be considered:

1. Electricity supply requirements, energy conservation measures, use of alternative energy sources.
2. Measures to protect any submarine cables or pipelines which may be affected.
3. Water requirements, proposed supply or storage, water recycling and reuse options.

4. Solid and liquid waste disposal requirements, proposed methods and locations for recycling or disposal.
5. Land and water transport requirements, provisions for public transport.
6. Controls to compensate for poor flushing.

C.7 Other similar facilities in the locality

Where applicable, outline:

1. The nature of any past or existing port, harbour, marina or other facilities on the proposed site or other sites within the immediate locality.
2. Past environmental performance, including the impacts of the operation on the environment and the effectiveness of any impact mitigation; previous controls which applied on the site.
3. The relationship of the proposed development to previous or existing operations.

C.8 Consideration of alternatives and justification for the preferred alternative

The EIA should include an assessment of the environmental impacts or consequences of adopting alternatives, including:

1. The location of the port;
2. Site layout;
3. The type and level of services;
4. Breakwater, basin or port design;
5. Inlet channel positioning and alignment to river or tidal flow;
6. Management or administrative practices;
7. Mitigation and rehabilitation options.

Consideration should also be given to the consequences of not carrying out the proposal, DO NOTHING alternative.

The selection of the preferred option should be justified in terms of:

1. Type, quality and scale of services offered - justification for the facilities should include reference to any supporting surveys and market research.
2. Environmental factors including biophysical, economic and social factors.
3. Meet project objectives.
4. Meet environmental performance requirements including improved conservation or protection of natural resources and reduced environmental costs.
5. Meet site specific environmental performance requirements considering the vulnerability of the air quality, groundwater, surface waters, soil, ecological communities, heritage or social factors.
6. Safeguard public health, and social issues.

D. Description of the existing environment baseline data

The following specific issues are nominated as potentially important in the assessment of impacts and for decision-making in relation to ports. The outline of the issues is not exhaustive and the degree of relevance of each will vary. The EIA should only deal with relevant issues as applicable to the particular proposal.

The following should be included for any potential impact which is relevant for the assessment of a specific proposal:

1. A description of the existing environmental conditions (baseline conditions).
2. A detailed analysis of the potential impacts of the proposal on the environment; the analysis should indicate the level of confidence in the prediction outcomes and the resiliency of the environment to cope with the impacts.
3. The proposed mitigation, management and monitoring program including the level of confidence that the measures will effectively mitigate or manage the impacts.

With each issue, the level of detail should match the level of importance of the issue in decision-making.

D.1 Land surface issues

If the surface characteristics (above or below water) are likely to be disturbed or altered, issues to consider include:

1. Existing above and below water surface characteristics, including contours, soil characteristics, terrain stability, slope gradient, susceptibility to erosion or landslip.
2. Any materials to be disturbed or altered or to be used for landscaping - include the source of any fill and destination and use of excavated or dredged material; characteristics that may be relevant include the physical or chemical properties of soil or sediment including depth, particle size distribution, permeability, dispersibility, pH, suitability of soil for landscaping or reclamation.

D.2 Coastal changes

A separate coastal impact assessment (CIA) study should be carried out (referred to in law 4/94), consultation with the Egyptian Shore Protection Authority is needed. Issues to consider include:

1. Meteorological data collection and measurements, include prevailing and design conditions for wind, waves, currents and tides.
2. Bathymetric maps to a readable scale and survey report showing relation to a known datum, previous bathymetric surveys should also presented.
3. Source of data and prediction methods, including reliability of the method used.
4. Sediment samples and analyses.
5. A description of the physical process involved is required to determine the minimum requirements of any numerical model to be used.

D.3 Hydrological issues

Issues to consider include:

1. Existing drainage patterns; the range of water levels, wave climate, tidal patterns, daily flushing regime, storm surge or flood levels; the flood liability of sites and adjacent land; the depth to and condition of groundwater likely to be affected by the proposal.
2. Changes in water movement patterns, groundwater hydrology, flushing and surface sediment transport processes.

