Exploring post-authorisation follow-up and EIA effectiveness in South Africa: case studies from KwaZulu-Natal

by

Sinethemba Charity Cele

207509118

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Declaration

I declare that the following study is a reflection of my own work, under the supervision of Ms Dayle Totter at the University of KwaZulu-Natal. Where the work of others has been utilized in the study, acknowledgment has been fully provided in text and on the final reference list.

Signature. _____.

Date_____

Sinethemba Charity Cele

University of Natal

Howard College

Signature._____.

Date_____

Ms Dayle Trotter

Project Supervisor

Discipline of Geography

School of Agricultural, Earth and Environmental Sciences

University of KwaZulu-Natal

Pietermaritzburg

Abstract

Environmental Impact Assessment (EIA) is recognised internationally as a tool for identifying and addressing the potential adverse impacts of a proposed development on the environment. The effectiveness of an EIA depends on the successful performance of the EIA follow-up. EIA follow-up aims to improve environmental protection during project implementation and provide feedback on EIA processes. However, minimal attention is often paid to the post-authorisation follow-up procedure which has compromised the effectiveness of the EIA process as a tool to enhance environmental protection. The aim of this study is to investigate follow-up activities and understand the implications for EIA effectiveness in South Africa by using case studies from KwaZulu-Natal (KZN). This was achieved by exploring the procedural criteria, the substantive outcomes of follow-up as well as the participants' perceptions on the EIA follow-up. By adopting a case study approach, primary data were collected through conducting in-depth interviews with participants in the follow-up process and accompanying Environmental Control Officers (ECOs) on monthly site audits, while secondary data were collected through audit reports and environmental management plans for three selected case studies. The case studies consisted of the Moss Kolnick Interchange Project, the Dickens Road Retaining Wall and BASF Chemical Plant in the eThekwini Municipality, KZN. Other data sources were used to explore the success of the EIA follow-up and its impact on the success of EIA. Through the follow-up procedure, mitigation measures were successfully employed and the environment was protected during development which contributes to the effectiveness of EIA. Overall, it is recommended that the regulator's role in monitoring and enforcing compliance needs to be actively encouraged and supported.

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Acronyms

CBD	Central Business District
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, No 107 of 1969
ECO	Environmental Control Officer
EDTEA	Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EIAMS	Environmental Impact Assessment and Management Strategy
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EM	Ecological Modernisation
EMI	Environmental Management Inspector / Inspectorate
EMP	Environmental Management Plan
EMS	Environmental Management System
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEC	Independent Environment Checker
IEM	Integrated Environmental Management
MTSF	Medium Term Strategic Framework
NDP	National Policy Directive

NECER	National Environmental Compliance and Enforcement Report
NEMA	National Environmental Management Act, No 107 of 1998
NEPA	National Environment Policy Act, No. 107 of 1969
NFSD	National Framework for Sustainable Development
NSSD	National Strategy of Sustainable Development
SADC	Southern African Development Community
SD	Sustainable Development
SDF	Strategic Development Framework
UK	United Kingdom
WSSD	World Summit on Sustainable Development

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Chapter One: Introduction

1.1 Introduction

The past three decades in the 'environmental calendar' have been marked by an increasing concern for the detrimental impacts of human activity and development on the environment. Environmental Impact Assessment (EIA) was established in order to ensure sustainable development and management of the environment (Glasson, *et al*., 2005). EIA originated in the 1970s in the United States of America (USA) through the endorsement of the National Environmental Policy Act 107 of 1969 (NEPA). This Act served as a solution to the growing concern of the negative impacts on the environment due to unfavourable developments (Bond *et al.*, 2009).

Cashmore (2004) has defined an EIA as a holistic, cyclical, systematic and multidisciplinary process used to identify, evaluate and determine potential adverse consequences of proposed development activities on the environment and create mitigation measures to reduce such impacts and enhance environmental protection. This is achieved through a written statement that is used as a guide during decision making, planning, and design and implementation stages of that activity (Morrison-Saunders and Arts, 2004). The ultimate goal is to achieve sustainable development by restricting potential harmful effects and mitigating harmful measures at the planning stage thus ensuring development that is not harmful to the environment (Glasson *et al.*, 2005). Sustainable development maintains that developments should achieve social and economic goals without degrading the natural environment on which it is based (DEAT, 2014).

Sustainable development, as this study's theoretical framework, suggests that social and economic goals can be achieved with a suggestion and implementation of a development option. It is based on the notion that needs for the current generation should be met without compromising the natural resources (RSA, 2011). The concept of sustainability was introduced to address the concerns related to the deteriorating relationship between the global ecological systems and the ongoing economic development (Faber *et al*., 2005). Conducting an EIA follow-up ensures that the natural resources and the social environment are not compromised during developments. It also ensures that necessary mitigation and remedies are implemented to protect and promote the quality of natural resources. An effective EIA system overall promotes sustainability and sustainable development. Therefore, environmental

impact assessment facilitates decision making and leads to sustainable planning, policy and development choices (Polonen *et al.*, 2011).

The EIA process is systematically divided according to three generic steps namely: the preliminary assessment, the detailed assessment and the follow-up. Forming part of the pre-decision stage, the preliminary assessment and detailed assessment involve the early component of EIA before the development of the project (Morrison-Saunders and Arts, 2004). This component incorporates project planning, screening, scoping, impact prediction, mitigation and decision making. The pre-decision stage of an EIA assists in determining adverse impacts on the environment and the possible mitigation measures to reduce such impacts (Arts *et al.*, 2001). As part of the post-decision process, the follow-up stage of an EIA involves monitoring, management, audit/evaluation and communication (Morrison-Saunders *et al.*, 2007). The post-decision stage of the process assesses the efficiency of the mitigation measures and implements the possible additional actions that may be required to prevent adverse environmental impacts.

However, the paradox of an EIA is that minimal attention is focused on the environmental impacts that are created as a result of a development where predictions and expectations are measured against the development on the ground (Dipper, 1998). For an EIA to be effective in promoting optimal environmental management, all the generic steps in the pre-decision and post-decision stages need to be fully implemented. The pre-decision stage is credited internationally as the most practised component of the EIA while, in practice, the post-decision (follow-up) component of an EIA has gained minimal recognition locally or internationally (Arts *et al.*, 2001). This compromises its effectiveness and its long term goal of sustainable development (Ahammed and Nixon, 2006). This, in turn, provides feedback that can improve the overall EIA system (Marshall and Morrison-Saunders, 2003). As a result, EIA follow-up promotes sustainable development by monitoring the effects of a development project which secures environmental protection for both the current and future generations (Bruhn-Tysk and Eklund, 2002). Overall, there are five reasons for conducting a follow-up procedure, namely: to control projects and their effects on the environment, to maintain flexibility in decision making, to improve public consciousness and acceptance, integration with other information and to improve scientific and technical knowledge follow-up for stakeholders (Polonen *et al.*, 2011).

The EIA follow-up can be evaluated at three levels: the meta-level, the macro-level and the micro-level (Sadler, 2004). Evaluation at a meta-level refers to the use of EIA as a policy idea and instrument. It addresses whether EIA, on a bigger scale, is a worthwhile process that can be used for informed decision making and lead to improved environmental protection (Sadler, 2004). A macro-level approach to an EIA follow-up procedure refers to the evaluation of the success of the EIA systems at a jurisdictional (i.e. national) level. This level outlines the effectiveness and performance of an EIA as measured against particular legislation under which the EIA process operates (Sadler, 2004). A micro-level approach to EIA follow-up procedure refers to evaluation of the success of EIA application to a specific project (Sadler, 2004).

EIA in South Africa has been practised since the 1970s for large projects (Glazewski, 2000). EIA emerged as one of the tools or techniques that form part of the Integrated Environmental Management (IEM) process which is outlined in the National Environmental Management Act (NEMA) No. 107 of 1998. The IEM is an overarching and holistic environmental management philosophy that seeks to establish and maintain a balance between development and the environment (Strydom *et al.*, 2009). The IEM has provided a philosophy for environmental management and ultimately for environmental assessment. Currently, the Environmental Impact Assessment Management Strategy (EIAMS) aims for a more efficient and effective IEM system that is supported by a range of Environmental Management (EM) instruments and tools towards achieving sustainability (DEAT, 2014). In the 1980s, EIA was restrictive in scope, reactive, against development and set apart from the planning process until it was formally promulgated. Emphasis on the EIA follow-up was only clearly distinguished after several amendments in the EIA regulations under NEMA No. 107 of 1998 (DEAT, 2010). According to Fuggle (2011), the EIA follow-up procedure in South Africa has been neglected since it was not mandatory under the EIA regulations promulgated in September 1997 in terms of the Environment Conservation Act (ECA) of 1989. As a result, assessment of projects conducted prior to its promulgation have produced inaccurate prediction of impacts and implementation of mitigation measures, the implications of which are, to a certain extent, largely unknown (Fuggle, 2011).

The Oxford Dictionary (2013) defines effectiveness as the extent to which something is successful in establishing and creating a desired result. The desired result for an EIA process is to minimise potential unfavourable environmental impacts of a proposed activity and meet

the goals and purpose intended (Sandham and Pretorius, 2008). The effectiveness of an EIA depends, among other factors, on the success of the performance of the EIA follow-up procedure. Other factors include pre-decision procedural performance, report quality, reviewing the quality of an EIS and institutional aspects of an EIA system (Lee and Colley, 1992; Annendale, 2001; Wood, 2002). This is achieved during the application of the follow-up procedure. This study investigates the overall effectiveness of an EIA determined by the performance of the follow-up procedure in three case sites based on procedural criteria and substantive outcomes. Procedural effectiveness determines whether the EIA processes are in accordance with established expectations and regulatory requirements, while the substantive outcomes determine the deliverance of environmental goals once the development proposal has been implemented (Morrison-Saunders and Bailey, 2009). This study further explores the perspectives of EIA follow-up participants[1] to determine their attitude towards follow-up procedure and the implications for EIA effectiveness since they fulfil important roles and responsibilities in the follow-up procedure.

This research project explores the role, value and importance of the follow-up procedure in South Africa, and investigates the impacts of development projects on the environment in greater detail through selected case studies in KwaZulu-Natal. These include the Moss Kolnick Interchange Project, the Dickens Road Retaining Wall and the BASF Chemical Plant Project in Umbogotwini. This study is of geographical importance since it demonstrates the spatial dimension and relationship society shares with the environment. It is concerned with minimising potential negative impacts of development on the surrounding physical and natural systems by conducting an EIA process. This excludes the social impacts which are not considered in this study. It outlines the impact of a follow-up procedure in the long term in terms of sustainable development and prevention of environmental degradations as the inextricable relationship between humans and the environment expands.

1.2 Rationale

Literature reveals that the absence of EIA follow-up seems to be a worldwide challenge, compromising the effectiveness of EIA as a tool or instrument for safeguarding sustainable

[1] In this study the term 'participants' refers to respondents purposively selected by the researcher for interview purposes. In this study stakeholders are referred to in the broader sense of literature. Such stakeholders include interested and affected parties for proposed developments.

development. It also reveals how the substantive outcomes from EIAs have been overshadowed by extensive discussion on the procedural actions of the EIA (Frost 1997; Arts *et al*., 2001; Jay *et al*., 2007; Polonen *et al*., 2011). This study addresses this deficiency by analysing the collected data according to the procedural steps as well as substantive outcomes thus outlining the importance of each process. It proceeds with a discussion of perceptions of participants with different professional backgrounds, especially selected according to the trans-disciplinary nature of EIA and the IEM.

Literature has identified different EIA follow-up participants involved in EIA and EIA follow-up. However, it has been unsuccessful in outlining their specific and distinctive roles in the EIA follow-up procedure. This is also replicated in the South African legislation, where there is a lack of distinctive roles and responsibilities for various persons or EIA follow-up participants in the EIA follow-up procedure. However, the 2014 amended EIA regulations stipulate that an Environmental Management Programme (EMPr) (previously referred to as an Environmental Management Plan) should specify roles and responsibilities of participants and persons responsible for managing environmental impacts[2]. This study outlines the role and responsibilities of participants and explores their perspectives on the importance of follow-up for the overall effectiveness of the EIA system.

By reviewing the follow-up procedure of the three sites, this study further emphasises that without an EIA follow-up the consequences of EIAs and the environmental outcomes and mitigation measures of development projects will remain unknown. In addition, it outlines that an effective EIA process is able to manage the impacts of developments without compromising the quality of the environment and is able to promote environmental protection. According to Cashmore *et al*. (2004), there is minimal literature in evaluations on the effectiveness of EIA, and until recently, limited research had been conducted on EIA follow-up in South Africa. Contemporary studies have focused on the evaluation of the influence in the South African context of independent verifiers or ECOs and their role in EIA follow-up (Wessels *et al.*, 2015). By investigating the follow-up process and evaluating the effectiveness of EIA, this study contributes to this growing body of knowledge on EIA and EIA follow-up in South Africa.

[2] Regulation 23 (4), Appendix 4 (1) in terms of the 2014 amended EIA regulations under NEMA Act (No. 107 of 1998)

1.3 Research Aim and Objectives

The aim of this research is to investigate the performance of follow-up activities and the perspectives of participants, and understand the implications for EIA effectiveness in South Africa with case studies from KwaZulu-Natal.

This will be achieved through the following objectives:

i. Explore the role, value and importance of EIA follow-up (literature review);

ii. Investigate and document the content, process and procedural steps of follow-up programmes and associated outcomes from selected case studies;

iii. Explore participant perspectives on the EIA follow-up procedure and implications for EIA effectiveness;

iv. In learning from the operational experience of the three sites, provide recommendations for good practice and improvements to future applications of EIA.

1.4 Methodological Approach

This study uses a qualitative, social constructivist and case study approach for data collection and analysis. Three sites were selected through non-random purposive sampling techniques; and primary and secondary data was collected. Primary data was collected via semi-structured interviews and the researcher's observations during on-site visits. Secondary data was collected from documentary sources which included policy documents and applicable legislation, Conditions of Authorisation, audit reports, and government guideline documents pertaining to the EIA process for sustainable development. Data collected was analysed and interpreted through documentary and thematic analyses.

1.5 Structure of the Dissertation

Chapter One introduces the research topic and provides a brief outline of sustainable development as the study's theoretical framework. It also presents a brief background on EIA follow-up for EIA effectiveness as well as the aim and objectives of the study. The chapter provides the study's rationale as well the significance of this study to geography as a discipline.

Chapter Two reviews literature, derived from secondary sources including journal articles and books, pertaining to EIA systems and related themes. These include the effectiveness of EIA systems and the role of the follow-up process, the development/origins of EIA, the effectiveness of an EIA, the follow-up process and the theory of sustainable development.

Chapter Three is the background chapter and is divided into two parts. The first part of the chapter provides the regulatory framework for EIA. It reviews the history of EIA, discusses IEM in South Africa as well as the environmental legislation and the EIA system in South Africa. Environmental legislation is an essential guideline for compliance with authorisations and environmental protection. The second part of this chapter outlines the three sites examined for this project, namely the Moss Kolnick Interchange Project, the Dickens Road Retaining Wall and the BASF Chemical Plant Project in Umbogotwini.

