**ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINES FOR THE GENERAL CONSTRUCTION AND SERVICES SECTOR**

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**Prepared by**

 **Environmental Protection Agency**

**under the**

 **Ghana Environmental Assessment Capacity Development Programme (GEACAP)**

**and**

**Ghana Environmental Assessment Support Programme (GEASP)**

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# FOREWORD

The Environmental Assessment Regulations, LI 1652, was promulgated in 1999 to give comprehensive legal cover to the Ghana Environmental Impact Assessment procedures. These Regulations require that all developmental activities likely to impact adversely on the environment must be subject to Environmental Assessment. The objective of the LI is to ensure that such development activities are carried out in an environmentally sound and sustainable manner. The requirements of the LI, however, place enormous responsibilities on all stakeholders involved in development in Ghana. The nature of the responsibilities varies for different stakeholders, depending on their statutory functions, areas of jurisdiction and interests such as policy makers, implementing or regulatory agencies, planning authorities, financial intermediaries or institutions providing training or consultants providing services in EIA.

A national Environmental Assessment Capacity Development Programme (GEACaP) was initiated in 2001 with financial assistance from the Netherlands Government. This was to assist all relevant institutions in meeting their respective obligations under the LI, and to promote sustainable development in Ghana. An important aspect of the programme was the development of Environmental Assessment Sector Specific Guidelines for eight sectors, namely; Transportation, Mining (revision), Tourism, Health, Energy, Manufacturing, Agriculture and General Construction. Eight networks made up of representatives from relevant stakeholder institutions were formed to facilitate the development of the guidelines for these sectors. The key objectives of the General Construction and Services Sector Core Team included:

1. Defining the screening criteria for environmental assessment for General Construction and Services sector investments.
2. Determining the scope of Environmental Impact Assessment (EIA) for the sector.
3. Providing systematic procedures on Environmental Impact Statement (EIS) preparations for the sector.
4. Providing guidelines on common potential impacts and mitigation measures.

This document covers all the areas outlined above and it is intended to provide guidelines for the conduct of environmental assessment in the General Construction sector in Ghana

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# ABBREVIATIONS

ADB African Development Bank

AER Annual Environmental Report

EIA Environmental Impact Assessment

EA Environmental Assessment

EIS Environmental Impact Statement

EMP Environment Management Plan.

EPA Environmental Protection Agency

EPC Environmental Protection Council

GCSS General Construction and Service Sector

GEACAP Ghana Environmental Assessment Capacity Development Programme

GEASP Ghana Environmental Assessment Support Programme

IBAs Important Bird Areas ,

LI Legislative Instrument

PEA Preliminary Environmental Assessment

PER Preliminary Environmental Report

TOR. Terms of Reference

TCPD Town & Country Planning Department

TRC Technical Review Committee

WRC Water Resources Commission

**Table of Contents**

Table of Contents

[FOREWORD ii](#_Toc235129729)

[ACKNOWLEDGEMENT iii](#_Toc235129730)

[ABBREVIATIONS iv](#_Toc235129731)

[1.1 Background 1](#_Toc235129732)

[1.2 History of EIA in Ghana 2](#_Toc235129733)

[1.3 Benefits of Environmental Impact Assessment 3](#_Toc235129734)

[1.4 Actors in Environmental Impact Assessment 4](#_Toc235129735)

[1.5 Worldwide Scope of EIA 5](#_Toc235129736)

[**2.0 A SUMMARY OF THE EIA PROCESS** 6](#_Toc235129737)

[2.1 Preamble 6](#_Toc235129738)

[2.2 The Requirement for Registration 6](#_Toc235129739)

[2.3 The Determination Review 7](#_Toc235129740)

[2.4 Public Involvement during the Determination Review 7](#_Toc235129741)

[2.5 The EPA’s Decision 7](#_Toc235129742)

[2.6 If a Comprehensive Review is Required 8](#_Toc235129743)

[2.6.1 Screening 8](#_Toc235129744)

[2.6.2 Preliminary Environmental Assessment 9](#_Toc235129745)

[2.6.3 Scoping / Terms of Reference 9](#_Toc235129746)

[2.6.4 Environmental Impact Assessment 9](#_Toc235129747)

[2.6.5 Environment Permit 9](#_Toc235129748)

[2.6.6 Annual Environment Report 10](#_Toc235129749)

[2.6.7 Environmental Management Plan 10](#_Toc235129750)

[2.6.8 Environmental Audit 10](#_Toc235129751)

[2.6.9 Environmental Certificate 10](#_Toc235129752)

[2.7 Conducting the Comprehensive EIA Study and Preparing the EIA Report 11](#_Toc235129753)

[2.8 Review of the Draft EIA Report 11](#_Toc235129754)

[2.9 Public Review and Comment on the EIA Report 12](#_Toc235129755)

[2.10 Public Meetings 12](#_Toc235129756)

[2.11 The Final Decision 13](#_Toc235129757)

[2.12 Administration of the Process 13](#_Toc235129758)

[3.0 SCOPE OF GENERAL CONSTRUCTION AND SERVICE GUIDELINES 14](#_Toc235129759)

[3.1 Introduction 14](#_Toc235129760)

[3.2 Scope of the Sector 14](#_Toc235129761)

[3.3 Screening Criteria for Activities under the Sector 16](#_Toc235129762)

[3.2.1 Lists of Projects and Thresholds 17](#_Toc235129763)

[3.2.2 Environmental Sensitive Areas as defined Under the Sector 19](#_Toc235129764)

[3.4 Impact Identification and Mitigation Measures 20](#_Toc235129765)

[3.4.1 Impact Identification 20](#_Toc235129766)

[3.4.2 Mitigation Measures 20](#_Toc235129767)

[3.5 General Guidelines 20](#_Toc235129768)

[3.5.1 General Guidelines for site selection and preparation measures 20](#_Toc235129769)

[3.5.2 General Socio-Economic and Socio-Cultural guidelines 21](#_Toc235129770)

[3.5.3 General Guidelines for Works 22](#_Toc235129771)

[3.5.4 Guidelines on use of Activities and the Biophysical Changes Lists Associated with these Activities 25](#_Toc235129772)

[4.0 CONCLUSION 32](#_Toc235129773)

[ANNEXURE: Additional Information for the Sector 33](#_Toc235129774)

[ANNEX I: Registration Guide: The General Construction and Service Sector 34](#_Toc235129775)

[ANNEX II: Wastewater Treatment Projects 61](#_Toc235129793)

[ANNEX III: Projects Involving Dams, Impoundments and/or Causeways 66](#_Toc235129794)

[ANNEX IV: Major Residential Developments 72](#_Toc235129795)

[ANNEX V: Linear Facilities 76](#_Toc235129796)

[ANNEX VI: Waste Disposal Facilities 81](#_Toc235129797)

[ANNEX VII: Golf Courses 86](#_Toc235129798)

[ANNEX VIII: Coastal Viewshed 92](#_Toc235129799)

[ANNEX IX. Environmentally Sensitive Areas 134](#_Toc235129800)

1.0 INTRODUCTION

## 1.1 Background

Over the past two decades, Ghanaians have become increasingly aware of their relationship with the environment and the role they can play in preserving its integrity. Residents have sought a greater role in government decisions that may affect the environment and their quality of life.

During the same period, experience in Ghana and across the world has repeatedly shown that a preventive approach to environmental protection is more cost effective than finding a cure. Ensuring that environmental concerns are addressed at the earliest possible stage of development planning is widely recognized as the best way to proceed.

Ghana’s Environmental Impact Assessment Regulation (LI 1652) came into force on 19th September 1999, to provide a legislative framework for proactive environmental planning, including opportunities for public involvement. These regulations required that all development activities likely to impact adversely on the environment must be subjected to environmental assessment. This is to ensure that such development activities are carried out in an environmentally sound and sustainable manner.

The LI 1652 is designed to identify the environmental impacts associated with development proposals well in advance of their implementation, so that such impacts can be avoided or reduced to acceptable levels before they occur. Environmental Impact Assessment (EIA) gives technical specialists from government agencies, as well as local residents and the general public, a chance to provide their inputs to the decision-making process with respect to specific development proposals. The EIA review process must be completed before any project subjected to EIA can proceed. Although the EIA Regulation grants the Minister responsible for the environment, the authority to prevent projects from proceeding, LI 1652 is not intended to be a mechanism for stopping developments for which the anticipated impacts can be avoided or reduced to acceptable levels through mitigation.

Under the Regulation, individuals, companies or public sector agencies that propose projects (listed as Undertakings in Schedule “1 & 2” of LI 1652) are required to register information about the proposal with the Environmental Protection Agency at an early stage in the planning schedule.

The Ghana Environmental Assessment Support Project (GEASP) with financial support from the Netherlands Government is a vehicle for the development of environmental assessment in Ghana. As part of the programme, a number of sector specific guidelines for environmental impact assessment are to be prepared including the General Construction and Service Sector.

The aim of this study is to produce environmental impact assessment guidelines to streamline development activities within the general construction and service sector in environmentally sound and sustainable manner.

This document is an outcome of a series of workshops for the development of EIA guidelines for the Construction Sector in Ghana. The document gives specific guidelines for the screening of development projects during:

* The concept stage of an undertaking, or
* The registration of an undertaking or
* The initial assessment stage of the EA registration of an existing undertaking.

The Guidelines are intended to help the general construction industry and more specifically, development planners, administrators, contractors of water projects, water resources managers, environmental specialists and project managers to:

* Examine whether a statutory EIA process and detailed EIA studies are required, according to the national statutes and regulations.
* Define the focus and the extent of environmental appraisal for projects, including the effect of the projects on the land and other natural resources as well as on human settlement, and
* Classify the environmental components resulting from the various activities in a systematic manner.

The objective of this publication is to summarize the main components of the Ghana EIA process, the requirements of LI 1652 and specifically to offer guidance on environmental considerations in the General Construction and Service Sector. Copies of the Regulation and additional information on the EIA process can be obtained directly from the address below.

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## 1.2 History of EIA in Ghana

Ghana has since 1989 begun making considerable advances in shifting from its past unsustainable path of development to sustainable development practices. The main tool in this endeavor has been the Environmental Impact Assessment (EIA)

The Act 490 (1994) that stipulated the establishment of Environmental Protection Agency (EPA) in lieu of the earlier set Environmental Protection Council (EPC) mandates the Agency “to ensure compliance with the laid down Environmental Impact Assessment procedures in the planning and execution of development projects, including compliance in respect with existing project”.

Following the enactment of the Act 490, to facilitate the effective implementation of the Environmental Impact Assessment, the existing Environmental Impact Assessment guidelines were converted to procedures and published (1995). The Ghana Environmental Impact Assessment guide was also published (1996) and an initial capacity building was carried out for a broad array of stakeholders. In 1999, the Environmental Impact Assessment procedures were enacted into Environment Assessment Regulation - Legislative Instrument (LI) 1652 giving Environmental Assessment a complete legal status in Ghana. It presents a detailed set of procedures for EIA that must be followed by project proponents, and by the Agency itself.

Almost two decades of experience with EIA in Ghana have demonstrated its value as a planning tool, both for the project proponents and for the concerned regulatory agencies.

A key guiding principle for environment management in Ghana is the preventive approach, which is also the main thrust of Ghana’s environmental policy. Environmental Impact Assessment is one reliable tool with inherent preventive attributes for promoting the realization of Ghana’s environmental policy and sustainable development.

The objective of Environmental Impact Assessment is to obtain adequate and relevant information on the proposed undertaking; fully understand the implications of its siting. in order to influence and facilitate informed decision-making and to ensure sustainable development. The purpose of Environmental Impact Assessment is to:

* Provide avenues for public involvement (affected by a proposed undertaking) and other stakeholder institutions (including governmental, financial/banks and others) in all relevant decision making areas of the undertaking
* Predict the potential consequences of a proposed investment/development from the environmental, ecological social, economic perspective and to introduce mitigation measures for significant adverse impacts.
* Integrate environmental considerations with economic/financial at the earliest stages of planning and undertaking.
* Ensure that proposed investments/developments are executed or implemented in a sustainable manner.
* Support the goals of sound environmental management of proposed investments and developments.

## 1.3 Benefits of Environmental Impact Assessment

Environmental Impact Assessment identifies potential constraints and opportunities and may quantify primary and secondary consequence of a proposed development action at the earliest stage of planning. Where this is not done, it could necessitate the introduction of expensive abatement measures (e.g. pollution control equipment) and other remedial or ameliorating actions (including compensation payment or other cost), once the project becomes operational. In some cases, this could render the project economically non viable and possibly lead to its abandonment.

Environmental Impact Assessment may lead to significant long-term financial advantages. If some potential adverse effects or sources of conflict, constraints or problems are identified early in project planning, considerable savings could be made and possible liability avoided through design modifications to produce environmentally acceptable and responsible options for development.

EIA facilitates the selection of the most suitable alternative sites in terms of cost effectiveness and other benefit maximization and also ensures avoidance of risks to sensitive sites and resources.

EIA can improve the efficient use of natural and human resources, valuable to those promoting development/investments, if integrated with project feasibility study (and design) where mitigation implication and cost becomes the product of the two, can enhance decision making and project financing. Environmental Impact Assessment can reduce the time taken to reach decisions by ensuring that subjectivity and duplication of efforts are minimized.

## 1.4 Actors in Environmental Impact Assessment

There are various actors or players in Environmental Assessment and these are often the same for all type of developments. There are two basic sets of law governing development in Ghana. These are the Town and Country Planning Law 1945 and more current Local Government Act 462, 1993, Environmental Protection Agency Act 490, 1994 and the more current Environmental Assessment Regulation, LI 1652, 1999. The lead institutions in development in Ghana are the Town and Country Planning department responsible for the former laws and the EPA for the latter laws.

The proponent (developer or investor) is the primary stakeholder in any Environmental Impact Assessment. There are a wide array of stakeholders and institutions involved in Environmental Impact Assessment and for that matter in development. The relevance of these actors and stakeholder institution depends on the sector (whether Agriculture, Energy, Manufacturing, Mining, Tourism, Construction, or Transportation sectors) under consideration, . Furthermore, the nature of responsibilities varies for different stakeholders depending on their statutory mandates, area of jurisdiction and other interests and concerns.

For example, in a typical construction development, the Ministry of Works and Housing would be the frontline stakeholder with EPA and the relevant Assembly (Town and Country Planning Department) as well as other communities and parties that may be affected by the development. Other resource regulators may also become stakeholders depending on the location of the development and possible resources at risk, for example the Water Resources Commission, if a water body resource is implicated, or the Forestry Commission if a forest resource or reserve is implicated.

In all such cases, EIA is required as a basis of informed decision-making that clearly spells out the concern for consideration by the proponent.

Environmental Impact Assessment is applied in Ghana as a decision support tool and also as a planning tool as the outcome of the Environmental Impact Assessment is expected to influence both, the decision making and the planning processes in order to promote sustainable development in Ghana.

All stakeholders have a shared responsibility by way of their contribution or inputs/ involvement in the Environmental Impact Assessment process and the progressive decisions made at every relevant stage leading to the granting of a permit for the development. The stakeholders and relevant institutions are in partnership right from the planning phase through the operational phase and also in monitoring stage, to ensure that all commitment and conditions for responsible stewardship and necessary for sustainable development are complied with. Stakeholders especially the institutions have a collective responsibility to institute, protect and guarantee the following essential investor friendly attributes of the Environmental Impact Assessment system.

* Transparency
* Timeliness
* Predictability and the
* Effective application of the appeal provision for redress.

## 1.5 Worldwide Scope of EIA

Environmental Impact Assessment is not peculiar to Ghana. Its rudiment is often traced to the National Environmental Policy Act of USA in 1970. Major innovations came about in 1985 particularly when the European Economic Community adopted the concept. World Health Organisation (WHO) became interested in Environmental Impact Assessment and so did the United Nations Agency, notably the UNDP and the FAO that have Environmental Impact Assessment as a prerequisite for sponsored development project.

EIA is critical in the World Bank dealings and also in Multinational and Bilateral lending organisations. The World Bank for instance, funds nearly 230 to 250 development projects in some 85 countries (including Ghana) every year. EIA is a formal requirement for the Bank funded projects and Ghana is no exception in meeting the requirement. The Takoradi Thermal Plant by the VRA, the Village Infrastructure Programme by Ministry of Food and Agriculture and the Tema Export Processing Zone (enclave) development under the Ghana Free Zones Programme are some major national projects covered by Environmental Assessment.. Environmental Impact Assessment is a prerequisite for loan negotiations not only with the World Bank, but also a requirement of the African Development Bank (ADB). The ADB in 1991 integrated Environmental Impact Assessment into its programme to ensure that the Bank is financing sustainable development in regional member countries. Similar policies apply in regional financing and lending institutions on all continents.

# **2.0 A SUMMARY OF THE EIA PROCESS**

## 2.1 Preamble

Environmental Assessments are required to be carried out on specific undertakings in Ghana as a means of ensuring environmental soundness and sustainability in the development of undertakings. The definition of “undertaking” is any enterprise, activity, scheme of development, construction, project, structure, building, work, investment, plan, programme and any modifications, extension, abandonment, demolition, rehabilitation or decommissioning, and the implementation of which may have significant impact.

The Environmental Assessment systems refer to the relevant procedures for ensuring that:

1. The planning phase follows and satisfies the provision for environmental soundness and sustainability in the various decision-making processes, alternatives and options for the eventual preferred scheme of development.
2. The operational phase follows the required management provisions to achieve environment soundness and sustainability in the implementation of the undertaking.

The planning phase of an undertaking is covered by an Environmental Assessment, while the operational phase is covered by Environment Management Plan. The scope of the Environmental Assessment plan ensures that not only large and significant impact undertakings are provided for (their environmental soundness and sustainability) but also cumulative implications of small and medium scale impact undertakings.

## 2.2 The Requirement for Registration

Compliance with the Environmental Assessment Systems commences with registration, by completing the appropriate registration forms. These forms include Environmental Assessment forms EA1 and EA2 for schedule1 and schedule 2 new undertakings respectively, of the Environmental Assessment Regulations 1999, LI 1652. However, during the development of these sector guidelines, a new form has been developed specifically for the General Construction and Service Sector (Form GCSS 1).

The first step in the EIA process is thus registration. As per the requirements of Section 1 (1) of the EIA Regulation, all individuals, private firms, or government agencies that propose specific undertakings in Ghana must formally register details of their proposals with the EPA. Schedule 1 and 2 of the Regulation identifies the types of undertakings that must be submitted for registration. It is important to note that the requirement for registration also includes projects that would modify, rehabilitate, extend, abandon or demolish previously approved undertakings, including those that were completed before the Regulation came into force.

Section 1 (2) of the Regulation requires that proponents of the above noted projects deliver a completed registration form to the EPA. A registration document, completed in accordance with the detailed Registration Guide that has been prepared by the EPA is deemed to be the completed form.

The General Construction and Service Sector Registration Guide (hereafter referred to as the Registration Guide) is available at the EPA Website at http://www.epa.gov.gh/ and is included as an Annex 1 to this general guideline. It is the proponent’s responsibility to accurately provide all relevant information concerning the proposal by preparing and submitting a registration document that addresses all the requirements outlined in the Registration Guide. Full and accurate descriptions of the project location, proposed activities, the existing environment, potential impacts, and proposed mitigation are required.

It is in the best interest of the proponent to submit the registration document early in the planning process so that maximum flexibility to modify the project to address government and stakeholder concerns is maintained. In any event, the registration must be submitted to the EPA and a decision must be rendered by the EPA before any statutory approvals are granted and before any physical work on the project is begun.

## 2.3 The Determination Review

All registered projects undergo a Determination Review. The Determination Review is an EIA aimed at identifying and evaluating the environmental issues surrounding the proposed project. The review is coordinated by the EPA and is completed with the assistance of a specially constituted Technical Review Committee (TRC) comprised of experts and specialists from government agencies, various departments of the state and the district Assemblies or municipality having jurisdiction over the project location. It is an interactive process, and includes opportunities for clarification of specific technical issues through dialogue between the Committee and the proponent. The purpose of the review is to determine whether or not a Comprehensive Review is warranted. Where necessary to address TRC concerns and questions, the proponent may be asked to provide supplementary studies and information.

## 2.4 Public Involvement during the Determination Review

Open and transparent public involvement is required for all registered projects. In order to fulfill the requirements of Section 17 of the EIA Regulation, the proponent must demonstrate that the affected public and other stakeholders have been given the opportunity to become involved in reviewing the project and must indicate how the proponent has considered or addressed any resultant questions and concerns. The opportunity for public involvement benefits citizens most when they take an active role at an early stage in the process and clearly articulate their specific questions or concerns. Additional information about public involvement during the Determination Review is included in Section 6.0 of the Registration Guide and Appendix C of the Registration Guide at the end of this booklet.

## 2.5 The EPA’s Decision

In accordance with Section 7(3) of the EIA Regulation, once the EPA has received sufficient information about the proposal including documentation of public and stakeholder concerns and the proponent’s responses, the proponent will be notified of the EPA’s decision within a maximum of 25 days. Typically the total length of the review period is longer than 25 days because the proponent needs additional time to respond to the issues and concerns raised by the TRC following registration. The EPA is committed to making every effort to complete the Determination Review within 25 days of the date that the project was registered.

If the EPA determines that a Comprehensive Review is necessary to assess the nature and significance of the potential impacts through further study, the proponent will receive written notice to this effect prior to placement of a notification in the Newspapers and/or any other public statement that may be issued on the subject.

Alternatively, if it is decided that the EIA process carried out during the Determination Review is sufficient, the EPA will issue a Permit and will notify the proponent that the undertaking may be carried out subject to any appropriate terms or conditions established by the EPA.

Finally, the EPA may decide that the project should not proceed.

**Note:** if the EPA determines that a Comprehensive Review is not required, all relevant environmental regulations such as the provisions of the EPA Act, or any other relevant legislation must nonetheless be complied with, and all required permits and approvals must be obtained. In addition, EPA will typically attach conditions to the project, aimed at addressing or mitigating concerns raised during the Determination Review. The EPA may subsequently suspend or revoke an approval, if the proponent violates the terms and conditions imposed for the project.

## 2.6 If a Comprehensive Review is Required

If the EPA decides that a Comprehensive Review is warranted, the proponent is required to conduct it in order to proceed with the undertaking.

To assist in completing the Comprehensive Review, the previously constituted Technical Review Committee continues to function and the EPA continues to co-ordinate the review process.

The following paragraphs describe the next steps of the Comprehensive Review

### 2.6.1 Screening

Screening is carried out to determine the level of Environmental Assessment a proposed undertaking must be subjected to. This exercise normally involves visit to proposed sites to verify information in the registration form and to consult with relevant stakeholders within the likely area of influence of the undertaking. Within 25 days of submission of the registration form, a screening decision must be made. Key consideration must be given to:

* The size and output of the proposed undertaking in relation to the location
* The technology to be used
* Concerns of the general public
* Land use considerations
* Other factors relevant to the particular undertaking
* Zoning status of the location for the undertaking

The output of screening is a screening report, which makes one of the following 5 decisions:

1. Approval may be given for the undertaking to proceed
2. Restrictions may be imposed on proceeding as proposed because of objection to undertaking
3. Additional information/clarification required.
4. Preliminary Environmental Assessment required
5. Environmental Impact Assessment required.

### 2.6.2 Preliminary Environmental Assessment

Preliminary Environmental Assessment is required for small to medium impact scale undertakings. These are normally schedule 1 undertakings. The findings of the Preliminary Environmental Assessment are compiled into Preliminary Environmental Report (PER). The Preliminary Environmental Report provides sufficient information on the undertaking as a basis for decision-making on the Environmental Permit.

### 2.6.3 Scoping / Terms of Reference

A scoping report must be submitted on a proposed undertaking (i) when the screening decision on the undertaking indicate that Environmental Impact Assessment is required or (ii) when a registration form is submitted on schedule 2 undertaking or (iii) for which an issue on schedule 5 of the LI 1652 relates. (schedule 5 refers to the Environmentally Sensitive Areas).

Scoping involves the identification and the consultation with all relevant stakeholders (interested and affected parties/communities such as the government departments, ministries, local authorities, etc) who must make an input in the Environmental Impact Assessment.

The purpose of scoping is to help focus the Environmental Impact Assessment to be carried out on the key areas/issues of concern or impact. The output of scoping is the terms of reference (TOR) for the Environmental Impact Assessment.

The proponent submits scoping report and draft TOR. Ten (10) copies are submitted for consideration and agreement, prior to using the TOR to conduct the actual Environmental Impact Assessment.

### 2.6.4 Environmental Impact Assessment

The proponent commissions the actual Environmental Impact Assessment based on the agreed TOR. Environmental Impact Assessment normally involves baseline survey and inventory, development proposal options, potential impact identification, prediction, mitigation and alternative considerations and other requirements of the TOR.

The findings of the Environmental Impact Assessment are compiled into an Environmental Impact Statement, which form the basis for the required decision-making on the undertaking for an Environment Permit.

### 2.6.5 Environment Permit

An Environment Permit for an undertaking issued by the Agency is an evidence of compliance with the procedural requirement of Environmental Impact Assessment. Environmental reports (PERs and EISs) submitted are reviewed and appropriate decisions made.

The review exercise is supported by a cross-sectoral national Environmental Impact Assessment Technical Review Committee, whose review recommendations are acted on by the Agency.

Environment Permits are issued always with a set of schedules of conditions. Among the key conditions are the requirements to:

1. Submit annual environmental report and Environmental Management Plans
2. Give notice of commencement of operation of the undertaking and
3. Obtain environment certificate within 24 months of commencement of operations. This is to certify that the operations are satisfactory and are in compliance with environmental permitting conditions.

### 2.6.6 Annual Environment Report

Any undertaking approved for implementation is required to submit an Annual Environmental Report (AER) on the undertaking. The first AER must be submitted after twelve (12) months from the date of “notice of commencement” of the undertaking and subsequently after every 12 months as stated in the LI 1652.

The AER is a report on the relevant aspects of the development at the operational stage of the undertaking. The relevant aspects include (but not limited to) monitoring results, adequacy and appropriateness of mitigation measures adopted, environmental standards and measures pursuedas well as targets that were set.

### 2.6.7 Environmental Management Plan

Operating undertakings covered by Preliminary Environmental Reports and EIS are required to submit Environmental Management Plans within 18 months of commencement of operation and thereafter every 3 years.

The Environmental Management Plan shall set out the steps and approaches to be taken to manage the operating undertaking in order to ensure environmental soundness and sustainability.

### 2.6.8 Environmental Audit

An Environmental Audit of an undertaking is the periodic and systematic objective evaluation of the required environmental effectiveness of the operational and management systems of the undertaking.

The management of an undertaking may commission an independent expert to conduct the audit in order to be fully informed of the true status of relevant areas of the undertaking.

The Agency shall also carry out its own audit to verify and inform itself about the compliance status of the undertaking. This would provide useful input in the Agency’s review of EMPs and AERs submitted on undertakings, leading to the granting of an environment certificate.