D.4 Water quality and waste management issues

Issues to consider include:

1. The existing condition of any surface water or groundwater body that may be changed as a result of the development; discussion should focus on relevant characteristics that may alter as a result of development and may include the following classes of indicators (the monitoring techniques used should be described in an Appendix of the EIA):
   a) faecal coliforms;
   b) nutrients (e.g. nitrogen and phosphorus);
   c) particulate matter (e.g. turbidity, light penetration);
   d) chemical contaminants such as specific biocides (e.g. for antifouling and treatment of jetty timbers), hydrocarbons and trace metals;
   e) dissolved oxygen;
   f) gross pollutants.
2. Potential sources of change to water quality from direct, secondary or cumulative effects of the port construction or operations consider:.
3. Potential accidental, incidental, deliberate or managed discharge or release of materials from shore or water-based activities.
4. Individual sources of change including:
   a) chemicals and other contaminants from spillage of fuels or lubricants, scrapings, washings, painting, antifouling materials used in jetty construction (including any chemicals used for preservation of materials) or other potentially harmful chemicals;
   b) waste disposal including litter or solid waste, sewage, bilge or ballast water, run-off from washdown, slipway and hard stand areas, run-off from road, parking and other sealed areas;
   c) dredging or other construction or operational activities leading to changes in nutrient and contaminant levels, salinity, stratification, sediment or changes to flushing.

D.5 Air quality

If air quality is likely to change as a result of the proposal, issues to consider include fixed and mobile sources of air pollution from construction and operation of the port

D.6 Noise

If noise is likely to be produced from the proposal, issues to consider include noise levels from fixed and mobile noise sources including:

1. Construction sources such as pile-driving equipment, dredging, blasting, earthmoving equipment, compressors, delivery of materials by land and water.
2. Operational sources of noise such as:
   a) vehicle movements;
   b) port noise such as halyards slapping on masts, engine noise, pumps, amplification systems;
   c) workshop equipment or plant and its usage.

D.7 Visual problems

If the proposal is likely to have a visual impact, issues to consider include visual impacts from adjoining properties and from surrounding land and water.

D.8 Flora and fauna issues

If terrestrial or aquatic fauna or flora or their habitat are likely to be disturbed, issues to consider include:

1. Identifying terrestrial and aquatic plant/animal habitats (including marine, fresh water and intertidal areas), ecological communities and where appropriate, populations and species in areas that may be directly or indirectly affected

by the proposal, this is done through an extensive survey program.

2. The local and regional scarcity of these habitats, ecological communities, populations and species - if relevant identify the following, indicating their incidence on the site:
   a) threatened, protected or rare species, populations or ecological communities;
   b) areas or communities protected by law 102/1983 and successive laws;
   c) list of protected species;
   d) the economic significance of any potentially affected species.

D.9 Social issues

The issues of demography, gender issues, and culture should be addressed. In addition to the social issues identified already, issues to consider include:

1. Health and safety issues
2. Employment issues
3. Amenity issues
4. Access issues such as disabled access and access to public land and waterways.
5. Sites of religious significance (springs, well, etc.).

D.10 Land transport and parking issues

A separate traffic study should be undertaken for all proposals involving significant numbers of vehicle movements. Studies could also be carried out where vehicle movements or on-street parking are likely to significantly affect the amenity of the community because of the characteristics of the location.

D.11 Water transport issues

If the proposal is in a sensitive area or is likely to significantly increase water transport, issues to consider include:

1. The effect of construction and operation including the increased boating activity generated by the proposal on:
   a) commercial shipping, navigational lanes and markers; the need for changes to signage or markers;
   b) naval waters and activities;
   c) commercial fishing grounds and aquaculture.
   d) ferries (vehicular and passenger); routes, terminals and pick-up points;
   e) sea planes; aerodromes, terminals, fuelling or parking areas;
   f) recreational boating (including dive boats), fishing, swimming, baths, boat hire, boat ramps, public wharves;
2. Boating safety issues, including:
   a) the navigable width of the port entrance, layout and widths of interior channels, warning signs, speed limits, channel maintenance;
   b) rescue and emergency services;
   c) provision for educational and informational material such as signage, brochures, maps and notices detailing; local aquatic hazards, safety measures and procedures relating to refueling, spillage, rescue.