Chapter Four describes in detail the research methods adopted in this research and demonstrates how these methods were used to analyse the data and draw the necessary conclusions. The data were analysed thematically according to the substantive outcomes and procedural steps/issues identified. This was conducted against an EIA practical framework employed in this study.

Chapter Five presents the first part of the results of this research which were interpreted and discussed to answer the second objective of this study. It presents and discusses the procedural steps and substantive outcomes of the EIA follow-up of each of the three case studies to determine its performance in contributing to the overall effectiveness of the EIA process. The procedural steps were interpreted and are presented according to a practical framework developed by Morrison-Saunders and Arts (2004). This chapter also presents and discusses the substantive outcomes which were the deliverance of environmental goals at the three sites.

Chapter Six presents the second part of the results section of this research which relate to the third objective of this study. It discusses how the perspectives of participants of follow-up relate to their understanding of EIA effectiveness. This includes participants' view of the strengths and weaknesses of the EIA follow-up procedure, implications of the EIA effectiveness and future directions for EIA follow-up.

Chapter Seven presents the summary of the findings as well as conclusions established from these findings. Recommendations from this research are then proposed.

1.6 Conclusion

An EIA is an essential decision making tool for ensuring that the environment is protected from the adverse consequence of proposed developments. However, with the minimal attention that has been placed on the EIA follow-up procedure, the success of the EIA as a whole has been compromised. The aim of this study is to investigate the performance and stakeholder perspective of follow-up activities and understand the implication for EIA effectiveness in South Africa, with case studies from KwaZulu-Natal. It argues that a successful performance of an EIA follow-up procedure ensures the effectiveness of the EIA system at large which contributes to sustainable development. This is further developed by literature and themes associated with EIA, EIA follow-up and EIA effectiveness.

Chapter Two: Literature Review

2.1 Introduction

This chapter reviews literature and themes associated with the effectiveness of EIA which are divided into four main components. Firstly, the theoretical framework of the study, that being sustainable development, is presented, thus providing the overarching academic foundation for this study. The chapter proceeds by introducing the EIA system and reviews its historical origins as well as presents the EIA process as reflected in the literature. Thirdly, it critically reviews the follow-up in detail as the post-decision component of the EIA. With this it introduces the practical framework and principles that were used to determine the success of the follow-up and effectiveness of the overall EIA. The chapter then reviews literature on the effectiveness of EIA follow-up. These themes combined form the conceptual framework for the study. This chapter is contextualised with the scales and criteria of evaluation as well as the experience of the follow-up in developed and developing countries. Finally, literature is used to discuss sustainable development and its applicability to the EIA and EIA follow-up.

2.2 Sustainable Development

Sustainable development has evolved steadily over the last thirty years as a response to the increasing development and industrialisation (Faber *et al*., 2005). Such economic growth has proven to be detrimental to the economic, social and environmental aspect thus creating concerns for the earth's natural and social environment and the irreparable quality of life for future generation (DEAT, 2007). Sustainable development was popularised in 1987 in the *Our Common Future* report, released by the United Nation World Commission on Environment and Development (UNCED) (Lozano, 2008). This report, now universally known as the Brundtland Report, introduced the most quoted definition of sustainable development: "Development that meets the needs of the present without compromising the ability for future generations to meet their own" (Our Common Future, 1987:41). Since then, various conferences initiatives, and meetings have been developed to promote sustainability and sustainable development (DEAT, 2010). The concepts of sustainability and sustainable development have been used interchangeably. For the purpose of this study it is essential to differentiate between the two concepts.

2.2.1 Sustainability and Sustainable Development

The terms ‘sustainability’ and ‘sustainable development’ have been used interchangeably in different ways since their introduction in 1972 (DEAT, 2007). According to Jorna *et al.* (2005), the concept of sustainability was introduced to address the concerns related to the deteriorating relationship between global ecological systems and ongoing economic development. Sustainability, firstly recognises that protecting and maintaining natural resources and healthy ecosystems are vital for human well-being and secondly, it recognises that the goods and services they provide are limited and cannot be replenished (DEAT, 2008). Sustainable development on the other hand, is the process employed to achieve sustainability (DEAT, 2011). It suggests that social and economic goals can be achieved in the implementation of a development option. It is based on the notion that needs for the current generation need to be met without degrading the environment on which it is based (DEAT, 2011). Conducting EIA follow-up ensures that natural resources are not compromised during developments. It also ensures that necessary mitigation and remedy measures are implemented to protect and promote the quality of natural resources. Sustainable development helps to understand the dynamics and the relationship between economic, social and environmental aspects in order to restore equilibrium (Lozano, 2008). These aspects can be represented as models of sustainable development.

2.2.2 Models of Sustainable Development

Sustainable development recognises the interdependence and interrelation between social (equity), economic (growth) and environmental (conservation) pillars or dimensions (Joshi *et al*., 2007; Rogers *et al.*, 2008). Therefore, a balance needs to be maintained between the need for humans in lifestyle improvement and well-being and preserving the natural environment and ecosystem for future generations. The economic approach is concerned that the allocation and distribution of resources for the current generation are supported by the dividends of resources (Baker, 2006). The social approach is concerned with human morals and values, relationship and institutions and maintains the stability of social-cultural systems (Baker, 2006). Lastly, the environmental approach promotes the protection of ecological processes, safeguarding of genetic diversity and sustainable use of species and ecosystems (Rogers *et al*., 2008).

By recognising the interdependence and the links, sustainable development suggests that economic growth, social development together with environmental protection should reinforce each other (Joshi, 2007). There are three types of economic models: the pillar model, the concentric model and the integrative model. The three pillar basic model (Figure 2.1) is the most common and contains three dimensions: economy, environment and society. This model displays three interlocking circles of environmental (conservation), economic (growth) and social (equity) dimensions. The concentric model highlights the economic system: the socio-political system and ecosystem spheres are seen as interrelated (Figure 2.2). The integrative model illustrates how the economic system, the socio-political system and the ecosystem are integrated by governance with a legitimate regulatory framework (Figure 2.3) (DEAT, 2008). The balance between the social, economic and environmental pillars is further guided by sustainable development principles. These principles serve as guidelines for achieving sustainable development and for the whole assessment process and the communication of results (Hardi and Zdan, 1997).

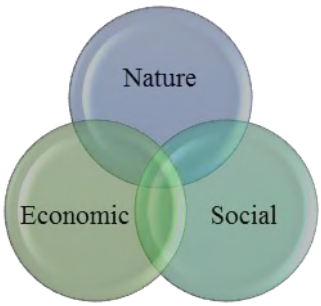

Figure 2.1 Three pillar models (Joshi *et al.*, 2007)

Figure 2.2 Concentric Model (DEAT, 2006)

Figure 2.3 Integrative Model (NFSD, 2008:15)

2.2.3 EIA and Sustainable Development

EIA and EIA follow-up are internationally recognised as critical support tools that promote sustainable development (Barrow, 2004). According to Glasson et al. (2005), EIA can be viewed as an effective environmental management tool if it accomplishes sustainable development, achieves its goals for environmental protection, is cost effective and assesses impact throughout the life of a project. EIA ensures sustainability of projects while protecting

society and ecosystems from negative outcomes that might be associated with developments (DEAT, 2006). Environmental assessment entails applying various techniques and procedures to predict and evaluate the consequences of human actions on the environment. It is an important component of contemporary environmental management and one of the primary measures to achieve environmental sustainability (Kidd and Retief, 2009).

The EIA process promotes the management of environmental impacts due to development and establishes mitigation measures at the planning stage, prior to the construction, whilst the EIA follow-up procedure ensures that the outcomes are followed through and predictions are met. This contributes to and safeguards the environment and its services which are utilised by society and for economic benefit. In essence EIA bridges the gap between development and the environment (Rogers *et al*., 2008). In order to support sustainable development, environmental management requires tools and techniques to prevent negative impacts of human activities on the social and natural environment. EIA is one of the tools that ensure that the environment is not compromised by proposed development activities.

2.3. History and Development of EIA

2.3.1 Origins of EIA

Environmental assessment is a tool used to prevent negative effects of human activities on the environment and improve decision-making on proposed actions and their potential to cause negative environmental consequences (Noble, 2006). EIA can be defined as "a systematic process that examines the environmental consequences of development actions in advance" (Glasson *et al.*, 2004:4). It is a process that identifies and analyses information gathered on proposed developments and integrates environmental considerations and public concerns into the decision-making process (Noble, 2006). It is, through predicting the likely effects of the outcomes of a proposed development, plan or policy on the environment prior to decision making, a tool that can contribute to achieving the goal of sustainable development, which became essential with the increase of industrial development and economic activity (Glasson *et al.*, 2004).

With the increase of industrial development globally in the 1960s, it became apparent that industrial activities were having major environmental impacts. Due to the increase in environmental awareness, from Carson's *Silent Spring* and events such as Earth Day on 22 April 1970, harm towards the environment by such activities was highlighted (Noble, 2006).

In order to address these environmental issues, legislation such as control of air and water pollution, hazardous waste management and resource protection were introduced (Noble, 2006). However, the most significant outcome was the establishment of the National Environmental Policy Act (NEPA) in 1969, which came into effect in the United States of America (USA) in January 1970. This law set the first and legal foundation for EIA (Noble, 2006).

Since the endorsement of NEPA, EIA has been established throughout the world in various forms, initially with more developed countries such as Canada in 1973, Australia in 1974, West Germany in 1975, and France in 1976 (Glasson *et al.* 2005). However, EIA was inadequately implemented and delayed in developing countries as the need for economic growth and eradication of poverty overshadowed environmental protection, which was not catered for in the NEPA procedure (Rajaram and Das, 2011). The emergence of the EIA process in developing countries only became substantial after the United Nations Conference on Environment and Development (Rio 92 or Earth Summit) in 1992 (Anago, 2002). It was facilitated by funding agencies requesting, in some African countries, the implementation of EIA to ensure that the projects they were financing were in fact safeguarding the environment (Ogola, 2007). Funding agencies include investment banks such as African Development Bank, World Bank, European Investment Bank and European Bank for Reconstruction and Development amongst others (Ogola, 2007). For this reason, borrowing countries, mainly developing countries, were obliged to prepare an EIA report prior to development (Ogola, 2007).

2.3.2 The EIA Process

EIA can be represented as a series of iterative stages (Figure 2.4) (Glasson *et al.*, 2005). While it is represented in a linear manner here, an EIA should be a cyclical process with interactions between the various steps (Glasson *et al.*, 2004). As a cyclical process, it systematically examines the potential environmental implications of development actions (Noble, 2006). As previously stated, the pre-decision process involves the early components of EIA prior to proposal authorisation and implementation (Morrison-Saunders and Arts, 2004). The post-decision stage of the proposal is the actual follow-up process of EIA, and includes post-decision monitoring and auditing and is concerned with the various components of the plan or project life cycle after the decision has been made (Morrison-Saunders and Arts, 2004).

The practice of EIA varies from one country to the next as there are various institutional requirements for EIAs, depending on different types of governance (Ogola, 2007). Not all the stages of the process are compulsory in individual EIA systems. The manner in which the individual stages of the process are conducted can differ significantly. In particular, the last stage of follow-up is not in most jurisdictions and this limits the cyclical nature of the process (Noble, 2006).

For a proposed development to take place, certain procedures have to be undertaken to demonstrate the safety of the development towards the environment through indicating that these projects will not adversely impact the environment. In order to do so, proponents (clients) need to submit an EIA with a full Environmental Impact Statement (EIS). This statement constitutes a description of the activity, potential impacts and the necessary mitigation measures (Noble, 2006 and Glasson *et al.*, 2004). The two stages of an EIA process encompass the following:

STAGE 1

Project screening

The EIA begins with a screening process. Its screening focuses on projects with the potential to cause adverse environmental impacts or whose impacts are not fully known. From this a development project plan is created where minimal or no impacts are "screened out" (Glasson *et al.*, 2005). There are three approaches to screening of projects namely: case-by case screening, threshold-based screening and list-based screening (Noble, 2006). Once the project has been screened, if the EIA is required the scoping process takes place.

EIA Scoping and Assessment

The scoping process occurs during the development of the project plan where the significance of impacts is evaluated and recorded accordingly (DEAT, 2004). It determines impacts that are thought to be important, those thought to be not significant and those impacts that are unclear (Glasson *et al.* 2005). When the scoping process has been completed, the significance of impacts are identified, mitigation measures and alternatives are provided. Once this has been completed, a decision can be made regarding approval of the project.

Decision making

The consent to a decision regarding the approval of EIA is usually made after the screening and scoping process. As a process, EIA assists in decision making with regard to authorising project development with terms of approval (DEAT, 2004). The authorities are responsible for issuing authorisations, permits and licenses and establishing conditions of approval (Morrison-Saunders and Arts, 2004). Once the first stage of the EIA process is completed, the second stage is implemented. The second stage is the EIA follow-up procedure which forms part of the post-decision process (Morrison-Saunders and Arts, 2004).

STAGE 2

This stage is essential and is the focus of this study. It is implemented during the construction and operational phases of development where there is monitoring of impacts. It involves follow-up whereby the outcomes associated with development impacts are recorded. The follow-up includes both monitoring and auditing of data, which will be further discussed as the chapter unfolds. As part of the project life cycle, this stage determines the consequences and state of the environment as a result of development (Arts *et al*., 2001). The follow-up procedure occurs in this stage.