### 2.6.9 Environmental Certificate

Within 24 months of commencement of operations, an undertaking covered by a Preliminary Environmental Report or an Environmental Impact Statement (EIS) must obtain an environmental certificate. The conditions to secure environment certificate for an undertaking include:

1. Confirmation of actual commencement of operations
2. Evidence of acquisition of other permits/approvals/concerns applicable to the sector and undertaking
3. Evidence of compliance with relevant mitigation commitments
4. Evidence of compliance with other environment permit conditions
5. Submission of a current annual environment report on the undertaking (verified and considered satisfactory)
6. Submission of an accepted Environmental Management Plan for the undertaking
7. Satisfying environment audit condition
8. Payment of an environment certificate fee

## 2.7 Conducting the Comprehensive EIA Study and Preparing the EIA Report

The completion of an EIA study and the preparation of a report incorporating all the results of assessment represent the central information-gathering components of the EIA process. The proponent is responsible for the cost of the study that, in most cases, is carried out by a team of consultants offering a variety of technical expertise.

The principal objective of an EIA is to predict the impacts that can be expected, should the project proceed. This is accomplished by gathering information about the project’s socio-economic, biological and physical setting, conducting field investigations as required and using scientific methods to evaluate potential interactions between the environment and activities associated with the undertaking.

The study is expected to identify methods of enhancing positive impacts and minimizing negative impacts resulting from the undertaking. In addition to considering impacts, it includes a detailed description of the project, an evaluation of alternatives, and a description of methods for evaluating the accuracy of impact predictions. During the study process, proponents are also required to conduct consultation with potentially affected members of the public and other stakeholders in accordance with the consultation requirements set out in the EIA guidelines that were developed for the project.

Information gathered during the study and a description of the resultant decisions affecting the project’s design and implementation are compiled in a draft Environmental Impact Assessment Report. The time and effort required to produce this report will vary from project to project and will depend on such factors as the complexity of the project, the complexity of the biological, physical and socio-economic environment, the number of stakeholders identified during public consultation and the issues they raise, the extent of the required field investigations and the nature of the scientific evaluations required to assess potential impacts.

## 2.8 Review of the Draft EIA Report

Once the draft Report is received by the EPA, it is turned over to the Technical Review Committee for detailed examination. The Committee's responsibility at this stage is to determine whether the document has adequately addressed the issues related to the proposed activity. Review of the draft EIA report is an interactive process, and includes opportunities for clarification of specific technical issues through dialogue between the Committee and the proponent.

If, on the advice of the Committee, the EPA is satisfied that the EIA Report is adequate, the next step is to involve the public in discussing the impacts following the process outlined under 2.9 and 2.10.

If on the advice of the Committee, the EPA determines that the draft Report does not adequately address all the issues, the public process is delayed while the EPA advises the proponent of the deficiencies that must be addressed. To advance the EIA process at this point, the proponent is required to make revisions to the Report in order to remedy the deficiencies. This may, in turn, necessitate additional investigative work.

Once the revisions have been made to the draft Report, the review process is reactivated and proceeds until the EPA is satisfied that the final Report adequately meets the necessary requirements.

## 2.9 Public Review and Comment on the EIA Report

Once the Report is officially accepted by the EPA, the proponent is required to submit 30 copies of the final Report to the EPA in English. The second and more comprehensive opportunity for public involvement in the EIA process then begins.

Within 30 days of receiving the final Report from the proponent, the EPA releases the documentation for public review and comment. The documentation is made available to the public at various places depending on the project location. At the same time, the date(s) and location(s) for one or more public meetings (called public hearings) to discuss the EIA information are announced by the EPA through various media, including notification in the Newspapers.

Following the release of the study information, a minimum period of 21 days must be provided for public review, before any meeting is scheduled. The public is invited to submit written briefs in response to the study. These may be sent directly to the EPA. .

## 2.10 Public Meetings

At least one public meeting to discuss an EIA is held near the proposed project’s site. The purpose of the meeting is to provide all interested parties with an opportunity to make comments, raise concerns, or ask questions for clarification about any matter covered in the EIA report. Note that this meeting is in addition to any meeting that may have been held by the proponent during the Determination Review.

A Panel of independent experts is retained to chair the public meeting, receive public input and respond to questions and concerns. The proceedings are recorded and a verbatim transcript is produced for subsequent study by the EPA. The Panel prepares a report on public involvement, reflecting input gathered at the public meeting as well as written comments received throughout the public comment period.

Following such meetings, an additional period of fifteen days is set aside for members of the public to submit further written comments regarding the proposal. At the end of this period, a summary of public participation is prepared based on the written briefs submitted to the EPA, transcripts of public meetings and any additional comments received following the final public meeting.

This summary is released publicly and copies are sent to every identified person who participated in the public meeting. At the same time, the full package of EIA information, including the public participation summary, is forwarded to the EPA for final consideration.

## 2.11 The Final Decision

At some time after release of the public participation summary, the TRC will submit a report and a recommendation concerning the proposal to the EPA. At this point, it becomes the responsibility of the EPA to consider the report as well as the recommendation of the public hearing and issue or deny an approval for the undertaking.

If approval is given, terms and conditions may be stipulated that the proponent must adhere to in implementing the project. The EPA may subsequently suspend or revoke an approval, if the proponent violates the terms and conditions imposed for the project. Similarly, any approval previously given may be rescinded if the EPA has reason to believe the proponent has failed to disclose relevant facts, or submitted inaccurate information.

When an approval is issued, the EPA may require the formation of a committee to- track the progress of an undertaking, review the success of any mitigation measures proposed in the EIA, and determine the overall impact of the project on the environment.

It should also be noted that an EIA approval does not mean that the proponent is exempted from other applicable statutory requirements, such as the provisions of the EPA Act or any other relevant legislation that concerns the undertaking.

## 2.12 Administration of the Process

The EPA is committed to ensuring that the administration of the EIA Regulation is based on well-coordinated procedures, timely responses, openness and active cooperation with all parties concerned. Department staff responsible for the Environmental Impact Assessment schedule is available to assist all interested parties in understanding how they can most effectively become involved. Contact information is provided on page 1 of this booklet.

# 3.0 SCOPE OF GENERAL CONSTRUCTION AND SERVICE GUIDELINES

## 3.1 Introduction

The Construction Sector is one of the critical sectors in every economy. However, developments within this sector have contributed significantly to the level of environmental degradation in the country.

For example, the construction of the Akosombo dam has resulted in inundation of a large portion of land formerly under cultivation, displacement of people and its attendant loss of livelihoods and loss of biodiversity.. Provision of housing, office spaces, markets; etc has resulted in waste management and drainage problems in the country. The constructional phase with its insatiable demand for resources such as timber, gravels, sand, etc has resulted in land degradation in certain parts of the country.

From hindsight, therefore, it is recognized that the Construction Sector needed to be guided in the way that works are executed so as not to compromise the environment but at the same time to fulfil its mission. Operators in the sector must also be guided to understand that they are in competition with other sectors for the same natural resource. For this and other reasons the following guidelines are provided to assist the players in the sector so that they may tread the path of sustainable development.

## 3.2 Scope of the Sector

The classification of projects or undertakings of this sector kept evolving. For example, more recently in urban areas there have been many non-residential buildings (commercial, religious, industrial etc) being constructed within residential areas and in many instances even conversions of residential buildings to other uses. These developments sometime tend to conflict with zoning and environmental requirements. It is therefore necessary to have a more comprehensive list and general environmental guidelines to safeguard building construction.

Taking all these developments within the sector into consideration, the lists of projects or undertakings considered under the general construction and service sectors are:

1. Housing and Residential Buildings

(a) Individual houses on own plots

(b) Housing edevelopment

(c) Others

2. Educational, Institutional and Research Facilities

(a) Pre-school

(b) Primary institution

(c) Secondary institution

(d) Tertiary institution

(e) Research facilities and laboratories

(f) Others

3. Cultural

(a) Cultural and arts centres

(b) Libraries

(c) Others

4. Health

(a) Private clinic

(b) Pharmacies

(c) Mortuaries and funeral homes

(d) Health post and public clinic

(e) Polyclinics

(f) Hospitals

(g) Others

5. Religious

(a) Small-size chapels, mosques and similar religious buildings

(b) Medium-size churches, mosques and similar religious buildings

(c) Large churches, cathedrals, mosques and similar religious buildings

(d) Others

6. Governmental and Public

(a) Government offices

(b) Police stations

(c) Fire stations

(d) Post offices

(e) Embassies and diplomatic missions

(f) Public washrooms and sanitary areas

(g) Others

7. Commercial

(a) Small-size retail outlets

(b) Medium-size retail outlets

(c) Local / Open-air markets

(d) Supermarkets

(e) Shopping malls

(f) Banks

(g) Offices-general

(h) Bars, drinking spots and restaurants

(i) Parking lots and garages

(j) Others

8. Industrial

(a) Industrial buildings — general

(b) Storage and warehouses

(c) Industrial estates

(d) Large industrial plants

(e) Petroleum, energy-generation and similar plants

(f) Nuclear reactors and radio-active infrastructure

(g) Others

9. Recreational and Entertainment

(a) Local sporting facilities

(b) Playgrounds

(c) Sports facilities

(d) Others

10. Transportation

(a) Roads and highways

(b) Lorry parks and bus terminals

(c) Cargo handling, tankers and long vehicle terminals

(d) Harbours

(e) Airports and terminals

(f) Bridges

(Note: A complete sector specific guidelines have been developed for the transport sector. However, certain cross-cutting issues have been covered in this sector guideline as well. Proponents intending to do projects in the transportation sector should consult these other guidelines apart from those covered in this guideline and its Annexes.)

11. Water and Sanitation Infrastructure

 (a) Drainage

 (b) Coastal protection

 (c) Dams and impoundments

 (d) Waterworks and treatment

 (e) Groundwater development

 (f) Waste (Liquid and solid) treatment facilities

 (g) Others

12. Communications Services

(a) Electricity transmission

(b) Radio, satellite, telephone installations and masts

(c) Others

13. Miscellaneous

This section includes projects of a special nature not easily categorised under any of the above sections.

## 3.3 Screening Criteria for Activities under the Sector

Below is a suggested set of criteria generally used for screening of projects:

1. Character of the receiving environment
2. Potential impact of proposal/undertaking
3. Resilience of natural and human environment to cope with change
4. Confidence of prediction of impacts
5. Consideration of planning, policy framework and other decision-making processes and
6. Degree of public interest

The afore-mentioned screening criteria together with impact criteria below were used to assess and develop the inclusion lists of Projects and thresholds provided:

1. The magnitude (amount of change)
2. The extent (area affected)
3. The significance (how important)
4. The special sensitivity (country or/and regional concerns
5. The time frame (duration)
6. The reversibility (permanence or temporary)

### 3.2.1 Lists of Projects and Thresholds

*List A: Project Requiring No Environmental Assessment*

|  |  |
| --- | --- |
| Schools | Crèche, day nursery & kindergarten, (small-scale) |
| Offices | To house up to 50 people and (must have adequate parking space) |
| Car wash facilities |  |
| Vehicle garages | Up to 10 vehicles serviced per day and minimum area of 900m2 |
| Telecommunications installations |  |
| Fuel Filling Station | This must be located at least 50m from the nearest residence. |
| Car Parks | Non-tiered car park. |

*List B: Project Requiring Preliminary Environmental Assessments (PEA)*

|  |  |
| --- | --- |
| Schools & colleges  | 1st cycle Institutions and must be about 500m away from the nearest community |
| Offices | To house about 50 to 200 people |
| Shopping Centres | To be sited in the commercial areas. In the residential area, it must be sited about 500m away from the nearest residence |
| Warehousing | To be sited in industrial /commercial areas |
| Housing estates | Up to 50 housing units |
| Laundries | All commercial laundries |
| Vehicle garages | Parking space for more than 10 vehicles (all type of vehicles). |
| *Land drainage* | Tertiary drains of any type |
| Fuel Service Stations | This should be sited at least 50m from the nearest residence |
| Sporting facilities | Development which;Has facility to seat up to about 10,000 people on any given day; orHas a site area of between 2-10ha; orHas a site area of more than 5,000m2 and is within 200m of a designated site. |
| Religious facilities | All such facilities should be sited about 50m away from the nearest residence with full acoustics and in an approved development plan. |
| Golf courses  | A golf course in an approved development plan |
| Industrial estates | Development of an industrial estate with a site area of more than 1ha.Industrial development with a gross floor area of more than 2000m2 Industrial development with a gross floor area of more than 1000m2, and:Not an area zoned for industry in an approved plan; orwithin the aquifer protection zone or within 500m of a borehole. |

*List C: Project Requiring A Full Environmental Impact Assessment (EIA)*

|  |  |
| --- | --- |
| Schools & colleges | Any secondary and tertiary institution which has a total population of 500 or more. |
| Offices | To house about 200 people and above |
| Canalization and flood-relief works | Canals;Levees;Embankments;All types of flood-relief works as listed above |
| Dams and reservoirs | Types:Earth-fill; Rock-fill and ConcreteVolume of water to be impounded determines the scale of the dam to be constructed. However, regardless of the scale all dams must go through full EIA.  |
| Sporting facilities | Developments which;have facility to seat more than 10,000 people on any given day; orhave a site area of more than 10 ha |
| Land drainage | Primary and secondary drains of any type |
| Surface-water fed irrigation | Projects covering more than 500 hectares of land |
| Ground-water f ed irrigation | Projects covering more than 1000 hectares of land |
| Industrial estates | Development of a speculative industrial development (i.e. where no specific end user is identified), where the site area is 10ha or more; or a development of 2ha-10haand:more than 300 dwellings, or an area designated for more than 300 dwellings, or are within 200m of the site boundaries; orthe development is within the aquifer protection zone  |
| Coastal protection of all types | . Shoreline stabilisation. Backshore protection (from waves and surge). Inlet stabilisation (Dredging as the best solution). Harbour protection |
| Market complex with other developments | Including open markets with stores, stalls and sheds of all sizes must be sited at least 200m from the nearest residence. |
| Sporting facilities | Developments which; (i) May reasonably expect to attract 2500 vehicles on any given day or(ii) Cover an area of more than 10 ha. |
| Golf courses | A golf course not in an approved development plan. |
| Security installations | Development for the purpose of defense may require an EIS depending on the type of the development proposed, site area and location. |

* All undertakings that fall within environmentally sensitive areasapplicable to general construction and service require full environmental impact assessment.

*Definition of category A, B, C*

|  |
| --- |
| **Category A:** for projects that are likely to have minimal or no adverse environmental impacts. No EIA is required.**Category B:** for projects likely to have adverse environmental impacts that are less significant than those of category C projects, meaning that few if any of the impacts are likely to be irreversible, that they are site-specific, and that mitigation measures can be designed more readily than for category C projects. The environmental assessment normally consists of a limited impact assessment identifying suitable mitigation and management measures, and incorporating them into the project.**Category C:** for projects likely to have significant adverse environmental impacts that are sensitive (i.e., irreversible, affect vulnerable ethnic minorities, involve involuntary resettlement, or affect cultural heritage sites), diverse, or unprecedented, or that affect an area broader than the sites of facilities subjected to physical works. A full EIA is required.**Environmental sensitive areas as applicable to general construction and service:**Areas whose environmental quality and capacity, by virtue of their natural environmental attributes and existing land uses, are significantly affected by activities which generate residuals or create demand on resources. See Below. |

### 3.2.2 Environmental Sensitive Areas as defined Under the Sector

All the areas listed under schedule 5 of the Environmental Assessment Regulations, 1999, LI 1652, are considered to be very sensitive with respect to general construction and service sector.

The following have been classified as environmentally sensitive areas:

1. All areas declared by law as national parks, watershed reserves, wildlife reserves and sanctuaries including sacred grooves.
2. Areas with potential tourist values
3. Areas, which constitute the habitat of any endangered or threatened species of indigenous wildlife (flora and fauna).
4. Areas of historic, archaeological or scientific interest.
5. Areas, which are traditionally occupied by cultural communities.
6. Areas prone to natural disasters (geological hazards - earthquakes, landslides, volcanic activities - floods, rainstorm etc.)
7. Areas prone to bushfires
8. Hilly areas with critical slopes
9. Areas classified as prime agricultural lands
10. Recharge areas of aquifers
11. Water bodies characterized by one or any combination of the following conditions:
	1. Water tapped for domestic purposes;
	2. Water within the controlled and/or protected areas;
	3. Water, which supports wildlife and fishery activities.
12. Mangrove areas which characterized by one or any combination of the following conditions:
	1. Areas with primary pristine dense growth;
	2. Areas adjourning banks of major river systems
	3. Areas near or adjacent to traditional fishing grounds
	4. Areas, which acts as natural buffers against shore erosion, strong winds or storm floods.

## 3.4 Impact Identification and Mitigation Measures

### 3.4.1 Impact Identification

There are situations where the adverse environmental effects of some development action may be profound enough as to:

* threaten even short term viability of the development,
* threaten nearby land uses, and
* compromise the long-term sustainability of the development in terms of unsustainable resources application and utilization or other related demands;
* create cumulative and irreversibile effect on sensitive resources from inappropriate technology;
* create eminent risks and liability and social unacceptability from lack of informed decisions, poor planning and siting.

It is imperative that impacts of activities to be undertaken for any developmental project must therefore be identified, analyzed and taken into account in the planning phase of the project. Impact identification is therefore key element in any Environmental Assessment (EA) procedure.

### 3.4.2 Mitigation Measures

These are measures that must be developed to prevent or minimize potential adverse environmental impacts identified and analysed. The measures must be directed towards both the environment and the people during the execution of the works so as to enhance environmental benefits of the project.

## 3.5 General Guidelines

As indicated in section 3.2 there are a number of undertakings that are considered under this sector. Hence it will not be prudent to develop holistic guidelines for all these projects. The information presented here are therefore broad and general. Specific information about a particular project is provided as additional information for that particular project. Proponents are advised to consult these documentations for those specific undertakings in addition to the general information presented here. (See Annex for the list of additional information)

### 3.5.1 General Guidelines for site selection and preparation measures

* Avoid banks of watercourses; lakes or lagoons (Leave a minimum distance from the bank as approved by appropriate authorities.)
* Limit site preparation to dry seasons.
* No vegetation clearing on steep (above 15o) unstable slopes or highly erodible soils.
* Restore degraded sites to their previous condition.
* Structures set up for the duration of the works, such as drainage ditches, concrete slabs for storing hazardous materials or refuse pits have to be demolished
* Remove machinery and used parts (batteries, tyre, filter etc).
* Avoid siting work camp in protected environment such as reserves or parks.
* Re-establish natural run-off channel in areas of heavy rainfall.
* Set up sites in sahelian areas as water retention points
* Organize large replanting of appropriate exiting flora species and where possible the fauna.
* Trees must not be felled unless absolutely necessary and if it is impossible seek clearance from appropriate authorities
* Rules governing life inside the camps must also contain measures aimed at protecting the environment (e.g. a ban on poaching, exploitation of the forest, etc)
* To limit soil degradation and pollution, servicing toxic-material storage and site machinery washing areas must be concretized and contained.
* Systematic sprinkling of access roads, work areas and crushing sites must be carried out to reduce the amount of airborne dust.
* To limit erosion risks, embankments, trenches and outfalls must be strengthened.
* Dispose off constructional and excavated materials that were not used at the appropriate designated site.

### 3.5.2 General Socio-Economic and Socio-Cultural guidelines

* Conduct pre-project socio- economic surveys and assessments of land resources use.
* Involve local communities and people in project planning and implementation.
* Establish clear, long term jurisdictions over the facilities emphasizing local participation in decision-making.
* Provide alternatives to fairly compensate local people who incur losses.
* Protect significant landmarks and traditional land resource use patterns.
* Develop local infrastructure to take care of increase in population.
* Monitor and control health aspects of the people involved in construction and operation of facilities.

### 3.5.3 General Guidelines for Works

|  |  |
| --- | --- |
| **Stage** | **General Guidelines** |
| Preconstruction | Proponent shall submit to EPA, one copy each of design drawings(s) drawn to such a scale to afford easy reading. These drawings shall be submitted together with a brief explanation in writing of the processes, on not more thantwo pages of A4 sheet where appropriate. |
| For construction in an environmentally sensitive area[[1]](#footnote-2), EPA and the Proponent shall agree on any flora and fauna deemed to be of exceptional interest by the EPA and the methods to be taken by Proponent to protect such species during construction |
| Construction | The Proponent shall take steps to secure the project site against un-authorised access by: (i) hoarding off the site (ii) allowing access to only authorised personnel and vehicles(iii) providing temporary diversion of public roads or paths passing through the site |
| The proponent shall submit to EPA one copy of the ‘Approved’ Schedule of Construction to enable the EPA monitor effectively all activities affecting the Agency’s work |
| A nominated EPA officer shall attend construction site meetings, visit the site once every calendar month and submit an independent report to the nominated supervising officer at the EPA office, on the status of adherence or non compliance by the Proponents’ contractor to previously agreed processes for protecting the environment during construction |
| The nominated EPA Supervising Officer shall direct the Proponent in writing to correct any infractions of rules and regulations for protecting the environment within a stated period not exceeding 30 days from the date of the notice |
| The EPA shall seek a High Court Order to enforce any willful disregard of an instruction given under Item 7 above. |
| Where construction is likely to cause erosion and or landslide, as in the case of construction on a hillside, the Proponent shall submit in writing to EPA details of proposals to prevent erosion and possible landslide |

|  |  |
| --- | --- |
| **Stage** | **General Guidelines** |
| Operational | The EPA shall assign a nominated officer to any project which shall require monitoring. |
| Monitoring officers shall be adequately trained in monitoring techniques, including but not limited to: 1. Measurement of noise levels
2. Taking air and water samples
3. Ventilation requirements for various activities,
4. Processes for vermin control etc
 |
| The monitoring officer shall prepare a checklist of items to be considered during inspection and a copy of the checklist shall be made available to the Proponent’s authorised representative who shall accompany the EPA officer during the inspection. The EPA monitoring officer and the Proponents agent shall each sign the inspection checklist at the end of the inspection. |
| After every visit to a project, the EPA shall furnish the Proponent within 14days, one signed copy of the report of findings |
| The monitoring officer shall invite the proponent in writing to discuss the report, if it contains any adverse findings and proposals for correction, of any anomalies. |
| If in the course of operation, Proponent proposes to modify the use of the project in such a manner as to make it substantially different from the purpose for which permit was originally issued, such modification must be submitted to EPA for prior approval before it is implemented |

|  |  |
| --- | --- |
| **Stage** | **General Guidelines** |
| Decommissioning | Notice of Intent to decommission a project  |
| The Proponent shall inform the District officer of the EPA in writing, at least 90 days in advance of his intention to start decommissioning a project on a particular date. |
| The Proponent shall submit together with the Notice of Intent, a schedule of work for decommissioning. |
| The Proponent shall submit to EPA in writing, not less 60 days before commissioning, details of all known toxic materials stored at the site including any such materials known to be buried below ground. |
| The Proponent shall submit in writing to EPA not less than, 60 days before scheduled date of decommissioning, proposals for the removal and disposal of any toxic materials at the site |
| The Proponent shall submit in writing to EPA ,not less than 30days before decommissioning, details of proposals for removing all construction materials from site and the location (s) where such materials are to be dumped. |
| The Proponent shall secure the site before decommissioning by erecting hoarding around to deny access to unauthorized persons. |
| The Proponent shall supply to all workers on site, appropriate work gear, including hard hats, boots, and where necessary, ear mufflers and respiratory guards for protection against inhalation of dust and harmful particles |
| Where radioactive materials or other contaminants are found to be at the site, the Proponent must provide appropriate attire to all workers and visitors to site. |
| The proponent shall erect message boards in letters not smaller than 30mm, to warn about the presence of radio-active materials or contaminants and with instructions that appropriate materials shall be worn at all times. |
| The Proponent shall provide adequately trained security staff at site to ensure compliance with appropriate dress and safety codes at all times. |
| The Proponent shall agree with EPA and the appropriate Local Authority/District Municipal/Metropolitan Assembly, the route (s) for haulage trucks carting waste materials away from site. |
| Before the start of decommissioning, the Proponent shall submit in writing to EPA, not less than 60days before decommissioning, the proposals for restoring the land to environmentally acceptable status. |
| EPA shall not capriciously deny approval of any proposals submitted under Item 12 above. |

### 3.5.4 Guidelines on use of Activities and the Biophysical Changes Lists Associated with these Activities

1. List 1 provides the impacts of pre-construction phase (camping) of the various undertakings under the sector
2. List 2 is a detail of activities that are common under the sector. Use it to determine the type of activity that will be carried out in your project;
3. List 3 is a number of broad categories of biophysical changes that may result from these activities. Use it to determine the biophysical changes that may result from the activities that will be carried out in your project. Expert input is needed to determine the magnitude and direction of the changes and the probability of their occurrence.;
4. List 4 also provides the likely socio-economic impacts that may result from the activities of an undertaking or the presence of the undertaking in an environment.
5. A number of functions and the landscapes to which these functions are linked may be affected by the biophysical changes. Local information and expert input is required to determine which functions will be altered. Note that functions may be altered in positive or negative directions. Some of the changes in functions are the intended results of the project; others may be unintentional consequences of the project, positive or negative.