D.12 Heritage issues

This section is relevant if land clearing, earthworks, disturbance of existing items (buildings, works, relics or places) or reduction of the heritage will occur as a result of the proposal. Issues, which may need to be considered, include: identifying any items of heritage significance on the site (including underwater) and in the area affected by the proposal. This should include two steps:

Step 1: collect information from any relevant heritage study or conservation plan for the site or area - this source may need to be supplemented with information from the relevant historical research on the area or consultation with governmental bodies.

Step 2: survey the area likely to be affected, to identify any items of potential heritage significance.

D.13 Hazardous materials

Issues to consider include:

1. Identify all materials stored which have a Dangerous Goods Classification, quantities and proposals for safe storage and handling.
2. Identify potential hazards from:
   a) fire, explosion or release of chemicals or polluted waters;
   b) natural occurrences such as storms, fire, landslip.
3. Identify nearby sensitive areas.

D.14 Economic issues

Issues to consider include:

1. Current market demand for the services being offered in a local and regional context; an analysis of regional supply, future demand for the types of services to be offered on the site.
2. The effect of the proposal on other facilities, boat users, boating services and the supply of moorings; an assessment of the affordability of port services.

3. Employment at the site and in the community as a result of the proposal.

E. Prediction of impacts and evaluation of significant impacts

Ports, harbours, and marinas including most coastal construction projects will impact the environment during construction and operations. Adverse impacts from dredge and fill operations may include coral reef (Red Sea), seagrass and other marine habitat loss or degradation (Mediterranean and Red Sea), increased turbidity or siltation, reduced dissolved oxygen or resuspension of nutrients or toxic pollutants.

The main environmental problems associated with the construction and operations of harbours, ports and marinas (facilities) are:

1. Alteration of the physical environment; since the above facilities are most frequently constructed in sheltered areas, piers and the likely structures may alter the hydrodynamic system and hence sedimentation pattern;
2. Pollution generated by the above facilities and the associated infrastructures typically include: sewage, garbage and spilt fuel and lubricants, antifouling agents used in painting;
3. The main ecological effects of an improperly constructed and operated facilities may be extensive growth of planktonic and attached algae which may not be confined, spill oil and fuel as well as high levels of pathogenic microorganisms which may affect the water quality;
4. Increased sea traffic affecting the ecology and safety;
5. Impact on the social environment: visual and landscape impact, noise, disturbance to public access, loss of recreational and fishing activities.

Each impact that is identified must be classified in terms of the severity of its effect on the environment (e.g. high impact, moderate impact, low impact, insignificant impact). Each of the terms used must be clearly defined.

E.1 Overview of the affected environment

Based on the analysis carried out in D, an overview of the affected environment should be provided in order to place the proposal in its local and regional context.

General information to be provided includes:

1. Meteorological factors which may influence erosion, flooding, water quality, air quality or noise impacts such as rainfall intensity, frequency and duration and wind direction and intensity
2. Geomorphological factors such as major landform features; evidence of historical morphological change; shoreline characteristics
3. Hydrological and water quality factors
4. Predominant aquatic and terrestrial communities on the site, their habitat or conservation values
5. Any buildings, items or places of conservation or heritage significance likely to be affected by the proposal.