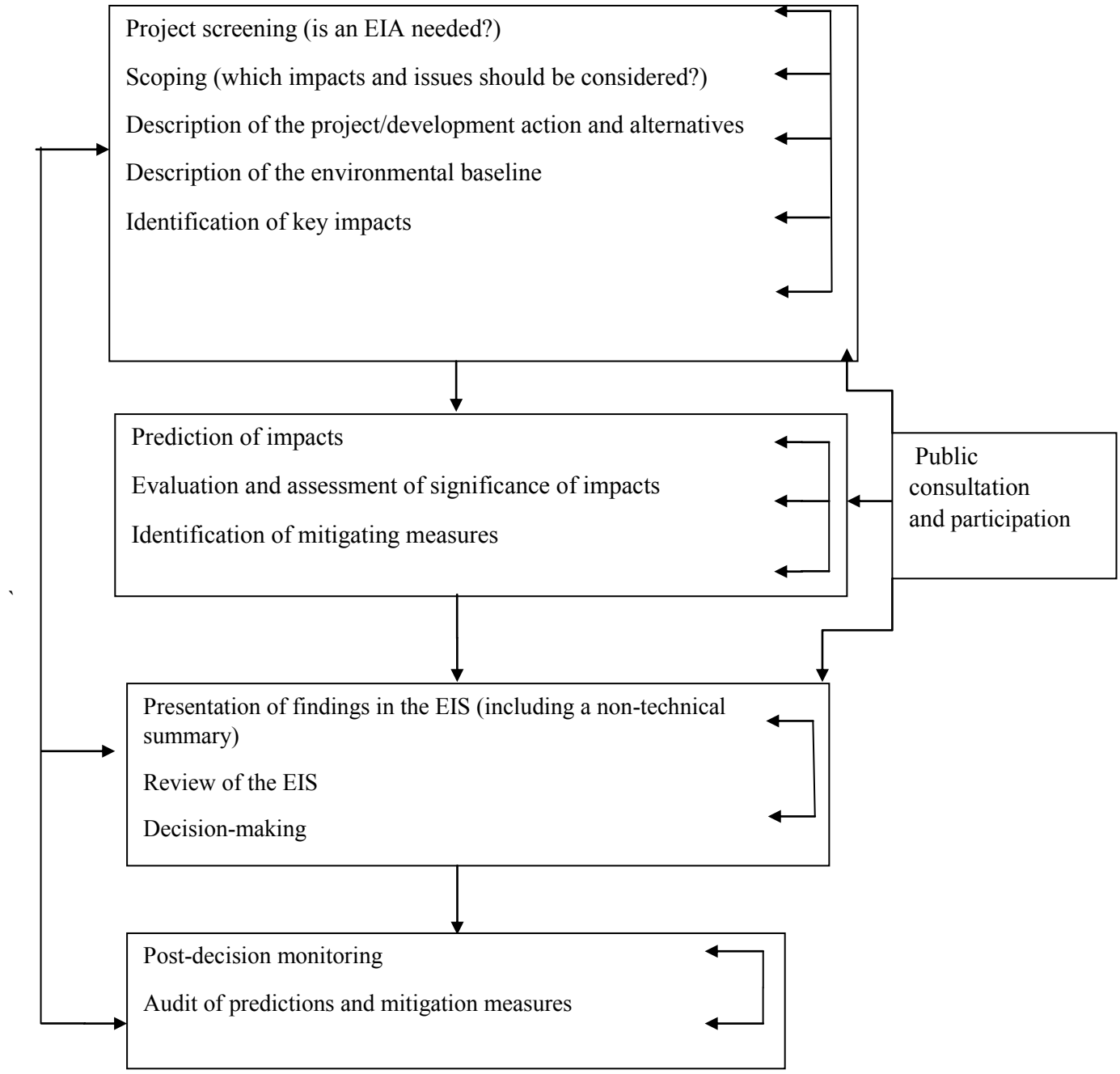

Figure 2.4 Flow diagram of the EIA Process (Source: Glasson *et al.*, 2004: 4)

2.4 EIA follow-up

Stage Two is the follow-up, post-decision stage which constitutes monitoring and auditing processes. This process requires continuous collection of data to ensure compliance with conditions and regulations (Noble, 2006). Monitoring and auditing occur during site inspection conducted by an environmental officer. These processes assess the quality and

effectiveness of mitigation measures and contribute to the learning process in the EIA (Glasson *et al.*, 2005). EIA follow-up is defined by Morrison-Saunders and Arts (2004:4) as "the monitoring and evaluation of the impacts of a project or plan (that had been subject to EIA) for management of, communication about, the environmental performance of that project or plan". The follow-up ensures that the outcomes of the project have the same substantive goal as the initial EIA which is to prevent and reduce the adverse consequences of development while securing the protection of the environment (Polonen *et al*., 2011). Arts *et al*. (2001) proposed that EIA follow-up consists of four components:

Monitoring – refers to collecting data from the activity and the environment both before (baseline monitoring) and after implementation (compliance and impact monitoring);

Auditing/Evaluation – refers to the assessment of the conformance with standards, expectations, predictions as well as the environmental performance of the activity;

Management – refers to the making of decisions and adopting of appropriate measures in response to issues arising from monitoring and evaluation activities; and

Communication – refers to informing the EIA follow-up stakeholders involved about the results of EIA follow-up in order to offer feedback on plan/project implementation and on the EIA process as a whole.

The above components are crucial in an EIA follow-up. They contribute to a successful EIA follow-up process and fulfil its purpose in environmental management and sustainable development. There are various purposes for conducting a follow-up procedure which ultimately contribute to the effectiveness of the EIA.

2.4.1 Need for EIA follow-up

The absence of an EIA follow-up has compromised EIA as a tool or instrument for safeguarding sustainable development thus questioning its effectiveness (Bond *et al*., 2009; Hulett and Diab, 2002; Jay *et al*., 2007; Sandham and Pretorius, 2008). The EIA follow-up highlights environmental uncertainties inherent in a prospective activity, such as project planning and decision making to improve and promote environmental protection (Arts *et al.*, 2001). By conducting an EIA follow-up, corrective measures can be implemented to actual – and sometimes unexpected – impacts of a project without compromising the quality of the

environment (Arts *et al.*, 2001; Morrison-Saunders and Arts, 2004). The EIA follow-up procedure offers an opportunity to prevent, rehabilitate, mitigate and control adverse impacts on the environment due to developments. It is ultimately useful in determining the outcomes of EIA (Marshall *et al.* 2005). Without some form of follow-up the consequences of EIAs and the environmental outcomes of development projects will remain unknown and can hinder feedback into the EIA system (Morrison-Saunders and Arts, 2004). The EIA follow-up is important for controlling projects and their impacts, informing decision making and providing feedback into the EIA process.

Controlling

The EIA follow-up allows one to check whether the predicted impacts, as stipulated in the EIS, were accurate and determine the unforeseen impacts caused by the project (Polonen *et al.* 2011). It controls projects and their environmental impacts by making sure that through compliance monitoring, the consent decision and relevant environmental standards have been implemented properly (Polonen *et al.* 2011). Furthermore, it allows for an overview of the ongoing monitoring, evaluation and decision-making activities that constitute the EIA. This may contribute to greater understanding of effects and issues as well as detailed project operations. This is beneficial for resource managers, environmental authorities as well as the proponents (Morrison-Saunders and Arts, 2004).

Informing

Communication about environmental impacts suggests that the follow-up process can be strengthened by allowing EIA follow-up participants to express their opinions on monitoring results (Polonen *et al.* 2011). EIA follow-up informs decision-making flexibility and promotes an adaptive management approach. The decision-making tool in an EIA is facilitated, firstly, by national policy that presents the goals of development and environment (Zeremiah and Quinn, 2007).

EIA follow-up may contribute to the improvement of scientific and technical knowledge. Many of the tasks involved in EIA are grounded in scientific method (e.g. baseline and impact monitoring, impact prediction, engineering design and mitigation) (Morrison-Saunders and Arts, 2004). Some of the EIA follow-up activities can provide information about the effectiveness of the EIA system as a whole. For example, feedback from the 'prediction accuracy audit' can be used to improve methods, techniques and EIA predictions

for future projects. This may improve the quality of mitigation measures or construction technique used in projects.

The EIA follow-up also assists in strengthening transparency and accountability during the planning and decision making process. It should improve public awareness on actual environmental impacts of development on the environment and demonstrate if the environment is protected adequately, thus leading to improved public acceptance of proposals (Morrison-Saunders and Arts, 2004).

Feedback

The EIA follow-up procedure has the potential to improve the EIA process by providing feedback on the consequences of an activity into the EIA (Jha-Thakur, 2009). Feedback into an EIA can be achieved by checking, learning, communicating, monitoring and evaluating impacts of a project of plan or development proposal (that has been subject to EIA) (Marshall and Morrison-Saunders, 2003). Determining the effectiveness of mitigation measures provides feedback that can improve the overall EIA system and can provide some follow-up on the environmental management plan (Marshall -and Morrison-Saunders, 2003). According to Morrison-Saunders *et al.* (2007), the follow-up provides feedback to the EIA and enables learning from experience to take place. Learning furthers understanding of the effects of the impacts of the project and promotes more accurate predictions for future projects (Polonen *et al.*, 2011). However, there is minimal feedback since the EIA follow-up procedure is rarely practised.

At the macro-and meta-scale, learning about the outcomes allows the EIA procedures and concepts to be evaluated to improve effectiveness and future EIA practice. This will encourage bridging the implementation gap between the pre-decision and post-decision phases of an EIA process. In essence, follow-up links the pre-and post-decision stages of EIA (Figure 2.2 and Figure 2.3) thereby overcoming the gap between project plans and their implementation, for ultimately it is not the predicted impacts, but rather the real impacts of the project on the environment that are important (Marshall, 2004).

At a micro-level, it is essential to learn about the impacts of a proposal and the effectiveness of the mitigation measures. This knowledge is useful since it may be used by regulators and proponents to improve future EIAs and to implement, measure and mitigate or prevent adverse impacts on the environment (Marshall *et al.*, 2005). Unfortunately, the need for a

follow-up cannot be fully appreciated due to the lack of implementation. According to Arts *et al.* (2001), currently there appears to be an 'implementation gap', meaning that there may be a difference between plans and recommendations outlined in the EIA with their actual implementation.

The EIA follow-up outcomes are meant to reduce negative impacts on the environment and increase positive outcomes which are outlined in an EIS (Sadler, 2004). The EIS shows the project anticipated environmental effects and explains to the EIA follow-up participants how the principles of good environmental practice are incorporated into the developer's objectives during development (Figure 2.5).

Although it is represented in iterative steps, bridging the implementation gap completes the project life cycle and ensures that the EIA is a cyclical process. This can be achieved through the evaluation of compliance with authorisations and legislation and evaluation of the successful performance of monitoring and auditing (Marshall, 2004). The implementation of the EIA follow-up should merge the existing planning, decision making and project management activities to develop clear steps for a structured process (Figure 2.6).

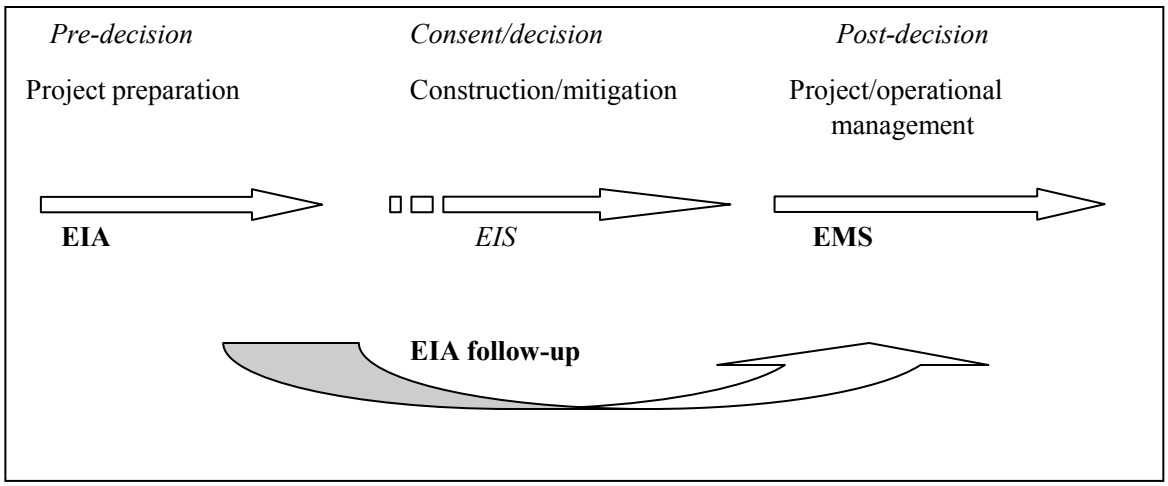

Figure 2.5 EIA follow-up as linkage between EIA and operational management (Source Marshall and Morrison- Saunders, 2004:17)

The pre-decision phase of an EIA is predictive and uncertain; follow-up can usefully address such uncertainties, which are fundamental to the EIA planning and decision-making process (Marshall *et al.*, 2005). Ultimately the real or actual effects caused by development on the

environment are relevant for protecting the environment and not the predicted impacts (Marshall *et al.*, 2005). Applying 'best practice principles', which are critical guidelines used for deriving best possible results, facilitates the protection of the environment from the real effects caused during development (Macharia, 2005).

2.4.2 Principles of EIA Follow-up

The purpose of formulating the principles for EIA follow-up was to guide the development of projects and capacity building amongst practitioners in order to improve EIA outcomes and protect the environment in the process (Morrison-Saunders *et al*., 2007). The best practice principles, formulated by Morrison-Saunders *et al*. (2007), provide regulators and proponents with the opportunity to implement mitigation and control measures to prevent negative effects on the environment, thus enhancing environmental protection, and consequently, the protection of the environment (Marshall *et al.* 2005). Best practice principles refer to the most ideal and best way an EIA follow-up can be conducted (Storey and Noble, 2004). These principles are divided into two tiers: Guiding Principles and Operating Principles (see Table 2.1 below).

The guiding and operating principles are further divided into four groups, namely the core values, the nature of EIA follow-up, roles and responsibilities of EIA follow-up participants and conducting EIA follow-up (see Table 2.2 below). The guiding principles present the rational and core values of the EIA follow-up procedure and address the nature of EIA follow-up procedure (Marshall *et al*., 2005). The core values for an EIA follow-up include the need for a follow-up, scale of the follow-up, application of the follow-up and EIA follow-up outcomes as well as the nature of the follow-up. Outlining the need for a follow-up is vital in determining the outcome from the procedure (Morrison-Saunders and Arts, 2004). The operating principles, on the other hand, are concerned with the various roles and responsibilities of participants in the EIA follow-up procedure as well as how the process should be conducted (Marshall *et al.* 2005).