List 1: Camping Site Selection and Preparation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **Activity** | **Possible Impact** | **Possible Mitigation Measures** | **Monitoring Indicators** |
| 1 | Siting of camps on/near sensitive habitats such as mangrove zones, estuaries, wetlands  | Could have a far-reaching damage on ecosystem and resources therein e.g. accidental spillages of oil and chemicals may cause fish kill and destruction of mangroves | Avoid camping near sensitive areas |  |
| 2 | Site preparation during wet seasons  | Serious topsoil removal from sites | Siting clearing should be done during the dry seasons | Sheet and gully erosion |
| 3 | Siting near banks of river course, lakes or lagoons  | Pollution of these water bodies through discharge of effluents and solid wastes | Avoid these areas |  |
| 4 | Siting near steep unstable slopes, which will also necessitate clearing of vegetation  | Could result in landslide | Avoid these areas |  |
| 5 | Improper selection of site e.g. siting close to residences and birds roosting areas  | Noise nuisance for residents living close to the sites and to roosting birds and other animals Social conflicts as workers of contractors interact with local residents | Camp should be away from these areas if possibleEducation and enforcement of certain ground rules for workers | Complaints from residentsNoise level measurements |
| 6 | Post-Camping | Campsites may become degraded if not restored back to their previous conditions | Restore camp sites by re-vegetating  | Periodic visits to site |
| 7 | Machinery parts (batteries, tyres, filters etc) left at the site. | Degradation of the environment  | Be thorough in camp clean-up | Visit to site after moving out to find out if clean-up has been thorough |
| 8 | Structures set up for the duration of the works, such as drainage ditches, concrete slabs for strong hazardous materials or refuse pits when left at sites  | Could become breeding grounds for mosquitoes and also serves as death traps for small animals | Remove all structures before leaving unless the structures are also meant to serve the community after the construction works | Visit to site |
| 9 | Stock piling of materials (gravels chippings rip-raps etc)  | May result in visual intrusion | Avoid critical lines of vision(e.g. where a driver may not be able see directly ahead of him due to the stockpiled materials)  | . |
| 10 | Movement of vehicles in and out of site  | Noise emission Dust generationTraffic and pedestrian conflicts | Regular maintenance of vehicles and other machineriesRegular watering of access roadsProvide adequate road signs | Noise level measurementsDust level measurementsSafety accident records  |

List 2: Detailed List of Activities in the General Construction and Service Sector

|  |  |
| --- | --- |
| **1. Land Use Change / Land Conversion** | 2.9.5 Use of Processed water |
| **2. Construction Activities** | 2.9.6 Intensive use of Transport |
| ***2.1 Land Treatment*** | 2.9.7 Intensive use of Power |
| 2.1.1 Land Clearing | 2.9.8 Creation of Waste Dumps |
| 2.1.2 Burning | **3. Land & Water Development** |
| 2.1.3 Earth Moving (Cut & Fill) | ***3.1 Land Shaping*** |
| ***2.2 Line-shaped Earth works*** | 3.1.1 Levelled Land |
| 2.2.1 Land Clearing | 3.1.2 Shaped Surface |
| 2.2.2 (Sub) – Soil improvement | 3.1.3 Bunds |
| 2.2.3 Earth Moving | 3.1.4Terraces |
| 2.2.4 Compaction | 3.1.5 Controlled gullies |
| 2.3 Localised Earth works | 3.1.6 Treated Catchments |
| 2.3.1 Mounding | ***3.2 Improved Land*** |
| 2.3.2 Excavation | 3.2.1 De-watering |
| 2.3.3 Land Filling | 3.2.2 Sub-Soiling |
| ***2.4 Works in wet Circumstances*** | ***3.3 Water Source Development*** |
| 2.4.1 Dredging | 3.3.1 Deep Groundwater Extraction |
| 2.4.2 Stabilising of River Banks | 3.3.2 Shallow Water Extraction |
| ***2.5 Secondary Earth Works*** | 3.3.3 Extraction from Lakes, Swamps and Marshes |
| 2.5.1 Dumping of Spoil | 3.3.4 Capturing of Springs |
| 2.5.2 Creation of Quarries | 3.3.5River Water Extraction |
| 2.5.3 Creation of Borrow Pits | ***3.4 Drainage*** |
| ***2.6 Structures*** | 3.4.1 Drainage Provisions |
| 2.6.1 Construction of Dams/Cross-river works | 3.4.1.1 Surface Drainage |
| 2.6.2 Construction on Banks/Shore | 3.4.1.2 Sub-surface Drainage |
| 2.6.3 Construction of Drainage Structures | 3.4.2 Main Drains |
| 2.6.4 Construction of Buildings | 3.4.3 Drainage Disposal |
| 2.6.5 Well Drilling | 3.4.3.1 Drainage Disposal in Surface Water |
| ***2.7 Construction Materials*** | 3.4.3.2 Drainage Disposal in Groundwater / Evaporation Pan |
| 2.7.1 In situ Earth materials | 3.4.3.3 Tidal Drainage Disposal |
| 2.7.2 Use of Gravel/Sand | **4. River Valley And Coast Hydraulic Measures** |
| 2.7.3 Use of Stone/Rock | ***4.1 River/Coast Training*** |
| 2.7.4 Use of Bentonite | 4.1.1 Stabilised River Embankments |
| 2.7.5 Use of Cement | 4.1.2 River/Coast Dikes (Flood Protection) |
| 2.7.6 Use of Asbestos | 4.1.3 Groynes |
| 2.7.7 Use of Bitumen | 4.1.4 Cross-sectional Change (Dredging) |
| ***2.8 Construction Practices*** | 4.1.5 River Canalisation |
| 2.8.1 Use of Explosives | 4.1.6 River Diversion |
| 2.8.2 Use of heavy Machinery | 4.1.7 Flood Diversion |
| ***2.9 Logistic Provisions*** | ***4.2 Dams and Weirs*** |
| 2.9.1 Storage of Large quantities of Fuel | 4.2.1 Weirs and Check Dams |
| 2.9.2 Storage of Polluting Materials | 4.2.2Small Storage Dams |
| 2.9.3 Temporary Roads | 4.2.3 Large Dam/Barrage |
| 2.9.4 Shelters | 4.2.4 Salt Water Barrier in Delta/Estuary |

List 3: Main Categories of Activities in General Construction and Service Sector and the Potential Biophysical Changes caused by these Activities

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **SOIL** | 1. Soil Chemistry | 2. Soil Texture & Structure | 3. Soil Moisture | 4. Soil Fertility | 5. Soil Pollution Level | 14. Susceptibility to Erosion, Subsidence, Landslides | **WATER** | 6. Quantity of Surface Water | 7. Quantity of Groundwater | 8. Quantity of Run-off | 9. Quality of Surface Water | 10. Quality of Groundwater | 11. Quality of Run-off | 15. River Bed / Coastal Morphology | **AIR** | 12. Meso-Climatic Changes | 13. Air Quality (Dust, Noise, Pollution) | FLORA & FAUNA | 16. Infestation / Invasion with (aquatic) Weed, Algal Bloom, Plant Diseases | 17. Invasions of Animal Pests Damage, Interference with Wild Life | 18. Migration Routes of Aquatic Animals | 19. Breeding of Disease Transmitting Organisms | 20. Loss of Traditional Varieties/Breeds |
| ! Changes LeadingtTo Onsite Impacts only |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ! Changes Lead To Off-Site Impacts only |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| A. Construction Activities |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1. Land Treatment |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. Line-Shaped Earth Works |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3. Localised Earth Works |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4. Works in Wet Circumstances |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5. Secondary Earth Works |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6. Structures |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7. Construction Materials |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8. Construction Practices |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9. Logistic Provisions |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| B. Land& Water Development |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10. Land Shaping |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11. Improved Land |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12. Water Source Development |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| C. Drainage |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13. Main (Primary) Drains |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14. Secondary/Tertiary Drains |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15. Drainage Disposal |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **D. River Valley & Coast Hydraulic Measures** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16. River Training |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17. Dams & Weirs |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 18. River Valley & Wetland Management |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

List 4: Socio- Economic Impacts

The socio- economic impacts induced by the presence of a project are looked at in the broadest sense here. This includes many aspects of the human/ social environment. For better appreciation of the different dimensions of the human context, a categorisation has been applied to the list of socio-economic impacts. The list is divided into impacts that may be experienced on the individual / household level and impacts experienced on the community and/or institutional level at constructional and/or operational phase of the project.

Use this list to determine whether your project within the sector has negative or positive impact..

INDIVIDUAL AND HOUSEHOLD LEVEL

A. Health And Physical Well-Being

1. Violation of human rights
2. Death; death of a family member
3. Change in level of health and fertility
4. Mental health
5. Personal safety and hazard exposure
6. Environmental amenity value
7. Quality of housing and homeliness
8. Visual intrusion

B. Economic Impacts

1. Changes ineconomic situation
2. Status and type of employment / risk to livelihood or employment
3. Increased workload
4. Loss of other options/decrease in choice of type of employment
5. Changes in standard of living
6. Replacement costs: replace a function that was formerly provided by the environment

C. Cultural Impacts

1. Change in cultural values
2. Moral outrage (blasphemy, religious affront, violation of sacred sites)
3. Alterations in the family structure (family stability, divorce)
4. Changes in ‘self image’ of the individuals

D. Social Impacts

1. Changes in daily living practices
2. Changes in existing social networks
3. Changes in attitude to the local community

COMMUNITY LEVEL

A. Health and Physical Well-Being

1. Death

B. Economic Impacts

1. Employment generation
2. Induced unemployment
3. Economic dependency
4. Income generation from trading
5. Diversity of economic opportunities
6. Disruption of local economy
7. Conflict over job opportunities
8. Economic prosperity
9. Replacement costs: to replace functions that were formerly provided by the natural environment, such as water filtering, agriculture, protection against floods, etc.
10. Provision of social amenities

C. Cultural Impacts

1. Cultural differentiation
2. Cultural integrity: adulteration of culture (disregard for marital and child responsibilities, prostitution, drug abuse, influx of “foreign” culture, etc)
3. Cultural marginalisation
4. Loss of local language
5. Social values about heritage and biodiversity

D. Impacts on Gender Relations

1. Participation in decision making on the community level
2. Access to / control over community resources and/or facilities
3. Advocacy for equal right for women
4. Organisational capacity of women

E. Social Impacts

1. Social differentiation
2. Social tension
3. Community cohesion
4. Overloading of infrastructure and social services (e.g. housing, health, transport) by the influx of traders and spontaneous settlers
5. Disruption of social networks
6. Actual crime
7. Actual violence

F. Institutional Impacts

1. Workload on local government
2. Integrity of local government
3. Access to resources
4. Organisational capacity of (sectors of the) community

# 4.0 CONCLUSION

The general construction and service sector has been identified as one of the key sectors of the Ghanaian economy. However, it has been identified as among the sectors that are contributing to environmental degradation in the country. In view of this, these guidelines have been developed for the sector to assist all players within the sector to promote sustainable development.

The projects considered under the sector are quite broad and diverse. Hence, additional information has been provided as annexes to this general guideline. All players within the sector are therefore advised to consult this additional information.

# ANNEXURE: Additional Information for the Sector

## ANNEX I: Registration Guide: The General Construction and Service Sector

**ANNEX I: Registration Guide:**

**How to fill the General Construction and Service Sector Form (Form GCSS 1)**

**REGISTRATION GUIDE**

Pursuant to Section 1 of the Environmental Assessment Regulation, LI 1652, of the Environmental Protection Agency (EPA) Act, Act 490, this guide is prepared to assist proponents to register their projects with the EPA.

## INTRODUCTION

This guide describes the information that must be submitted to the EPA in order to register an undertaking that is subject to the Environmental Assessment (EA) Regulation. The information is used by the Agency to conduct a review of the undertaking with the assistance of the Technical Review Committee (TRC) and to prepare a recommendation to the Executive Director of the EPA as to whether or not a Comprehensive Review (Environmental Assessment) is required.

The proponent must follow this guide in order to ensure that all the required information is provided. While it is acknowledged that final engineering details of a project will typically not be available at the time of project registration, full and accurate descriptions of the project location, proposed activities, the existing environment, potential impacts, and proposed mitigation are required as noted below. An authentic site plan showing the location of the various project components relative to each other and relative to the environmental features of the site must also be provided.

The EPA is committed to making every effort to facilitate Determination Review (i.e. issue an Environmental Permit or inform the proponent that a Comprehensive Review or Study is required) within 25 days of the date of registration specifically for those registrations that are accompanied by complete and accurate documentation as outlined in this registration guide and in the sector specific guidelines described below (provided that the proponent responds promptly to the subsequent questions and concerns raised by the TRC).

The EPA considers all registration information that is not protected under the Right to Information Act to be public information.The proponent must therefore be prepared to make such information available to stakeholders or to the public on request. Additional requirements for public involvement for registered projects is provided in Section 6.0 of this Guide.

## Sector-Specific Guidelines

Sector-specific supplements to this generic guide have been prepared by the EPA, and should be consulted by proponents as applicable. These supplements list information requirements for specific classes of undertakings in addition to the requirements listed below, and are available from the EPA (see contact information on page 1 of this booklet).

## Pre-Submission Consultation

Prior to registering a project, it is advisable to hold discussions with the Environmental Protection Agency to:

a) seek advice and guidance on the process of registration and review,

b) obtain information with respect to the possible timing and duration of the review and

c) to provide the Agency with advance notice of the anticipated timing of the registration (see contact information on page 1 of this booklet). In some cases, pre-submission consultation with specific government agencies is strongly recommended. Details are provided in the appropriate sections of this Guide.

d) consultation with neighbours (see Appendix C of this Registration Guide on details of public involvement)

## Complete and Accurate Submissions

The receiving EPA Office will review each submission for completeness and will determine if the submission is adequate for project registration. Should information be lacking, the project will not be registered. The proponent will be notified of the deficiencies and will be given the opportunity to provide a revised submission.

The EPA may waive certain information requirements deemed not applicable (e.g. a reduced description of environmental features may be allowed for projects that will be located within an area of existing development as opposed to a “green field” site). Further to the above, if a proponent feels that any of the information requirements listed in this guide are not applicable for a particular project the proponent should clearly state that the requirement is not applicable and provide justification. It is advisable to discuss this with the EPA prior to submission.

Any inaccurate or deficient information discovered after a project has been registered could result in delays in processing the registration and may ultimately result in the issuance of an order by the Executive Director for the discontinuing the undertaking*.* It is in the proponent’s best interest to provide a complete and accurate submission.

Once the EPA has received a **complete** submission, the project will be registered and the registration will be circulated to the TRC for review and comment. As noted above, complete and accurate submissions and timely responses to requests for additional information will help ensure that the Department can complete the review within the targeted timeframe of 90 to 120 day.

## Fees

To obtain an environmental permit the proponent is required to pay fees in accordance with the Environmental Assessment Amendment Regulations 2002, LI 1703. The Fees are in two categories:

* Non-refundable processing fee paid on submission of Environmental Assessment Registration Forms.
* Permit fee paid when a decision is taken to grant an environmental permit.by the Agency

The level of fees are based on the type and scale of undertaking. In all cases an invoice would be issued by the EPA

## Additional Information

After reviewing a registration submission, the TRC may require additional information. In such cases, the proponent will be notified in writing by the Agency. It is the proponent’s responsibility to ensure that the required information is provided in a timely manner unless alternative arrangements have been made with the Agency. Failure to do so may cause the Agency to close the project file and require that the registration process be restarted at the beginning.

## GENERAL INFORMATION REQUIREMENTS

The following is a suggested format for providing the information required to register an undertaking under the EIA Regulation. The information may be presented in a different format as long as the registration document is thorough and complete, and as long as the issues and items described below are addressed. If portions of the required information are contained in other documents, copies of the relevant sections of those documents must be included with the registration even if such documents have previously been submitted to the Agency.

Proponents should read this entire guide along with other relevant sector-specific guidelines before commencing preparation of the registration document.

### 1.0 THE PROPONENT

#### (i) Name of Proponent:

In the case of a joint venture, limited partnership, or other business venture between two or more corporate entities, the legal names of all parties associated with the project should be provided.

#### (ii) Address of Proponent:

#### (iii) Chief Executive Officer:

Name, official title and telephone number

#### (iv) Principal Contact Person for purposes of Environmental Impact Assessment:

Name, official title and telephone number

#### (v) Property Ownership:

Identify the property owner if different from the proponent. Note that if the proponent is not the owner of the land, the written consent of the landowner for submitting the registration must be included along with the registration, unless the proponent indicates that:

a) the project is proceeding under a right of expropriation granted by legislation, or

b) in the case of linear facilities (power transmission line, pipeline, highway, etc.) the proponent is still in the process of lease or purchase negotiations.

If the project will take place on or affect State Land, (including State Reserve Roads, lands below the high-water mark and most lake and river beds) indicate the extent of the affected State Land in the Registration document. A Land Use Application must be submitted to the Town & Country Planning Department (TCPD). As part of the registration, include an acknowledgement of the application from the TCPD and confirmation from TPCD, Lands Commission, that the subject State Lands have no claims or commitments, and that the lands can be made available subject to final review and various terms and conditions. Note that for projects where alternative sites or corridors are being considered that are located on or affect State Land, the registration document must at a minimum demonstrate that consultation with Lands Commission has been initiated. For additional information contact the TPCD and the Lands Commission.

### 2.0 THE UNDERTAKING

#### (i) Name of the Undertaking:

#### (ii) Project Overview:

This should be a written description sufficiently complete to allow the Agency to readily identify the scope of the undertaking, and to determine which agencies should participate on the project’s Technical Review Committee (TRC).

Note: if the project is a modification, extension, abandonment, demolition or rehabilitation of a previously registered project, please contact the Agency to determine what information is required at the time of registration.

#### (iii) Purpose/Rationale/Need for the Undertaking:

The market potential, benefit to society, economic benefits, job creation benefits, consumer and/or industrial demand, and other relevant issues that make the development of this project viable and desirable for the local and/or the Ghanaian economy should be outlined. If the project is being conducted to remedy a particular environmental problem, a detailed description of the problem and the proposed remedy should be provided.

This description should also include discussion of the alternatives to the project that could fulfill the same goal. A consideration of the “do-nothing” approach and a description of its likely consequences, should also be provided. The rationale for choosing the selected alternative should be clearly stated. Conversely, if there are no reasonable alternatives to the proposed project, this should be stated and justified in the registration document.

Under Sections (iv), (v), (vi), (vii), (viii), (ix) and (x) below, provide complete information concerning the selected alternative.

#### (iv) Project Location:

A detailed description of the geographic location of the proposed site must be provided and must include the following elements:

•The precise location of the project

• The street address (if available), community name, town and region in which the project will be located;

• The latitude and longitude (if available); and

• A map showing the location of the site, relative to existing features such as communities and residential areas, roads, railways and airports should also be provided. A 1:50,000 scale map can be used as a base map. These maps are available from the Survey Department at (233) 21-777334 / 782753, or survey@ghana.com. In the case of modifications to existing facilities, description of the location of the proposed modification relative to the current facility must also be provided.

#### (v) Siting Considerations:

Discuss the relevant siting or route selection criteria that were considered as part of the project site selection process, including but not limited to:

• The specific siting requirements of the proposed undertaking (availability of land, access to transportation, water supply, site gradients,

• A brief discussion of the alternative locations considered during the route or site selection process, and the reasons why these alternative locations were rejected;

• A list of any ecological that were taken into account as part of the project site selection and/or route selection (e.g. avoidance of sensitive natural features and sensitive land uses and cultural sites, etc.);

• Consultation with local planning authorities (where they exist). **\***

• Consultation with the Wildlife Division of the Forestry Commission regarding wetland issues (if applicable) **\*\***

• Consultation with the appropriate Metropolitan Municipal District Assemblies (MMDAs) regarding coastal issues (if applicable)

\* Registrations for projects taking place in areas with municipal or District land-use plans or zoning by-laws in place must include a letter from the planning authority indicating that the project is in compliance with the plans and by-laws. **If a re-zoning is required, it must be completed prior to submission of the registration,** unless multiple locations for the project are still being considered (e.g. if alternative routes are still being considered for linear facilities such as highways, power lines, etc.). In the latter case, the registration must at a minimum demonstrate that consultation with the appropriate planning authority has been initiated. General information on land use plans and zoning by-laws is available at the appropriate TPCD and the MMDAs. A list of contacts for specific MMDAs is available at <http://www.ghanadistricts.com/districts/?PHPSESSID=9797e92bb7129397519a65af5b64458c>.

\*\* If the project is likely to be located within 30 metres of a wetland, the registration must demonstrate that consultation with the Forestry Commission has been initiated.

#### (vi) Physical Components and Dimensions of the Project:

This description must include:

Drawings and Aerial Photographs:

• A preliminary site plan drawn to scale showing the location of the various physical components and infrastructure required for the project (see Additional Description, below), relative to each other and relative to the environmental features on and near the site (see Section 3.0 – DESCRIPTION OF THE EXISTING ENVIRONMENT) and showing the parcel identification numbers(s), if any; and A recent colour aerial photograph of the proposed location (if available) showing the photo reference number and scale, and annotated with the site boundaries and the various project components and structures of the proposed development. (Note that the annotated air photo can serve as the preliminary site plan provided that all relevant information required for the site plan is clearly shown and the photo image is not obscured. Use of a transparent overlay or enclosing a second, unmarked version of the photo are methods of achieving this); and

• An artist’s conceptual drawing, of the completed project (if available).

Additional Description (may be indicated on the above mentioned Site Plan if appropriate):

• The dimensions of the property lines of the subject property;

• The total area of the site;

• The total area of the portion of the site to be developed (if different from the above);

• A description of any required land acquisition (i.e. temporary or permanent easements, lease, rental or purchase of land);

• A description of all physical components and infrastructure (temporary or permanent) required for the project regardless of who will be responsible for its construction, e.g., buildings, storage facilities, pipelines, pump houses, temporary or permanent access roads, sewers, water mains, power transmission lines, transportation facilities (e.g. docks, parking areas, driveways, loading bays), other structures, etc.;

• The size(s) of the main project component(s), (e.g. length of roads, surface area of buildings);

• A description of any proposed external facility lighting (e.g. light standards for parking areas and roads, lighting on high structures such as smokestacks, antennas, towers, etc.);

• The estimated total area of new impervious surfaces (roof-tops, asphalt, etc.);

• A description of any set-backs or buffers that will be incorporated in the site design including the set-backs between any proposed works and sensitive features (including but not limited to watercourses, wetlands, dwellings, etc.);

• A description of any off-site facilities and processes that will be affected by or required by the project, including any requirements for off-site land use (e.g. due to off-site processing, storage, shipping, etc.); and

•Details of the types of activities that may be directly associated with, or may occur as a result of the undertaking (e.g. increased vehicular traffic, transportation of raw materials or completed products, etc.). Note that all units used in the description (length, area, distance, etc.), must be consistent and should be metric if possible.

#### (vii) Construction Details (if applicable):

• Identify the approximate duration of the total construction period (if staged, please list the approximate order of each stage and its approximate duration; e.g. Step 1: access road construction 2 days, Step 2: clearing and grubbing 1 week, Step 3:grading 1 week, Step 4: foundation construction and framing 4 weeks, etc.);

• State the estimated hours of construction (e.g. 7 am to 5 pm, Monday to Saturday, etc.);

• List the anticipated equipment, and construction procedures to be used to construct the major features of the project (e.g. excavation of trench using backhoe, placing of shoreline erosion protection using barge-mounted crane, blasting of bedrock, etc.);

• Identify the proposed date of first physical construction-related activity on site;

• Identify potential sources of pollutants during the construction period(s), including noise, airborne emissions, liquid effluents, hazardous materials and solid waste materials;

• Indicate the ultimate fate of all wastes, emissions and effluents generated during construction, including their discharge/disposal locations if applicable;

• Provide details of how the site will be accessed, and how, where and when the access will be constructed and controlled (if required) including details of any required detours or other impacts on movements of vehicles and people;

• Provide details on clearing and grubbing activities and the fate of any merchantable timber and topsoil removed during these activities;

• Identify the origin of any required fill materials (rock fill, topsoil, granular materials etc.); and

• Provide a description of any construction/excavation/grading required in or near areas such as wetlands, watercourses, wildlife habitat, Environmentally Significant Areas, or other sensitive areas identified under Section 3.0 – DESCRIPTION OF THE EXISTING ENVIRONMENT (below).

#### (viii) Operation and Maintenance Details:

Provide the following information using maps, diagrams, tables, flow charts etc., as appropriate:

• Describe the key features of the operation, (i.e. all routine activities, processes, and operations, including any pollution control equipment and including all anticipated routine maintenance requirements and activities, and theirschedule);

• State the estimated daily water use and the source of the water supply;

• State the design capacity of pumps or pipelines for conveying water or product;

• Indicate the number of employees;

• Describe the proposed production capacity (if applicable);

• Identify the proposed mode of production (i.e. batch, continuous, seasonal, etc.), if applicable;

• Identify the estimated period of operation and number of shifts (e.g. 1 shift, 8 hours per day, 5 days per week);

• State the estimated life span of the project;

• If applicable, identify the total area of land to be disturbed annually during the life of the project (e.g. for peat extraction, quarrying, etc.);

• Provide a description of the type and quantity of all raw materials, intermediate products and final products including waste products (i.e. airborne emissions, liquid effluents, hazardous materials and solid waste materials);

• Provide a description of all storage locations for raw materials, intermediate products, finished products and wastes (e.g. storage tanks, bins, hoppers, storage yards, etc.);

• Describe the project’s energy requirements and how the required power will be obtained or brought to the site (hydro transmission line, gas pipeline, generator, oil tanker truck, etc.);

• Describe the sources of all raw materials used during routine operations;

* Indicate the ultimate fate of all wastes, emissions and effluents including their discharge/disposal locations if applicable;

#### (ix) Future Modifications, Extensions, or Abandonment:

Note that any modification, extension, abandonment, demolition or rehabilitation of a previously registered project will normally require a separate registration. To determine the information requirements for such registrations, please contact the EPA.

For some types of new projects, site closure or rehabilitation plans must be submitted at the time of project registration. Where applicable, this requirement is indicated in the appropriate sector-specific guidelines.

#### (x) Project-Related Documents:

Please provide:

• A list of all project-related documents already available;

• Copies of any report on environmental work, (surveys, designs, investigations, etc. already performed in relation to the project);

• If the subject property or undertaking is known to have been subject to a previous EIA registration, please provide details (project name, date(s), and EPA file number(s) if known);

• Copies of all relevant correspondence previously received from any municipal, provincial or federal government agency or department with respect to the proposal; and

• A list of any applications submitted to any government agency concurrently with the registration (See Section 7.0 APPROVAL OF THE UNDERTAKING).

### 3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

This description must include all features that are found within the project location and/or are likely to be affected by the project. All mapable features should be shown on the preliminary site plan (See Section 2.0 (vi) -Physical Components and Dimensions of the Project, above). Photographs of key environmental features would also be useful. Some possible sources of information about environmental features are listed in Appendix “A” – Selected Resources.

If the project will result in the removal or alteration of a natural or biological feature, site specific information must be obtained from field investigations conducted by appropriate specialists. For example, for projects that would result in the alteration of a watercourse, then the following information will be required:

• Name of the watercourse and its discharge location;

• Composition of the substrate;

• Presence / absence of fish (Note that fish habitat survey forms required for field studies are available from the Fisheries Department of Ministry of Fisheries);

• Description of the methods used to sample fish such as electro-seining, netting, timing of sampling (*needs* Fisheries Department *approval*);

• Identification of all commercial species that are found in or near the proposed activity (It is important to consider the timing of the sampling, with respect to fish lifecycles (spawning, migration, etc.);

• Seasonal usage by fish;

• Surrounding (shoreline) vegetation; and

• Existing or known water withdrawal and/or effluent discharges to the watercourse in the vicinity of the proposed project.

For projects that are located on sites of occurrence of species listed as 'species at risk' would also require field studies to look for these species and if found, to describe them, and assess how they would be affected as a result of the development.

Since some of the above studies can only be completed duringspecific times of the year. Depending on the natural feature being addressed, proponents should consider the implications for project scheduling and the timing of the registration submission. For further information on study requirements, consult the appropriate Sector-Specific Guidelines or contact the EPA.