E.2 Overview of the methodology used to identify and prioritize issues

Outline the procedures or methodology used to identify and prioritize issues. Factors to consider may include:

1. the outcome of a review of relevant sources of information on potential issues, including:
   a) Any relevant guidelines issued by government authorities;
   b) The provisions of any relevant environmental protection legislation;
   c) Any industry guidelines;
   d) EIAs or studies for similar projects, and any relevant commission of inquiry reports, determination reports and conditions of approval;
   e) Relevant research or reference material;
   f) Relevant strategic plans or policies;
   g) Relevant preliminary studies or pre-feasibility studies.
2. The outcome of consultation with stakeholders including meetings with stakeholders (e.g. governmental agencies, particularly EEAA, governorates, major market representatives).

E.3 Outcomes of the prioritisation process

Summarize the outcome of the identification and prioritization process including:

1. All the issues identified.
2. The key issues which will need a full analysis in the EIA (including comprehensive baseline assessment).
3. The issues which will Not need a full analysis in the EIA, though they may be addressed in the mitigation strategy; the justification for the proposed level of analysis.

E.4 Impact assessment

The following impacts should be discussed in this section utilizing all the modeling tools described in the previous section.

E.4.1 Impacts on land surface issues

1. Potential direct or indirect disturbance or alteration (above and below water). Describe disturbance from:
   a) demolition, erection or maintenance of structures;
   b) earthworks: dredging (including maintenance dredging), reclamation, excavation or landfill;
   c) boating activity; wash, wake, anchors, propellers;
   d) changes to sediment transport processes.
2. Final surface characteristics (above and below water).

E.4.2 Coastal impacts

1. Potential impacts of structures (such as breakwaters, groins, flood mitigation or foreshore works, aquaculture establishments) on the shoreline resulting from changed sediment transport patterns.
2. Estimation of sediment transport rate, sediment budget, including the formulae used.
3. Coastline changes including prediction method and description of the model used, calibration and validation of the model.
4. A two or three-dimensional model would be required for complex situations.
5. Advection/dispersion and plume modelling must be used to estimate the rate of suspended sediment during dredging and its possible effects on near by marine life.
6. Changes in water movement patterns, and sediment transport processes and mechanisms from dredging and maintenance of structures and boating activity.
7. The provisions of any relevant integrated coastal management plans.
8. If located in estuaries or on the coast::
   a) impacts on coastal landforms (including estuaries and river mouths), coastal and estuarine hydrodynamics;
   b) potential impacts from extreme tides.

E.4.3 Hydrological impacts

1. Potential impacts on structures such as bridges.
2. If located on floodplains:
   a) impact on flood regime;
   b) potential impacts from flooding or rising water-tables such as inundation or hazardous materials entering water bodies.

E.4.4 Impacts on water quality and waste management issues

Direct or indirect impacts, reversible or irreversible impacts should be specified and discussed.

E.4.5 Impacts on air quality

If air quality is likely to change as a result of the proposal, issues to consider include the likely impact of the proposal on air quality - if this is a significant issue then include:

1. Baseline data on the ambient quality of the air, including consideration of prevailing meteorological conditions and topographic features which may influence noise impacts.
2. Projected emission and deposition rates.
3. Frequency and times of emissions.

E.4.6 Noise impacts

If noise is likely to be produced from the proposed project, issues to consider include:

1. Baseline data on the existing acoustic environment including the consideration of prevailing meteorological conditions and topographic features which may influence noise impacts.
2. The proposed hours for construction and operation including land and water traffic movements.
3. Predicted noise levels at potentially affected sites, including dwellings, adjacent recreation areas, sensitive natural areas.

E.4.7 Visual impact

Consider potential impacts such as changed or obstructed views from:

1. The facility form, bulk, colour, reflectivity.
2. Lighting from security requirements or night operations.
3. Boat mooring and movements.
4. The clearing of vegetation.

E.4.8 Impacts on flora and fauna

If aquatic fauna or flora or their habitat are likely to be disturbed, issues to consider include:

1. Potential impacts on fauna and flora: either directly through removal by clearing or dredging, or indirectly by; sedimentation, access to light, induced bank collapse, a change in substrata, effects of boat wash,

changes in water quantity, quality, movement or groundwater regime;

2. The sensitivity of species or communities to disturbance; the potential impacts of disturbance on biodiversity; the potential for re-colonization following any disturbance.
3. The significance of flora for other biota, including biota not directly affected by the proposal but which interact with potentially disturbed flora.
4. Modelling is needed to verify the water quality inside the port, this should include the model selection and verification.