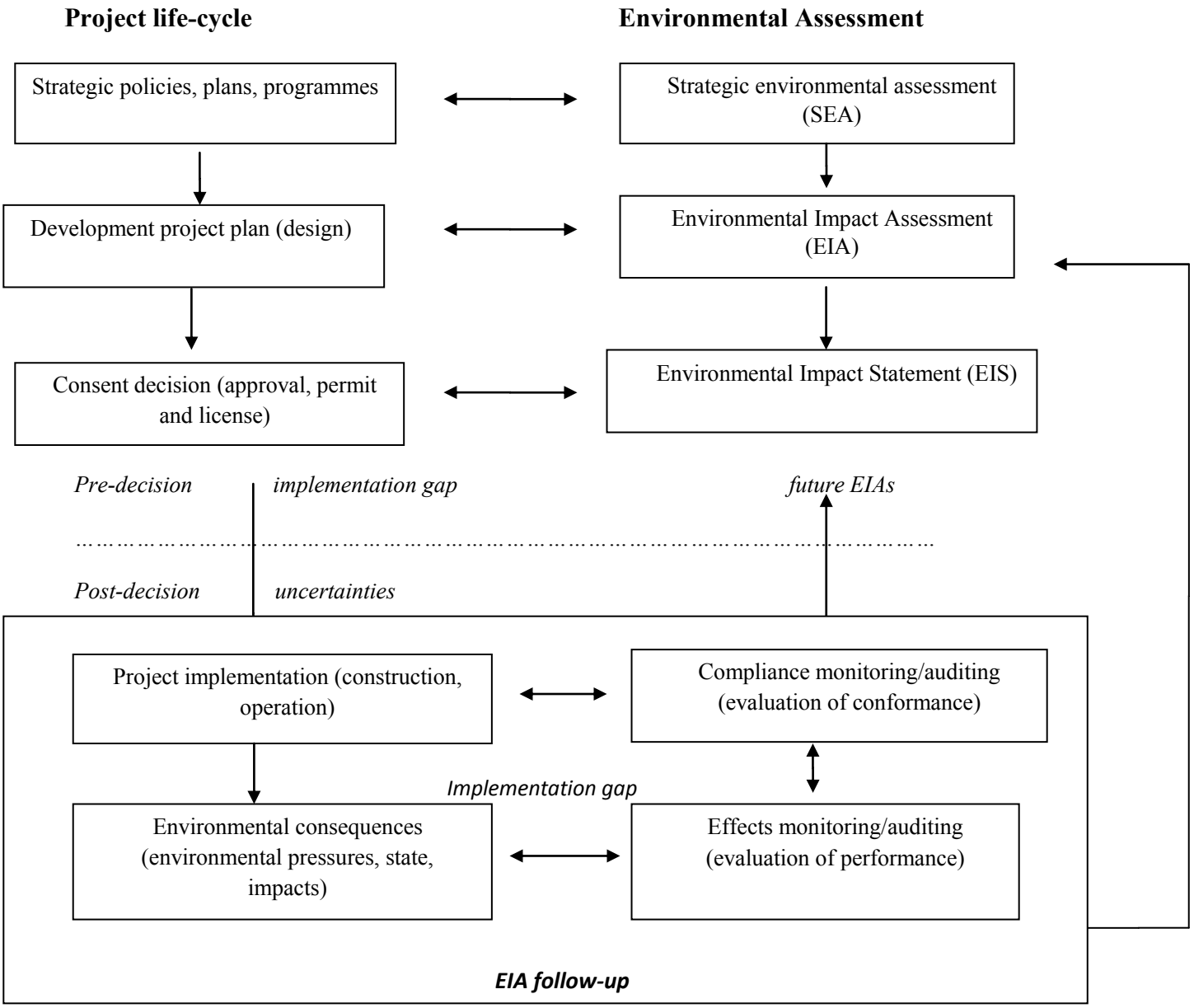

Figure 2.6 EIA follow-up as a link between EIA and Project life cycle (Source: Arts *et al.* 2001)

Table 2.1 Principles of EIA follow-up (Source: Marshall *et al*., 2005)

Principles of EIA follow-up	
Guiding Principles	
1	Follow-up is essential to determine EIA outcomes
2	Transparency and openness in |EIA follow-up is important
3	EIA should include a commitment to follow-up
4	Follow-up should be appropriate for the EIA culture and social context
5	EIA follow-up should be timely and adaptive
6	EIA follow-up should consider cumulative effects and sustainability
Operating Principles	
1	The proponent of change must accept accountability for implementing EIA follow-up
2	Regulators should ensure that EIA is followed up.
3	The community should be involved in the EIA follow-up
4	All parties should seek to cooperate openly and without prejudice in the |EIA follow-up
5	EIA follow-up should promote continuous learning from experience to improve future practice
6	EIA follow-up should have a clear division of roles and responsibilities
7	EIA follow-up should be objective led and goal orientated

Table 2.2 Guiding and Operating Principles of an EIA follow-up (Source: Marshall *et al.* 2005)

The Core Values (The Why Principles)	
1	*Follow-up is important in determining the outcomes from the EIA process:* The goal of the follow-up to reduce the negative impacts of development on the environment. The follow-up process should be carried out to ensure that the consequences of EIA planning and decision making are known which will, safeguard and protect the environment
2	*Transparency and openness in EIA follow-up is important:* Feedback from the EIA process should be provided for the stakeholders to facilitate participation. In addition, decisions from the follow-up process should be transparent, fair and communicated to them.
3	*EIA should include commitment to follow-up:* Commitment as well as accountability to the follow-up process is required from all the parties responsible. The follow-up commitments relate to programme preparation and implementation of monitoring, evaluation, management and communication.
The Nature of EIA follow-up (The What Principles)	
4	*Follow-up should be appropriate for the EIA culture and societal context:* There is no single method for conducting a successful EIA follow-up. It should be custom-made to suit legislative, administrative, socio-economic and cultural circumstances; and merged with existing planning decision making and project management activities.
5	*EIA follow-up should consider cumulative effects and sustainability:* Applying EIA follow-up at the individual level is limited in terms of dealing with cumulative effects of multiple developments and sustainability issues. However, the strategic level or area oriented approach should be followed.
6	*EIA follow-up should be timely, adaptive and action oriented:* Environmental issues are best solved through adaptability and pro activity of the EIA follow-up. Actions must be effective in meeting the defined goals of the EIA follow-up programme.

Roles and Responsibilities of Participants (The Who Principles)	
7	*The proponent must accept accountability for implementing EIA follow-up:* This makes reference to the duty of care principle. The proponent must consider their actions towards the environment and the need for EIA follow-up. They should communicate the follow-up results to the stakeholders. The EIA follow-up should be seen by the proponent as a project management tool and as a measure to reduce potential costs.
8	*Regulators should ensure that that EIA is followed up:* The need for EIA follow-up should be identified by the regulators and must be enforced through regulatory requirements, securing a balance between the interest of the proponent and the community confirming compliance from proponents and facilitating learning from experience.
9	*The community should be involved in EIA follow-up* The community should be informed of the outcomes from the EIA follow-up procedure. Direct community participation in the follow-up process is desirable. This will build trust and partnership, share knowledge with the community.
10	*All parties should co-operate openly and without prejudice in EIA follow-up*: The interests of proponent, regulator and community are often interlinked, which should initiate practicable and reasonable EIA follow-up programme.
11	*EIA follow-up should promote continuous learning from experience to improve future practice:* An attempt by the EIA follow-up should be made to ensure that the process is not static but learning from experience through active feedback. A good EIA follow-up requires good communication
Conducting EIA follow-up (The How Principle)	
12	*EIA follow-up should have a clear division of roles, tasks and responsibilities:* The EIA follow-up procedure should have clear and distinct roles, tasks and responsibilities which should be identified in the pre-decision EIA documentation. This should outline tasks and responsibility among and within the different parties.

13	*EIA follow-up should be objective-led and goal orientated:* In order for an EIA follow-up to be effective, the set goals and objectives must be achieved. This is an important task of scoping in EIA follow-up procedure.
14	*EIA follow-up programme must equal the anticipated environmental effect*. Each project is unique; therefore an EIA follow-up programme must be tailored to suit the proposed activity, its stages and dynamic context. In addition, the process should be as practical and feasible and should focus on the *'art of the possible'*.
15	*EIA follow-up should include the setting of clear performance criteria:* The EIA follow-up programme should have rigorous performance criteria that are implemented through well-defined methodologies or approaches to monitoring, evaluation, management and communication. These actions should become useful information and outcomes that can be measured easily.
16	*EIA follow-up should be sustained over the entire life of the activity:* The need for an EIA follow-up should be determined during screening and scoping during EIS preparation. In addition to the construction of a development, the EIA follow-up programme should cover the operation and where relevant the decommissioning phase. EIA follow-up should be responsive to long-term and short term environmental changes.
17	*Adequate resources should be provided for EIA follow-up:* EIA follow-up must be cost-effective, efficient and pragmatic. Resources such as time, staff and capacity need to be provided for in advance.

These principles promote and provide guidelines for EIA follow-up. These guidelines indicate a starting point for the EIA follow-up process. Since there is no 'right' way of conducting a follow-up, these guidelines can be altered to suit the needs of the EIA follow-up participants and type of activity in question (Morrison-Saunders *et al.* (2007). Through the application of these principles, EIA follow-up participants have the choice to use the best available technique for optimum results (Storey and Noble, 2004). Moreover, these best practice principles also provide guidance on how to properly design and implement a follow-up procedure that can yield favourable results whilst protecting the environment (Storey and Noble, 2004). In addition, the implementation of these best practice principles will strengthen the overall structure and process for the EIA as well as improve EIA practice (Morrison-

Saunders *et al.* 2007). Moreover, the application of these principles will also address the issues that occur during the development of any follow-up programme. Such issues, amongst others, include lack of fulfilment of roles and responsibilities, minimal community participation and, a lack of transparency and openness in the follow-up procedure. These principles form part of the contextual settings for EIA follow-up.

2.4.3 Contextual Setting for EIA follow-up

The context in which the EIA follow-up occurs is a function of four factors, namely regulations and institutional arrangements, approaches and techniques, resources and capacity and project type (see Figure 2.7 below) (Morrison-Saunders and Arts, 2004). Firstly, regulations and institutional arrangements refer to the regulatory and administrative framework for conducting follow-up. Although these regulations and institutional arrangements are an essential first step to initiating an EIA follow-up procedure, they do not guarantee that a follow-up process will be followed (Jesus, 2002; Arts, 2004). Secondly, the approaches and techniques refer to the methods and techniques used for the collection of data, the development of skills and techniques in EIA follow-up (Morrison-Saunders and Arts, 2004). According to Marshall *et al*. (2005), the development and application to practicable methods and techniques can promote the best practice of the EIA follow-up. Thirdly, investments need to be made in both staff and financial resources and capacity by the proponents and regulatory agencies (Morrison-Saunders and Arts, 2004). This is further supported by Kidd (2008) who pointed out that staff and financial resources are required since the EIA follow-up procedure can extend over long periods of time and can become complex. Lastly, the type of project that has been subjected to EIA is important to determine the manner in which the EIA follow-up can be conducted. Two important characteristics pertain to the size of the project (small versus big investment) and initiator of the project (private versus government proponents) (Morrison-Saunders and Arts, 2004).

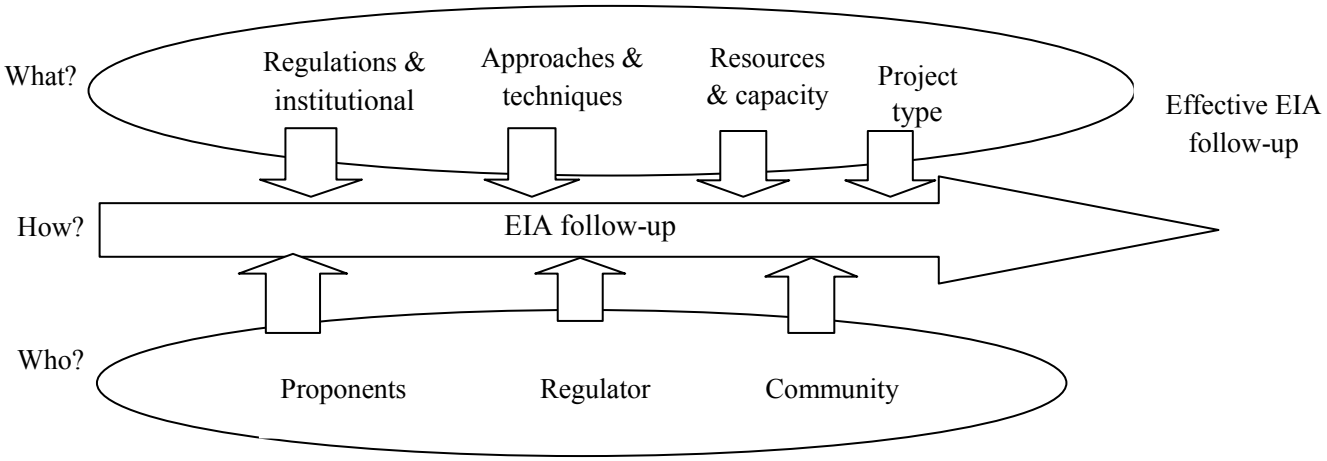

Figure 2.7 Contextual factors and relevant parties for successful EIA follow-up (Source: Morrison-Saunders and Arts, 2004)

The interaction between the stakeholder groups and the contextual factors determines the nature and success of the follow-up procedure. There are various stakeholders (parties) that contribute to the success of the follow-up. These various stakeholders, through the application of the best practice principles (how to conduct the follow-up), can promote the success of the follow-up.

The roles and responsibilities of participants are essential in attaining a successful EIA follow-up procedure (Morrison-Saunders *et al*., 2003). EIA follow-up participants refer to the main persons responsible for the EIA follow-up procedure. There are generally four principle groups of participants involved, namely the consultant, the proponent, the regulator and the community. According to Morrison-Saunders and Bailey (2009), the roles and responsibilities of EIA follow-up participants in the EIA should generally be made clear to accommodate effective monitoring and auditing as well as to promote accountability

Proponents are private companies or government organisations that develop a project. They are often expected to conduct their own EIA follow-up activities. An independent person is usually hired by the client to conduct the EIA follow-up (Morrison-Saunders and Arts, 2004). Consultants are hired by proponents to work on their behalf on new development proposals and are referred to as EIA practitioners (Ahammed and Nixon, 2006). These practitioners

advise proponents on relevant EIA policies, practices and procedures, help proponents with the administrative aspects of EIA, and assess and mitigate the potential impacts of the proposal, e.g. baseline studies (Ahammed and Nixon, 2006).

Regulators are the competent authority or government agency staff responsible for administering the process and authorising proponents to commence with development (Ahammed and Nixon, 2006). They implement EIA policy and procedures according to the legislative framework, e.g. sign-off on scoping requirements and check report quality (Ahammed and Nixon, 2006). Regulators ensure that proponents comply with the EIA approved conditions and learn from experience to improve future EIA processes.

The final group is the community, which consists of the public or civil society. They may have significant indigenous or local knowledge of the area. In addition, their independence from regulators and proponents enables the community to evaluate the performance of both these participants in the EIA process. Furthermore, the stress from public scrutiny of a development project may serve as a force for proponents and regulators to implement EIA follow-up programmes (Morrison-Saunders *et al*., 2005).

The relationship between the regulator and the consultants is essential in ensuring overall protection of the environment (Morrison-Saunders and Bailey, 2009). In order to improve the relationship between consultants and regulators, Morrison-Saunders and Bailey (2009), propose the adoption of the Partnering Agreement Strategy. This strategy was developed in Western Australia and it describes the co-operation and collaboration of two organisations working towards a common goal. In this case it refers to environmental practitioners working together to establish a favourable relationship to ensure the environment is protected. With the principles and the contextual setting of the follow-up procedure being discussed, it is essential to discuss a framework to facilitate this procedure.

2.4.4 Practical Framework

Hulett and Diab (2002) asserted that an EIA cannot advance without an appropriate framework and a set of guiding principles to facilitate its design and implementation (Figure 2.8). A practical framework serves as guidance to the follow-up procedure when determining the need, designing the programme, implementing the programme, evaluating the findings and managing issues identified during the findings (Morrison-Saunders and Arts, 2004). This

practical framework is the 'model' and criteria against which the successes of the EIA follow-up procedures for this current study are measured.