In all cases, the description of the existing environment should include:

#### (i) Physical and Natural Features:

• Site topography (maximum and minimum site elevation, and maximum and minimum gradients);

• General surface drainage regime (e.g. “the majority of the property drains toward the southwest”);

• Watercourses, rivers, streams, drainage ditches, and wetlands;

• Any adjacent watercourses or water bodies • Coastal features

• Geological and hydrogeological features, and soils of the project location where these have the potential to affect or be affected by the project (e.g. where septic systems, waste disposal facilities, ponds, building foundations, significant excavations and re-grading etc, are required);

• The presence of other adverse environmental conditions that could affect the project (e.g. acidic rock, areas prone to flooding, and areas vulnerable to storm surges, etc.);

• All private or municipal wells, municipal well fields and protected watersheds (i.e. municipal surface water supplies) located within 500 metres of the subject property;

• Existing ambient air quality (if currently impaired);

• Existing ambient noise levels (if existing background noise levels are currently affected by other activities);

• All Environmentally Significant Areas as identified by the schedule 5 of the Environmental Assessment Regulations 1999, LI 1652 within 500m of the subject property; (refer to appendix IX)

• The variety, extent and species composition of the existing vegetation;

• The variety extent and significance of any fish or wildlife populations and/or habitat; and

• Any known presence of species at risk (legally-listed species) or other species of conservation concern;

• The presence of potential habitat for species at risk, for sites where there is a reasonable expectation of occurrence of those species; \*

• Any known presence of critical habitat or other sensitive habitat (e.g. old growth forest); and

• The presence of other environmentally significant areas, including National Wildlife Areas, Migratory Bird Sanctuaries, game reserves, RAMSAR (wetlands of international significance) sites, Important Bird Areas (IBAs), and designated critical habitats

\* Existing records and reports should not be considered exhaustive inventories of species in an area. The non-occurrence of a species cannot be inferred by its absence. Therefore, in addition to obtaining the available data records, organizations that keep such records and local naturalist groups should also be consulted about the potential presence of wildlife at risk and for assistance in designing and conducting of surveys that may be needed to fill data gaps important to the assessment.

#### (ii) Cultural Features:

• List all nationally or locally recognized recreational sites or features, tourism features or attractions, tourism operations, cultural activities, hunting, fishing, gathering, reserves, traditional uses, etc. on the subject property or adjacent lands; Consult appropriate state institutions such as Ghana Tourist Board, Ghana Wildlife Division etc for such a lists

• List all nationally or locally recognized heritage resources/areas (e.g. historic sites, national or provincial parks, fossils, archaeological sites, etc.) on the subject property or adjacent lands. Consult appropriate state institutions such as Ghana Museums and Monuments Board, Wildlife Division etc for such a lists

#### (iii) Existing and Historic Land Uses:

• Provide a description of existing and previous uses of the subject property and adjacent lands including a description of existing man-made features and activities (dwellings, other buildings, agricultural activities, commercial/industrial activities, pits/quarries, mines, wells, disposal sites, etc.);

• Provide a general description of the existing condition and use of the site (e.g. existing industrial facility, vacant forested land, residential property, vacant cleared land, agricultural land, etc.);

• Identify the ownership of properties abutting the proposed site; and

• Describe the type and extent of any known or suspected contamination resulting from previous uses of the subject property or adjacent properties.

### 4.0 SUMMARY OF ENVIRONMENTAL IMPACTS

For each project phase (i.e. Construction and Operation & Maintenance), identify the anticipated impacts (if any) on environmental features identified in the previous section. These should include impacts of the project on the environment (e.g. emissions to the atmosphere, etc.) and vice-versa ( e.g. seasonal flooding, extreme events such as maximum precipitation, wind, and climate change scenarios that may be pertinent to long-term facilities, etc.) . Consideration should be given to impacts that may result from any accidental events, malfunctions, etc. It is important to note that environmental impacts include reference to both socio-economic and bio-physical effects which could result from the project. Additional guidance is found in Appendix “B” – Sample List of Environmental Attributes.

As part of the response to this requirement, the anticipated impacts can be characterized in terms of compliance with relevant legislation, policies and standards (for those impacts where legislation, policy and standards exist). For example answers can be provided to questions such as the following: will the proposed project: a) Result in the net-loss of wetland functions (policy on wetland conservation is aimed at achieving no-net loss goal), b) Result in the destruction of significant wetland (contrary to wetlands conservation policy), c) Result in the deposition of a deleterious substance harmful to fish or migratory birds (prohibited by national legislation), d) Emit effluent in excess of permissible levels as stipulated in relevant legislation, e) Violate provisions contained in the Environmental Protection Agency Act or any other relevant regulations f) Result in the loss of individuals of a threatened or endangered species or damage or destruction of an individual residence or critical habitat g) Compromise the conservation of a species of special concern, h) Result in the exceeding national Standards or national ambient air quality objectives (published under EPA), etc.

For further information on study requirements, consult the appropriate Sector-Specific Guidelines and contact the EPA.

### 5.0 SUMMARY OF PROPOSED MITIGATION

Describe the mitigation measures proposed to minimize the environmental impacts identified in the previous section. A wide variety of measures can be employed depending on the type of project and its physical setting. As part of the information submitted at the time of registration the proponent will typically make a commitment to implement the required mitigation plan. Specific details are typically required later in the process (e.g.. as a condition of Determination). In considering mitigation options, primary attention should be directed to avoidance impact (e.g. pollution prevention), then to impact reduction, and finally to compensation of unavoidable impacts.. This approach can be best demonstrated by listing the proposed mitigation measures according to the above mentioned hierarchy. Examples of mitigation include but are not limited to the following:

• Environmental protection plans and protocols for specific activities (e.g. refuelling, herbicide applications, waste disposal) or for activities in certain sensitive locations (e.g. works near watercourses or wetlands);

• Erosion and sediment control plans;

• Stormwater management plans;

• Leak and spill prevention plans (e.g. addressing equipment maintenance, materials storage and handling, etc.);

• Contingency plans (e.g. spill notification and clean-up, evacuation, etc.);

• Access maintenance plans (e.g. traffic flow plans, detours etc.);

• Special design features incorporated into the project (e.g. buffer zones, set-backs, acoustical or visual barriers, fish passage structures, natural channel design, etc.);

• Pollution control equipment (e.g. effluent treatment, scrubbers, lagoons, electrostatic precipitators, etc.);

•Avoidance of sensitive areas (e.g. no development within the habitat of legally-listed species at risk, and investigation of alternatives for issues involving habitats of other species of conservation concern);

• Timing restrictions (e.g. no pile driving after 9 p.m., no in-stream works during fish spawning, no clearing during nesting/breeding season for migratory birds);

• Noise or vibration reduction plans (e.g. use of anti-vibration pads, duct silencers, etc.);

• Site specific environmental studies and surveys (e.g. rare plant surveys, habitat assessments, archaeological surveys, predictive modeling);

• Monitoring plans (for pre-construction, construction or post-construction phases as applicable) aimed at verifying predicted impacts and confirming the effectiveness of mitigation measures;

• Environmental compliance measurement (e.g. auditing of compliance with environmental legislation and with site specific environmental protection plans);

• Use of inspectors (e.g. environmental, geotechnical, archaeological, etc.);

• Specification of qualifications of designers (e.g. tailing pond to be designed by a geotechnical engineer);

• Training plans (e.g. to ensure local employment); and

• Compensation (financial, implementation of protection or restoration efforts elsewhere, environmental education programs, etc.).

Note that if the proposed project is allowed to proceed, a condition will normally be attached, to ensure adherence to all obligations, commitments, monitoring and mitigation measures presented in the registration document, as well as to all those that are subsequently identified correspondence during the Determination Review. A number of other conditions may also be identified. Typically, there will be a requirement that a summary table be prepared and submitted on a regular basis, detailing the status of each of the conditions attached to the permission to proceed.

### 6.0 PUBLIC INVOLVEMENT

**At the time of registration**, describe how public input has been or will be sought and considered in relation to the proposed project. Public involvement is a requirement for **all registered projects**. The definition of “public” includes all stakeholders (individuals, companies, agencies, organizations, interest groups, etc.) who may be affected by the project. It also includes those who may have local knowledge of the location of the proposed development that may assist in its siting or design. Where appropriate, consultation with local people is also required. **It is the proponent’s responsibility to design, implement and document the public involvement process, and to provide documentation of the program and its results to the EPA.**

The overall goal of public involvement at the Registration stage of the EIA process is to ensure that those potentially affected by a project, are aware of the Registration, are able to obtain additional information about the project, and are able to express any concerns they may have. While it is recognized that not all concerns can be addressed to the satisfaction of all parties, the proponent is expected to respond to the public in an open and forthright manner and resolve as many of their concerns as possible, while clearly identifying those which could not be resolved. A report documenting the public involvement process must be provided to the EPA as part of the review process.

**Minimum Requirements**

The minimum requirements for public involvement and a description of the contents of the required documentation are listed in Appendix “C” – Minimum Proponent Sponsored Public Involvement Standards for Registered Projects.

**Timing**

The public involvement process is not intended to be open ended. Public involvement activities must be completed and a report on public involvement activities must submitted to the EPA by the proponent within 25 days of project registration.

In order to meet this schedule, the proponent should make it clear to stakeholders and the general public that they must forward their comments to the proponent within 25 days of the date of a Public Hearing (if one is held) or within 25 days of the date of the public notice of registration issued by the proponent.

In some situations, it may be desirable to initiate public involvement in advance of project registration. This will allow the incorporation of public input earlier in the project planning stage and enable the proponent to assess the degree of potential interest and concerns related to the proposed project. A description of the public involvement program and its results could then be included in the Registration Document. Such a strategy may also serve to streamline the review process by addressing the public involvement requirements “up front”.

It is important to note that **an Environmental Permit will not be issued until the public involvement program has been completed and the documentation has been received, reviewed and approved by the EPA.**

Where applicable, an on-going dialogue with stakeholders throughout the project life is encouraged (e.g. through the establishment of community liaison committees etc.). Such dialogue ensures that the proponent and public are aware of issues as they develop. In addition, it may form part of the mitigative measures for anticipated environmental impacts.

### 7.0 APPROVAL OF THE UNDERTAKING

List the main permits, licenses, approvals, and other forms of authorization required for the undertaking, together with the names of the authorities responsible for issuing them (e.g., government department, local government department, municipal, etc.). These may include but are not limited to:

• Building permits from the local planning authority;

• Watercourse and Wetland Alteration Permits issued by Forestry Commission; (www.fcghana.com)

• Approvals to Construct and Approvals to Operate issued by WRC;

• Petroleum Storage System Approvals issued by the Energy Commission; (http://new.energycom.gov.gh)

• Water Supply Source Assessment approval by Water Resources Commission; (www.wrc-gh.org)

• Authorization from the Department of Fisheries;

• Approval from Ministry of Transport;

• Authorization from the Lands Commission for all land uses planned on State land;

• All other required permits, approvals and licenses. If the project is a modification, extension or rehabilitation of a project that was previously registered under the EIA Regulation and received a previous Environmental Permit or a previous EIA approval, review and summarize all resultant EIA conditions and indicate which of these, if any, would require amendments.

### 8.0 FUNDING

If applications for a grant or loan of capital funds from a government agency have been or will be submitted, please state the name and address of the department or agency from which the funds have been or will be requested.

### 9.0 SIGNATURE

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Date Signature of Chief Executive Officer

### 10.0 SUBMISSION INSTRUCTIONS

**Complete electronic copies of registration documents (CD or Online at http://epaghanaeia.org) are preferred.** (Note that 1 hard (paper) copy of the complete submission must also be provided). All maps, plans documents, or drawings submitted electronically should either be in PDF format or be readable by standard word processing software. E-mail submissions are subject to the following restrictions: a) maximum file size 10 megabytes, b) no zipped files, c) no executable (\*.exe) files. Anti-virus filters on the EPA server will not allow such files to be sent or received. Other restrictions to E-mail attachments may be applied from time to time.

Alternatively, two (2) hard copies of the registration (including all maps, plans surveys, reports, etc.) can be mailed or delivered to the Executive Director, Environmental Protection Agency.

In either case, if GIS data was used to create any of the maps or drawings included in the submission, please include the digital data file(s) with the submission (e.g. Shapefile, Coverage or DXF format).

The appropriate fee as described on page (ii) of this document must accompany the registration.

Address For hand delivery, or courier:

The Executive Director,

Environmental Protection Agency

Starlet 91 Road

Opposite Registrar General’s Department

Ministries

Accra

Mailing Address:

The Executive Director,

Environmental Protection Agency

PO Box MB 326, Accra

Telephone: (+233) 302-664697/8, Fax: (+233) 302-662690

E-mail - support@epaghana.org

**Selected Resources**

The following is a guide only and is not intended to be an exhaustive or a prescriptive list. The proponent is responsible for identifying and utilizing the most relevant resources. Where necessary, information from secondary sources such as those listed below must be supplemented by detailed site specific studies prepared by qualified professionals. In addition, local residents and naturalist groups may represent valuable sources of information.

Electronic versions of all EPA acts and regulations are available online at <http://www.epa.gov.gh/>

**Aerial Photographs and Maps**

Aerial Photographs – Survey Department – ((233) 21-777334 / 782753, or survey@ghana.com.)

Maps – Survey Departments – ((233) 21-777334 / 782753, or survey@ghana.com.)

**Aquaculture**

See also the resources listed in the Sector-specific Guideline: Additional Information Requirements for Aquaculture Facilities

**Aquatic Habitat**

**Atmospheric Environment**

**Biodiversity**

**Climate Change**

**Coastal Areas**

**Contaminated Sites**

**Dams and Impoundments**

**Energy Policy**

**Environmental Impact Assessment**

**Environmentally Significant/Sensitive Areas**

**Environmental Legislation**

**Geology and Soils**

**Groundwater and Surface Water Quality and Quantity**

**Hazardous Waste**

**Highway Construction**

**Migratory Birds**

**Mining and Mineral Extraction**

**Navigable Waters**

**Pollution Prevention**

**Species at Risk**

**Species of Conservation Concern**

**Subdivisions and Building Construction**

**Waste Disposal and Wastewater Treatment**

**Water Supply**

 National Water Policy – MWRWH (June 2007)

**Watercourses and Wetlands**

**Sample List of Environmental Attributes**

Does the project or related activities (including construction, operation and maintenance) have the potential to affect or be affected by any of the following environmental attributes? If so, then describe the impact and the proposed mitigation. Note: the following is a guide only and is not intended to be an exhaustive or a prescriptive list.

**Air Quality .**

• Particulate/smoke

• Dust

• Odours/Fumes

• Visibility

• Primary Chemical loadings (NOx, SOx etc.)

• Secondary Chemical loadings (e.g. Photochemical smog)

• Greenhouse Gasses

**Biology and Ecology (Aquatic)**

• Deep Sea Marine Habitat (Seasonal and Permanent)

• Inshore Marine Habitat (Seasonal and Permanent)

• Inter-tidal Marine Habitat (Seasonal and Permanent)

• Lacustrine Habitat (Seasonal and Permanent)

• Fluvial Habitat (Seasonal and Permanent)

• Wetland Habitat (Seasonal and Permanent)

• Spawning, feeding breeding sites

• Populations/communities of aquatic species (including flora, fish, birds, marine mammals, etc.)

• Species diversity and variety

• Species at risk and other species of conservation concern

• Migration Routes/movement corridors

• Aquaculture

• Sports Fisheries

• Commercial Fisheries

• Subsistence Fisheries

• Native (Cultural) Fisheries

**Biology and Ecology (Terrestrial)**

• Natural vegetative cover/vegetation communities

• Virgin/old growth timber stands

• Farmland/crops/domestic livestock/orchards

• Agricultural capability

• Migration /movement corridors

• Temporary (seasonal) habitat

• Permanent habitat

•Nesting breeding, roosting and perching sites feeding sites

• Size and distribution of populations/communities (animals, birds reptiles, amphibians, insects)

• Species at risk and other species of conservation concern

• Species diversity and variety

• Sport, recreational, commercial, subsistence hunting/trapping/gathering

**Physical (Climate/Atmosphere)**

• Macro-climate

• Micro-climate

• Temperature

• Humidity

• Wind patterns/ air circulation

• Precipitation patterns

• Fog

• Thermal inversions

• High level ozone (ozone layer)

• Noise or vibration

**Physical (Geology)**

• Aggregate or Mineral resource potential

• Rock Pressure

• Geochemistry (e.g. acid rock drainage etc.)

**Physical (Geomorphology)**

• Landforms, Topography

• Soil Erosion

• Soil Permeably

• Total Site Imperviousness

• Ground transmitted noise/vibration

• Soil Bearing Capacity/Settling/Liquefaction

• Slope Stability/Earth slides/Rock Slides/Slumps

• Aggregate or mineral resource potential

• Soil fertility

• Soil moisture/drainage

**Physical (Groundwater)**

• Quantity (aquifer yields etc.)

• Quality (e.g. Salinity, nitrates, toxic substances)

• Base flow to streams/springs/seepages

• Depth to water table (mounding, draw down, etc.)

• Flow direction

• Recharge areas

• Domestic/Municipal/Industrial/agricultural Supplies

**Physical (Surface Water)**

• Quantity of flowing and standing water (rivers, lakes, and streams)

• Quality of water ( Temperature, BOD, Dissolved Oxygen, Bacteria, Turbidity (suspended solids, sediments), nutrients, pH, pesticides, chlorinated organics, trace metals, hydrocarbons, Misc. toxics, salinity, taste, odour, floating debris)

• Tidal patterns and ranges

• Quantity and quality of wetlands

• Flood Frequency/magnitude/elevation

• Currents/ circulation patterns

• Wave patterns

• Beaches/Dunes (size and substrate)

• Flow regime (variability, frequency, velocity)

• Domestic/municipal/industrial/agricultural supplies

• Thermal Regime (stratification)

• Chemical equilibrium/mobilization (movement between sediments and water column)

• Trophic state

• Drainage patterns, Catchment Boundaries hydrologic transfers/losses

• Unique Physical Features

• Shoreline Processes (erosion, transportation, deposition)

• Channel morphology, configuration

**Valued Spaces/Locations**

• Significant Structures, Sites, Monuments, Objects

• Archaeological Sites

• Paleontological (Fossil) Sites

• Areas of Special Local Significance (Spiritual, Cultural, Ecological)

• Parks and Reserves

• Sites of Educational, Scientific, Natural, or Historical Interest

• Visual Character (Scenery, Views, Vistas)

• Ornamental Features (Plantings, Landscaping)

• Unique Physical Features

**Community Structure (Socio-economic)**

• Population Size and Density

• Housing Availability

• Public Health

• Incomes Levels

• Employment Opportunities

• Municipal Income (Tax Base/Grants, etc.)

• Property Values

• Municipal Expenditures

**Community Structure (Physical and Functional)**

• Land Use Compatibility

• Temporary or permanent Barriers to Vehicular/Pedestrian Movement

• Temporary Land use Restrictions/Disruptions

• Municipal Infrastructure, Utilities, Fire/Police Protection

• Transportation Patterns (modes and routes)

• Traffic Volumes

• Access to and within Farms, Homes, Businesses, Industries

• Operational Practices of Farms, Businesses, Industries

**Lifestyle and Quality of Life**

• Access to Existing Recreational Opportunities

• Cultural Facilities

• Congestion

• Community noise levels/vibration

**Minimum Proponent Sponsored Public Involvement Standards for Registered Projects**

**This Appendix must be read in conjunction with Section 6.0 of the Registration Guide**.

Steps 1 to 4, and Step 8 describe the minimum public notification and involvement standards that must be addressed for of all registered projects. It is in the proponent's best interest to ensure that all stakeholders are identified and contacted, so that key stakeholders do not appear late in the process, resulting in potential delays to project approval. For this reason proponents may wish to exceed the minimum requirements.

1. The proponent shall communicate directly with relevant officials (i.e. the Metropolitan Municipal District Assemblies), local service districts, community groups, environmental groups, and other key stakeholder groups (companies, agencies, interest groups etc.) as appropriate, enabling them to become familiar with the proposed project and ask questions and/or raise concerns. This could be done by:

• Organizing one or more meetings or workshops; and/or

• Appearing at a community or group's regular meeting (e.g. a council meeting); and/or

• Sending a letter or information flyer as described under Item 2 (below).

Note that it is the **proponent’s responsibility** to identify the stakeholders.

2. The proponent shall provide direct, written notification (letter, information flyer, etc.) about the project and its location to potentially affected area residents and landowners and individuals (to be determined in consultation with the EPA). The notification must include the following:

Required Content of Public Notices

* Bbrief description of the proposed project;
* Description of proposed location (map is desirable);
* Status of the approvals process (i.e. “The project is currently registered for review with the EPA under the Environmental Impact Assessment Regulation, EPA Act”);
* Statement indicating that people can ask questions or raise concerns with the proponent regarding the environmental impacts;
* Proponent's contact information (name, address, phone number, E-mail); and
* Date by which comments must be received (See Section 6.0 of the Registration Guide)

Should the undertaking involve the use of State Land, this must be made clear as part of the public notice.

3. The EPA shall place notice of the Registration on the Agency’s web site at <http://www.epa.gov.gh/>

4. The **proponent** shall make copies of the project registration document (and any subsequent submissions in response to issues raised by the Technical Review Committee) available to any interested member of the public and stakeholder and shall deposit a copy of this document along with any subsequent revision with the appropriate EPA regional office, where it will be available for public review.

For large scale projects, and projects in sensitive environmental settings, **the following additional** requirements may be required at the discretion of the EPA.

5. The proponent shall place public notice(s) in at least one local newspaper having general circulation in the area of the proposed project and/or at least in one daily newspaper. The notice(s) must include (at minimum) the information outlined in the sample notice below:

NOTICE

**Registration of Undertaking**

**Environmental Impact Assessment Regulation, LI 1652**

**Opportunity for Public Comment**

On (***date of registration***), (***proponent***) registered the following project with the Environmental Protection Agency in accordance with Section1 and Schedule “1 & 2” of the Environmental Impact Assessment Regulation: (***Nameof Project***).

The purpose of the proposed undertaking is (***Brief 1 – 2 sentence description***). The project would be located at (***Brief 1 – 2 sentence description***)

The proponent’s registration document can be examined at: (***list two publicly accessible viewing locations local to the project area***) and at (***EPA Regional Office***) and at the EPA Head Office, Starlet 91 Road, Opposite Registrar General’s Department, Ministries, Accra.

Any comments should be submitted directly to the proponent at:

(***proponent’s mailing address and e-mail address***) or during a Public Hearing to be held at (***date time and location of the Public Hearing if one is being held***)

on or before (***date; the greater of: 25 days from first appearance of this notice or 25 days from date of the Public Hearing if one is being held***)

Additional information about the proposal and the public involvement process is available at: [www.xxxxxxxxxxx](http://www.xxxxxxxxxxx)

Notice Placed by: (***proponent name***)

Note that the proponent is also encouraged to use other appropriate media (radio, television, signs on subject property, email etc.) for the announcement of project registrations, solicitation of public comments and notification of public open houses.

6. The proponent shall make the project registration document, (and any subsequent submissions in response to issues raised by the Technical Review Committee) available at least at two locations within the administrative jurisdictions of the project area (e.g. the proponent’s offices, a public library, a municipal office, another public location).

7. The proponent shall advertise and host an open house or public meeting to provide the public with an opportunity to become familiar with the proposed project and to seek clarifications on issues that concerns them ask /or raise concerns pertinent to the environmental impacts.

**Documentation Requirements (For all registered projects)**

8. Within 25 days of project registration, the proponent shall prepare and submit to the EPA a report documenting the above public involvement activities and shall make this report available for public review. The report must:

* + - describe the public involvement activities (dates and times of any meetings, copies of newspaper notices, flyers, letters etc.);
		- identify key public and private stakeholders (local naturalist groups, industry representatives, politicians, etc.) directly contacted;
		- include copies of all correspondence received from and sent to stakeholders and the general public;
		- describe (summarize) all issues or concerns received as a result of the public involvement program (names and affiliations of persons providing the comments should be included in the report, but personal information such as addresses and telephone numbers should be omitted);
		- indicate how these issues and concerns were (or will be) considered or addressed;
		- describe any proposed future public consultation with respect to the undertaking (e.g. on-going public liaison committees, etc.).
		- for projects involving the use of State Land, any comments on this aspect of the project must be clearly documented.

Notes:

(i) The EPA has the authority to release the proponent from the obligation to respond to public comments that are: a) frivolous or malicious (e.g. personal attacks on the integrity of the proponent), or b) not specific to the project, (e.g. general concerns about broader social or environmental issues).

(ii) The proponent is not required to address any comments received anonymously.

(iii) The EPA considers all public comments and the proponent’s responses to be public information. The report on public involvement activities will be made available for public review at the relevant EPA’s Regional Office and at the EPA’s Head Office.

## ANNEX II: Wastewater Treatment Projects

**dditional Information Requirements for Wastewater Treatment Projects**

Pursuant to Section 1 of the *Environmental Impact Assessment Regulation* of the *Environmental Protection Agency Act*, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is **requireded in addition** to that outlined in the Registration Guide and. must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-302-664697/8.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and in the Registration Guide.

**Definition**

This guideline is applicable to all municipal and industrial wastewater disposal or treatment facilities, other than domestic, on-site sewage disposal systems.

A complete list of potential triggers for project registration is provided in Schedule “1 & 2” of the Regulation. To determine if registration is required for a specific project, please contact the EPA at the number listed above.

**1.0 THE PROPONENT**

See Registration Guide

**2.0 THE UNDERTAKING**

**(iii) Purpose/Rationale/Need for the Undertaking:**

* How are the current wastewater treatment demands being met?

**(v) Siting Considerations:**

* Discuss the location with respect to existing sensitive land uses (e.g. residential properties, schools, recreational facilities, tourist areas, etc.)
* If the facility is intended for municipal use, does the community have communal potable water supply and where is it compared to the proposed waste water treatment plant (WWTP) location?
* Have the locations of existing or proposed Wellfield Protected Areas and Watershed Protected Areas been taken into consideration in the siting of the facility?
* Note that the proponents of new wastewater treatment facilities for municipal use should examine and fully exhaust potential locations within the municipal boundaries prior to looking outside the municipal limits.
* The siting for wastewater treatment facilities cannot be located within a 1:20 year floodplain. If applicable, delineate the floodplain on the proposed site. Should a floodplain exist, its extent must be determined and clearly delineated using mapping using a scale of 1:10,000. Should floodplains exist within the impact zone of the proposed facility or on the property of the proposed facility, the proponent is required to provide rationale for the facility location and to describe what mitigation measures the proponent is intending to implement. Specific attention in the registration document must be given to the location and design of the facility with respect to known flood levels, discharges and hydraulic upheavals.

**(vi) Physical Components and Dimensions of the Project:**

Provide a detailed description of the proposed project, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to the following:

* The proponent is required to identify in general terms all infrastructures related to the collection and release of wastewater. Detailed engineering drawings are not required however the proponent should identify the following information on an appropriate scale map: location of all collection piping; number and location of all lift stations; location of outfall piping; proposed lagoon design features if applicable (type of liner, size, retention time, etc.).
* A design brief should be provided for the proposed facility, describing the type of treatment system that is planned (facultative lagoon, surface aeration lagoon, subsurface aeration lagoon, constructed wetland, rotating biological contactor, other mechanical system, etc.) and describing various design features (size, design capacity, detention time, effluent treatment criteria, etc.).
* If subsurface disposal of waste water is being proposed, please provide:

a) survey plan of the property to identify exact lot dimensions for an on-site waste disposal assessment,

b) contour plan should also be submitted if slopes on the lot are greater then 5%, and

c) adescription of the permeability (hydraulic conductivity) of the disposal area. (For soils with low permeability, indicate the source and estimated volume of imported material that will be required.)