E.4.9 Social issues

In addition to social issues already identified, address of impacts should include:

1. Health and safety
2. Employment
3. Amenity
4. Address issues such as disabled access and access to public land and waterways.

E.4.10 Land transport and parking issues

Discussion should consider:

1. Assessing the impact of traffic generated by port construction and operation on the local and regional road network.
2. Estimating the average and peak parking demand for vehicles and trailers.

E.4.11 Water transport issues

Impacts due to increased navigation in the area.

E.4.12 Impacts on heritage

Impacts on cultural heritage include:

1. Assess the significance of any heritage items identified on the site, including archaeological, geological or palaeontological features or ecological communities.
2. Assess the potential impacts of the proposal on the heritage significance.

E.4.13 Impacts of hazardous material on site

This section should discuss the impacts of hazardous material in the site.

E.4.14 Economic issues

Issues to consider include:

1. Potential economic impacts on other industries both within the immediate locality and the wider community, such as tourist facilities, agriculture, aquaculture, commercial fishing, boat building.
2. Potential impacts on land values.

E.4.15 Cumulative impacts

Issues to consider include:

1. Existing or past marine operations in the same location or the immediate vicinity; other forms of industry in the vicinity which may have similar impacts.
2. An assessment of any likely cumulative impacts having regard to:
   a) river, estuary, lake or coastal morphology; bed, bank or beach degradation , tidal or wave patterns; and water quality;
   b) vegetation or fauna habitat (including fishing grounds, fish breeding areas and aquaculture);
   c) water or road vehicular activities, noise or visual impacts and loss of heritage items;
   d) loss of access to public land and waterways.
3. The advantages or disadvantages of clustering port operations or marine activities in the area.
4. The compatibility of mitigation measures.

F. Mitigation measures and monitoring plan

For each adverse impact that is identified, a mitigation measure needs to be identified which will reduce the impact to an acceptable level. The severity of this residual impact must also be defined. Monitoring, as part of an overall monitoring programme (see Section G.2) will then be carried out to determine the effectiveness of each mitigation measure.

F.1 Mitigation measures and monitoring

F.1.1 Land surface issues

1. Proposed mitigation and management measures to control impacts and to ensure compliance with relevant standards including an estimate of mitigation effectiveness; measures include:
   a) stabilisation works for cuttings, embankments and open channels;
   b) erosion and sedimentation control structures;
   c) landscaping and revegetation proposals.
2. Maintenance programs for all mitigation measures to ensure effective operation.

3. The proposed monitoring to determine the effectiveness of mitigation and to verify predictions.

F.1.2 Coastal Impacts

Mitigation measures should be discussed in terms of changing the plan or the design. Monitoring should discuss location and intervals for surveying the shoreline, with the government body responsible for review.

F.1.3 Hydrological issues

1. The provisions of any relevant water body management plans.
2. Proposed mitigation and management measures to control impacts including an estimate of mitigation effectiveness.
3. Proposed monitoring to determine the effectiveness of mitigation and to verify predictions.

