

3 Design Phase EM&A Manual

3.1 Policy

Project Environmental Policy Statements are required to clearly define the Project's commitment to improve and optimise the environmental performance of the project throughout its design phase.

The statements should provide the framework for the Project's commitment to the implementation of EIA/EA study and process requirements, and the Project's ongoing environmental improvement efforts.

3.2 Objective

The objective of the Design Phase EM&A Manual is to provide guidance to the setting up of an EM&A programme for the design of a development project. The Manual is designed to ensure and assure the environmental protection, and pollution prevention and control designs are able to comply with the approved Environmental Impact Assessment (EIA/EA) Study report's recommendations, Advisory Committee on Environment (ACE) requirements and conditions, as well as endorsed public comments on the development project. The Project Design phase EM&A Manual should outline, *inter alia*, its objectives and the means to achieve these objectives, such as,

- (a) management framework of the design phase EM&A programme;
- (b) project organization for the design activities, including the designation of responsibility for each design function and level;
- (c) works programme for the design and the deliverables arising from the translation of EIA/EA, ACE and other requirements/commitments into the project design;
- (d) systematic design protocols; to increase efficiency in use of resources (ie. materials and energy); minimize pollution from chosen materials/form of design; reduce impacts associated with the disposal of materials; encourage the recovery, reuse and recycling of materials; as well as minimize potential nuisances, such as, noise, smell and vibration, etc;
- (e) scope and content of design environmental monitoring and audit, and duty of the design engineer;
- (f) design audit procedure and duty of an Independent Checker (Environmental);
- (g) systematic protocols to ensure all requirements are translated from the EIA process to design, contract and subsequent tendering documentation, with the aim to ensure the implementation of all the project's environmental requirements, in a coherent, consistent and timely manner;
- (h) protocol/procedures to deal with any environmental design changes and the necessary actions to achieve the required or enhanced project environmental performance, including the implementation of the environmental auditor's (IC(E)) recommendations; and

- (i) requirements for environmental design documentation, and the mechanisms for their reporting and communication.

3.3 Project Details

3.3.1 Background

In this section of the Design phase EM&A Manual, a brief background of the project is required to address all forms and functions of the development to be established on the site, including any off-site facilities or works areas. Clear scaled project location drawing(s) should be used to indicate the relationship of project development and the sensitive receivers in close proximity to the sites, including all on/off-site works areas, disposal (works) sites, etc.

3.3.2 Project Design Phase Organization

A Project Design Phase Organization chart is required to present a clear picture of effective lines of communication and responsibility for each of the members involved in the design EM&A of the project. The project organization is the master organization of the team responsible for the whole project implementation, while, the design phase organization is the organization for the team responsible for the project design. It is important to highlight the project design hierarchy and contact information with special reference to the design engineer, Independent Checker (Environment) and the Director of Environmental Protection.

3.3.3 Deliverables in Design Phase

It is the responsibility of the Project Proponent to ensure all relevant requirements arising from the application of the EIA process to the project, are included in the design contract. The products of project environmental designs shall be subject to environmental monitoring and audit. The main focus shall be on the environmental protection, and pollution prevention and control commitments elaborated in Section 3.4 below. Items subject to EM&A should include, *inter alia*, analysis and plan of structure, facilities, plant and equipment, foundations, utilities and landscaping; documentation of tender, contractor contracts (construction/operation), drawings, specification (material, work procedure, procurement) and Bill of Quantities, etc.

All the above mentioned project design elements that might contribute to adverse environmental impacts on, *inter alia*, air, water, noise, waste and ecology, should be documented and reviewed to ensure the satisfactory environmental performance of the project.

3.3.4 Programme of Works and Relevant Design Components for Compliance with EIA/EA Recommendations/ACE Requirements

A project might be implemented in stages, phases and packages, etc. Hence, in the Design phase EM&A Manual, implementation details of the project for its the various stages/phases etc. should be clarified in relation to the whole project.

The works programme for design shall document all environmental works involved with a completion date and milestones for key items. Provisional date(s) for audit of environmental design performance are required also in the programme to avoid delay in the implementation of mitigation measures. The EM&A activities should not be critical path items.