**(vii) Construction Details:**

Provide a detailed description of the proposed construction activities and methods, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to the following:

* If a subsurface wastewater disposal system is proposed, confirm that the area for the disposal field will be marked off or flagged off to prevent soil compaction by heavy equipment.

**(viii) Operation and Maintenance Details:**

* Provide a detailed description of the proposed project’s operation and maintenance characteristics, addressing the requirements contained in the Registration Guide. For this class of project the required information includes but is not limited to the following:
* Describe the point of discharge into the receiving environment. This description should also identify the diffusion/dispersion method for the discharge.
* For river or marine discharge locations, provide information regarding the flow volume and an anticipated dilution factor to be achieved from the facility. Include a description of the mixing zone. Will the receiving stream always have at least eight times more volume of water than effluent?
* Will disinfection be used prior to effluent discharge? If so, please identify the technology and operating procedures. The proponent should note that if chlorination of the treated effluent is the preferred option, it must be accompanied with a de-chlorination process.
* To what level of its nominal capacity will the facility be functioning at the beginning of its operation?
* For municipal systems provide a prediction of probable loading growth and future extension of municipal services. How many years of additional capacity does the design provide? The submission must also include a detailed listing of the number of residential, institutional, commercial and industrial users to be serviced with the system.
* If the system is an expansion of an existing municipal wastewater treatment lagoon with a combined (storm and sanitary) sewer system, how does the system operate during storm events?
* Will the system discharge to the receiving environment be batch or continuous? If the discharge will be on a batch basis, when or how often are discharges likely to occur?
* For municipal systems, will any special industries or significant users be using the treatment facilities? Assess the possibility of either hazardous chemicals in the system or significant changes in the system loading as a result of such users.
* Will the facility be designed to allow it to receive hauled septage from septic service companies or other industrial facilities?
* Are pump or lift stations required? If so, please locate them on a map. Will they have emergency power? If the pumping station does not have back-up power, what mitigation measures are proposed to minimize environmental impacts from by-pass events?
* Describe the projected characteristics of the treated effluent (e.g., BOD, TSS, TKN, TP, etc.) and provide information on projected effluent flow volumes.
* Please note that EPA’s effluent quality objectives for municipal wastewater systems are 20 mg/l for BOD and 20 mg/l for TSS. If the proposed municipal project does not meet these objectives, a thorough justification must be provided.
* Characteristics of the raw influent wastewater loadings to the wastewater treatment facility (chemical and physical) should be provided so that the adequacy of the design can be verified by reviewers.
* Operation and Maintenance (O&M) targets or criteria should be established for the proposed facility. This information is usually known relatively early in the planning process as the facility owner may have physical or budgetary considerations which limit options for long term O&M. This information can be used in the EIA registration document, in conjunction with other material, to inform TRC members of the rationale used by the proponent for decision-making.
* Will there be disposal of sludge in the future? How much will be produced and how and where will it be treated or disposed of?
* Who will be responsible for the maintenance of the system? Note that for residential subdivisions with communal water and wastewater systems outside incorporated areas, the department will require that a public entity (municipality, commission) own and maintain the infrastructure associated with the development.

**3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT**

Include all relevant environmental features as noted in the Registration Guide. Examples of issues that may be of particular relevance to this class of project include but are not limited to the following:

* Current uses of the receiving stream downstream of the outfall; (e. g. swimming, drinking water, shellfish harvesting)
* The presence of other effluent discharges upstream or downstream of the proposed discharge location.
* For systems discharging to surface water, the fish habitat in the zone of influence of the proposed discharge.
* If subsurface disposal of waste water is being proposed, the distances to wells and septic fields on neighbouring properties.

**4.0 SUMMARY OF ENVIRONMENTAL IMPACTS**

All anticipated impacts should be described and discussed. These will depend on the scope and complexity of the project as well as the project location. See the Registration Guide for further information. Examples of impacts resulting from this class of project may include but are not limited to the following:

* Odour impact - Provide an odour impact analysis for any existing sensitive land uses within 500m of the boundary of the subject property.

**5.0 SUMMARY OF PROPOSED MITIGATION**

Describe all mitigative measures that will be employed to minimize the potential environmental impacts identified above. These may include but are not limited to the following:

* Describe any proposed pollution control equipment and discharge monitoring programs.
* What contingency plans are in place for power failures and other malfunctions?
* What monitoring of nearby wells, receiving stream and/or of effluent is proposed?
* If surface aeration is the preferred option, how will potential concerns about aerosols impacting health of neighbours be addressed?
* In the case of municipal systems, will the consulting engineer be providing the municipality with sample by-laws concerning wastewater collection, such as allowable volumes or contaminants by users into the collection system?

Other mitigative measures will vary depending on the size, scope and complexity of the project and depending on its location with respect to environmental features. See the Registration Guide for additional guidance.

**6.0 PUBLIC INVOLVMENT**

See Registration Guide.

**7.0 APPROVAL OF THE UNDERTAKING**

See Registration Guide.

**8.0 FUNDING**

See Registration Guide.

**9.0 SIGNATURE**

See Registration Guide.

**10.0 SUBMISSION INSTRUCTIONS**

See Registration Guide.

## ANNEX III: Projects Involving Dams, Impoundments and/or Causeways

**ANNEX III: Projects Involving Dams, Impoundments and/or Causeways**

**Additional Information Requirements for Projects Involving Dams, Impoundments and/or Causeways**

Pursuant to Section 1 of the *Environmental Impact Assessment Regulation* of the *Environmental Protection Agency Act*, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is required in addition to that outlined in the Registration Guide and must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-21-664697/8.

After reviewing the registration submission, the Technical Review Committee may require other information beyond the items listed below and in the Registration Guide.

Note: If your project involves any of the following components, please contact the Environmental Protection Agency at (+233)-21-664697/8 to determine if your project requires a comprehensive study under the Environmental Assessment Regulation:

a) expansion of a dam or dyke that would result in a 35% increase in the surface area of a reservoir, or

 b) a dam or dyke with a reservoir surface area of 1,500 hectares or more.

**Definition**

This guideline is applicable to all facilities or developments involving the construction/operation, modification or removal of a dam, impoundment or causeway.

A complete list of potential triggers for project registration is provided in Schedule “1” of the Regulation. To determine if registration is required for a specific project, please contact the EPA at the number listed above.

**1.0 THE PROPONENT**

See Registration Guide

**2.0 THE UNDERTAKING**

**(v) Siting Considerations:**

Provide the results of a site-selection study, including the following:

* Description of any potential alternatives to the project and their feasibility (e.g., if the impounded area is being created for water supply, discuss the feasibility of any alternatives to the project, such as the use of groundwater);
* Description of all alternative sites that were considered and the existing environmental components potentially affected by each alternative; and
* Explanation of the rationale for the chosen option.

**(vi) Physical Components and Dimensions of the Project:**

Provide a detailed description of the proposed project, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to:

* Details on the site layout (i.e., show the proposed dam/causeway/impoundment location and the location of other required construction areas. Include dimensions of these features – e.g., the size and maximum depth of any impounded areas);
* Details on the design of the proposed dam/causeway (i.e., layout, geometry, core and facing material, spillway location and design, etc.);
* Accessibility of site, including any additional access routes to be constructed (indicate if additional routes are temporary or permanent);
* If additional access routes are required to be constructed, provide details on any stream crossings (i.e., temporary/permanent, culvert, bridge, etc.);
* Classification of dam according to the Dam Safety Guidelines (available on the internet at the address provided in Appendix “A” of the Registration Guide).

**(vii) Construction Details:**

Provide a detailed description of the proposed construction activities and methods, addressing the requirements contained in the Registration Guide. For this class of project the required information includes but is not limited to the following:

* Description of the location of any stock piles, spoil piles and/or waste rock storage areas (include the dimensions as well);
* If drilling or blasting is anticipated, provide details on where, how much, anticipated charge size and location of adjacent streams to potential blast sites, etc.;
* preliminary details on construction of any stream diversions;
* Description of e clearing and grubbing activities, including fate of any merchantable timber and topsoil removed during these activities;
* Information about any excavation associated with dam construction, (i.e., depth, width, excavation method etc.);

**(viii) Operation and Maintenance Details:**

Provide a detailed description of the proposed project’s operation and maintenance characteristics, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to:

* Description of the various operational activities in sufficient detail for the Review Committee to gain a full understanding of the project. Include in the description all proposed operation, maintenance and inspection activities (e.g. inspection and maintenance schedules, seasonal manipulation of water levels, sluice gate operation for high flow by-pass, turbine operation and maintenance, etc.). Other monitoring initiatives such as water chemistry, dissolved oxygen monitoring, etc should be listed.
* Information on contingency plans and emergency response plans (e.g. in the event of a water-control structure breach). Describe the frequency of dam safety review as dictated under the Dam Safety Guidelines.

**(ix) Future Modifications, Extensions or Abandonment:**

* Detailed information on any planned future modifications, extensions or abandonment/decommissioning plans for the proposed project, including predicted time frames and contingency requirements (e.g., what is proposed for the dam structure and impoundment, following the end of the operational life of the proposed project?).
* Description of any reclamation or restoration plans for the site following the end of the operational life of the project, with due consideration of the objective of returning any impacted areas to functioning habitats/ecosystems.

**3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT**

Include all relevant environmental features as noted in the Registration Guide. Examples of issues that may be of particular relevance to this class of project include but are not limited to the following:

* The physical and natural features of the area, including use of the site by wildlife and birds, at different times of the year.
* Existing hydrology (watercourses - e.g., channel width, water depth, seasonal flow, water quality, etc.), fish species/fish habitat, and wetlands (e.g., wetland type, functions provided, wetland boundary, etc.).
* The potential occurrence of species at risk
* Recreational, commercial or artisanal fisheries that could be potentially affected by project development.
* Archaeological/heritage resources that could potentially be affected by the proposed project, including those resources that could become submerged following impoundment.
* Lands currently in use for traditional resource collection purposes by local persons within the Project area. These may include Traditional Use Plants (i.e., traditional medicinal plants), spiritual areas, resource gathering, areas of interest, etc.

**4.0 SUMMARY OF ENVIRONMENTAL IMPACTS**

All anticipated impacts should be described and discussed. These will depend on the scope and complexity of the project as well as the project location. See the Registration Guide for further information. Examples of impacts resulting from this class of project may include but are not limited to the following:

* Grubbing, clearing, draining, hauling and building are typical components of construction activities. In addition the construction, modification or decommissioning of a water-control structure (e.g., dam) can result in significant changes to hydrology and wildlife habitats. These activities can produce water, noise, air and solid waste pollution, and result in adverse environmental effects, including erosion and sedimentation, and impacts on water quality, fish habitat and wetlands. Operational activities can also negatively affect environmental components, typically through the generation of runoff, light, dust, noise and other emissions, and as a barrier to fish passage.

Other examples of potential impacts resulting from the construction/operation, modification or removal of a dam, impoundment or causeway, include:

* impacts of water quantity and quality in the reservoir and downstream (e.g., the release and mobilization of methyl mercury and other heavy metals due to the submergence of vegetation, thermal impacts, changes in dissolved oxygen concentrations, changes in CO2/pH regime, trophic upsurge, nitrogen supersaturation, leaching of minerals from submerged bedrock, etc.);
* changes to downstream channel morphology due to changes in silt content and flow regime;
* impacts to fish/fish habitat (e.g., barrier to fish passage);
* impacts on wildlife (e.g., habitat loss, displacement or alteration);
* impacts on wetlands;
* impacts on species at risk and critical habitat features;
* impacts on land-use and property values;
* impacts on infrastructure; and
* impacts to previously submerged habitat/lands.
* In addition to the foregoing, provide an assessment of the predicted effects the environment may have on the proposed undertaking. Environmental factors that typically may impact the project include climate and meteorological conditions, and geology (e.g., subsidence, seismic activity, reservoir ice cover, etc).

**5.0 SUMMARY OF PROPOSED MITIGATION**

Describe all mitigation measures that will be employed to minimize the potential environmental impacts identified above. These may include but are not limited to the following:

* Measures to control erosion & sedimentation (silt fencing, soil stabilization and armouring);
* Measures to address fish passage requirements (e.g., fishways, etc);
* Compensation plans for lost fish habitat in accordance with national requirements;
* Measures to address the release of methyl mercury and other metals from the submergence of vegetation (e.g., vegetation removal prior to impoundment development);
* Measures to address potential thermal and other impacts of an impoundment on downstream and reservoir water quality;
* The use of water sprays and/or dust suppressants to reduce dust generation;
* Limiting the removal of riparian zone vegetation;
* Developing a contingency plan to respond in the event that heritage resources are discovered;
* Minimizing the use of heavy equipment in and adjacent to associated watercourses and wetlands; and
* Monitoring noise levels near noise sensitive areas, etc.

Note that an Environmental Management Plan (EMP) is a valuable tool for ensuring minimization of environmental impacts during construction and operation, by linking proposed mitigation measures to a geographic location. Typically, a site-specific EMP (including an erosion control and surface water management plan) will be required.

**6.0 PUBLIC INVOLVEMENT**

See Registration Guide.

**7.0 APPROVAL OF THE UNDERTAKING**

See Registration Guide.

**8.0 FUNDING**

See Registration Guide.

**9.0 SIGNATURE**

See Registration Guide.

**10.0 SUBMISSION INSTRUCTIONS**

See Registration Guide.

## ANNEX IV: Major Residential Developments

**ANNEX IV: Major Residential Developments**

**Additional Information Requirements for Major Residential Developments**

Pursuant to Section 1 of the *Environmental Impact Assessment Regulation* of the *Environmental Protection Agency Act*, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is required in addition to that outlined in the Registration Guide and must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-21-664697/8.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and in the Registration Guide.

**Definition**

This guideline is applicable to new or expanded residential subdivisions, large apartment/condominium complexes, large nursing homes, university/college residences and new or expanded courts/parks located outside incorporated areas.

A complete list of potential triggers for project registration is provided in Schedule “1” of the Regulation. To determine if registration is required for a specific project, please contact the EPA at the number listed above.

**1.0 THE PROPONENT**

See Registration Guide.

**2.0 THE UNDERTAKING**

**(v) Siting Considerations:**

* Route selection for roads and for infrastructure such as water mains, sewerage, and electrical distribution lines is a critical component of designing a major residential development. Refer to the document Additional Information Requirements for Linear Facilities for guidance on route selection.
* The Town and Country Planning Act and Building Regulations, have enforced several regulations which stipulate conditions and setbacks required for siting and designing proposed developments,

 **(vi) Physical Components and Dimensions of the Project:**

Provide a detailed description of the proposed project, addressing the requirements contained in the Registration Guide. For this class of project, a the required information includes but is not limited to the following:

* Provide information on the new sources of lighting that will be installed.
* Indicate how the development will be serviced (water, sanitary sewage and storm sewers).
* Provide details of ancillary features related to the development, such as paved roads, sidewalks, electrical distribution system, etc.
* Provide a description of the green spaces (parks, natural areas, buffer zones, etc.) that will be a part of the development.
* Provide details of the alternative sources that were considered for the development’s energy requirements (e.g. oil, natural gas, electricity, etc.).

**(vii) Construction Details:**

Provide a detailed description of the proposed construction activities and methods, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to the following:

* Construction schedule for site preparation activities, which may include the clearing of the site (if vegetation is present) and grubbing to remove unwanted debris, grading of the site and/or excavation of the site.
* Details concerning the installation of infrastructure such as access roads, electrical distribution system, water mains and sewage lines.

**3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT**

* Include all relevant environmental features as noted in the Registration Guide. Examples of issues that may be of particular relevance to this class of project include but are not limited to: Details of the site-specific geology and hydrogeology of the proposed property.

**4.0 SUMMARY OF ENVIRONMENTAL IMPACTS**

All anticipated impacts should be described and discussed. These will depend on the scope and complexity of the project as well as on the project location. See the Registration Guide for further information. Examples of impacts resulting from this class of project may include but are not limited to the following:

* Indication of the generation of dust, noise, vibrations, emissions from heavy equipment, and the possible generation of silt in surface runoff and release of concrete wash water that may adversely affect nearby watercourses. The storage and handling of hydrocarbons may also be of concern.
* Details on the increased in imperviousness of surfaces and the related storm water management issues, such as increased runoff.
* Description of the wildlife habitat fragmentation that will occur as a result of the decrease in the amount of green spaces in the proposed project area.
* Indication of the anticipated impacts that may result from pesticide use in the area.

**5.0 SUMMARY OF PROPOSED MITIGATION**

Describe all mitigation measures that will be employed to minimize the potential environmental impacts identified above. See the Registration Guide for additional guidance.

**6.0 PUBLIC INVOLVEMENT**

See Registration Guide.

**7.0 APPROVAL OF THE UNDERTAKING**

As a condition of Determination Review for Major Residential Developments, the Technical Review Committee (TRC) may require that the waste water systems and any communal drinking water systems be installed and rendered functional prior to the construction of any building which would be serviced by these systems. The TRC may also require that communal drinking water systems be installed and tested prior to commissioning and activation of the supply. Also, note that for residential subdivisions outside “serviced” areas, that will make use of communal water and wastewater systems, the EPA will require that a public entity (municipality, commission) own and maintain the infrastructure associated with the development.

**8.0 FUNDING**

See Registration Guide.

**9.0 SIGNATURE**

See Registration Guide.

**10.0 SUBMISSION INSTRUCTIONS**

See Registration Guide.

**OTHER APPLICABLE GUIDELINES**

Depending on the details of the project, it may be appropriate to also consult the guidelines- Additional Information Requirements for Water Works and Water Supply Projects, and Additional Information Requirements for Wastewater Treatment Projects.

## ANNEX V: Linear Facilities

**ANNEX V: Linear Facilities**

**Additional Information Requirements for Linear Facilities**

Pursuant to Section 1 of the *Environmental Impact Assessment Regulation* of the *Environmental Protection Agency Act*, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is required in addition to that outlined in the Registration Guideand must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-21-664697/8.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and in the Registration Guide.

Note: If your project involves any of the following components please contact the Environmental Protection Agency at (+233)-21-664697/8 to determine if your project requires a comprehensive study under the Environmental Assessment Regulation:

a) an electrical transmission line that is 75 km or more in length,

b) an oil or gas pipeline more than 75 km in length on a new right of way,

c) a railway line more than 32 km long on a new right of way,

d) a railway line designed for trains that have an average speed of more than 200 km/h, or

e) an all-season public highway more than 50 km long.

**Definition**

This guideline is applicable to linear facilities including major highways, pipelines, railways, electric power transmission lines and linear communications transmission systems that are listed as undertakings in Schedule “1” of the *Environmental Impact Assessment* Regulation. To determine if registration is required for a specific project, please contact the EPA at the number listed above.

**1.0 THE PROPONENT**

See Registration Guide

**2.0 THE UNDERTAKING**

(v) Siting considerations:

* Provide a route selection study including appropriate environmental constraint mapping, indicating how the selected route would minimize impacts on areas of environmental significance. In selecting the route, the proponent should distinguish between features where mitigation is possible versus features where there is no feasible mitigation. The process for selecting alternative routes should be described including any engineering, environmental and socio-economic constraints that were considered. This description should also address site location and design alternatives for ancillary activities or works that are directly linked to the linear project; for example: interchanges, borrow areas, waste rock and storage areas, rest areas, weigh stations, transformer stations, pump stations, etc.
* The route selection study should identify and compare the environmental impacts associated with the alternative routes. Where relative weightings or rankings are applied to the various environmental components listed above, these weightings or rankings should be explicitly stated and justified in the routing study.
* The sharing of existing linear corridors or right-of-ways should be considered where, technically feasible and environmentally beneficial.

Environmental features to be considered in the route selection study include but are not limited to the following:

* agricultural land;
* archaeological resources (known or suspected);
* avian migration routes including stopover, resting and feeding areas;
* commercial/industrial activities;
* communication facilities;
* ducks unlimited sites;
* environmentally significant areas;
* fish hatcheries;
* hazard lands (flood plains, subsidence risk, steep slopes, etc.);
* known contaminated sites;
* fish populations and habitat;
* forest (mature forest habitats, permanent forest sample plots, tree nurseries/plantations);
* institutional lands (schools, etc.)
* landfills;
* migratory bird staging areas;
* mines;
* mineral claims;
* military lands;
* municipal well fields;
* parks (private, municipal, provincial, federal);
* power transmission lines, pipelines, other linear infrastructure;
* protected watersheds;
* protected coastal areas;
* protected natural areas (terrestrial/marine)
* species at risk and other species of conservation concern; \*
* raptor nests;
* recreational areas (trails, camp clusters, etc.)
* residences;
* watercourses;
* wetlands;
* wildlife reserves/game management areas; and
* wildlife travel corridors and habitats

\* All species found in the project area that are identified as a species of conservation concern should be highlighted for attention when selecting a route.

**3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT**

Include all relevant environmental features as noted in the Registration Guide.

**4.0 SUMMARY OF ENVIRONMENTAL IMPACTS**

All anticipated impacts should be described and discussed. These will depend on the scope and complexity of the project as well as the project location. See the Registration Guide for further information. Examples of impacts resulting from this class of project may include but are not limited to the following:

Highways

* Provide a description of the impact of the proposed facility on traffic patterns, travel times, traffic volumes, etc.
* Provide an assessment of anticipated pollutant loadings as a result of this project (construction, operation and maintenance phases). Reasonable consideration of project effects on air quality would include quantification of pollutant releases (e.g., particulate matter (PM2.5, PM10), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs)) and greenhouse gas (GHG) emissions associated with the project (e.g., vehicle emissions during construction and operation). The contribution of asphalt plants to air pollution and GHG emissions should be highlighted and quantified in the EA. Also, methods to reduce GHG emissions associated with the project, and to minimize the loss of carbon sinks, should be adopted and described.
* Provide an analysis of the anticipated impact of the facility on wildlife movement/migration patterns, including proposed wildlife crossings, fish passage, wildlife fencing, etc. Note that consultation with the Wildlife Division of the Forestry Commission will be required to determine if wildlife crossing or fences are required.
* Planning for highways should consider the effects of the construction, operation and maintenance activities on the quality of groundwater and surface water.

See further information in the sector specific guidelines for this activity.

All Linear Facilities

* Provide an analysis of anticipated noise impacts on existing adjacent residential and institutional properties (e.g. due to vehicular traffic, compressor stations, transformer stations, etc.)
* Provide a description of existing trails, roads, etc. that would be permanently or temporarily blocked or re-routed as a result of the proposed facility, and a description of the resultant socioeconomic impacts.
* Describe the anticipated impacts on natural features and private lands resulting from increased public access (pedestrians, etc.) to lands via the proposed right-of-way, including a description of any proposed access control plans/features (signage, fencing, etc.).
* Describe the anticipated impacts of facility lighting (if any) on migratory birds. Conduct a migratory bird survey (see Appendix 1) on the selected route. Results should be used as input to determine the final alignment.
* Provide an assessment of the impacts of proposed maintenance activities (weed control, facility painting, facility cleaning, inspection activities, ice removal, etc.) on public health and safety and on the natural environment, including the quality of groundwater and surface water.

**5.0 SUMMARY OF PROPOSED MITIGATION**

Describe all mitigation measures that will be employed to minimize the potential environmental impacts identified above. Measures may include but are not limited to the following:

* Site-specific watercourse crossing designs or procedures will normally be required as a condition of EIA Determination. Preliminary or typical designs should be submitted at the time of registration.
* Provide details as to how protection of groundwater resources will be achieved. Include a discussion of the proposed collection of any necessary baseline groundwater quality and quantity monitoring data for potentially affected wells. Note that in the event that wells are adversely affected by construction or maintenance activities, an alternative water supply must be provided.
* A comprehensive erosion and sediment control plan and re-vegetation/stabilization plan for all disturbed portions of the right-of-way will be required prior to construction. A preliminary or typical plan should be submitted at the time of registration. Final details will be required as a condition of EIA Determination.
* Describe procedures that will limit the impact of construction on migratory birds.

**6.0 PUBLIC INVOLVEMENT**

See Registration Guide

**7.0 APPROVAL OF THE UNDERTAKING**

See Registration Guide

**8.0 FUNDING**

See Registration Guide

**9.0 SIGNATURE**

See Registration Guide

**10.0 SUBMISSION INSTRUCTIONS**

See Registration Guide

**OTHER APPLICABLE GUIDELINES**

Wetland Delineation Requirements for Linear Projects

## ANNEX VI: Waste Disposal Facilities

**Additional Information Requirements for** **Waste Disposal Facilities**

Pursuant to Section 1 of the Environmental Impact Assessment Regulation of the Environmental Protection Agency Act, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is required in addition to that outlined in the Registration Guide and must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-21-664697/8.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and in the Registration Guide.

Note: If your project involves the construction or decommissioning of a facility designed exclusively for the treatment, incineration, disposal or recycling of hazardous waste,, please contact the Environmental Protection Agency at (+233)-21-664697/8 to determine if your project requires a comprehensive study under the Environmental Assessment Regulation:

**Definition**

This guideline is applicable to projects involving the disposal of waste. All projects involving waste disposal facilities or systems must be registered under the EIA Regulation. These include but are not limited to municipal solid waste landfill sites, industrial landfills, tailing ponds, and waste incineration facilities.

A complete list of potential triggers for project registration is provided in Schedule “1” of the Regulation. To determine if registration is required for a specific project, please the EPA at the number listed above.

**1.0 THE PROPONENT**

See Registration Guide.

**2.0 THE UNDERTAKING**

**(ii) Project Overview:**

* This description should include the type of waste material, its origin(s), the annual volume and tonnage of waste material, and the estimated life span of the project.
* If the purpose of the project is to treat contaminated material, the contaminants and their concentrations should be identified.

**(v) Siting Considerations:**

* For new municipal or industrial sanitary landfills, site selection should be made with reference to Site Selection Guidelines for Municipal and Industrial Sanitary Landfills (copy may be obtained from the EPA Offices)
* Provide characterization of the geology and hydrogeology of the proposed site.
* Describe whether the proposed project would be located in a green field or a brown field (previously developed) site and state the justification for the selected location.
* Characterize the potential of risk from seismic activity at the site.
* Describe the anticipated socio-economic issues resulting from the location of the facility.

**(vi) Physical Components and Dimensions of the Project:**

Provide a detailed description of the proposed project, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to the following:

* Site plan showing the locations of all physical components of the project.
* Design of the facility including appropriate containment systems such as liners, leachate collection and/or treatment systems (if applicable), including as much detail about these components as possible.
* Hydrogeological assessment of the surface and subsurface conditions in and around the facility. The assessment should include test pits, boreholes and/or monitoring wells and provide appropriate detail concerning stratigraphy, hydraulic conductivity, groundwater elevations, topography, flow directions and gradients at various depths. The information should be presented in sufficient detail to determine the flow path and ultimate receptor of a liquid contaminant if that contaminant was released in an uncontrolled fashion at the facility. To aid in interpreting the details, provide cross-sectional drawings of the site showing the stratigraphy, assumed groundwater surface(s) and hydraulic conductivities, where known. Provide a plan of current and future groundwater monitoring wells and surface water monitoring stations.
* If the proposed facility is a landfill, please provide a drawing indicating the setback distances to the environmental and socioeconomic receptors outlined in the Site Selection Guidelines for Municipal and Industrial Sanitary Landfills.