F.1.4 Water quality and waste management issues

1. Proposed mitigation and management measures to control impacts and to ensure compliance with relevant standards including an estimate of mitigation effectiveness; measures include:
   a) drainage, storm water, wastewater and emergency management systems; such as:
      i) provision of reception facility;
      ii) pump out and collection facilities (indicate proximity to any water supply take-off);
      iii) sediment controls such as sediment traps and silt curtains;
      iv) gross pollutant traps and trash racks, oil separators, grease traps, drip trays, filters, control of build-up of debris in the vicinity of the port;
      v) controls to compensate for poor flushing;
      vi) controls to prevent contamination of water from maintenance, repair activities or from accidental leakage or spillage of potentially harmful substances;
      vii) response strategies, containment and recovery facilities including location of materials used in response strategies.
   b) procedures for storage, transport and disposal of waste for all hazardous and dangerous materials used on land and water;
   c) details of solid and liquid waste storage and disposal facilities; the impact of treatment methods on receiving water or soil;
   d) the vulnerability of hazardous and waste storage and treatment facilities to flooding or rising water tables;
   e) maintenance programs for all mitigation measures to ensure effective operation.
2. The proposed monitoring to determine the effectiveness of mitigation and to verify predictions.
3. An assessment of the need for a waterway or bay management plan.

F.1.5 Air quality and Noise

Proposed measures to enhance air quality and to reduce noise.

F.1.6 Visual issues

Proposed methods of reducing visual impacts such as landscaping, materials selection and management measures.

F.1.7 Fauna and Flora issues

1. Landscaping proposals, including compensatory planting of indigenous species, details of proposed mitigation methods to protect indigenous species including the seed stock in topsoil stockpiles.
2. Identifying potential weed and introduced species (including seaweeds), and describing measures to control and prevent infestations at the site and to control spread into localities adjacent to the proposal.
3. Mitigation proposals such as compensatory restocking of indigenous species, provision of new appropriate habitat, opportunities for colonization, considered timing of major disturbances.
4. Identifying potential vermin, feral and introduced species (including those from ballast water); measures to control and prevent infestations at the site and to control spread into localities adjacent to the proposal.
5. The proposed monitoring to determine the effectiveness of mitigation and to verify predictions.

F.1.8 Heritage issues

Propose measures to mitigate impacts to conserve items of heritage significance - if items of significance are to be disturbed a conservation management plan may need to be prepared in consultation with the government officials. Consider the acceptability of impacts on heritage significance and assess the adequacy of the

measures to mitigate impacts during all stages of the proposal.

F.1.9 Hazardous Waste

Proposed mitigation and management measures to control impacts and to ensure compliance with relevant standards, including an estimate of how effective this mitigation is expected to be and consequences of failure, fire walls, segregation of chemicals, fire fighting systems, use of inflammable materials.

F.1.10 Cumulative impacts

The compatibility of mitigation measures and the compatibility with existing (or proposed) water body management plans or flood mitigation works.

F.2 Compilation of mitigation measures

This section considers the mitigation strategy outlined in previous sections to demonstrate how the proposal and its environmental safeguards would be implemented and managed in an integrated and feasible manner. This section should also demonstrate that the proposal is capable of complying with statutory obligations under other licences or approvals.

The mitigation strategy should outline the environmental management principles which would be followed in the planning, design, establishment and operation of the proposal and include:

1. Specific location, layout, design or technology features.
2. Outline of ongoing management and monitoring plans.

In some circumstances, separate environmental management strategies should be outlined for the construction, operational and maintenance stages of the port project.

G. Environmental Management Plan (EMP)

An environmental management plan (EMP) is a document designed to ensure that the commitments in the EIA, subsequent assessment reports, approval or license conditions are fully implemented. It is a comprehensive technical document that is usually finalized during or after detailed design of the proposal following approval of the development application. It should provide a framework for managing or mitigating environmental impacts for the life of the proposal. It should also make provisions for monitoring the effectiveness of the proposed environmental protection measures and procedures.

The EMP should demonstrate that the environmental impacts can be managed in an integrated and feasible manner. Two sections should be included, one setting out the program for managing the proposal, and the other outlining the monitoring program with a feedback loop to the management program.

According to Law 4/94 and with major or controversial projects, an environmental record should be exhibited which outlines the environmental performance of the proposal. Although the level of detail required in an EMP is usually not considered necessary for the EIA, a comprehensive outline of the structure of the EMP with a summary of the environmental management principles which would be followed when planning, designing, constructing and operating the proposal, should be provided. It should be noted that with key issues, where there are high levels of risk or uncertainty, it might be essential to present details of how these issues would be managed in the EIA.