3.4 EIA Recommendations/ACE Requirements

All environmental protection conditions, EIA/EA study recommendations, ACE requirements and any endorsed public comments related to the design phase of the development project shall be clearly identified the Design phase EM&A Manual, in a tabulated format for easy reference (see Appendix C1, Implementation Schedule)

3.5 Environmental Monitoring

The Design phase EM&A manual shall require a self-monitoring and audit approach for the design engineer to certify completed environmental design elements as described in Section 3.3.3. Such an audit will ensure compliance with the requirements resulting from application of the EIA process as detailed in Section 3.4 (see Figures 3.1 and 3.2).

The sign-off of the design engineer in the relevant section of the Design EM&A proforma (see Appendix C1) shall confirm there are no outstanding environmental protection, pollution prevention and control measures that require further action.

3.6 Environmental Auditing

The Design phase EM&A Manual requires an independent audit procedure to validate compliance with the environmental protection conditions, and EIA process recommendations and requirements. The audit is required to confirm no resultant secondary or unforeseen or cumulative impacts arising due to the design or design changes, etc. have been introduced into the project implementation process.

In the event that design changes have been introduced, it is the function of the design engineer to ensure that the environmental performance of the design changes are equivalent to or better than the EIA/EA study predictions and any environmental protection conditions; and to have such environmental performance changes validated by the Independent Checker (Environment).

3.6.1 Qualified Personnel

The Design phase EM&A Manual shall document the education, qualification and experience requirements of an Independent Checker (Environment) (IC(E)), for the verification and validation of the environmental performance of the project's design. The