**(viii) Operation and Maintenance Details:**

Provide a detailed description of the proposed project’s operation and maintenance characteristics, including the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to:

* Describe the nature and character of the wastes to be treated, recycled or disposed with full characterization of the waste stream to determine the expected contaminants and the order of magnitude of the expected concentrations of each contaminant in the waste.
* Provide a process description including a flow chart illustrating the movement of materials through the waste treatment system, including details of the technologies to be employed.
* Based on the full characterization of the expected waste stream and the technologies to be employed, the ability of the facility to treat these wastes to acceptable levels should be demonstrated.
* The volumes, chemical characteristics and planned discharge locations of process wastewater, storm runoff, leachate and domestic wastewater should be estimated.
* Provide a description of the locations, methods and volumes of waste storage.
* Describe the fate of (market for) any recycled material.
* Describe the proposed site drainage including any piping, containment and treatment including any wastewater treatment technologies to be employed.
* Indicate the process and potable water requirements and water sources.
* Describe any sewage treatment facilities that will be necessary.
* What are the annual power requirements and the proposed power source?
* What are the anticipated volumes and types of traffic associated with the movement of goods, services and personnel to and from the project site during the facility operation?
* Describe the fate of any treated materials (e.g. treated effluent, composted materials, etc.)
* Describe the expected treatment and/or disposal volumes on an annual basis.
* Indicate the anticipated annual volume of any generated leachate.

**(ix) Future Modifications, Extensions, or Abandonment:**

A conceptual closure plan must be provided at the time of project registration.

**3.0 DESCRIPTION OF EXISTING ENVIRONMENT**

Include all relevant environmental features as noted in the Registration Guide. Examples of issues that may be of particular relevance to this class of project include but are not limited to the following:

* Existing geological and hydrological conditions at the receiving or processing site.
* Past, current or future projects, activities and land uses in the project area whose effects may interact with those of the project under review.
* Information concerning current water quality (i.e. current contaminant loading) in any watercourse which will receive treated leachate, plus high, low and normal flow estimates for the watercourse.

**4.0 SUMMARY OF ENVIRONMENTAL IMPACTS**

All anticipated impacts should be described and discussed. These will depend on the scope and complexity of the project as well as the project location. See the Registration Guide for further information. Examples of impacts resulting from this class of project may include but are not limited to the following:

* All air emissions that may result from the operation of waste disposal facilities should be characterized, including emissions from point sources (e.g., stacks or vents), fugitive emissions, and emissions from area sources (e.g., wood waste storage piles, road dust). Estimates of the range of emissions from the above sources for normal conditions and abnormal conditions (accidents and malfunctions) should be provided. The type and volume of any anticipated emissions of greenhouse gases must also be identified. (See “Other Applicable Guidelines” below)
* Risks to groundwater and surface water resources from the operation of the facility should be understood and described by the proponent Information on any proposed waste storage or chemical storage at the facility that may be a cause for water quality concerns should be provided. An estimation of whether the receiving surface water/groundwater quality will be significantly affected by the discharge of the leachate should be provided.
* In the case of facilities that will involve the operation of chemical processes (e.g., soil treatment facilities, incineration facilities, and hazardous waste treatment facilities), appropriate dispersion modeling studies should be conducted in order to determine the potential for adverse impacts on ambient air and water quality in the a local and regional context..
* Noise and odour impacts on sensitive propertieswithin the immediate vicinity of the propose project should be predicted and evaluated.

**5.0 SUMMARY OF PROPOSED MITIGATION**

Describe all measures that will be employed to mitigate the potential environmental impacts identified above. These may include but are not limited to the following:

* Environmental monitoring programs;
* An outline of proposed emergency and/or spill response procedures as well as potential remediation measures in the event of a spill, leaks etc
* Control and containment systems to be implemented as part of the project to protect the environment (for example leachate treatment to ensure that there will not be an impact on the receiving watercourse); and
* A conceptual Closure Plan.

**6.0 PUBLIC INVOLVEMENT**

See Registration Guide.

**7.0 APPROVAL OF THE UNDERTAKING**

See Registration Guide.

**8.0 FUNDING**

See Registration Guide.

**9.0 SIGNATURE**

See Registration Guide.

**10.0 SUBMISSION INSTRUCTIONS**

See Registration Guide.

**OTHER APPLICABLE GUIDELINES**

* It may be appropriate, depending on the details of the waste disposal facility to also consult the guideline:
* The emission rates of each of contaminants during the operational phase should be well understood by the proponent. Information can be obtained from:

a) operating experience and monitoring results from similar operations,

b) the use of material and energy balances, and

c) the use of published emission factors such as (USEPA (1995) “Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources” (available online at <http://www.epa.gov/ttn/chief/ap42/index.html>) or USEPA (2000) “Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 2: Mobile Sources” (available online at <http://www.epa.gov/otaq/ap42.htm>) or Environment Canada (2003) “National Pollutant Release Inventory Website”, (available online at <http://www.ec.gc.ca/pdb/npri>).

* It is recommended that proponents prepare a detailed emissions inventory of the facility based on the above information sources in order to quantify the magnitude of the expected emissions that may result from the operation of the facility.
* For new municipal or industrial sanitary landfills, site selection should be made with reference to Site Selection Guidelines for Municipal and Industrial Sanitary Landfills.

## ANNEX VII: Golf Courses

**Additional Information Requirements for Golf Courses**

Pursuant to Section 1 of the Environmental Impact Assessment Regulation of the Environmental Protection Agency Act, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is required in addition to that outlined in the Registration Guide and must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-21-664697/8.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and in the Registration Guide.

A complete list of potential triggers for project registration is provided in Schedule “1” of the Regulation. To determine if registration is required for a specific project, please the EPA at the number listed above.

**Definition**

This guideline is applicable to all golf courses proposed that consist of, or are a part of projects that require registration in accordance with Item (30) of Schedule “1” of the *Environmental Impact Assessment* Regulation.

**1.0 THE PROPONENT**

See Registration Guide

**2.0 THE UNDERTAKING**

(iv) Project Location:

* Provide a 1:10,000 map (with topographic contour lines) indicating the location of the proposed development.
* Provide a colour aerial photograph of the site.

 **(vi) Physical Components and Dimensions of the Project:**

Provide a detailed description of the proposed project, addressing the requirements contained in the Registration Guide. For this class of project the required information includes but is not limited to the following:

* The site plan should show: a) physical features of the site (including topography, forest cover, wetlands, watercourses, grasslands, areas prone to erosion) and b) the planned course layout (including the location and orientation of holes, buildings, parking areas, walking trails, cart paths, watercourses, practice areas, ponds, reservoirs, wells, pesticide/fertilizer storage areas, club house, maintenance and storage areas, associated residential or commercial development, etc).
* If the project will consist of several phases that will be gradually implemented over time, be sure to provide all available details on the location and layout of the future phases.
* Show the proposed conceptual site grading and drainage pattern of the golf course in relation to the adjacent properties and watercourse(s).
* Provide details of the proposed clubhouse if applicable. Will it include a restaurant? If so, give details (liquor license, number of seats, etc.).
* How will the club house be serviced (water and sewage)?
* Will there be any proposed holding tanks, privies, or other sanitary facilities located through out the golf course that will not be connected to the main sewage treatment system?

**(vii) Construction Details:**

Provide a detailed description of the proposed construction activities and methods, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to:

* type(s) of soil that will be affected (clay, sandy, etc.);
* construction method of any reservoirs, ponds or wells (note that ponds and reservoirs should be lined with compacted clay or synthetic liners to minimize seepage).;
* proposed method of removal and disposal of grubbings (chipping, buried, hauled away, etc.);
* construction schedule (will the holes be graded sequentially or all at once?);
* origin of any fill materials including topsoil.

**(viii) Operation and Maintenance Details:**

Provide a detailed description of the proposed project’s operation and maintenance characteristics, addressing the requirements contained in the Registration Guide. For this class of project, the required information includes but is not limited to:

**Water Supply**

* Provide an estimate of daily water use for all purposes including irrigation, potable water, water for fire fighting, etc. A monthly water demand/water balance for the proposed project, taking into consideration local precipitation records and estimated losses due to evapotranspiration and infiltration, should be presented to verify the estimate of water demand.
* Note that if the daily water requirement will be in excess of 50 cubic metres/day then a Water Supply Source Assessment shall be required. Contact EPA for further details.
* Provide details of the proposed source(s) of water for the above purposes (i.e. municipal water supply, irrigation well, irrigation pond, pumping from a watercourse, etc.). Note that the use of artificial reservoirs (including excavated lakes and ponds) is encouraged wherever possible to avoid depleting surface water and groundwater resources.
* If any water supply will be obtained from ground water, indicate the proposed pump capacity, and provide an estimate of monthly groundwater use. State the assumptions used to calculate this.
* If an irrigation pond will be used, describe the location, size, capacity, and retention time provided by the reservoir. Describe the irrigation pond overflow location and the receiving watercourse(s) (if applicable).
* If water will be pumped from a watercourse, list any upstream and downstream users of the watercourse.
* Based on the conceptual drainage and grading plan, and proposed fertilizer use, provide an estimate of the nutrient loadings to watercourses (lakes, rivers, streams)?

**Pesticides**

* Identify the pesticides proposed for use on the facility,including the Pest Control Product Number (PCP #), the product trade name and the active ingredient(s).
* Describe the proposed method and timing of application of the above substances.
* Describe any integrated pest management (IPM) practices considered for use.
* Where would pesticides be stored and how would pesticide containers be disposed of ?

Note that under Schedule 1 of THE PESTICIDES CONTROL AND MANAGEMENT ACT, 1996, “no person shall import, export, manufacture, distribute, advertise, sell or use any pesticide in Ghana unless the pesticide has been registered by the Environmental Protection Agency in accordance with this Act”.

**Waste Disposal**

* The proponent is encouraged to develop a recycling and composting program to minimize the volume of waste produced and to reduce the amounts requiring landfill disposal.

**3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT**

Include all relevant environmental features as noted in the Registration Guide. Examples of issues that may be of particular relevance to this class of project include but are not limited to the following:

* Watercourses, fishes and fish habitats;
* The quality and quantity of groundwater resources, depth of groundwater in the project area and the location of the nearest wells (both residential and municipal).

**4.0 SUMMARY OF ENVIRONMENTAL IMPACTS**

All anticipated impacts should be described and discussed. These will depend on the scope and complexity of the project as well as the project location. See the Registration Guide for further information. Examples of impacts resulting from this class of project may include but are not limited to the following:

**Construction**

* Grubbing, clearing, draining, hauling, and building are typical components of construction activities. These activities can produce water, noise, air and solid waste pollution. Perhaps the most significant of these is the impact on water quality due to erosion and sedimentation.
* A project may affect a watercourse either directly or indirectly. Examples include: (a) works within a watercourse, including any watercourse diversions, footbridges, etc., (b) water withdrawal, (c) discharge of runoff to a watercourse d) removal of stream bank vegetation, and e) construction or operation activities in proximity to a watercourse. Any anticipated impacts resulting from such activities must be described.

**Operation and Maintenance**

* Lowering of the water table due to water withdrawal;
* Impacts on groundwater quality due to pesticide applications, fuel or chemical spills, etc.;
* Impacts on surface water quality (due to sedimentation, pesticides and fertilizer application, fuel or chemical spills etc.);
* Drawdown of watercourses and noise from irrigation pumps.

Impacts on floral and faunal species of conservation importance. Many proposed golf course sites have been known to harbour important species and are established habitats of important species..

**5.0 SUMMARY OF PROPOSED MITIGATION**

Describe all measures that will be employed to mitigate the potential environmental impacts identified above. These may include but are not limited to the following:

* Many of the impacts to the watercourses are directly related to the buffer zone and the methods used to prevent runoff (sediment, pesticides, fertilize, etc.) from reaching these watercourses (non-directed flow, etc.). Describe any such measures to be employed including buffer zones between the facility and adjacent properties and between holes and watercourses. It is generally recommended that a minimum 15-metre buffer zone of unmaintained native vegetation on flat land adjacent to watercourses be employed. The width of the buffer zone should be increased in the event that the land slopes toward the water.
* .Consideration should be given to measures to mitigate impacts on flora and fauna species through creation of alternative site for relocation of some species where feasible or introducing these species in other natural sites where prior habitat management/ manipulation has been initiated to receive species of conservation importance
* An Environmental Management Plan (EMP) is a valuable tool for ensuring minimization of environmental impacts during the construction and the operation of the site. A site-specific EMP will be required prior to any environmental approvals being issued. The EMP for the golf course should emphasize the Erosion Control and Drainage/storm Water Management Plan in order to address the potential impacts with sedimentation, fertilizer and pesticides in the watercourses.
* Prior to the start of construction baseline water samples from adjacent watercourses and residential wells will be required.
* A proposed pest management program must be included with the EIA registration.

**6.0 PUBLIC INVOLVEMENT**

See Registration Guide

**7.0 APPROVAL OF THE UNDERTAKING**

See Registration Guide

**8.0 FUNDING**

See Registration Guide

**9.0 SIGNATURE**

See Registration Guide

**10.0 SUBMISSION INSTRUCTIONS**

See Registration Guide

**OTHER APPLICABLE GUIDELINES**

Depending on the details of the project, it may be appropriate to also consult the guidelines Additional Information Requirements for Water Works and Water Supply Projects, and Additional Information Requirements for Wastewater Treatment Projects.

## ANNEX VIII: Coastal Viewshed

**Additional Information Requirements for Projects in** **Coastal View Shed**

Pursuant to Section 1 of the *Environmental Impact Assessment Regulation* of the *Environmental Protection Agency Act*, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is required in addition to that outlined in the Registration Guide and must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-21-664697/8.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and also those listed in the Registration Guide.

Note: Please contact the Environmental Protection Agency at (+233)-21-664697/8 to determine if your project requires a comprehensive study under the Environmental Assessment Regulation.

**1.0 Introduction**The Siting and Design guidelines are split into three basic categories in response to the nature of the issues. These guidelines are developed as a basis for coastal management and decision-making.

The three categories are:

* Functional Guidelines:
a structure should be sited and designed to fulfil its purpose with sustainable use of resources.
* Cultural/Aesthetic Guidelines:
a structure should be sited and designed to culturally respect its setting and visually complement the surrounding coastal landscape.
* Ecological Guidelines:
a structure should not cause undesirable changes to terrestrial and marine ecosystems in the locality.

The guidelines are intended to cover all developments taking place in the coastal viewshed, both on private and public State land. Some forms of land use covered in the guidelines will be exclusively relevant for private land, some only for State land and some possibly for both. Regardless of the title, developments located in the coastal viewshed should have regard to these guidelines.

**2.0 Functional Guidelines**

*GOAL: That structure are sited and designed to fulfil their purpose with sustainable use of resources.*

**2.1 Introduction**

The Functional Guidelines deals with all utilitarian aspects of a development and seeks to ensure the efficient use of the limited resources of the coast. They provide directions on planning issues (traffic implications and appropriateness of the development to the site and area), issues affected by the siting of structures (pedestrian accessibility to the shoreline and the design of outdoor spaces) and the detailed design of structures to suit the particular environmental conditions of the coast (choice of material, structural design, energy considerations and the provision of utility services).

Of prime concern in the siting and design of structures on the coast is the general instability of these areas. Sandy shorelines often fluctuate and threaten to undermine any structure located on beaches, and many coastal areas are subject to long term erosion and recession of the shoreline. Permanent structures should generally not be erected close to shorelines where they will be threatened by marine erosion. The separating distances from the shorelines must be done in conformity to national buffer zone policy. Consultation with the Water Resources Commission and Ghana Maritime Authority is required in this regard.

**2.2 Appropriateness of Development**

*The coastline is a precious and finite environment and its limited land resources need to be used sparingly and wisely.*

The heavy demands made on the coastal areas especially for the exceptional value of their resource for public recreation, requires that uses of the land and water be preferentially allocated to those requiring a coastal site. These include primarily water based recreation activities and industries such as fishing and port activities, as well as uses associated with conservation and habitat. Only those structures associated with these activities, or directly related to marine works such as erosion protection and navigation, or which contribute significantly to public enjoyment and appreciation of the coast, should be located on the coast.

Examples of developments for which a coastal siting is appropriate are:

* Boat launching facilities.
* Boat moorings, marinas and jetties.
* Water-play structures.
* Toilets and kiosks associated with water based recreation activities.
* Surf Lifesaving Clubs in appropriate locations.
* Restaurants, in certain urban areas.

Examples of structures which at present are common but for which a coastal siting is not essential are:

* Non water based sporting facilities (eg. football grounds, etc.).
* Residential development in non-urban coastal environments.
* Camping facilities.
* Community halls.
* Non-maritime industrial plant and storage.

It should be noted that there are a range of support uses that are appropriate in many cases. These are generally to underpin the primary uses described above:

* Cafes and restaurants in many locations.
* Toilet and changing facilities.
* Car parking.
* Infrastructure sites and corridors.
* Children's play facilities.
* Bar and picnicing areas.
* Some retail facilities (convenience stores); marine fuelling facilities; specialist stores.

The use of temporary structures for short-term activities will be encouraged where appropriate. Temporary structures may be removed from the foreshore when not in use, thus allowing other activities to take place and the removal of structures which are often unsightly when not in use. Such structures include boat storage and temporary car parks to cater for increased demand in peak times. Care should be taken to avoid serious permanent environmental effects such as habitat loss, soil compaction and erosion, reduction in water quality, etc.

**2.3 Grouping of Structures**Where possible, development and structures should be concentrated at particular locations. A multiple-use approach should be adopted, to help avoid overshadowing or blocking of views. For example: using a drain structure as a base for a jetty.

Where possible, avoid overshadowing of the coastline during high use periods. This is particularly relevant in the towns or urban developments along the coast.

The concentration of facilities is to meet the requirements of a number of guidelines, including:
> Minimising impact on vehicular traffic in adjacent areas.
> Controlling access to the shoreline.
> Reducing wind, salt and sand impact on structures.
> Reducing the impact of structures on landscape character.
> Maximising foreshore areas freely accessible to public recreation.
> Improving appearance of signs and utilities.
> Minimising disturbance to natural vegetation.

Contact the relevant local planning authorities for assistance in identifying areas along the coast where development should be concentrated.

**2.4 Coastal Settlements**A coastal settlement should have visually hard edges to give the settlement a sense of entry and exit.

Urban design and townscape planning can be a useful tool to establish a sense of entry and exit from coastal townships.

Coastal settlements should use physical links such as pathways and signage, and visual links such as coastal views and landscape design to promote connectivity between the water, foreshore and the hinterland.

**2.5 Urban Infill**

* New development in existing settlements should respond to their context and be of an appropriate scale and form.
* Development may be located near or in certain cases over the water provided free public access is assured along the foreshore/water edge interface.
* Development should not cause any detrimental effects to the natural coastal processes.
* For new development, preference should be given to historically and locally available materials, unless proven otherwise.
* Negative impacts such as continuous overshadowing of foreshore areas need to be avoided.

**2.6 Setback from Shoreline**Structures should be located as far back as practicable from the shoreline in conformity with the national buffer zone policy. Consultation with the Water Resources Commission and Ghana Maritime Authority is required.

 Where a structure does not require a location on the water's edge, it should be set back to reduce the threat posed by coastal recession and wave attack.

The sitingof structures away from the shoreline can facilitates the achievement of several guidelines in all categories.
These include:

* Facilitating the connection to hinterland service systems.
* Reducing wind, salt and sand impact on structures.
* Reducing impact on unstable soils.
* Reducing interference with the flow of littoral sediments.
* Pedestrian accessibility.
* Overshadowing.

**2.7 Utility Services***(a) Development should be sited close and accessible to existing supplies of water and electricity* or (*gas), if required, and to storm water drains and sewers, where practicable.*

* Utility service providers should be consulted prior to the design of the proposed development.
* The siting of structures close to required services reduces the need to run new service lines with consequent destruction of vegetation, unnecessary expense and visual degradation.

(b) As a more sustainable, preferred alternative, innovative environmentally friendly techniques should be encouraged (such as composting toilets, solar power, etc.)

(c) All sewage should be discharged to adjacent sewers or provision made for disposal by an approved method.

**2.8 Vehicular Traffic Implications**Developments should not place undue strains on vehicular traffic in the locality.

* Local planning authorities should be consulted to determine traffic planning for the area and avoid duplication of car parking facilities or traffic congestion in the adjacent areas.
* Development should be located to utilise existing roads and car parks.
* For any major new development projects, strategies catering for increases in traffic and car parking demand must be provided as part of the project. Alternatives to new permanent car parks on the foreshore should be explored.
* Car parks and roads should be minimised in sensitive coastal environments.

**2.9 Pedestrian Accessibility and Open Space Links***(a) Structures should not impede public access to and along the shoreline except where access control is their primary function.*

*(b) Developments should provide planned and controlled pedestrian access to the shoreline in appropriate locations.*

*(c) Alternative modes of transport such as bicycling should be given access to the foreshore whilst not conflicting with pedestrian flows.*

* Where possible, single access points to the shoreline should serve groups of structures or car parks.
* Paths and other development should be located to direct people away from environmentally sensitive areas.
* The number of access points and the type of access will vary with intensity of use, topography and soil type of the area. For example, in dune and cliff areas, access should be limited to specific locations where adequate provisions, including fencing and path surfacing, can be made to minimise erosion.
* Where possible, suitable access to the shoreline should be provided for disabled persons.
* Locate pedestrian pathways and roads so as to minimise impact on the viewshed and work with the existing topographic conditions.
* Link hinterland open space with coastal parks to provide maximum connection of areas.

**2.10 Materials**

All materials and finishes should be durable in the coastal environment.

* The durability of materials in the coastal environment is determined particularly by their resistance to wind, salt spray and sand blasting. Deposition of salt on structures, in particular, increases the rate of deterioration of a wide range of materials by facilitating the corrosion of metals, and by retaining moisture which accelerates the breaking down of materials such as timber.
* Most common building materials are suitable for use, although increased maintenance is necessary.

Materials commonly used are:

* *>Timber*
Durability varies with species and finish. Generally the more dense the timber, the greater its durability. For ecological sustainability reasons the use of plantation-grown and recycled timbers is recommended.

The durability of timbers is generally improved by treatment with preservative followed by surface coating. Painting usually gives longer lasting protection than treatment with stains or varnishes. Treatment of timber with preservatives under pressure is particularly effective.

* *> Aluminium*

This material has a high durability rating which is increased by anodising. A roof pitch, greater than 5 degrees should be used to ensure self-washing. Aluminium window frames are suitable but require regular washing to reduce corrosion.

* *> Galvanised Steel*

Particularly susceptible to salt attack and should be painted regularly to prevent rapid corrosion. Increased durability is achieved by using pre-coated products. A roof slope greater than 10 degrees is recommended to achieve self-washing. Regular maintenance, particularly washing, will also improve the performance of this material in coastal areas. The robustness and ease of handling of steel are considerations in the design of public structures; however, allowance should be made for replacement at appropriate intervals.

* *> Compressed Cement Sheeting*

Durable in the marine environment, however the thinner sheets are susceptible to impact damage in public areas and may discolour and become brittle with age.

* > *Unglazed* tiles are more resistant to salt attack than glazed, with those tiles fired at high temperatures being the most durable.
* *> Concrete*

Durable, providing there is adequate cover to all reinforcement to prevent corrosion (in accordance with relevant Codes of Standards Association of Contractors). Concrete tiles are durable although fungal growths may cause a change in colour.

* *> Glass*

The use of glass on the coast needs special consideration to avoid glare and reflection. As a material it has a most logical use in the coastal environment, but extreme care is needed to ensure that the glass recedes into the landscape, particularly where the sun could be reflected (eastern, southern and western orientations).

* *> Environmental materials*

Ecologically friendly materials such as low embodied energy materials, recycled/recyclable materials and earth construction should be given preference and used wherever appropriate.

Clay bricks, natural stonework and plastic products are all durable and require no special treatment.

Most building materials benefit from the application of a protective surface treatment, such as paint. Where the finish is applied to protect a material which is prone to corrosion, such as galvanized steel, regular repainting is necessary to ensure that a complete cover is maintained. Similarly with timber, any breakdown in the paint surface will result in salt accumulation with a resultant build-up of moisture and deterioration of the material.

In all cases the aesthetic qualities of the materials should be considered in conjunction with their durability. Where visual requirements predominate and less durable materials are used, these should be finished and located in such a way as to maximize their durability.

**2.11 Maintenance - Design Implications**

*Structures should be designed to minimise maintenance, particularly having regard to the special nature of coastal areas.*

Part of the coastal attraction is the appreciation of the harsh conditions on natural and cultural elements eg. Sand blasting effects of wind on glass, erosion, rust, etc. These effects have strong implications for the maintenance of structures.

* Coastal structures are generally subjected to harsh conditions, particularly from wave attack, winds, sand movement and the corrosive effects of salt. The coast is a popular recreation area and structures also suffer heavy usage by the public.
* Roof pitches should be sufficient to allow self washing and undersides of roofs shielded from salt-laden winds, thus reducing salt build-up.
* Robust fittings and surface finishes which are capable of withstanding high usage and are resistant to damage by vandals should be used.
* Vegetation should be used to screen structures from salt laden winds.
* Landscape works should utilize vegetation which is resistant to coastal exposure. Landscape design should be appropriate to the level of maintenance envisaged. For example, in low maintenance areas, native plants in mulched soil with crushed rock paths may be more appropriate than a formal arrangement of plants with lawn areas. Structures should be located away from unstable shorelines to obviate demands for erosion protection works in the future. Where it is necessary to locate structures, such as observation towers for lifesaving services, close to unstable shorelines, they should be designed particularly for these unstable conditions. Portable or demountable structures, that can be moved when erosion threatens, are preferred.

**2.12 Structural Design***Structures should be designed to satisfy the engineering constraints of the special wind and soil conditions of the coastal environment.*

Wind force on buildings is a function of wind speed, local topography and surface features of the surrounding terrain, building form and building height. Structures in coastal areas being located adjacent to a flat expanse of water which offers little resistance to wind speed are exposed to greater wind forces than inland areas. Buildings on cliff tops and bluffs are exposed to even greater forces due to their height above the surrounding terrain.

* Wind forces may be reduced by:
> setting structures back from the shoreline in conformity to national buffer policy;
> siting structures away from elevated exposed sites;
> grouping buildings;
> locating vegetation on the windward side of buildings;
> localised earth mounds in strategic locations.
* All buildings should incorporate a system of connections, such as galvanized steel straps or framing anchors, which:
> adequately anchor the roof and walls to the footings to withstand vertical uplift forces;
> adequately cross-brace the building to withstand horizontal uplift forces;
> assure continuity of anchoring and bracing throughout the structure.
* Design wind forces should be calculated in accordance with appropriate standards.
* The design of footings should take account of the soil type and its depth and bearing capacity.
* While standard building practices can be employed to overcome the problems associated with these soil types, particular attention should be given to the effect of the chosen structural system on the surrounding environment. In some areas the choice of the structural system has a significant impact on the extent of erosion and vegetation removal by the structure.
* New permanent structures should not be built on mobile uncompacted sands.
* For general information concerning soils and footings, consult the appropriate authorities.