G.1 Environmental management strategy

The management strategy should demonstrate that sound environmental practice would be followed during the establishment and operation of the port. It should include details of:

1. The management of construction impacts, if appropriate, erosion and sedimentation management and re-vegetation plans for areas disturbed by construction activities.
2. Management of operational impacts, if appropriate include details of:
   a) materials management on site, including petroleum products, chemicals and fuel;
   b) water and air quality management; transport and parking management;
   c) maintenance and site security plans;
   d) contingency plans to respond to emergencies, incidents or any breakdown in environmental performance.
3. Strategies to feed information from the monitoring program back into the management practices and action plans to improve the environmental performance and sustainability of all components of the scheme.
4. Training programs for operational staff and incentives for environmentally sound performance.
5. An indication of how compliance with licensing and approval requirements will be achieved and due diligence attained.

6. If applicable, reporting mechanism on environmental performance and performance bond and relevant performance parameters.

G.2 Monitoring programme

This program should be carefully designed and related to the predictions made in the EIA and the key environmental indicators that would demonstrate the sustainability of the proposal. The EIA should outline the need for and use of any proposed monitoring, monitoring intervals and reporting procedures. Parameters that might be relevant include:

1. Performance indicators in relation to critical operational issues including:
   a) quality of water discharged or leaching to groundwater, surface water or soil;
   b) noise and air quality;
   c) any relevant public health indicators.
2. Waste management; performance indicators in relation to recycling and reuse.
3. Monitoring of complaints received.

The program outline should describe the following monitoring details:

1. The key information that will be monitored, its criteria and the reasons for monitoring (which may be compliance with regulatory requirements).
2. The monitoring locations, intervals and duration.
3. Procedures to be undertaken if the monitoring indicates a non-compliance or abnormality.
4. Internal reporting procedures and links to management practices and action plans.
5. Reporting procedures to relevant authorities and, if appropriate, to the consent authority and the community.

APPENDIX - NON-EXHAUSTIVE LIST OF RELEVANT LEGISLATION

International and Regional:

- International Convention for the Prevention of Pollution from Ships and Protocols (MARPOL 73/78).
- Convention for the Prevention of Marine Pollution from Land-based Sources (Paris, 1974)
- Convention for the Protection of the Mediterranean Sea Against Pollution and Protocols (Barcelona 1976)
- Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment and Protocols (Jeddah, 1982).

National:

- Law 4/1994 of the environment.
- Law 102/1983.
- Environmental Guidelines for Development in the Coastal Areas (EEAA, 1996).
- Guidelines for Egyptian Environmental Impact Assessment (EEAA, 1996).
- EIA Guidelines for Coastal development Projects in the Red Sea, GEF Project (TDA/EEAA/RSG), 1998.

Laws and Decrees:

Ports and lighthouses (constructing, permitting, organisation, maritime services, etc.).

- Law No. 572, l954
- Minister decree No. 383, 1968.
- President of the Republic decree issue No. 217, 1977.
- Minister decree No. 5, 1978.
- President of the Republic decree issue No. 544, 1986.
- Minister decree No. 78, 1986.
- Minister decrees No. 18 and 116, 1989.
- President of the Republic decree issue No. 95, 1990.
- Minister decrees No. 23 and 36, 1990.
- Minister decrees No. 145 and 149, 1991.
- Minister decrees No. 3 and 3, 1992.
- Prime Minister decree No. 1483, 1992.
- Minister decrees No. 1, 2, 14, 31 and 32, 1993.
- Minister decrees No. 17, 33, 42 and 34, 1994.
- Law No. 6, l995.
- President of the Republic decree issue No. 185, 1995.
- Minister decrees No. 2, 3, 5, 72, 81 and 295, 1995.
- Law No. 1, l996.
- Minister decrees No. 2 and 69, 1996.