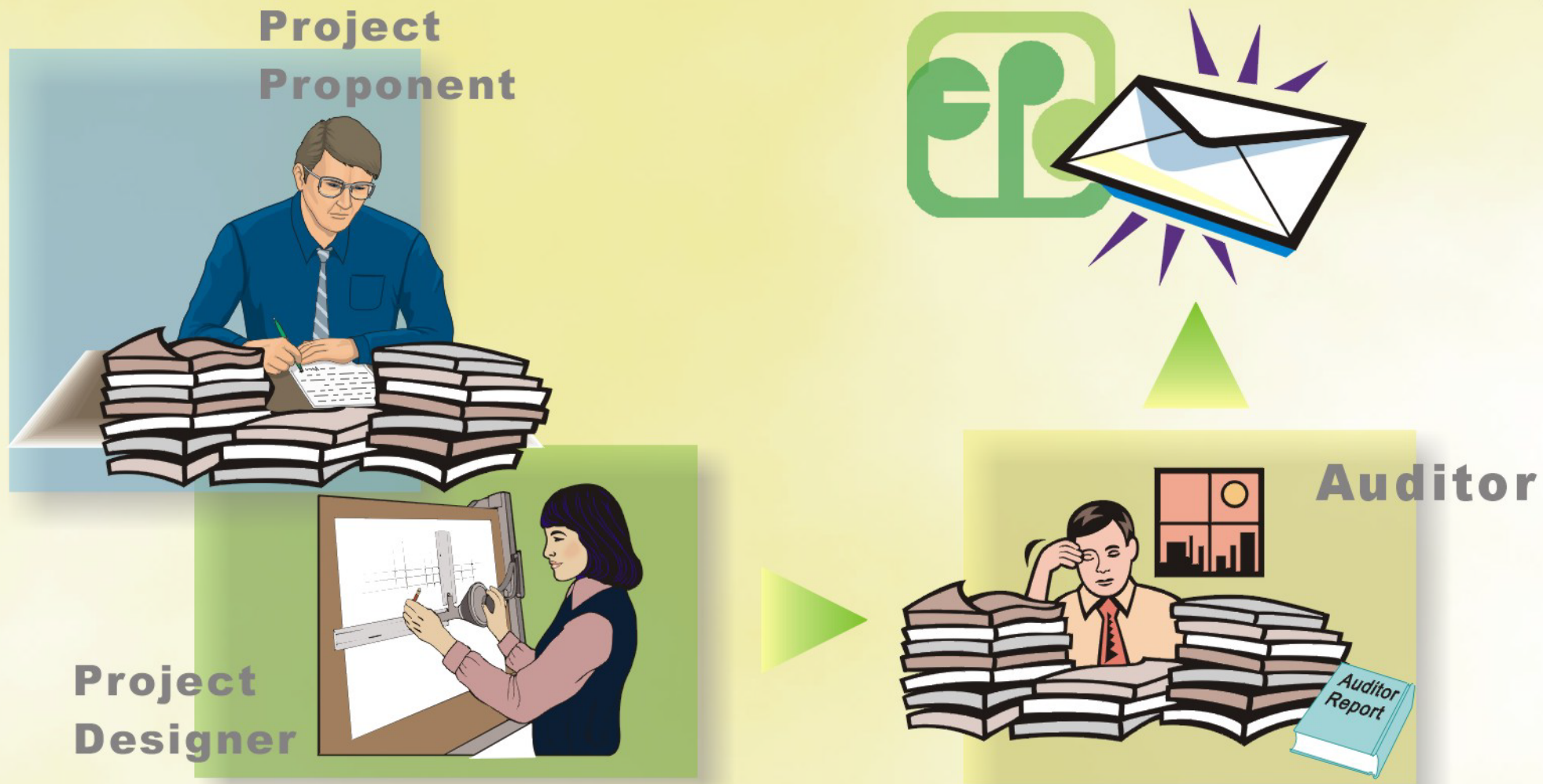


Figure 3.1 Design Phase Environmental Monitoring & Audit Procedure

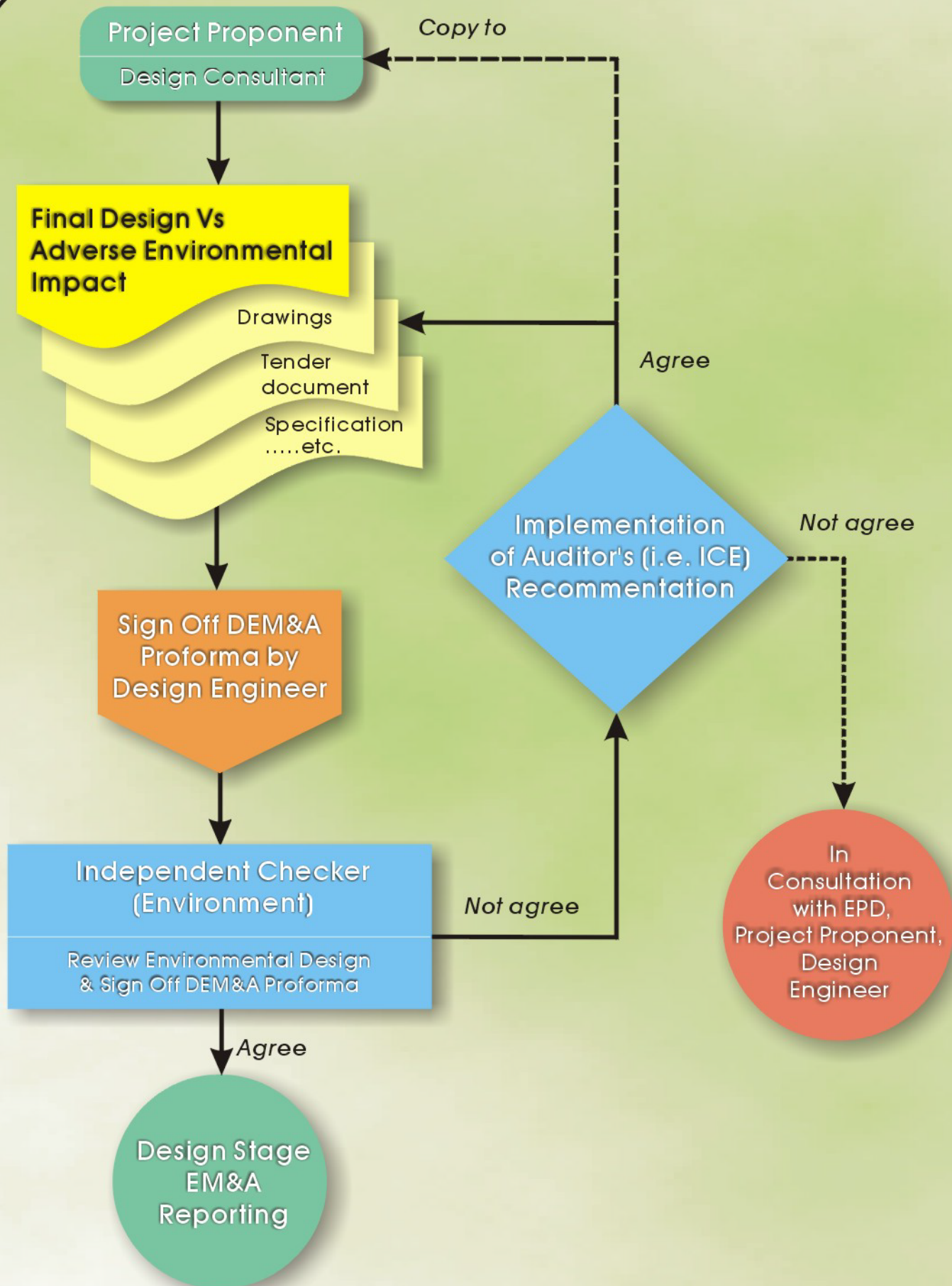


Figure 3.2 Design Phase Environmental Monitoring & Audit Procedure Flow Chart

qualifications, education, training, technical knowledge and experience requirements of the Independent Checker (Environment) (IC(E)) shall be clearly stated in this section. The Independent Checker shall be empowered with access to all design documentation related to the development project.

3.6.2 Audit Procedure

The Independent Checker (Environment) may call upon any documentation, plan or drawing of the design for environmental audit. The audit procedure shall cover, *inter alia*, the following steps:

- (a) review of project's general layout;
- (b) review of Design phase EM&A Proforma (see Appendix C1);
- (c) review relevant design documentation and/or conduct audit interviews;
- (d) check and verify design details against environmental protection conditions, EIA/EA study requirements (eg. environmental protection, pollution prevention and control requirements) and/or any established environmental performance standards/ guidelines. A listing of relevant environment related regulations and ProPECC Notes is included in Appendix B2 for reference;
- (e) sign-off relevant sections of Design phase EM&A Proforma to confirm compliance with the environmental protection conditions, EIA/EA requirements, etc.;
- (f) file an Auditor Recommendation Proforma (see Appendix C1) for any deviation from EIA/EA study requirements, unforeseen or resultant secondary and/or cumulative impacts;
- (g) process minor design changes as step (b) to (e); and
- (h) compile a Design Phase Environmental Monitoring and Audit Report and communicate the same to the design engineer and the Director of Environmental Protection.