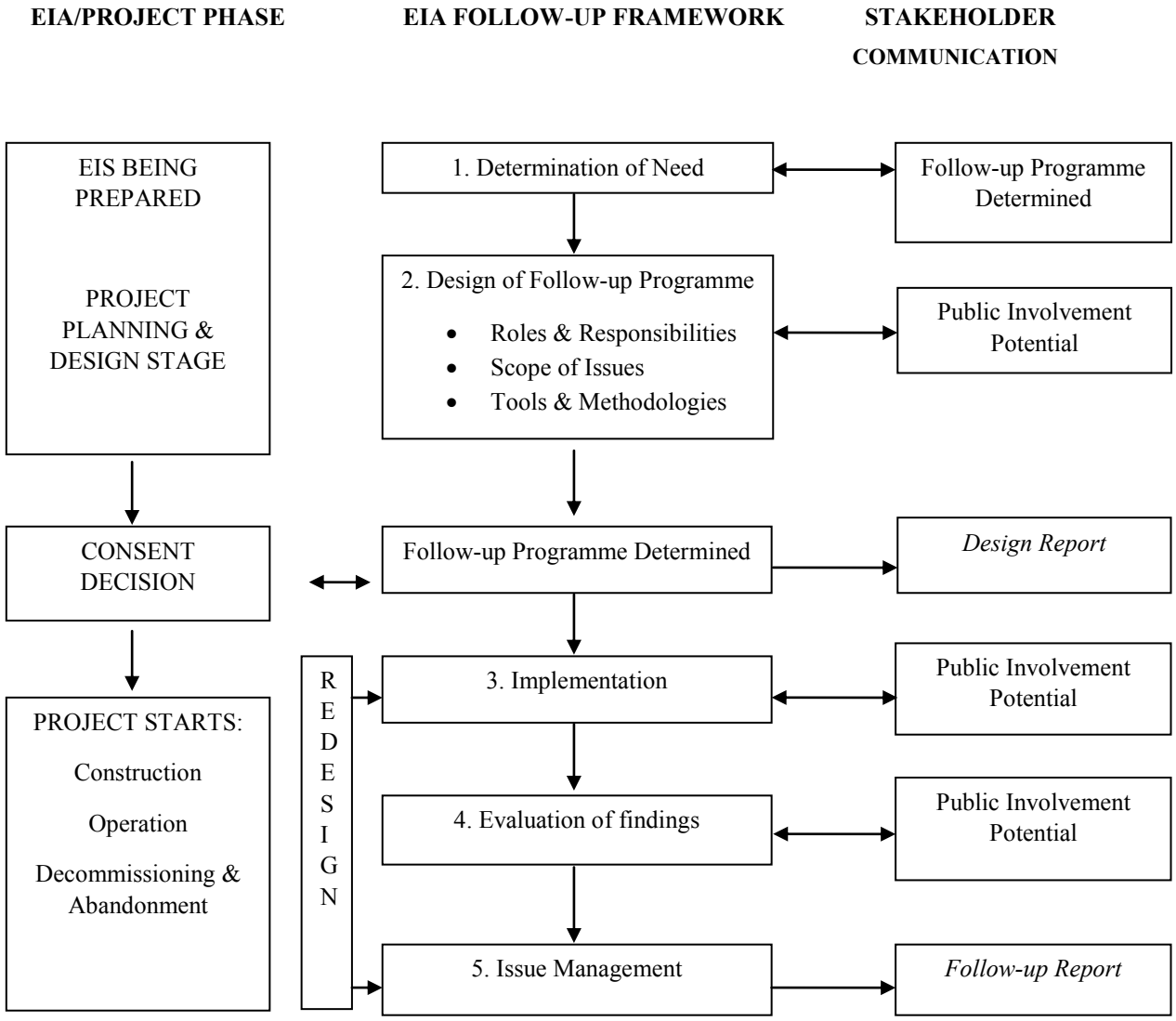

Figure 2.8 EIA practical framework (Source: Morrison-Saunders and Arts 2004)

2.4.4.1 Determination of Need (Step 1)

The follow-up framework begins with the question: Why do we need a follow up? Few countries conduct follow-up programmes as an obligation to their legal requirements. For other countries, if a follow-up procedure is conducted, for reasons other than legal requirements, there must be a clear indication explaining the added value for conducting this procedure, such as gaining knowledge and learning from the process (Baker, 2004). The need for follow-up differs across various jurisdictions. In the Netherlands, the added value of follow-up focuses on three core purposes of follow-up procedure: control, information and

communication. A second component in determining the need for a follow-up is to find a mechanism that will allow for a response to the need, such as taking extra mitigation measures (Baker, 2004). The need for a follow-up procedure is often determined by the regulatory agency, but may also be identified by any of the other EIA follow-up stakeholders involved. When determining the need, time, financial and human resources involved, the values of the affected party need to be taken into consideration as well (Kidd, 2008). Various considerations can determine the need for a follow-up. Such considerations include environmentally sensitive areas and issues of high public concern, where significant cumulative effects are predicted to occur, and where there is some reasonable uncertainty in the accuracy of the analysis and predictions.

2.4.4.2 Follow-up Programme Design (Step 2)

Once the need for the follow-up procedure has been established, the design phase is initiated. This phase includes the determination of the roles and responsibilities, the scope of the issues to be addressed and the selection of methods and tools that may be incorporated into the programme (Baker, 2004). The consideration of the above factors is essential for ensuring the effectiveness and efficiency of the entire follow-up process. A clear understanding of the roles and responsibilities of all EIA follow-up participants is crucial for implementing efficient follow-up programmes, thus ensuring that certain EIA follow-up participants can be held accountable for certain tasks (Baker, 2004). The determination of roles and responsibilities may depend upon the reasons for conducting the follow-up (Baker, 2004).

The scope of the follow-up depends on the significance of the impacts and the uncertainties about the predictions and outcomes of the issues outlined in the scoping process of an EIA (Sadler, 2004). Baker (2004) has noted the level of detail on the issue outlined in the follow-up programme depends on the scale, sensitivity and complexity of the issue. The selection of methods depends on the scope and type of project, the type of issues that need to be addressed and the extent to which the EIA follow-up participants are involved in the follow-up process (Baker, 2004). In addition to the determination of roles and responsibilities and issues that need to be addressed, several methodologies can be used to implement an EIA follow-up programme (Table 2.3).

Table 2.3 Methodologies and Tools for Follow-up Programme (Source: Baker, 2004:51)

Some of the Methodologies and Tools include:	
1	Environmental monitoring (base-line, effects and compliance)
2	Environmental audits and site visits or inspections
3	Proponent's environmental manager and environmental management system
4	Integration of follow-up terms and conditions into authorisation, license, permits and approvals
5	Complaints register
6	Camera or monitoring equipment streaming images or data onto a publicly accessible internet site
7	Regional environmental initiatives
8	Analysis of (secondary) monitoring data, documents, calculations, modelling, mapping and expert judgement
9	An adaptive management approach (must be integrated with the proposed mitigation strategy)

2.4.4.3 Implementation Stage (Step 3)

The implementation stage of is the beginning of the post-decision stage of the EIA in which the follow-up programme, as agreed on in the design stage, is implemented. Most practitioners identify this stage as a 'follow-up', considering that this is the phase where mitigation measures are put into place and impact monitoring programmes begin (Baker, 2004). Implementation of the follow-up may start along with project construction or when the operations begin (Baker, 2004). In addition information on environmental impacts and accuracy of mitigation measures are collected during implementation of the follow-up which allows for the verification of impact predictions and implementation of mitigation measures. Once data and information have been collected, they are then evaluated (Baker, 2004).

2.4.4.4 Evaluation of Findings (Step 4)

Evaluation, as a component of the EIA follow-up procedure, refers to the assessment of the conformance with standards, expectations, predictions as well as the environmental performance of the activity over a series of steps (Table 2.4) (Baker, 2004).

Table 2.4: Four Steps in the Evaluation of EIA Follow-up
(Source: Baker, 2004:54)

Four Steps in the Evaluation of EIA Follow-up	
1	The responsible agency (regulator or proponent) should ensure that all requested information has been submitted by the proponent in a timely manner, according to the agreed schedule.
2	The responsible agency should ensure that all materials (documents and licenses) submitted are reviewed by the respective experts and committees as set out at the beginning of the follow-up programme.
3	Once the responsible agency has reviewed the material it should determine measures where necessary (through consultation with all stakeholders involved in the follow-up).
4	Outcomes from the evaluation stage should be documented as appropriate. If further mitigation measures are identified as being necessary during the evaluation stage, then this should be discussed with the proponents and interested stakeholders.

In this stage, the results and outcomes from the implementation stage are compared to the baseline information collected before project implementation. This is done to determine the accuracy of the predictions in the EIA, the accuracy of the assessment and effectiveness of mitigation measures employed in the implementation stage (Baker, 2004). The results and outcomes from the implementation stage also assist in identifying lessons learnt from the EIA follow-up programme. It proceeds to determining whether the advice provided did protect the environment and/or mitigate environmental effects (Baker, 2004). Once findings and outcomes have been evaluated, further steps that need to be taken to manage any occurring issues are identified. Such steps can include alternate measures for rehabilitation and controlling of environmental impacts, particularly the unforeseen impacts during project development (Ogola, 2007).

2.4.4.5 Issue Management (Step 5)

In this stage, further actions may need to be taken due to, amongst others, the ineffective implementation of mitigation measures, the unforeseen environmental impacts identified during the follow-up, inaccurate predictions of environmental impacts in the EMP hence the occurrence of adverse environmental effects (Baker, 2004). The management of issues in the follow-up programme depends on the findings from the evaluation stage. These may suggest the need to revise the follow-up programme, particularly the design, and re-implement (Baker, 2004). In order to resolve issues identified, the construction, operation or decommissioning activities of a project may be modified. Suitable management measures can be implemented once they have been agreed upon by the various follow-up participants (Baker, 2004). Lastly, a written report should be communicated amongst the follow-up participants and agencies involved. This report should highlight specific findings of the follow-up programme, as well as any management issues adopted to remedy outstanding issues and provide a conclusion from the entire follow-up process (Baker, 2004). The practical framework is a valuable guideline aid in achieving successful performance of the EIA follow-up procedure. This framework can measure the performance of the EIA follow-up which constitutes monitoring and auditing. Monitoring and auditing are components of the follow-up which assess the quality and effectiveness of mitigation measures and contribute to the learning process in the EIA (Glasson *et al*., 2005).

2.4.5 Compliance and Enforcement

Countries have formulated environmental laws to address environmental concerns such as protection of flora and fauna, discharge of pollutants, storage and disposal of solid and hazardous wastes, protecting the quality and availability of clean water (INECE, 2009). For these laws to be effective and successful, authorities need to enforce compliance (INECE, 2009). Compliance refers to adherence to legal requirements or a standard while enforcement deals with the actions taken by the government to achieve compliance and impose sanction for non-compliance with the law (du Plessis, 2005; Craigies *et al*., 2009). According to the International Network for Environmental Compliance and Enforcement (INECE), there are various mechanisms the state can employ to enforce environmental law. Such mechanisms include ‘command and control’, ‘economic instruments’ and ‘self-regulation’ (Kidd, 2008). Command and control is strict monitoring of compliance by the state, whereas economic instruments act out of self-interest (encouraging the responsible persons to make

environmental friendly decision for their own economic benefit), and lastly, self-regulation reports instances where individuals monitor themselves (Kidd, 2008; 2011).

2.4.6 Mitigation and Environmental Management Plan

An environmental management plan (EMP) is a plan that is used as an environmental management tool to describe how negative impacts of construction, operation and decommissioning of a project can be mitigated, controlled and monitored to ensure that positive benefits of the projects are enhanced (Lochner, 2005). This is achieved by ensuring that the predicted and expected adverse impacts on the environment are mitigated and reduced as stipulated in the EMP as per the EIA mandate. The proponents of a project submit the EMP to the authorities who ensure that all relevant environmental impacts are taken into consideration with mitigation measures and alternative plans for the assessment (Polonen *et al.* 2011). The EMP was adopted 15 years ago by the World Bank (Bennet *et al*., 2015). Internationally, an EMP is perceived as an environmental protection tool that provides a continuous link between pre decision EIA process and an EMS post decision throughout the project life cycle. However, a study conducted in the UK amongst practitioners, indicated that some EMPs partially fulfil or provide weak links and the bridging role between EIA and EMS and it is difficult to measure its effectiveness due to the lack of communication (Bennet *et al*., 2015).. The objective of an EMP is to develop measures to mitigate, minimise and manage these impacts caused by developments on the environment (DEAT, 2004)

An EMP is produced from the EIA process and features a non-technical summary of major findings as well as a detailed description of the proposed action, impacts and alternative mitigation measures (Noble, 2006). Consequently, the EMP, as part of the EIA, benefits the applicants, proponents, authority and the environment. It encourages applicants to be more systematic in developing mitigation measures and ways to implement such mitigation and monitoring measures (DEAT, 2004). Authorities are provided with the ability to test how practical the implementation of the mitigation measures and monitoring measures are as stipulated in the EMP. They encourage the proponents to meet the requirements of the EMP which form the basis for the conditions of the authorisation of the project by the regulators. Overall, this enhances environmental protection thus promoting sustainability and sustainable development (DEAT, 2004).

According to the World Bank (1999), the EMP should contain the following components:

1. Summary of impacts: environmental impacts with their mitigation measures should be summarised;
2. Description of mitigation measures: a detailed description of feasible and cost-effective mitigation measures that will be utilised to reduce negative environmental impacts;
3. Description of monitoring programme: details how mitigation measures should be implemented and specifies indicators to be measured to determine the need for corrective action;
4. Institutional arrangement: persons responsible for mitigation and monitoring actions should be clearly defined;
5. Legal enforceability: legal framework for environmental protection and legal basis for mitigation are the critical legal considerations regarding the EMPs;
6. Implementation schedule and reporting procedures: The frequency, timing and period of mitigation and measures should be highlighted in an implementation schedule. Information on progress and results of mitigation and monitoring measures should also be clearly highlighted; and
7. Cost estimates: this includes the calculation for both the initial investment and recurring expenses for implementing the mitigation measures.

According to Noble and Storey (2005), the EMP provides mitigation measures on predicted impacts prior to development. Impact predictions, in some cases, are deficient in that they offer:

> Vague, imprecise and untestable statement about potential outcomes including little indication of when impacts are likely to occur; nonexistent, insufficient, inadequate or accessible monitoring data, both pre-project baseline and during project implementation; obsolete, one time "static" impact predictions resulting from changes in environmental conditions between the time that the predicted outcome was made and the monitoring activity, or changes in project design and schedules, each of which can affect the relevance of the project outcome. (Noble and Storey, 2005:170)

This implies that EMPs cannot be completely accurate since they are predictive documents of potential impacts that can cause adverse impacts on the environment during development.

This further demonstrates the need to conduct an EIA follow-up procedure to identify actual and unforeseen impacts in order to implement mitigation and control measures where necessary since it is not the predicted impacts, but the real impacts of the project on the environment that are important. There are challenges and barriers that can hinder the successful performance of the EIA follow-up and, ultimately, its contribution to EIA effectiveness overall.

2.4.7 Challenges and Barriers to EIA Follow-up

There are various challenges and barriers that hinder the relative success of the EIA follow-up in countries across the world. Such challenges include uncertainty and limited information, deficiencies in the EMP, lack of guidance on conducting the EIA follow-up procedure, lack of formal legislative requirements and demands of financial and staff resources.