**2.13 Energy Considerations**Buildings should be sited and designed to ensure optimal thermal performance and utilization of natural light.

* Buildings, where internal comfort is an important requirement, should be designed to:
> minimise the penetration of the sun with appropriate shading devices and with minimal east and west facing windows;
> minimise undesirable heat loss and gain with appropriate walls, floors and ceilings;
> facilitate cross ventilation by the appropriate location of windows and doors;

> make use of the thermal capacity and performance of building materials to reduce internal temperature fluctuations.

* Vegetation should be used to shelter the building from the sun and prevailing winds. This may be achieved through clever planting design for solar control.
* Where views to the coast are to the east, west or south, windows should be located to both take advantage of the view. All such windows facing the view should be adequately protected to prevent undesirable heat loss and gain.
* In buildings where hot water is required, consideration should be given to the installation of a solar hot water heater.
* Ensure that adequate natural light is provided within buildings.
* Help reduce wind impact. The Ghanaian coast is an ideal region for using wind generators; these should be encouraged in order to help reduce use of fossil fuels and to generate power. Visual and wind buffers are needed in places such as commercial, industrial and dry storage areas. Dense, fast growing material should be planted, possibly together with longer living, slower growing trees.

**2.14 Drains, Bridges, Boardwalks and Similar Structures***Generally, these structures should be designed to be incorporated into the coastal landscape and should not stand alone as foreign objects.*

These elements, which occur along the coast, need to be designed in a way that embodies them into the coastal landscape and utilizes them both visually and functionally. For example, bridges can be aesthetically pleasing elements. These can be used to support vehicle, pedestrian and faunal movements; carry engineering utilities and can serve as important viewing points. Such a multiple function approach is most desirable in the vulnerable and sensitive coastal environment.

*Bridges
Generally, bridges should be simple and functional.*

In particular, the following should be addressed in the design process:

* Minimise visual blocking by and from the structure, including the views for road-users.
* The structure should complement its context. For example, make use of a light-weight and tensile wooden footbridge in a natural setting.
* Respect materials and forms of the local area. For example, use local stone, where suitable.

*Drains
Drains should be designed to meet engineering requirements, while satisfying all other guidelines.*

The following issues need to be addressed:

* Avoid disturbance to natural systems, especially geomorphological processes (Refer to Ecological Guidelines).
* Avoid visual and ecological disturbance to the landscape by choosing less sensitive locations for these elements and by integrating with other uses and ensuring environmentally responsible discharge of water.
* Avoid interfering with pedestrian access to and along the foreshore.

*Boardwalks and Elevated Step Structures
These structures should predominantly be designed to protect vulnerable ground surface vegetation and micro-environments.*

* Boardwalks in natural areas should:
> Stay low where possible.
> Be constructed from materials and colours that blend with surrounding landscape so that the visual impact is low.
* Boardwalks in urban areas should:
> Stay low where possible.
> Use materials consistent with the urban environment which may be in accordance with local architecture and culture and in turn may require therefore bright colours, formal shapes or art-inspired experiences.

**2.15 Marine Structures, Aquaculture, Breakwaters/Harbours, Buoys/Pens, and Beach Protection Structures, including Groynes***Such coastal structures need to recognise the natural processes and features with which they are interacting and be in keeping with the landscape setting.*

Being in or close to the water, these structures are usually visually prominent elements that therefore need to be attractive. It is desirable that the structures express or be in keeping with local geography and heritage.

* Refer to the above recommended process and emphasise the following:
> Understand marine hydrology and coastal geomorphology.
> Analyse other natural systems.
> Take all of the above and determine an economic and sustainable solution.

Other considerations

In designing these facilities, recognise the following likely impacts:

* The element should be attractive to the eye, and should not block views.
* Facilities of this kind are often used by fauna in a variety of ways, usually not anticipated by the designs. For example, seals and birds using buoys, piers, breakwaters etc.

In most cases this is a charming addition to the primary function and should be encouraged. An example of this approach is set out as follows:

* Groynes normally form barriers along a beach. Where there is forethought they could become viewing areas, promontories and have inbuilt access steps.

The above example highlights the need to plan for elements of this kind in a way that enables and enhances access to and along the coastline.

**2.16 Pipeline and Cable Shore Crossing***Foreshore disruption by pipelines and cable shore crossings should be minimised.*

In placing such structures in the landscape the following need to be addressed:

* The need to minimise negative visual impacts. These elements should be buried and should be placed away from the waters edge.
* The need to minimise disruption to the natural systems (vegetation, soils, etc.).
* The need to avoid interference with public access to and along the foreshore.

If any parts of the structure are to occur above ground, they need to be integrated into the local landscape design for the project, eg. incorporate into a walkway, lookout, groyne, jetty etc.

**ANNEX VIII. Coastal View Shed**

**Additional Information Requirements for Projects in Coastal View Shed**

Pursuant to Section 1 of the *Environmental Impact Assessment Regulation* of the *Environmental Protection Agency Act*, Act 490, this document is intended to assist proponents in preparing a registration submission for projects involving the General Construction and Service Sector. It should be read in conjunction with the General Information Requirements as outlined in the latest version of the Registration Guide and the sector guidance document. Note that the following information is required in addition to that outlined in the Registration Guide and must also be provided. For further assistance, please contact the Environmental Protection Agency at (+233)-21-664697/8.

After reviewing a registration submission, the Technical Review Committee may require other information beyond the items listed below and also those listed in the Registration Guide.

Note: Please contact the Environmental Protection Agency at (+233)-21-664697/8 to determine if your project requires a comprehensive study under the Environmental Assessment Regulation.

**1.0 Introduction**The Siting and Design guidelines are split into three basic categories in response to the nature of the issues. These guidelines are developed as a basis for coastal management and decision-making.

The three categories are:

* Functional Guidelines:
a structure should be sited and designed to fulfill its purpose with sustainable use of resources.
* Cultural/Aesthetic Guidelines:
a structure should be sited and designed to culturally respect its setting and visually complement the surrounding coastal landscape.
* Ecological Guidelines:
a structure should not cause undesirable changes to terrestrial and marine ecosystems in the locality.

The guidelines are intended to cover all developments taking place in the coastal view shed, both on private and public State land. Some forms of land use covered in the guidelines will be exclusively relevant for private land, some only for State land and some possibly for both. Regardless of the title, developments located in the coastal view shed should have regard to these guidelines.

**2.0 Functional Guidelines**

*GOAL: That structure are sited and designed to fulfill their purpose with sustainable use of resources.*

**2.1 Introduction**

The Functional Guidelines deals with all utilitarian aspects of a development and seeks to ensure the efficient use of the limited resources of the coast. They provide directions on planning issues (traffic implications and appropriateness of the development to the site and area), issues affected by the siting of structures (pedestrian accessibility to the shoreline and the design of outdoor spaces) and the detailed design of structures to suit the particular environmental conditions of the coast (choice of material, structural design, energy considerations and the provision of utility services).

Of prime concern in the siting and design of structures on the coast is the general instability of these areas. Sandy shorelines often fluctuate and threaten to undermine any structure located on beaches, and many coastal areas are subject to long term erosion and recession of the shoreline. Permanent structures should generally not be erected close to shorelines where they will be threatened by marine erosion.

**2.2 Appropriateness of Development**

*The coastline is a precious and finite environment and its limited land resources need to be used sparingly and wisely.*

The heavy demands made on the coastal areas especially for the exceptional value of their resource for public recreation, requires that uses of the land and water be preferentially allocated to those requiring a coastal site. These include primarily water based recreation activities and industries such as fishing and port activities, as well as uses associated with conservation and habitat. Only those structures associated with these activities, or directly related to marine works such as erosion protection and navigation, or which contribute significantly to public enjoyment and appreciation of the coast, should be located on the coast.

Examples of developments for which a coastal siting is appropriate are:

* Boat launching facilities.
* Boat moorings, marinas and jetties.
* Water-play structures.
* Toilets and kiosks associated with water based recreation activities.
* Surf Lifesaving Clubs in appropriate locations.
* Restaurants, in certain urban areas.

Examples of structures which at present are common but for which a coastal siting is not essential are:

* Non water based sporting facilities (eg. football grounds, etc.).
* Residential development in non-urban coastal environments.
* Camping facilities.
* Community halls.
* Non-maritime industrial plant and storage.

It should be noted that there are a range of support uses that are appropriate in many cases. These are generally to underpin the primary uses described above:

* Cafes and restaurants in many locations.
* Toilet and changing facilities.
* Car parking.
* Infrastructure sites and corridors.
* Children's play facilities.
* Bar and picnicing areas.
* Some retail facilities (convenience stores); marine fuelling facilities; specialist stores.

The use of temporary structures for short-term activities will be encouraged where appropriate. Temporary structures may be removed from the foreshore when not in use, thus allowing other activities to take place and the removal of structures which are often unsightly when not in use. Such structures include boat storage and temporary car parks to cater for increased demand in peak times. Care should be taken to avoid serious permanent environmental effects such as habitat loss, soil compaction and erosion, reduction in water quality, etc.

**2.3 Grouping of Structures**Where possible, development and structures should be concentrated at particular locations. A multiple-use approach should be adopted, to help avoid overshadowing or blocking of views. For example: using a drain structure as a base for a jetty.

Where possible, avoid overshadowing of the coastline during high use periods. This is particularly relevant in the towns or urban developments along the coast.

The concentration of facilities is to meet the requirements of a number of guidelines, including:
> Minimising impact on vehicular traffic in adjacent areas.
> Controlling access to the shoreline.
> Reducing wind, salt and sand impact on structures.
> Reducing the impact of structures on landscape character.
> Maximising foreshore areas freely accessible to public recreation.
> Improving appearance of signs and utilities.
> Minimising disturbance to natural vegetation.

Contact the relevant local planning authorities for assistance in identifying areas along the coast where development should be concentrated.

**2.4 Coastal Settlements**A coastal settlement should have visually hard edges to give the settlement a sense of entry and exit.

Urban design and townscape planning can be a useful tool to establish a sense of entry and exit from coastal townships.

Coastal settlements should use physical links such as pathways and signage, and visual links such as coastal views and landscape design to promote connectivity between the water, foreshore and the hinterland.

**2.5 Urban Infill**

* New development in existing settlements should respond to their context and be of an appropriate scale and form.
* Development may be located near or in certain cases over the water provided free public access is assured along the foreshore/water edge interface.
* Development should not cause any detrimental effects to the natural coastal processes.
* For new development, preference should be given to historically and locally available materials, unless proven otherwise.
* Negative impacts such as continuous overshadowing of foreshore areas need to be avoided.

**2.6 Setback from Shoreline**Structures should be located in accordance with the national buffer policy and in consultation with the Water Resources Commission. Where a structure does not require a location on the water's edge, it should be set back to reduce the threat posed by coastal recession and wave attack.

The sitingof structures away from the shoreline can facilitates the achievement of several guidelines in all categories.
These include:

* Facilitating the connection to hinterland service systems.
* Reducing wind, salt and sand impact on structures.
* Reducing impact on unstable soils.
* Reducing interference with the flow of littoral sediments.
* Pedestrian accessibility.
* Overshadowing.

**2.7 Utility Services***(a) Development should be sited close and accessible to existing supplies of water and electricity* or (*gas), if required, and to storm water drains and sewers, where practicable.*

* Utility service providers should be consulted prior to the design of the proposed development.
* The siting of structures close to required services reduces the need to run new service lines with consequent destruction of vegetation, unnecessary expense and visual degradation.

(b) As a more sustainable, preferred alternative, innovative environmentally friendly techniques should be encouraged (such as composting toilets, solar power, etc.)

(c) All sewage should be discharged to adjacent sewers or provision made for disposal by an approved method.

**2.8 Vehicular Traffic Implications**Developments should not place undue strains on vehicular traffic in the locality.

* Local planning authorities should be consulted to determine traffic planning for the area and avoid duplication of car parking facilities or traffic congestion in the adjacent areas.
* Development should be located to utilise existing roads and car parks.
* For any major new development projects, strategies catering for increases in traffic and car parking demand must be provided as part of the project. Alternatives to new permanent car parks on the foreshore should be explored.
* Car parks and roads should be minimised in sensitive coastal environments.

**2.9 Pedestrian Accessibility and Open Space Links***(a) Structures should not impede public access to and along the shoreline except where access control is their primary function.*

*(b) Developments should provide planned and controlled pedestrian access to the shoreline in appropriate locations.*

*(c) Alternative modes of transport such as bicycling should be given access to the foreshore whilst not conflicting with pedestrian flows.*

* Where possible, single access points to the shoreline should serve groups of structures or car parks.
* Paths and other development should be located to direct people away from environmentally sensitive areas.
* The number of access points and the type of access will vary with intensity of use, topography and soil type of the area. For example, in dune and cliff areas, access should be limited to specific locations where adequate provisions, including fencing and path surfacing, can be made to minimise erosion.
* Where possible, suitable access to the shoreline should be provided for disabled persons.
* Locate pedestrian pathways and roads so as to minimise impact on the viewshed and work with the existing topographic conditions.
* Link hinterland open space with coastal parks to provide maximum connection of areas.

**2.10 Materials**

All materials and finishes should be durable in the coastal environment.

* The durability of materials in the coastal environment is determined particularly by their resistance to wind, salt spray and sand blasting. Deposition of salt on structures, in particular, increases the rate of deterioration of a wide range of materials by facilitating the corrosion of metals, and by retaining moisture which accelerates the breaking down of materials such as timber.
* Most common building materials are suitable for use, although increased maintenance is necessary.

Materials commonly used are:

* *>Timber*
Durability varies with species and finish. Generally the more dense the timber, the greater its durability. For ecological sustainability reasons the use of plantation-grown and recycled timbers is recommended.

The durability of timbers is generally improved by treatment with preservative followed by surface coating. Painting usually gives longer lasting protection than treatment with stains or varnishes. Treatment of timber with preservatives under pressure is particularly effective.

* *> Aluminium*

This material has a high durability rating which is increased by anodising. A roof pitch, greater than 5 degrees should be used to ensure self-washing. Aluminium window frames are suitable but require regular washing to reduce corrosion.

* *> Galvanised Steel*

Particularly susceptible to salt attack and should be painted regularly to prevent rapid corrosion. Increased durability is achieved by using pre-coated products. A roof slope greater than 10 degrees is recommended to achieve self-washing. Regular maintenance, particularly washing, will also improve the performance of this material in coastal areas. The robustness and ease of handling of steel are considerations in the design of public structures; however, allowance should be made for replacement at appropriate intervals.

* *> Compressed Cement Sheeting*

Durable in the marine environment, however the thinner sheets are susceptible to impact damage in public areas and may discolour and become brittle with age.

* > *Unglazed* tiles are more resistant to salt attack than glazed, with those tiles fired at high temperatures being the most durable.
* *> Concrete*

Durable, providing there is adequate cover to all reinforcement to prevent corrosion (in accordance with relevant Codes of Standards Association of Contractors). Concrete tiles are durable although fungal growths may cause a change in colour.

* *> Glass*

The use of glass on the coast needs special consideration to avoid glare and reflection. As a material it has a most logical use in the coastal environment, but extreme care is needed to ensure that the glass recedes into the landscape, particularly where the sun could be reflected (eastern, southern and western orientations).

* *> Environmental materials*

Ecologically friendly materials such as low embodied energy materials, recycled/recyclable materials and earth construction should be given preference and used wherever appropriate.

Clay bricks, natural stonework and plastic products are all durable and require no special treatment.

Most building materials benefit from the application of a protective surface treatment, such as paint. Where the finish is applied to protect a material which is prone to corrosion, such as galvanised steel, regular repainting is necessary to ensure that a complete cover is maintained. Similarly with timber, any breakdown in the paint surface will result in salt accumulation with a resultant build-up of moisture and deterioration of the material.

In all cases the aesthetic qualities of the materials should be considered in conjunction with their durability. Where visual requirements predominate and less durable materials are used, these should be finished and located in such a way as to maximise their durability.

**2.11 Maintenance - Design Implications**

*Structures should be designed to minimise maintenance, particularly having regard to the special nature of coastal areas.*

Part of the coastal attraction is the appreciation of the harsh conditions on natural and cultural elements eg. Sand blasting effects of wind on glass, erosion, rust, etc. These effects have strong implications for the maintenance of structures.

* Coastal structures are generally subjected to harsh conditions, particularly from wave attack, winds, sand movement and the corrosive effects of salt. The coast is a popular recreation area and structures also suffer heavy usage by the public.
* Roof pitches should be sufficient to allow self washing and undersides of roofs shielded from salt-laden winds, thus reducing salt build-up.
* Robust fittings and surface finishes which are capable of withstanding high usage and are resistant to damage by vandals should be used.
* Vegetation should be used to screen structures from salt laden winds.
* Landscape works should utilise vegetation which is resistant to coastal exposure. Landscape design should be appropriate to the level of maintenance envisaged. For example, in low maintenance areas, native plants in mulched soil with crushed rock paths may be more appropriate than a formal arrangement of plants with lawn areas. Structures should be located away from unstable shorelines to obviate demands for erosion protection works in the future. Where it is necessary to locate structures, such as observation towers for lifesaving services, close to unstable shorelines, they should be designed particularly for these unstable conditions. Portable or demountable structures, that can be moved when erosion threatens, are preferred.

**2.12 Structural Design***Structures should be designed to satisfy the engineering constraints of the special wind and soil conditions of the coastal environment.*

Wind force on buildings is a function of windspeed, local topography and surface features of the surrounding terrain, building form and building height. Structures in coastal areas being located adjacent to a flat expanse of water which offers little resistance to wind speed are exposed to greater wind forces than inland areas. Buildings on cliff tops and bluffs are exposed to even greater forces due to their height above the surrounding terrain.

* Wind forces may be reduced by:
> setting structures back as far as possible from the shoreline;
> siting structures away from elevated exposed sites;
> grouping buildings;
> locating vegetation on the windward side of buildings;
> localised earth mounds in strategic locations.
* All buildings should incorporate a system of connections, such as galvanised steel straps or framing anchors, which:
> adequately anchor the roof and walls to the footings to withstand vertical uplift forces;
> adequately cross-brace the building to withstand horizontal uplift forces;
> assure continuity of anchoring and bracing throughout the structure.
* Design wind forces should be calculated in accordance with appropriate standards.
* The design of footings should take account of the soil type and its depth and bearing capacity.
* While standard building practices can be employed to overcome the problems associated with these soil types, particular attention should be given to the effect of the chosen structural system on the surrounding environment. In some areas the choice of the structural system has a significant impact on the extent of erosion and vegetation removal by the structure.
* New permanent structures should not be built on mobile uncompacted sands.
* For general information concerning soils and footings, consult the appropriate authorities.

**2.13 Energy Considerations**Buildings should be sited and designed to ensure optimal thermal performance and utilisisation of natural light.

* Buildings, where internal comfort is an important requirement, should be designed to:
> minimise the penetration of the sun with appropriate shading devices and with minimal east and west facing windows;
> minimise undesirable heat loss and gain with appropriate walls, floors and ceilings;
> facilitate cross ventilation by the appropriate location of windows and doors;

> make use of the thermal capacity and performance of building materials to reduce internal temperature fluctuations.

* Vegetation should be used to shelter the building from the sun and prevailing winds. This may be achieved through clever planting design for solar control.
* Where views to the coast are to the east, west or south, windows should be located to both take advantage of the view. All such windows facing the view should be adequately protected to prevent undesirable heat loss and gain.
* In buildings where hot water is required, consideration should be given to the installation of a solar hot water heater.
* Ensure that adequate natural light is provided within buildings.
* Help reduce wind impact. The Ghanaian coast is an ideal region for using wind generators; these should be encouraged in order to help reduce use of fossil fuels and to generate power. Visual and wind buffers are needed in places such as commercial, industrial and dry storage areas. Dense, fast growing material should be planted, possibly together with longer living, slower growing trees.

**2.14 Drains, Bridges, Boardwalks and Similar Structures***Generally, these structures should be designed to be incorporated into the coastal landscape and should not stand alone as foreign objects.*

These elements, which occur along the coast, need to be designed in a way that embodies them into the coastal landscape and utilises them both visually and functionally. For example, bridges can be aesthetically pleasing elements.These can be used to support vehicle, pedestrian and faunal movements; carry engineering utilities and can serve as important viewing points. Such a multiple function approach is most desirable in the vulnerable and sensitive coastal environment.

*Bridges
Generally, bridges should be simple and functional.*

In particular, the following should be addressed in the design process:

* Minimise visual blocking by and from the structure, including the views for road-users.
* The structure should complement its context. For example, make use of a light-weight and tensile wooden footbridge in a natural setting.
* Respect materials and forms of the local area. For example, use local stone, where suitable.

*Drains
Drains should be designed to meet engineering requirements, while satisfying all other guidelines.*

The following issues need to be addressed:

* Avoid disturbance to natural systems, especially geomorphological processes (Refer to Ecological Guidelines).
* Avoid visual and ecological disturbance to the landscape by choosing less sensitive locations for these elements and by integrating with other uses and ensuring environmentally responsible discharge of water.
* Avoid interfering with pedestrian access to and along the foreshore.

*Boardwalks and Elevated Step Structures
These structures should predominantly be designed to protect vulnerable ground surface vegetation and micro-environments.*

* Boardwalks in natural areas should:
> Stay low where possible.
> Be constructed from materials and colours that blend with surrounding landscape so that the visual impact is low.
* Boardwalks in urban areas should:
> Stay low where possible.
> Use materials consistent with the urban environment which may be in accordance with local architecture and culture and in turn may require therefore bright colours, formal shapes or art-inspired experiences.

**2.15 Marine Structures, Aquaculture, Breakwaters/Harbours, Buoys/Pens, and Beach Protection Structures, including Groynes***Such coastal structures need to recognise the natural processes and features with which they are interacting and be in keeping with the landscape setting.*

Being in or close to the water, these structures are usually visually prominent elements that therefore need to be attractive. It is desirable that the structures express or be in keeping with local geography and heritage.

* Refer to the above recommended process and emphasise the following:
> Understand marine hydrology and coastal geomorphology.
> Analyse other natural systems.
> Take all of the above and determine an economic and sustainable solution.

Other considerations

In designing these facilities, recognise the following likely impacts:

* The element should be attractive to the eye, and should not block views.
* Facilities of this kind are often used by fauna in a variety of ways, usually not anticipated by the designs. For example, seals and birds using buoys, piers, breakwaters etc.

In most cases this is a charming addition to the primary function and should be encouraged. An example of this approach is set out as follows:

* Groynes normally form barriers along a beach. Where there is forethought they could become viewing areas, promontories and have inbuilt access steps.

The above example highlights the need to plan for elements of this kind in a way that enables and enhances access to and along the coastline.

**2.16 Pipeline and Cable Shore Crossing***Foreshore disruption by pipelines and cable shore crossings should be minimised.*

In placing such structures in the landscape the following need to be addressed:

* The need to minimise negative visual impacts. These elements should be buried and should be placed away from the waters edge.
* The need to minimise disruption to the natural systems (vegetation, soils, etc.).
* The need to avoid interference with public access to and along the foreshore.

If any parts of the structure are to occur above ground, they need to be integrated into the local landscape design for the project, eg. incorporate into a walkway, lookout, groyne, jetty etc.

**3.0 Cultural and Aesthetic Guidelines**

GOAL
*That structures are sited and designed to culturally respect their setting and visually complement the surrounding coastal landscape.*

**3.1 Introduction**

The Cultural and Aesthetic Guidelines deal with cultural issues and with the appearance of structures, but include other facilities and factors such as car parks and the way they relate visually to their surroundings or the value people place on a setting or past events. These Guidelines also show how they impact on less tangible, and perhaps more important, matters of coastal landscape character and aesthetics.

The siting and design of structures should generally be sensitive to the character of the surrounding landscape, particularly with respect to the degree of naturalness of this landscape and its coastal related character.

Landscape character is determined by both natural and cultural features. The natural features of a landscape include the vegetation, geology, landform, soils and the presence of water bodies. The cultural features include land uses, the character and arrangement of existing structures, and the extent to which the natural features of the landscape have been altered.

Landscape character is also affected by climate - the driving rain squalls of the south west for example, the impact of far off ocean storms in the form of booming surf pounding up and over boulders and rock shelves.

there are also the intangibles which must be recognised in land planning - the important local heritage going back perhaps 100,000 years and the important maritime heritage of the coast, both of which are largely invisible.

The latter is perhaps less obvious because much of that heritage derives from navigation in the days of sail with ships running aground, colliding, crew desertions, heroic rescues and the like with little evidence of all this remaining above sea level.

Local heritage must have an important focus - some important sites of occupation marked by shell deposits with some implements and ash remains are often covered and only revealed by shifting sands and other erosive process or by excavation. As well, there are places that are important symbolically and these are more difficult to define.

 Notwithstanding, it is important to understand the significance to local culture of any particular coastal area prior to making changes to the landscape.

In coastal areas the maintenance and the enhancement of the distinctive features which contribute to the landscape character of the area is of prime importance. These features include:

* The presence of water
* Landforms such as beaches, bluffs, cliffs and estuaries and the views across the water afforded by them.
* The presence of sand in beach and dune formations.
* Distinctive vegetation which is tolerant of coastal conditions.
* Land uses associated with shipping, commercial fishing, and recreation activities such as swimming and sailing.
* Cultural influences of any historical nature
* Maritime heritage, associated with early settlements near port facilities.
* Existing buildings of all types which, in certain locations, often dominate the area. Many are of a character related to their coastal location or association with maritime activities.
* Landscape character is also informed by the composition of textures, forms, lines and colours of both the cultural and natural features of the landscape.
* To visually integrate a structure into the surrounding landscape and minimise visual conflicts, the elements of the structure should generally match or be in consonance with the dominant elements of the surrounding landscape. A wall or groyne on a coastline with rock cliffs, for example, will appear as part of the natural landscape if constructed to match the colour, forms and textures of the adjacent cliffs. The character of a flat rural coastline is dominated by the major linear elements of the landscape, the shoreline and often the vegetation line behind the beach. Structures which break across these lines will be visually intrusive or sensationally effective.

**3.2 Form***The form of structure should maintain and enhance the established coastal landscape character of the area as expressed in the dominant forms of the surrounding environment.*

* The form of a structure or a group of structures is determined by their shape and size (ie.width and height).
* In predominantly culturally modified areas:
> the form of surrounding structures, where they contribute to the landscape character, should be used as a basis for the design of new developments;
> where surrounding structures make no contribution to the coastal landscape character of the area, new forms of a coastal or traditional character may be introduced.
> innovative proposals which complement the landscape character and the existing form of surrounding structures will be considered on their merits.
* In predominantly natural areas:
> the form of buildings should relate to the landform and vegetation masses of the local landscape.
> in flat areas with low vegetation, low single storey developments are most easily integrated with the surroundings;
> in sloping treed locations, split level buildings with roof lines which follow the slope are most appropriate;
> in undulating country, either of the above forms are suitable depending on the location of the development.