3.6.3 Frequency of Audit

The frequency of audit is dependent on:

- (a) the complexity of the development project;
- (b) the time constraint for any design revision as a result of audit; and
- (c) the programme of design works.

The frequency of audit shall be scheduled in the programme stated in Section 3.3.4 and agreed with the Director of Environmental Protection.

3.7 Design Changes

The Project Proponent shall distinguish project changes from the original proposal as described in the EIA/EA study and notify the Director of Environmental Protection for further action.

3.8 Documentation Requirement

The reporting requirement and the frequency of reporting shall be stated in the manual. A Design Phase EM&A report shall be produced to conclude the environmental design work at the end of each audit period. The audit period should be documented in the Design phase EM&A Manual and agreed with the Director of Environmental Protection.

3.8.1 Design Phase: Environmental Monitoring & Audit Report

It is a general requirement that the Project Proponent shall submit the EM&A report to the Director of Environmental Protection within 10 working days subsequent to the audit period. Detailed reporting requirement are summarized in Section 2.7 and Appendix B3 following section 2.7. A generic outline for an EM&A report for design work is as follows:

- (i) Audit Certification
- (ii) Executive Summary
- (iii) Project Background
- (iv) Scope of the Project Design during the Reporting Period (ref: Sec 3.3.3)
- (v) Monitoring and Audit (ref: Sec 3.5, 3.6, 3.7)
- (vi) Environmental Status & Compliance
- (vii) Audit Recommendations
- (viii) Summary of Important Events
- (ix) Conclusion

Appendices

- ☐ Implementation Schedule
- ☐ Design Monitoring and Audit Proforma
- ☐ Auditor Recommendation Proforma