2.4.7.1 Uncertainty and Limited Information

Various uncertainties and limited information during the pre-decision stages of an EIA exist and they introduce the need for an EIA follow-up study. If these uncertainties are not resolved they create difficulties during the follow-up and can potentially produce inadequate and inaccurate data during the EIA follow-up, thus impacting negatively on the process and its goals (Morrison-Saunders and Arts, 2004). Such uncertainties include limited scientific knowledge and inaccurate prediction of environmental impacts (Morrison-Saunders and Arts, 2004). According to Aud *et al.* (2006), the communication of uncertainty amongst the various EIA follow-up participants can improve the EIA follow-up investigations.

2.4.7.2 Deficiencies in EMPs

EMPs have demonstrated inadequate impact predictions, they estimate from little or no baseline monitoring, or an absence in firmness with which projects are described and arguments constructed. Through impact monitoring and mitigation during follow-up, the extent of these deficiencies can be established thus allowing the actual environmental outcomes to be determined (Morrison-Saunders and Arts, 2004).

2.4.7.3 Lack of Guidance

Even though there is abundant information on how to conduct an EIA (particularly during the pre-decision stages of the process), there is minimal guidance on how to conduct an EIA follow-up procedure. Additionally, there is a need for training and capacity building for EIA follow-up, especially in countries with little experience (Morrison-Saunders and Arts, 2004).

2.4.7.4 Legislative Deficiencies

Minimal guidance with the EIA follow-up can be partly attributed to the lack of formal legislative requirements for follow-up in some jurisdictions, such as Tanzania (Sosovele, 2011). Tanzania was only able to establish their first comprehensive legal and institutional framework supporting environmental management (the Environmental Management Act 1991) in 2004. However, it is still struggling with governance issues such as stakeholder participation, authorisation of the EIA process, capacity building, and institutional arrangement for the administration the EIA process with inadequate or lack of accountability and environmental enforcement authorities (Sosovele, 2011).

2.4.7.5 Demands of Financial and Staff Resources

EIA follow-up requires considerable resources in terms of time, money and staff members in both proponent and regulatory agencies. Until the benefits of EIA follow-up are more widely recognised in terms of long term cost savings and improved environmental management, the demands on financial and staff resources are likely to hinder progress in this area (Kidd, 2008). For example, environmental monitoring is generally costly, especially over the time and scale boundaries that are often needed to determine the extent and level of environmental damage. The lack of resources and capacity delays the authorities in addressing problems, and enforcing legislation and authorisation (Kidd, 2008). Having discussed the EIA system, and what follow-up involves, the next section discusses the effectiveness of an EIA system.

2.5 EIA Effectiveness

The effectiveness of an EIA depends inter alia on the success of the performance of the EIA follow-up which is outlined in the evaluation stage of the follow-up procedure (ex-post evaluation) (Sadler, 2004). ‘Effectiveness’ of an environmental tool is determined by whether it works and whether it meets the purpose for which it is designed and intended for (Polonen

et al., 2011). This includes maintaining and improving environmental quality through its application (Jay *et al*., 2007). Performance refers to the end state or outcome or process of implementation. It suggests a favourable accomplishment or achievement of the task or activity (e.g. what was achieved with the environmental objectives and benefits) (Sadler, 2004). As such, Sadler (2004) asserted that the effectiveness is a broad, total measure of the manner of performance. The manner of performance determines whether the EIA, as a whole or application of the main stages, fulfilled its procedural requirements and substantive criteria (Sadler, 2004). In this context, procedural requirements are concerned with whether an EIA is undertaken according to established expectations and substantive criteria with whether the EIA achieves its purpose (Cashmore *et al.*, 2004). Effectiveness and performance are indicators that outline the level to which this process achieves its stated aims. In this context, they measure how well the EIA process works and whether it improves decision making and the environment (Sadler, 2004). The effectiveness of the EIA process can be evaluated against certain criteria and standards (Sadler, 2004). The success of the implementation of EIA is relative and is determined by the criteria or standards that are created for effectiveness and performance review (Sadler, 2004). The scale of EIA can be applied and evaluated accordingly at three levels namely: micro-levels (individual activities), macro-level (EIA system) and meta-level (EIA concept) (Sadler, 2004).

2.5.1 Scales of Evaluation

Evaluation at a meta-scale refers to examining the overall EIA at a multi-jurisdictional level. It addresses the question: *Does an EIA work?* (Morrison-Saunders and Arts, 2004). A macro-level approach refers to evaluation at a single jurisdictional level or system level. It addresses the question: *How effective and efficient is the EIA system (i.e. within a particular jurisdiction or country)?* (Morrison-Saunders and Arts, 2004). A micro-level approach refers to evaluation of the overall EIA system at an individual proposal level (Sadler, 2004). It addresses the question: *Was the project and the impacted environment managed in an acceptable manner?* (Morrison-Saunders and Arts, 2004). The current study adopts a micro-level approach to evaluating the effectiveness of an overall EIA system. It focuses on aspects such as impact monitoring, compliance auditing, impact prediction and implementation of mitigation measures. To determine the effectiveness of the EIA system overall in various countries, the performance of the EIA needs to be evaluated against set criteria. Once it has been evaluated, improvements can be made to the EIA system to ensure its effectiveness.

2.5.2 Evaluating and Improving EIA Effectiveness

There are various criteria that can be used to measure the effectiveness of an EIA system. Annandale (2001) revealed that evaluating an EIA system was essential since it assists in strengthening and improving the system. Some of the evaluation criteria include Emmelin's (1998) two dimensional categorised system approach, evaluation criteria from Abaza *et al*. (2004) and Wood's (2002) commonly used evaluation criteria. These criteria are discussed briefly below.

Emmelin (1998) developed a two-dimensional categorised system approach to EIA. The first dimension is a distinction between theory and practice whilst the second dimension is a distinction between the structure of the EIA system and its context (Emmelin 1998). These two dimensions are further divided into four categories of EIA evaluation (Figure 2.9).

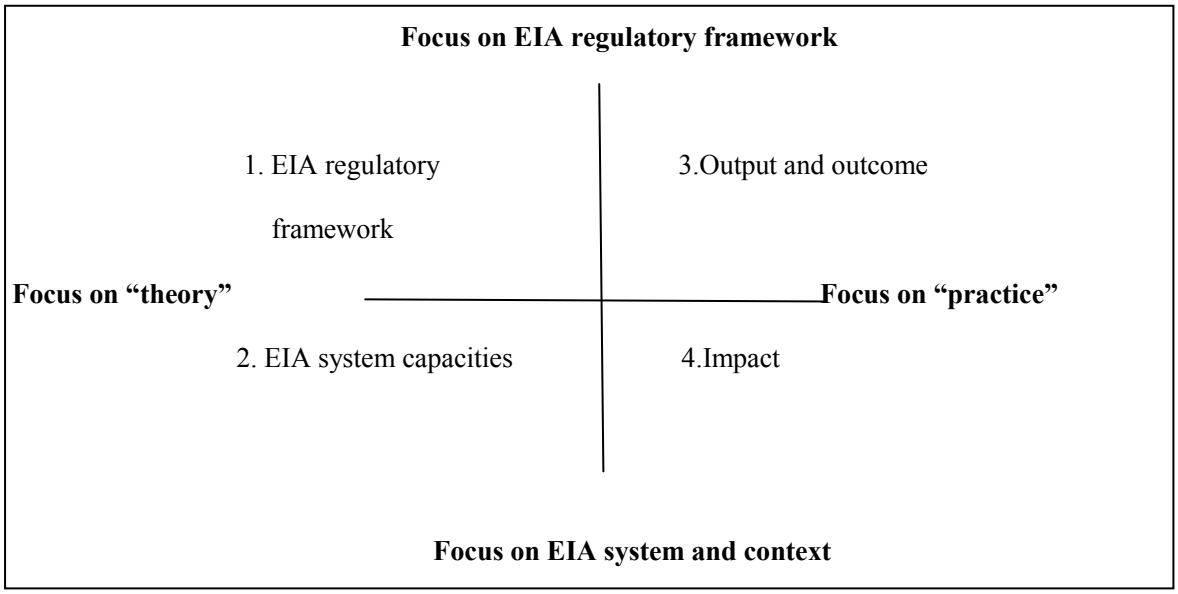

Figure 2.9 Dimensions for categorisation of approaches for EIA (Source: Emmelin, 1998)

The first category includes the evaluation of national EIA regulatory frameworks against other frameworks, or compared with what is considered a good practice EIA regulatory framework. In the second category, the performance of the EIA system is evaluated resulting in a concrete and measureable short term output such as the quality of the EIA report (De Jong *et al.* 2012). The third category of approaches emphasises the outcome and/or impact of EIA, with the prospect of identifying long term goals (De Jong *et al.* 2012). The fourth and

final category, evaluates the impact of the EIA system in practice once it has been implemented. It suggests that EIA systems should be introduced and implemented within the context of a well-established environmental administration (De Jong *et al.* 2012). This is further supported by Annandale (2001) who discussed the importance of studying the EIA system functions within its context for a better understanding of its strengths and weaknesses.

Wood's (2002) criteria have been the most comprehensive approach to evaluating an overall EIA system of a country (Zeremariam and Quinn, 2007and have proved useful for meta-scale evaluations. These evaluation criteria consist of the institutional aspects of EIA system, the actual EIA process and other features of the EIA system (see Table 2.5 below). Wood's (2002) evaluation criteria were formed based upon the stages in the EIA process (including the consideration of alternatives, project design, screening, scoping, report preparation, review, consultation and public participation, mitigation, decision-making and monitoring of project impacts); the aims of EIA; and the various evaluation frameworks. The focus of his criteria is mainly on the operation and requirements of the EIA process, i.e. procedural effectiveness (Wood, 2002). These criteria have open-ended questions thus providing a platform for descriptive analysis on various the EIA systems. According to Wood (2002), the effectiveness of EIA systems can be evaluated based on the following criteria:

Table 2.5 Evaluation criteria on performance of EIA system (Source: Wood, 2002: 15)

Wood's Evaluation Criteria	
1	Is the EIA system based on clear and specific legal provisions?
2	Must the relevant environmental impacts of all significant actions be assessed?
3	Must evidence of the consideration by the proponent of the environmental impacts of reasonable alternative actions be demonstrated in the EIA process?
4	Must screening of actions for environmental significance take place?
5	Must scoping of the environmental impacts of actions take place and specific guidelines be produced?
6	Must EIA reports meet prescribed content requirements and do checks to prevent the release of inadequate EIA reports exist?

7	Must the findings of the EIA report and the review be a central determinate of the decision on the action?
8	Impacts must be monitored and determine whether action needs to be undertaken and linked to the earlier stages of the EIA process?
9	Must the mitigation of impacts be considered at the various stages of the EIA process?

Certain aspects of Wood's (2002) criteria have been used by developed and developing countries to determine the effectiveness of EIA. The EIA system can be evaluated in both developed and developing countries. The method of evaluating effectiveness of an EIA process in developed countries differs from that of developing countries. Although Wood's criteria (2002) have been frequently used they differ across jurisdictions.

The quality of EIA reports can be used to determine the effectiveness of an EIA system. A study conducted by Barker and Wood (2003) used the EIA reports to determine the effectiveness of the EIA process on eight of the European Union (EU) countries to evaluate and determine the effectiveness of the EIA: the EIA follow-up programme compared the effects expected with the issuing of the consent decision against the real effects of the implemented activity. Evaluating the quality of the Environmental Impact Report contributes to the effectiveness of the EIA process (Sadler, 2004). The provision of inadequate information on the project and its likely consequences negatively impacts on decision making, and hence a poor quality report impacts on the degree of effectiveness (Glasson *et al.*, 2005).

The effectiveness of an EIA system can be measured by compliance with the stipulated regulations and authorisation. In the United Kingdom (UK), an effective EIA is measured by the success of the performance of the EIA follow-up procedure in complying with the authorised planning conditions such as the agreed methodologies, working times, management principles or the final design principles (Marshall, 2004). It is also measured against the proponent's ability to honour the agreement between central government decision making bodies in implementing the mitigation, monitoring, auditing and a variety of compensatory measures (Marshall, 2004).

Several countries such as Canada, the Netherlands, Scotland, and Hong Kong have made provisions for some form of post-decision analysis as a means of evaluating EIA effectiveness (Au and Hui, 2004; Ross, 2004; Arts and Meijer, 2004; Marshall, 2004). However, most of these post-decision analyses are more common and applied in developed and industrial countries than developing countries. According to Rajaram and Das (2011), achieving this still remains a challenge since in developing countries the need for fast economic growth to eradicate poverty has overshadowed the need to invest in environmental protection.

Most African countries have newly established EIA legislation. Eritrea, for example, a developing country in East Africa, is faced with immense social and environmental problems after engaging in an armed conflict with Ethiopia for thirty years (between 1960 and 1991) (Zeremariam and Quinn, 2007). Currently, the EIA system in Eriteria lacks legal provision, policies and plans for EIA, human resources and environmental information for effective decision making. In addition, the monitoring process is weak due to the lack of appropriate experts to conduct the monitoring process and the lack of a proper legal mandate to prosecute for non-compliance (Zeremariam and Quinn, 2007). This hinders the success of the EIA process.

While significant research has been undertaken on the effectiveness of EIA systems based on various criteria, such as pre-decision procedural performance and report quality, there has been minimal research that has been conducted on the role, value and importance of an EIA follow-up procedure, particularly in developing countries. Even though the research arena has broadened over time with EIA drawing from a range of disciplines that include various socio-cultural and geopolitical environments, the process of EIA still overshadows its substantive purposes, thus questioning the effectiveness of EIA.

According to Abaza *et al*. (2004), EIA can be made effective and evaluated through three approaches namely: (i) a self-directed assessment; (ii) an EIA process administration; and (iii) through guidance on EIA implementation. A self-directed assessment is a measure used by private sector proponents and government agencies to assess and account for their environmental decisions and actions associated with a particular development (Abaza *et al*., 2004). This assessment ensures proponents are more responsible for the environment, participate in identifying and implementing mitigation measure and environmental management plans. The EIA process administration entails a separate agency or independent

person established to monitor compliance with EIA legal and procedural requirements (Abaza *et al*., 2004). This administrative body is vital in reinforcing accountability, consistency, fairness and interpretation of rules and requirements thus ensuring procedural effectiveness of EIA. According to Abaza *et al*. (2004:26), an EIA administrative body can have one or more of the following functions and duties:

1. Preparation of regulation and guidance;
2. Providing procedural advice and direction including on issue resolution (as in Hong Kong);
3. Registration of EIA reports and documentation;
4. Overseeing or facilitating stakeholder involvement;
5. Review or approval of EIA report;
6. Promoting EIA good practice;
7. Supervision or inspection of EIA derived environmental management plans for project implementation; and
8. Carrying out EIA audit and follow-up studies.