  **3.3 Line***The siting and design of development should maintain and enhance the coastal landscape character of the area as expressed in the dominant line or linear relationships found in the surrounding environment.*

* In predominantly culturally modified areas:
> the height of existing development should be maintained;
> avenues of trees, both in formal public gardens and streetsshould be maintained unbroken.
* In predominantly natural areas:
> ridgelines should remain unbroken by roads or structures;
> boundaries between vegetation types, e.g. the edge of a tea-tree scrub should remain intact;
> the canopy of vegetated areas should not be broken;
> wherever possible, the shoreline or water's edge should be maintained as a continuous line, unbroken by structures. New jetties, water play features, buildings or similar structures on the shoreline should be located in visually unobtrusive sites at the ends of stretches of beach, in bays, under cliffs or other positions where they will not disrupt major linear landscape elements.
* The skyline as viewed from the water should be considered to ensure that undesirable intrusions do not occur.

**3.2.4 Colour and Texture***The design of structures should maintain and enhance the coastal landscape character of the area as expressed in the dominant colours and textures found in the surrounding environment.*

* In predominantly culturally modified areas:
> where the colours and textures used in surrounding development complement or contribute to the landscape character of the area, these should be used as a basis for selection in new development;
> where there is a significant historical aspect to the existing character, colours and textures of the appropriate period should be used;
> bold colours and textures, not found in the surrounding area, might be used where they contribute to the overall effect of the development.
* In predominantly natural areas:
> colours and textures should relate to those of surrounding vegetation, soil and rocks where extensive outcropping occurs;
> where possible, materials which occur naturally in the surrounding landscape should be used and their surfaces left unpainted.

**3.5 Views - including scenic lookouts, road views, path and open space views***(a) Structures should not impair existing views to the water or along the coast and should enrich views to and from the coast*.

Particular attention should be paid to the maintenance of panoramic views from cliff tops and other elevated locations and the impact of structures in these prominent locations. Important also are the views from roads and public spaces.

*(b) Key views should be maintained and controlled from inappropriate development that may reduce or impinge on the setting.*

* Identify those views of value and the controlling attributes.
* Identify actions that are inappropriate within the viewshed. For example, in an open and predominantly natural viewshed, development or modification to the current character should be avoided.
* The siting of structures in key viewsheds should take into account all other guidelines.
* Particular attention should be paid to the maintenance of panoramic views from cliff tops and other elevated locations and the impact of structures in these prominent locations. Important also are the views from roads and public spaces.

*(c) Views of Natural Features from Roads.
In major new development, views of attractive natural features (such as dunes, the surf, coastal bluffs, outcroppings and estuaries) from the nearest public thoroughfare should be protected and public viewing areas provided.*

*(d) Protection of Coastal Views.
Development (including buildings, fences, paved areas, signs, landscaping) should not be allowed to significantly block views of the shoreline from key public viewing points such as roads that terminate at the coast, roadside turnoffs, recreation areas and beaches.*

**3.6 Visual Co-ordination***The design of structures, outdoor furniture, signs and utilities in a locality should be visually coordinated.*

These structures may be designed on a common theme or utilise common forms or materials which complement the surrounding landscape character or existing structures nearby.

**3.7 Viewshed Protection***If development occurs on major landscape features, such as ridges, cliffs and headlands, it should be visually screened.*

* Private roads on headlands should be visually screened and driveways connecting to the main coastal road minimised in number.
* The transitions between headlands and related stream valleys should be left in a natural state, with bridges over valleys minimised in number, combined and located at the narrowest crossing points as far inland as physically feasible and environmentally acceptable.
* Buildings on cliff edges and hilltops should be visually unobtrusive when viewed from the valley floors below or public access such as roads and paths.
* Coastal valleys with recreational and natural value should not be used for unsightly sanitary landfill sites.

**3.8 Signs and Utility Services**

*(a) Signs should be clear and informative but unobtrusive.*

* Signs should be grouped or concentrated at particular locations, where most visible with least impact on the landscape. Signs should be located and designed in detail to minimise impacts on views. Common structures should be used, where possible.
* Signs should occur on a landward side of roads, so as not to interrupt views.
* Signs should not be higher than the roofline of adjacent buildings or vegetation, or be moving, or consist of flashing lights. These restrictions may not be appropriate for temporary signs or signs in designated development zones or areas of intensive urban development.
* There is a need to strive for consistency of signage on a local and regional basis. Signs should announce a common geographic region or form, reinforcing the qualities of the coastal environment rather than municipal boundaries,.
* Signs and associated structures should be designed to avoid injury to pedestrians and especially joggers and cyclists. This posed considerations of the height and location of signs and the sharpness of the materials.

*(b) Utility services should be unobtrusive and, wherever possible, underground.*

**3.9 Landscape Conservation and Development**

*(a) Landscape design should maintain and enhance the coastal landscape character of the area, as expressed in existing landforms, vegetation and materials.*

* Landscape design should cover all site works associated with buildings including grading and earth shaping; surface treatment;, retaining walls and the selection; and location of trees, shrubs, ground covers and vines.
* In predominantly culturally modified areas:
> where there is an historical influence evident through avenue planting or the formal layout of public parks, new development should t relate to and continue these themes;
> although it is generally preferable to use indigenous species, existing exotic street tree and foreshore planting may also be considered as a basis for plant selection in adjacent areas where a cultural precedence has been established;
> where layout and materials used in the surrounding landscape contribute to the coastal landscape character of the area, materials of similar colour and texture should be used in the new development;
> a landscape design concept which contrasts with the surrounding landscape treatment may be used where it contributes to the overall effect of a development which seeks to re-establish the coastal landscape character of the location.
* In a predominantly natural area:
> natural regeneration should be encouraged where possible;
> indigenous plant species should be planted;
> layout and grading of the site should relate to those in the surrounding landforms;
> the colour and texture of materials should relate to those in the surrounding landscape.
* During the landscape design process, reference should be made to relevant municipal and state agency policies.

*(b) Landscape development (predominantly through vegetation and grading) should be utilised to visually integrate development with the site.*

In areas of high bushfire hazard trees should be suitably set back from buildings (Refer to the Fire Service and the relevant Local Authority for relevant bushfire avoidance, protection guidelines).

(c) Landscape development should be utilised to screen inappropriate existing structures.

(d) Landscape development should be utilised to direct views and improve amenity.

**3.10 Heritage and Historic Structure and Sites***Heritage and historic structures and sites should be considered on their merits using the appropriate design and planning procedures.*

* In areas of high heritage and historic significance where renovation or new development is planned it should also be in keeping with the relevant tourism guidelines or other such relevant documents.

**4.0 Ecological Guidelines**

**GOAL***That structures do not cause undesirable changes to terrestrial and marine ecosystems*

**4.1 Introduction***Whilst the Guidelines are intended to primarily address site planning and visual landscape matters, ecological impacts need to be considered.*

The Ecological Guidelines are designed, therefore, to deal with the impacts of development on coastal ecosystems. The assessment of ecological impact is particularly important in coastal areas where the stability of natural systems is often fragile and the restoration of disturbed systems difficult.

Generally, the elements and processes within ecosystems are inter-related and the disturbance of one process or the partial destruction of one element may affect the whole system.

The major impacts of development on coastal areas are:

(a) Soil erosion resulting from the removal of vegetation and changes to drainage patterns. The erosion of unstable exposed sand dunes by wind, after removal of vegetation, is a particular problem.

(b) Loss of animal habitat resulting from the removal of vegetation, farming, urban activity, draining and filling of wetlands and estuaries and water pollution.

(c) Depletion of beach systems and siltation caused by interruption of marine sediment supplies and the movement of marine sediment by walls, groynes and breakwaters and changes in natural drainage patterns.

(d) Deterioration of the quality of the water caused by the discharge of sewage fertilisers and toxic chemicals and changes to water circulation patterns.

(e) Modification and lost of ecosystem and their habitats.

These impacts are primarily due to alterations to land drainage patterns, vegetation, soils and direct changes to sea water quality and circulation. It is also important to anticipate the impacts of change, even on remote marine ecosystems.

The geomorphology of the area is an important consideration in understanding the suitability of sites.

In all cases every effort should be made to preserve natural systems. This is desirable not only to maintain the quality of natural ecosystems, but also to avoid expensive protection and reconstruction works such as those associated with dune erosion, beach erosion and siltation. Changes to estuaries and wetland systems by reclamation or drainage works can have significant impacts on fish breeding in these areas, which is of great consequence for the fishing industry.

In some circumstances, it is necessary that structures do interfere with natural coastal systems, either where natural processes threaten existing developments, or where it is necessary to control the natural system and, in some instances, completely change it in areas of intensive development, such as ports. Where erosion threatens major roads or urban areas, it may be necessary to erect protective structures such as sea walls or groynes. In these instances, however, it is important that other alternatives, which may be less disruptive of natural systems in the long term, are considered. For example, sand pumping or moving threatened developments inland may obviate the need for construction of protective walls.

**4.2 Land Drainage**

(a) Siting, design and construction of any structure should result in minimal change to the natural drainage patterns of the area.

* Retain drainage ways and their associated vegetation in their natural state. In particular, water flow in streams, creeks and natural drainage swales should not be altered by changing the channel shape and surface (e.g. by constructing a concrete culvert) or by damming.
* In developed areas, approved stormwater drainage disposal systems may be required to improve natural drainage.
* The drainage pattern of an area is affected by changes to the stormwater run-off volume and rate. To reduce run-off, impervious surfaces should be limited to the minimum possible and the development planned to utilise permeable surfaces wherever feasible. Where possible, run-off should be detained, e.g. in catch basins, to achieve a flow rate simulating the predevelopment state.
* Confine construction to the minimum area possible and provide temporary water catchment until the stormwater drainage system is installed.
* Where connection to the local stormwater is not possible, run-off should be diverted and dispersed (e.g. by using soakage pits).
* Do not fill or build over seasonally wet areas.
* (b) Siting, design and construction of any structure should result in minimal deterioration in the quality of run-off water.
* To minimise the deterioration of run-off water quality: 1) control soil erosion both during construction and in the finished development; 2) minimise contamination (from manure and fertilisers) of drainage-ways in rural areas; 3) eliminate discharge of toxic wastes into drainage-ways.

**4.3 Vegetation**

(a) Natural vegetation should be disturbed as little as possible.

Structures should be sited and designed to have minimal impact on existing vegetation.

Where possible, disturbance to natural vegetation should be reduced by grouping structures and providing common access points.

Vegetation should be protected during construction to minimise unnecessary loss.

(b) Natural regeneration should be encouraged and extensive planting of indigenous species should occur around development in urban, suburban and rural areas.

Where replanting of indigenous species is undertaken, the natural hierarchy of trees, shrubs and ground covers should be restored.

Topsoil should be stockpiled and re-used on-site to facilitate regeneration. Re-use should take place as soon as possible, to ensure germination of the maximum possible number of seeds.

**4.4 Soil**

(a) Siting, design and construction of any structure should result in minimal disturbance to soils.

* Construction works involving excavation and cut and fill on slopes can cause considerable problems with soil erosion in unstable sandy coastal soils.
* Buildings should not be located on steep slopes.
* Structures should be designed to minimise cut and fill. Where possible, on sloping sites, buildings should utilise footings which allow the natural slope to be maintained, e.g. pole structures.
* Topsoil should be stockpiled and used on-site.

*(b) Permanent structures should not be located on or adjacent to foredunes, unstable or mobile soils.*

Where structures are necessary, the following strategies should be adopted:

1) minimise increases in water run-off rate and volume and in particular avoid the concentration of run-off into one location;
2) site structures to minimise wind funnelling and consequent wind erosion;
3) stabilise all ground surfaces which are exposed to erosive forces during and after construction;

4) permanently stabilise all slopes greater than 1:4 with protective coverings, such as mulch under fabric, or retaining walls. Where slopes are mulched, soil binding ground cover plants should be established;
5) minimise vegetation removal, particularly on slopes and in loose wind blown soils, e.g. sand dunes.

**4.5 Coastal Waters**

*(a) Siting, design and construction of any structure should minimise changes to the natural patterns of movement and supply of marine sediments.*

* The beaches at a number of locations along the coast have been depleted by a number of factors, including coastal recession and as a result of walls, breakwaters and groynes interrupting the flow of sand to the beach.
* Marine structures such as walls have also accentuated erosive pressures on the coastline in some locations, resulting in increased erosion and loss of beaches.
* Wherever possible, the natural erosion of coastlines should be allowed to take place without interference by walls, groynes or similar structures. Such erosion supplies sediment to form beaches in the area and further down the coast, where these are maintained by the littoral drift of sediment. Sediment is also supplied by streams flowing into the bay and this supply similarly should not be restricted by works and structures in the streams or catchments.
* Structures in the water may impede the transport of marine sediments along the shoreline and thus reduce the supply of sand to beaches. These should be designed to keep to a minimum the effect on littoral sediment movement, and strategies such as sand pumping should be considered to overcome unavoidable interference with natural patterns of erosion and accretion.
* In some instances, it is necessary to control erosion where it threatens developments, such as buildings or roadways, on the coast. The construction of protective structures, such as walls, may be necessary in these instances. The construction of breakwaters for sheltered boat moorings, piers, jetties and structures associated with navigation is often necessary, even though those structures may affect natural patterns of coastal erosion and accretion.
* Where it becomes necessary to control erosion, alternative techniques such as beach renourishment, should be considered. Where possible, structures or other development on sites threatened by coastal erosion should be relocated to obviate the need for protection works.

**4.6 Ecological Sustainability and the Recognition of Environmental Processes**

*All siting and design should be based on ecologically sustainable principles and recognise the significance of environmental processes such as sea level rise due to climate change (the greenhouse effect and ozone depletion).*

* The use of solar and wind power and innovative environmentally friendly techniques, such as composting toilets, roof water, recycled materials, etc., should be encouraged.
* Avoid siting and designing structures/facilities that may be subject to adverse effects from the ocean rising due to the influence of the Greenhouse Effect.
* The sea level rise may cause a re-evaluation of how people use and interact with the coast. Siting and design of structures should be mindful to provide maximum solar protection to the coast user.

**4.7 Recognition and Protection of Marine Biological Values**

*Protection and improvement of marine biological values is critical in coastal environments, and these should be recognised in any proposed actions along the coast.*

* These values can be conserved and improved in a variety of ways, for example:
* Creation of breakwaters in appropriate locations which can serve as fish and bird habitat areas.
* Creation of wetland and stormwater systems to enhance vegetation and, therefore, habitat areas.

**3.0 Cultural and Aesthetic Guidelines**

GOAL
*That structures are sited and designed to culturally respect their setting and visually complement the surrounding coastal landscape.*

**3.1 Introduction**

The Cultural and Aesthetic Guidelines deal with cultural issues and with the appearance of structures, but include other facilities and factors such as car parks and the way they relate visually to their surroundings or the value people place on a setting or past events. These Guidelines also show how they impact on less tangible, and perhaps more important, matters of coastal landscape character and aesthetics.

The siting and design of structures should generally be sensitive to the character of the surrounding landscape, particularly with respect to the degree of naturalness of this landscape and its coastal related character.

Landscape character is determined by both natural and cultural features. The natural features of a landscape include the vegetation, geology, landform, soils and the presence of water bodies. The cultural features include land uses, the character and arrangement of existing structures, and the extent to which the natural features of the landscape have been altered.

Landscape character is also affected by climate - the driving rain squalls of the south west for example, the impact of far off ocean storms in the form of booming surf pounding up and over boulders and rock shelves.

there are also the intangibles which must be recognised in land planning - the important local heritage going back perhaps 100,000 years and the important maritime heritage of the coast, both of which are largely invisible.

The latter is perhaps less obvious because much of that heritage derives from navigation in the days of sail with ships running aground, colliding, crew desertions, heroic rescues and the like with little evidence of all this remaining above sea level.

Local heritage must have an important focus - some important sites of occupation marked by shell deposits with some implements and ash remains are often covered and only revealed by shifting sands and other erosive process or by excavation. As well, there are places that are important symbolically and these are more difficult to define.

 Notwithstanding, it is important to understand the significance to local culture of any particular coastal area prior to making changes to the landscape.

In coastal areas the maintenance and the enhancement of the distinctive features which contribute to the landscape character of the area is of prime importance. These features include:

* The presence of water
* Landforms such as beaches, bluffs, cliffs and estuaries and the views across the water afforded by them.
* The presence of sand in beach and dune formations.
* Distinctive vegetation which is tolerant of coastal conditions.
* Land uses associated with shipping, commercial fishing, and recreation activities such as swimming and sailing.
* Cultural influences of any historical nature
* Maritime heritage, associated with early settlements near port facilities.
* Existing buildings of all types which, in certain locations, often dominate the area. Many are of a character related to their coastal location or association with maritime activities.
* Landscape character is also informed by the composition of textures, forms, lines and colours of both the cultural and natural features of the landscape.
* To visually integrate a structure into the surrounding landscape and minimise visual conflicts, the elements of the structure should generally match or be in consonance with the dominant elements of the surrounding landscape. A wall or groyne on a coastline with rock cliffs, for example, will appear as part of the natural landscape if constructed to match the colour, forms and textures of the adjacent cliffs. The character of a flat rural coastline is dominated by the major linear elements of the landscape, the shoreline and often the vegetation line behind the beach. Structures which break across these lines will be visually intrusive or sensationally effective.

**3.2 Form***The form of structure should maintain and enhance the established coastal landscape character of the area as expressed in the dominant forms of the surrounding environment.*

* The form of a structure or a group of structures is determined by their shape and size (ie.width and height).
* In predominantly culturally modified areas:
> the form of surrounding structures, where they contribute to the landscape character, should be used as a basis for the design of new developments;
> where surrounding structures make no contribution to the coastal landscape character of the area, new forms of a coastal or traditional character may be introduced.
> innovative proposals which complement the landscape character and the existing form of surrounding structures will be considered on their merits.
* In predominantly natural areas:
> the form of buildings should relate to the landform and vegetation masses of the local landscape.
> in flat areas with low vegetation, low single storey developments are most easily integrated with the surroundings;
> in sloping treed locations, split level buildings with roof lines which follow the slope are most appropriate;
> in undulating country, either of the above forms are suitable depending on the location of the development.

  **3.3 Line***The siting and design of development should maintain and enhance the coastal landscape character of the area as expressed in the dominant line or linear relationships found in the surrounding environment.*

* In predominantly culturally modified areas:
> the height of existing development should be maintained;
> avenues of trees, both in formal public gardens and streetsshould be maintained unbroken.
* In predominantly natural areas:
> ridgelines should remain unbroken by roads or structures;
> boundaries between vegetation types, e.g. the edge of a tea-tree scrub should remain intact;
> the canopy of vegetated areas should not be broken;
> wherever possible, the shoreline or water's edge should be maintained as a continuous line, unbroken by structures. New jetties, water play features, buildings or similar structures on the shoreline should be located in visually unobtrusive sites at the ends of stretches of beach, in bays, under cliffs or other positions where they will not disrupt major linear landscape elements.
* The skyline as viewed from the water should be considered to ensure that undesirable intrusions do not occur.

**3.2.4 Colour and Texture***The design of structures should maintain and enhance the coastal landscape character of the area as expressed in the dominant colours and textures found in the surrounding environment.*

* In predominantly culturally modified areas:
> where the colours and textures used in surrounding development complement or contribute to the landscape character of the area, these should be used as a basis for selection in new development;
> where there is a significant historical aspect to the existing character, colours and textures of the appropriate period should be used;
> bold colours and textures, not found in the surrounding area, might be used where they contribute to the overall effect of the development.
* In predominantly natural areas:
> colours and textures should relate to those of surrounding vegetation, soil and rocks where extensive outcropping occurs;
> where possible, materials which occur naturally in the surrounding landscape should be used and their surfaces left unpainted.

**3.5 Views - including scenic lookouts, road views, path and open space views***(a) Structures should not impair existing views to the water or along the coast and should enrich views to and from the coast*.

Particular attention should be paid to the maintenance of panoramic views from cliff tops and other elevated locations and the impact of structures in these prominent locations. Important also are the views from roads and public spaces.

*(b) Key views should be maintained and controlled from inappropriate development that may reduce or impinge on the setting.*

* Identify those views of value and the controlling attributes.
* Identify actions that are inappropriate within the viewshed. For example, in an open and predominantly natural viewshed, development or modification to the current character should be avoided.
* The siting of structures in key viewsheds should take into account all other guidelines.
* Particular attention should be paid to the maintenance of panoramic views from cliff tops and other elevated locations and the impact of structures in these prominent locations. Important also are the views from roads and public spaces.

*(c) Views of Natural Features from Roads.
In major new development, views of attractive natural features (such as dunes, the surf, coastal bluffs, outcroppings and estuaries) from the nearest public thoroughfare should be protected and public viewing areas provided.*

*(d) Protection of Coastal Views.
Development (including buildings, fences, paved areas, signs, landscaping) should not be allowed to significantly block views of the shoreline from key public viewing points such as roads that terminate at the coast, roadside turnoffs, recreation areas and beaches.*

**3.6 Visual Co-ordination***The design of structures, outdoor furniture, signs and utilities in a locality should be visually coordinated.*

These structures may be designed on a common theme or utilise common forms or materials which complement the surrounding landscape character or existing structures nearby.

**3.7 Viewshed Protection***If development occurs on major landscape features, such as ridges, cliffs and headlands, it should be visually screened.*

* Private roads on headlands should be visually screened and driveways connecting to the main coastal road minimised in number.
* The transitions between headlands and related stream valleys should be left in a natural state, with bridges over valleys minimised in number, combined and located at the narrowest crossing points as far inland as physically feasible and environmentally acceptable.
* Buildings on cliff edges and hilltops should be visually unobtrusive when viewed from the valley floors below or public access such as roads and paths.
* Coastal valleys with recreational and natural value should not be used for unsightly sanitary landfill sites.

**3.8 Signs and Utility Services**

*(a) Signs should be clear and informative but unobtrusive.*

* Signs should be grouped or concentrated at particular locations, where most visible with least impact on the landscape. Signs should be located and designed in detail to minimise impacts on views. Common structures should be used, where possible.
* Signs should occur on a landward side of roads, so as not to interrupt views.
* Signs should not be higher than the roofline of adjacent buildings or vegetation, or be moving, or consist of flashing lights. These restrictions may not be appropriate for temporary signs or signs in designated development zones or areas of intensive urban development.
* There is a need to strive for consistency of signage on a local and regional basis. Signs should announce a common geographic region or form, reinforcing the qualities of the coastal environment rather than municipal boundaries.
* Signs and associated structures should be designed to avoid injury to pedestrians and especially joggers and cyclists. This posed considerations of the height and location of signs and the sharpness of the materials.

*(b) Utility services should be unobtrusive and, wherever possible, underground.*

**3.9 Landscape Conservation and Development**

*(a) Landscape design should maintain and enhance the coastal landscape character of the area, as expressed in existing landforms, vegetation and materials.*

* Landscape design should cover all site works associated with buildings including grading and earth shaping; surface treatment;, retaining walls and the selection; and location of trees, shrubs, ground covers and vines.
* In predominantly culturally modified areas:
> where there is an historical influence evident through avenue planting or the formal layout of public parks, new development should t relate to and continue these themes;
> although it is generally preferable to use indigenous species, existing exotic street tree and foreshore planting may also be considered as a basis for plant selection in adjacent areas where a cultural precedence has been established;
> where layout and materials used in the surrounding landscape contribute to the coastal landscape character of the area, materials of similar colour and texture should be used in the new development;
> a landscape design concept which contrasts with the surrounding landscape treatment may be used where it contributes to the overall effect of a development which seeks to re-establish the coastal landscape character of the location.
* In a predominantly natural area:
> natural regeneration should be encouraged where possible;
> indigenous plant species should be planted;
> layout and grading of the site should relate to those in the surrounding landforms;
> the colour and texture of materials should relate to those in the surrounding landscape.
* During the landscape design process, reference should be made to relevant municipal and state agency policies.

*(b) Landscape development (predominantly through vegetation and grading) should be utilised to visually integrate development with the site.*

In areas of high bushfire hazard trees should be suitably set back from buildings (Refer to the Fire Service and the relevant Local Authority for relevant bushfire avoidance, protection guidelines).

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* Do not fill or build over seasonally wet areas.
* (b) Siting, design and construction of any structure should result in minimal deterioration in the quality of run-off water.
* To minimise the deterioration of run-off water quality: 1) control soil erosion both during construction and in the finished development; 2) minimise contamination (from manure and fertilisers) of drainage-ways in rural areas; 3) eliminate discharge of toxic wastes into drainage-ways.

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Where replanting of indigenous species is undertaken, the natural hierarchy of trees, shrubs and ground covers should be restored.

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*All siting and design should be based on ecologically sustainable principles and recognise the significance of environmental processes such as sea level rise due to climate change (the greenhouse effect and ozone depletion).*

* The use of solar and wind power and innovative environmentally friendly techniques, such as composting toilets, roof water, recycled materials, etc., should be encouraged.
* Avoid siting and designing structures/facilities that may be subject to adverse effects from the ocean rising due to the influence of the Greenhouse Effect.
* The sea level rise may cause a re-evaluation of how people use and interact with the coast. Siting and design of structures should be mindful to provide maximum solar protection to the coast user.

**4.7 Recognition and Protection of Marine Biological Values**

*Protection and improvement of marine biological values is critical in coastal environments, and these should be recognized in any proposed actions along the coast.*

* These values can be conserved and improved in a variety of ways, for example:
* Creation of breakwaters in appropriate locations which can serve as fish and bird habitat areas.
* Creation of wetland and stormwater systems to enhance vegetation and, therefore, habitat areas.

## ANNEX IX. Environmentally Sensitive Areas

1. All areas declared by law as Wildlife Conservation area
2. Areas which constitute the natural habitat(s) of any threatened (endangered, data deficient and vulnerable), rare, endemic flora and fauna
3. All known historical, cultural, archeological and scientific sites that are of public interest
4. Areas known to be prone to natural environmental disturbance including coastal erosion, flooding, geological hazards (earthquake, tremor, landslide) and radioactive emissions
5. Hilly areas with gradient above 45 degrees and prone to erosion or rock fall or mudslide or landslide.
6. Areas (of land) adjoining water bodies of minimum distance 50 meters away from the bank of the water body
7. Water bodies characterized by one or more of the following conditions:

 a) used for domestic purposes,

 b) water within controlled/ protected areas,

 c) supports wildlife and fish,

 d) head waters.

1. Mangrove area characterized by one or more of the following conditions:

 a) adjoining mouth/estuary of a river/stream system;

 b) habitat for wildlife;

 c) spawning ground for fish;

 d) near or adjacent to traditional fishing ground;

 e) acting as natural buffer against shore erosion, strong winds or for storm floods

1. The EPA alone shall have authority to define what constitutes an environmentally sensitive area. [↑](#footnote-ref-2)