Guidance on EIA implementation is another approach recommended by Abaza *et al*. (2004) for an effective EIA. Formalised guidelines can be implemented when preparing official documents issued by an administrative body. Guidelines need to outline the EIA requirements, application of the EIA legislation and regulations with explanations of actions required. In essence, guidelines describe what needs to be done, how specific actions can be conducted, when these can be done and what decisions are required (Abaza *et al*., 2004). At an international level, environmental governance and policies such as NEPA were initiated in developed countries. These policies influenced the evolution of environmental governance and EIA in South Africa, which is reviewed in the next section.

2.6 The South African Situation

The National Environmental Management Act (NEMA) was developed as South Africa's legal framework to assist in environmental decision making and promote ecologically

sustainable development. This framework provides environmental rights stipulated in section, section 24 of the Constitution of Republic of South Africa, 108 of 1996 (van der Linde, 2010). According to NEMA, the environment is "the surroundings within which humans exist and that are made of (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing"[3]. NEMA is an environmental regulation that encompasses and provides a framework for all environmental areas. These environmental areas include land-use planning and development, natural resource and pollution control and waste management. The purpose of this section is to present a critical review of the research that has been undertaken regarding the South African experience and to identify for the reader a gap in the research literature in South Africa. It critically examines sustainable development, EIA follow-up and the overall effectiveness of EIA in South Africa. A more detailed description of the regulatory framework for EIA is thereafter provided in Chapter 3.

2.6.1 Sustainable development in South Africa

The concept of sustainable development became more prominent in South Africa after the 1994 elections. In relation to the rest of the world, sustainable development planning is newly established in South Africa and it has been strongly influenced by international developments (Reenkamp, 2012). South Africa rededicated and reaffirmed its commitment to sustainable development in 2002 when it hosted the World Summit on Sustainable Development (WSSD), in Johannesburg (Reenkamp, 2012).

Subsequent to WSSD, various phases of the National Strategy for Sustainable Development (NSSD) were approved by the Cabinet from the former Department of Environmental Affairs and Tourism in 2005 (DEAT, 2011). The NSSD presents and creates an understanding of sustainable development and pathways being taken (DEAT, 2011). With this, it aims to promote social and economic goals towards ecological sustainability and create an awareness that recognises the dependence of socio-economic systems as entities on ecosystems, thus promoting sustainability (DEAT, 2011). The first phase of the NSSD ended with the adoption of the National Framework for Sustainable Development (NFSD) in 2008.

[3] National Environmental Management Act (Regulations under NEMA No. 107 of 1998)

This framework and the National Development Plan (NDP) are the two main cross planning exercises executed by the government after the 1994 democratic elections (Rennkamp, 2012). The NFSD became a framework for macroeconomic plans instead of a planning tool for sustainable development (Rennkamp, 2012). It aimed "at promoting stewardship of South Africa's natural, social and economic resources" (DEAT, 2013).

These strategies and frameworks, as appropriate to this study, include the efficient use of natural resources as well as sustaining our ecosystem, progression towards a green economy, responding properly to the increase of human and development, economic and environmental challenges (DEAT, 2011). An EIA can be used as a tool to ensure that there is sustainable use of natural resources with the increase of human development and economic growth. In South Africa, the sustainability principles are set out by NEMA (No. 107 of 1998). These principles encourage environmental management to ensure integrated management of activities that may have adverse impacts on the environment (DEAT, 2014). According to NEMA the environment is holistic in that it includes the ecological, social, economic and cultural environment.[4] Adhering to, and maintaining, the principles of sustainable development during EIA follow-up are fundamental to the effectiveness of the overall EIA system in the country. This can range from exercising the precautionary principle, implementing mitigation measures, public participation in decision making to avoiding waste and loss of biodiversity. These principles serve as guidelines as well as ensure accountability and responsibility for one's actions which can be beneficial to both follow-up participants and the environment. Implementation and compliance with these principles promotes ecological sustainability which in turn contributes to sustainable development.

Sustainable development is also an integral outcome in Integrated Environmental Management (IEM). South Africa has used environmental procedures such as EIA to facilitate sustainable development (Sadler, 2004). Sustainable development is also enabled though effective environmental governance. Environmental governance is concerned with the process of decision making regarding the management and control of the environment and natural resources (Fakier, 2005). Environmental governance in South Africa is largely shaped by the concept of IEM. IEM is a broad interpretation approach to environmental management. It identifies compliance monitoring, environmental monitoring and

[4] National Environmental Management Act (Regulations under NEMA No. 107 of 1998)

environmental auditing as important components of an EIA process (Hulett and Diab, 2002). Of all the IEM tools, only EIA is formally mandated in terms of regulation (DEAT, 2014). The EIA legislation has improved significantly since its promulgation in 1997 by enhancing regulations and supporting the follow-up components in the EIA process. Morrison-Saunders *et al*. (2003:46) argued that "having regulations in place is clearly an important first step in initiating EIA follow-up: however, the presence of regulations does not necessarily guarantee that follow-up will actually occur in practice".

2.6.2 EIA Follow-up in South Africa

Although mandated in legislation, attention is still placed mainly on the pre-decision process of the EIA whilst the post-decision EIA process remains the weakest. There is little emphasis on post-decision follow-up to ensure compliance with authorisation and implementation of mitigation measures (Jay *et al*., 2007, Bond *et al*., 2009). This is not limited to South Africa alone but is evident in most countries where EIA is being practised (Hulett and Diab, 2002; Sandham and Pretorius, 2008). An extensive number of studies have been conducted on the EIA process globally; few, however, have focused on the EIA follow-up procedure and even fewer on South Africa's EIA follow-up procedure. Studies in South Africa have been conducted to understand and explain various roles, tools and components of the EIA follow-up process to highlight its importance; more recently these have focussed on the evaluation of the effectiveness of EIA in relation to the role of Environmental Control Officers (ECOs). However, there is still scope for development in such studies in South Africa (Hulett and Diab, 2002; Wessels and Morrison-Saunders, 2012; Wessels *et al.*, 2015).

According to a study conducted by Wessels and Morrison-Saunders (2011), compliance monitoring is one of the primary roles of independent verifiers (ECOs) in South Africa. The ECOs monitor activities on site, monitor enforcement actions, ensure that there is legal compliance as well as conduct site inspections (Wessels and Morrison-Saunders, 2011). This is important for ensuring compliance and enforcement can improve the quality of the environment by providing credibility to environmental laws and institutions responsible for administering those laws (du Plessis, 2005).

Moreover, private sectors have grown to take care of legal compliance and performance evaluation through environmental assessment and management strategies (Wessels *et al.*, 2015). The effectiveness of the enforcement of environmental regulations has been a challenge for many years in South Africa (Kidd, 2008). According to the INECE (2009),

environmental compliance and enforcement need to part of an environmental management cycle. Strategies and management approaches to ensure that environmental compliance and enforcement is part of the environmental management cycle were established; results were published and evaluated in the National Environmental Compliance and Enforcement Report through the use of compliance and enforcement indicators (NECER, 2013).

In South Africa, the implementation of new mechanisms for enforcement has demonstrated an improvement in the compliance and enforcement sector. These findings were presented in the NECER 2012/2013 (DEA, 2013), a report which is released by the Department of Environmental Affairs annually. This report creates awareness on how the South Africa government addresses environmental problems and non-compliance as well as provides feedback which can lead to better planning and implementation (INECE, 2009). These activities are conducted by the Green Scorpions at a national, provincial and local level of government across South Africa (Shah, 2014). The NECER of 2012/2013 reported an increase in compliance with legislation and authorisations by means of administrative controls, such as licenses and warning letters, which are facilitated by imposing criminal sanctions through administrative controls (DEA, 2013). This presented an overall improvement with the enforcement of the South African environmental law which was a great concern, as outlined by Hulett and Diab (2002). Another challenge was the lack of adequate and qualified personnel to enforce compliance (Duthie, 2001; Hulett and Diab, 2002; Kidd, 2008). This deficiency was addressed by increasing the number of qualified Environmental Management Inspectors (EMI) (Craigie *et al*., 2009). The duty of an EMI is to ensure compliance with EIA regulations and enforcement of pollution and waste management as well as biodiversity management (DEA, 2013). They also ensure compliance with the authorised Environmental Management Plan (EMP).

The development of an EMP was first promulgated under the National Environmental Act, 107 of 1998 during 2006 (Section 23, 32 and 34 of Regulation 385). This legislation also identified the need to implement environmental management and mitigation measures and to recommend mechanisms for monitoring compliance.[5] The Environmental Management Programme (EMPr) provides the overall framework for environmental management. In large and complicated projects it is divided into EMPs (DEAT, 2004). Therefore, the EMP is embedded within the overall EMPr. In such projects the EMP may be prepared for specific

[5] Regulation 35 in terms of the 2006 amended EIA regulations under NEMA (No. 107 of 1998)

areas such as solid waste management (DEAT, 2004). The EMP makes provisions for licenses, permits and regulations that require compliance from participants and enforcement from relevant authorities (INECE, 2009). An EMP is an important environmental management tool in post-decision EIA process and, like the EIA follow-up process, it should be used to ensure that developments are conducted sustainably.

2.6.3 Follow-up and EIA Effectiveness in South Africa

The EIA follow-up procedure offers an opportunity to prevent, rehabilitate, mitigate and control adverse impacts on the environment due to developments (Marshall *et al.* 2005). The minimal emphasis on this procedure in South Africa has compromised EIA as a tool or instrument for safeguarding sustainable development thus questioning its effectiveness (Bond *et al*., 2009; Hulett and Diab, 2002; Jay *et al*., 2007; Sandham and Pretorius, 2008).

As noted in Section 2.5 above, the effectiveness of the EIA can be measured against the proponent's ability to honour the agreement with central government decision-making bodies to implement mitigation, monitoring, auditing and a variety of compensatory measures (Marshall, 2004). In the Free State, South Africa, a study conducted by Kruger and Chapman (2005) indicated that there was poor compliance with the EIA regulations in the Free State province which has negatively affected the overall EIA process. The EIA reports neglected socio-economic impacts, they adopted a subjective assessment methodology, inadequate public involvement and there was limited input of specialist studies. However, the NECER of 2012/2013 presented an improvement with compliance and enforcement in Free State. This was marked with an increase in the number of warning letters written as well as the number of pre-compliance and final compliance notices issued and directives issued by the Department of Economic Development, Tourism and Environmental Affairs.

Few studies have been conducted pertaining to Environmental Impact Assessment Report (EIAR) (Kruger and Chapman, 2005; Sandham and Pretorius, 2008; Sandham *et al*., 2013) EIARs are important for communicating results and providing descriptions related to proposed activities (Sandham and Pretorius, 2008 and Sandham *et al*., 2013. A study conducted by Sandham *et al.* (2013) found that the quality of environmental impact reporting in South Africa has not improved with the implementation of the new EIA regulations in 2006; instead it remained satisfactory. In addition, reports demonstrate a degree of subjectivity as a result of an overreliance on the ECO's checklist during impact evaluation (Kruger and Chapman, 2005). According to studies conducted, EIAR insufficiently addresses

alternative and mitigation measures that can be employed on site (Kruger and Chapman, 2005; Sandham and Pretorius, 2008). After having been presented with an overview of the South African situation in this section, a more detailed description of the regulatory framework and institutional arrangements for EIA in South Africa is provided in Chapter Three.

2.7 Conclusion

Minimal attention has been paid to the post-decision follow-up process as a procedure to safeguard the environment and promote sustainable development. This is visible in South Africa and most countries that employ the EIA process. Literature reviewed highlighted that the EIA follow-up is an important and valuable process with an essential role in decision making and environmental protection. Literature shows that an EIA's effectiveness depends on closing the gap between project plans and their implementation as actual effects caused by development on the environment are relevant for protecting the environment, not the predicted impacts. An EIA follow-up procedure is effective if it complies with the procedural steps (from the practical framework and legislation) and produces substantive outcomes (deliverance of environmental goals in terms of level of compliance). In this study, this is assessed at a micro-level through a qualitative research approach. Sustainable development maintains that developments should achieve social and economic goals without degrading the natural environment on which they are based (DEAT, 2014). Sustainable development, as this study's theoretical framework, suggests that social and economic goals can be achieved without compromising the integrity of the environment. It is based on the notion that needs for the current generation should be met without compromising the natural resources and the needs of the future generations (RSA, 2011). The the data presented demonstrates how EIA follow-up can contribute to the sustainability of the environment and sustainable development overall. To understand the procedural steps of follow-up as carried out in each of the case studies, this study uses the practical framework developed by Baker (2004). The practical framework consists of determining the need (step 1); follow-up programme design (step 2); implementation stage (step 3); evaluation of findings (step 4); and issue management (step 5) (Baker, 2004). Further reflection on the findings for all three case study sites has been undertaken in relation to the main principles of follow-up which included both operating and guiding principles (Marshall *et al*., 2005). Lastly, the theories, principles and processes of EIA, and the sustainable development paradigm, together provided a conceptual framework for analysing and interpreting the empirical data collected for this study.

Chapter Three: Background of South Africa's EIA regulatory framework and case studies

3.1 Introduction

This chapter provides a background to South Africa's EIA regulatory framework and introduces the three sites for this study. An overview of the legislation is essential since it provides a regulatory framework for the EIA process and the EIA follow-up procedure against which compliance can be measured. The chapter also discusses compliance in these frameworks as enforced by the institutional and administrative structures of EIA to ensure its success. This chapter is divided into three main sections. Firstly, the chapter addresses the broad theme of EIA legislation in South Africa as framed in the overarching philosophy of IEM (Section 3.2). Secondly, it presents the institutional and administrative structures for EIA systems (Section 3.3). Finally, the details of the three sites that have been examined in this study are discussed in Section 3.4.

3.2 History of EIA

Although usually displayed in an iterative manner, EIA is a cyclical process that needs to be conducted for authorisation prior to the commencement for the project. The evolution of EIA in South Africa has been greatly influenced by international policies (Kidd, 2008). EIA has been practised in South Africa for large projects since 1976, following a similar process set by the promulgation of the National Environmental Policy Act (NEPA) in the United States (US) in 1969 (Glazewski, 2000). NEPA of 1970 was promulgated as a response to rapid population growth, technology and economic development. Under NEPA, EIA became the first tool for environmental management which addressed environmental concerns that were increasing at an exponential rate (Sadler, 2004).

Internationally, the practice of EIA was voluntary in that it was not a statutory requirement to conduct an EIA process prior to construction (Duthie, 2001). By the late 1980s it was realised that EIA on its own was limited in scope, was reactive and not proactive, in addition to being anti-development and separate from the planning process. This view was confirmed by environmental professionals and academics at that time (Strydom *et al.*, 2009). South Africa delayed developing and promulgating procedures for environmental assessment. The early to mid-1990s saw two landmark events in South Africa which included the promulgation of the

Environment Conservation Act 73 of 1989 and the publication of the Council for the Environment's Integrated Environmental Management (IEM) in South Africa in 1989 (DEAT, 2004). The enactment of the ECA (Act 73 of 1989) established a formal procedure for environmental assessment. Its purpose was to assist in decision making and preparing an environmental impact report (Sowman *et al.*, 1995). The IEM provided the philosophy of environmental management which was closely linked to the evolution of EIA thus requiring a broader philosophy for environmental assessment (Strydom *et al.*, 2004). In reaction to environmental degradation, IEM was perceived as a concept that mainly took into account a "green" environment during decision making which aimed to prevent any adverse environmental impacts. Since then, its philosophy has changed and it now incorporates a set of principles of sustainable development which include social, political and cultural and economic impacts (DEAT, 2004). The new Constitution as set out in 1996 enshrined South African citizens' right to a healthy environment, and implementation of EIAs, as set out by NEMA. However, due to inequality and poverty, the environmental agenda is often neglected (Duthie, 2001; Death, 2006).

3.3 Integrated Environmental Management

Environmental governance in South Africa is largely shaped by the concept of IEM which is currently being implemented in terms of Chapter 5 of NEMA[6] (No. 107 of 1998). IEM is the broad interpretation approach to environmental management. As a philosophical framework, the purpose of IEM is to integrate environmental management principles into decision making and ensure that there is a balance between development and the environment (DEAT, 2004). This is achieved by identifying and evaluating potential impacts on the environment or socio-economic conditions to develop optimum environmental management. IEM is concerned not only with assessment, but also with the implementation, monitoring and the full planning cycles and various environmental management tools to ensure that environmental considerations are taken into account at every stage of a project (DEAT, 2004).

[6] Republic of South Africa, National Environmental Management Act 107 of 1998

In South Africa IEM is defined as:

> A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is integrated as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity at a local, national and international level-that has a potentially significant effect on the environment.
>
> (DEAT, 2004a:18)

This indicates that an effective approach to environmental evaluation in South Africa would need to be flexible, widely accepted and practical enough to implement (Sowman *et al*., 2004). A revised IEM procedure and a series of guideline documents were published by the Department of Environmental Affairs (1992). These documents have been used widely, in particular the set of twelve principles that support the IEM philosophy for South Africa. Some principles relevant to the current study include:

1. Accountability and responsibility: accountability and responsibility of all stakeholder in the process and through the life-cycle of the activity;

2. Alternative options: the process must identify reasonable alternatives and offers the decision-makers an understanding of the trade-offs. These alternatives should include demands, activities, location, schedules and processes;

3. Polluter pays: those who are primarily responsible for pollution, environmental degradation and subsequent health effects are liable for paying the costs to remedy such situations; and

4. Adaptive: Processes should be flexible and adaptive to realities issues and circumstances. (DEAT, 2004)

IEM integrates environmental consideration across the life cycle of the activity, knowledge across disciplines, and provides an opportunity for EIA follow-up participants involved to communicate through proper initiating, planning, implementing, controlling and closure of an activity (DEAT, 2004). These tools are effective in the stages of the development cycle. The IEM provides the conceptual framework for both the EIA regulations promulgated in terms

of ECA in 1997 (EIA regulations promulgated in terms of sections 21, 22 and 26 of ECA 73 of 1989 (DEAT, 2004) and the new EIA regulation promulgated in terms of NEMA in 2006.

The Department of Environmental Affairs aimed for a more efficient and effective IEM system that is supported by a range of EM instruments and tools which are directed towards achieving sustainability. In order to assist in the implementation, adaptation and improvement of IEM, DEA launched an Environmental Impact Assessment Strategy (EIAMS) in 2011. The primary reason of the EIAMS was to enable the use of Environmental Management (EM) instruments and tools to, amongst others, inform decision making, integrate environmental consideration into policies and ensure the development and appropriate use of Environmental Management (EM) tools to achieve sustainability. The EIAMS outlines and addresses underlying causes that limit the success of the IEM system in securing the desired outcome from sustainability. Some of the root causes, as appropriate to this study, include the lack of mechanisms to facilitate monitoring, evaluation, feedback and adaptive management for IEM/instruments and tools. There is a lack of internalisation of NEMA (No. 107 of 1998) principles and the principles of sustainability do not incorporate effective cooperative governance; in addition more understanding of and appreciation for the environment are required as well as tools for proper environmental protection. Finally there is a lack of effective public participation. Addressing these underlying causes will provide an enhanced system for integrated planning and implementation, as well as governance systems and relevant capacity and sustainable environmental management which forms part of the National Policy Directives (NDP) (DEAT, 2014).

3.4 National Policy Directives

The National Policy Directives focus on how to improve the current IEM system to facilitate the move towards sustainability for the country. With this, the strategy aims to create an efficient governance system for integrated planning and implementation, an enhanced governance system and capacity, and sustainable environmental management. This is derived from the National Development Plan (NDP), the Medium Term Strategic Framework (MTSF), the Presidential Outcome and the National Strategy of Sustainable Development (NSSD).

The National Development Plan (2011, 2013) was developed by the National Planning Commission in the President's office. The National Development Plan 2030, amongst others,

focuses on transition to a low carbon economy, resilience towards climate change and progression towards an environmentally sustainable South Africa (Presidency, 2011). As outlined in the EIAMS, the MTSF addresses the constraints on the vision outlined by the NPD for South Africa's environmentally sustainable future (DEAT, 2014). Constraints that needed to be addressed include natural resource degradation and depletion due to economic growth which were addressed as the 12 sub-outcomes and actions established during the drafting of the 2014-2019 MTSF.

The overall goal of the NSSD is sustainability (or a sustainable society). NSSD acknowledges that maintaining a healthy ecosystem and natural resources are preconditions for human well-being (DEAT, 2014). There is a relationship between the sustainability objectives of the NDP, the MTSF, and Outcome 10 (from the 12 outcomes) and the NSSD. Outcome 10 refers to the protection of environmental assets and natural resources to produce sustainable environmental management. These objectives include enhancing governance systems and sustainable environmental management, sustained ecosystem and protected biodiversity, positive response to climate change, a low carbon or green economy and sustained communities (DEAT, 2014). Achieving sustainability, and ultimately, sustainable development requires a sustainability-led approach.

A sustainability-led approach to the IEM system in South Africa aims for a sustainable development path for this country. This would include the NDP, NSSD and the Presidential Outcomes. A sustainability-led approach aims to enhance favourable effects of human activity on the natural environment without compromising its integrity. It ensures that the human basic needs are met and avoids inappropriate trade-offs. It includes the use of sustainability objectives, indicators and targets, as well as avoidance and decrease of impacts (DEAT, 2014: 88). This in turn encourages the exploration and evaluation of alternatives to proposals and projects in order to meet the needs, purpose and sustainability objectives and targets (DEAT, 2014). One of the important requirements for an effective sustainability led approach is the monitoring, measuring and implementing of compliance enforcement to sustainability targets. This in turn will promote sustainable development as a main support tool for EIA (Weaver *et al*., 2008).

Although voluntary, formal procedures for EIA were developed through the enactment of the ECA (Act 73 of 1989). Under the National Environmental Management Act, 1998 (Act No. 107 of 1998, EIA regulations have been developed to set a formal procedures where

cooperative governance can be provided to assist in decision making, preparing environmental assessment report and promoting environmental protection. Ultimately NEMA (No. 107 of 1998) was promulgated to improve and contribute to the Environmental Management Policy.

3.5 Environmental Framework Legislation

3.5.1 EIA and NEMA 2006-2010

The old EIA Regulations promulgated under the Environment Conservation Act (No. 73 of 1998) were replaced shortly thereafter by the new EIA regulations made in terms of Chapter 5 under NEMA (No. 107 of 1998) in April 2006 (see Table 3.1) (Kidd and Retief, 2009). Under NEMA (No. 107 of 1998), a framework for co-operative environmental governance in South Africa and the application of environmental assessment tools were promoted to ensure integrated environmental management of activities (DEAT, 2006). The Act cancelled most of the Environment Conservation Act, No. 73 of 1989 and since then it has been subsequently amended on several occasions.

Table 3.1 Comparison of Environment Conservation Act No 73 of 1989 and National Environmental Management Act 2006 (Source: adapted from Jordaan, 2010)

Environment Conservation Act 1989	**National Environmental Management Act 1998**
The Environment Conservation Act (ECA), No. 73 of 1989 (RSA, 1989)	National Environmental Management Act (NEMA), No. 107 of 1998 (RSA, 1998) National Environmental Management Act (NEMA), Second Amendment Act, No 8 of 2004 (RSA, 2004) National Environmental Management Act (NEMA), Third Amendment Act, No 21 of 2006 (RSA, 2006)
Regulation 1182 of 5 September 1997 (RSA, 1997a) Regulation 1182 of 5 September 1997 (RSA, 1997a) Regulation 1182 of 5 September 1997 (RSA, 1997a)	Regulation of 543 of 18 June 2010 (RSA, 2010a) Regulation of 544 of 18 June 2010 (RSA, 2010b) Regulation of 545 of 18 June 2010 (RSA, 2010c) Regulation of 546 of 18 June 2010 (RSA, 2010d)
Lack of thresholds for listed activities	Thresholds for listed activities

Lack of time frames resulting in high volumes of expensive EIA executions and increased capacity and time needs related to the decision making authority	Strict time frames
Proper guidance in terms of public participation pertaining to the nature and extent is absent	Clear prescriptions in terms of Interested and Affected Parties and public participation.
Lack of prescriptions in terms of consultant's competence and professionalism	The need to appoint independent consultants outlined. Prescriptions in terms of appointment requirements and disqualification for consultant provided.
Low clarity and different interpretations because of low prescriptive measures that pertain to impacts on the environment and that the impacts were not effectively managed no reference made to compliance with the provisions of the Record of Decision (RoD). Neither monitoring nor compiling of Environmental Management Plans (EMPs) is addressed; the RoD is issued for listed activities.	Highly prescriptive in terms of identifying the impacts and the mitigation measures to be put in place. Monitoring to be done and EMPrs to be developed before activity can commence. Environmental Authorisation (EA) is given for listed activities.
Minimal enablement of strategic decision making	Strategic decision making enabled through provisions for Environmental Management Framework (EMF and Environmental Management Plans)
Not streamlined process, but it did however assist authorities to make informed decisions.	Streamlined in terms of provisions for combination of projects
Unnecessary time and monetary costs	Time frames set and should be cost-effective.
Time and resources wasted due to no differentiation of nature, environmental footprint and risk of those listed activities which required and EIA – all activities were subject to similar EIA process	Clear differentiation between listed activities and there are two processes for basic and scoping EIA
Social Impact Assessment (SIA) not included in EIA as it lacks legal standards – social issues are often seen as unimportant and SIA is poorly funded compared to EIA (Kruger and Chapman, 2005)	SIA only addressed as part of specialist inputs if identified by the EAP

NEMA (No. 107 of 1998) has been amended on several occasions. The NEMA 2006 EIA regulations were replaced by the NEMA 2010 EIA regulations. The 2006 amended National Environmental Management Act 107 of 1998 (RSA, 1998) outlined the need for monitoring and auditing which is the follow-up procedure of projects with an authorised EIA. This demonstrates an improvement in South Africa's environmental regulations since the implementation of the follow-up procedure was not provided for in the Environment Conservation Act (ECA), No. 73 of 1989.

The new EIA regulations under NEMA aimed to make the EIA process more flexible and project specific and aimed for efficiency in decision making for the approval of developments (DEAT, 2006). The main changes in the new Regulations included certain types of activities with more detailed thresholds, length of time of the coverage of activity requiring an EIA e.g. mining; time frames; provision for post decision follow-up and the introduction of two types of assessment processes (Kidd and Retief, 2009). These new changes were outlined under NEMA (Act No. 107 of 1998) in 2010 and were amended in 2014.

3.5.2 NEMA 2010 and EIA 2014 amendments

The new NEMA (No. 107 of 1998) regulations in South Africa, which came into effect in August 2010, aimed at improving the effectiveness and efficiency of EIA (DEAT, 2010). The revised NEMA regulations replace the 2006 EIA regulations. This research was based on case studies that were authorised under the NEMA Regulations as amended in 2010.

These regulations are documented in Chapter 3 of the 2014 NEMA regulations under the subtitle: content authorisation. Content authorisation stipulates the information required by the competent authority for environmental authorisation for the requested project, under which it states that activities conducted by an EIA require the management, monitoring and reporting of the impacts of the activity on the environment throughout the life cycle of the activity as contained in the approved environmental management plan (RSA, 2010). The completion of an Environmental Impact Report (EIR) and an environmental audit report are also required to be prepared by the holder of the authorisation or a person who is independent. Such reports should specify proof of compliance, i.e. the extent to which the conditions of the authorisation are being or not being complied with, the reasons for such behaviour, and any action taken with regard to mitigation measures (RSA, 2010). The lack of specific regulations dedicated to the improvement of EIA effectiveness is addressed in the

new and revised regulations of NEMA 2014. The legislation, under content of environmental authorisation, clause 37 (d. ii) states that

> "... the conditions subject to which the activity may be undertaken, including conditions determining requirements for the management, monitoring and reporting of the impacts of the activity on the environment throughout the life cycle of the activity as contained in the approved environmental management programme". (RSA, 2010: 46)

Regulations are continuously being improved through amendments. The latest amendments to the NEMA, EIA regulations were in the form of an agreement between the relevant Departments to manage the impacts of mining on the environment. The EIA regulations had to be substantially amended before this agreement was placed into operation on 8 December 2014. The most significant amendment as pertaining to this study includes:

1. It is specified in the regulations that EMPr (Environmental Management Programmes) previously known as Environmental Management Plan) must clearly stipulate the various roles and responsibilities of EIA follow-up participants and indicate the person responsible for the implementation of management actions[7]. EMPrs replace EMPs with amendments of EIA regulations in 2014. However, EMPs will be referred to specifically during discussions pertaining to the case studies since they were approved as EMPs (under NEMA 2010 regulations) and conducted as such for this study.

2. Provisions are made for dealing with offences[8], including failure of the holder of an environmental authorisation to notify the competent authority of its intention to amend the EMPr[9], failure to comply with the conditions of environmental authorisation and EMPr and audit requirements[10] and when activity commences where the environmental authorisation was suspended or withdrawn.

[7] Regulation 23 (4); Appendix 4 (1) in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[8] Regulation 48 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[9] Regulation 37 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[10] Regulation 34 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

3. Provisions have been made for the amendment of the EMPr or closure plan as a result of an audit. If amendments are made to the EMPr based on 'audit' findings then these amendments need to be approved by the competent authority. Approval will be granted if the amended EMPr sufficiently provides for avoidance, management and mitigation impacts of associated activity[11]; if other amendments are made (i.e. before the occurrence of the first audit) then approval by the competent authority is not required[12].

4. The amended terms seek to clarify terms, including 'Environmental Audit Report' as well as develop guidelines on the content of audit reports[13].

5. The holder of the authorisation must place the audit report on a website where it can be publicly available.[14]

For this study, applicable legislation, Conditions of Authorisation, audit reports and EMPs were used as documentary sources for the collection of secondary data, as is detailed in Chapter Four below. Content analysis was used to analyse texts from these documents. EIA is governed by section 23 and section 24 of NEMA which specify the regulations and procedure for reviewing EIA reports as well as the EIA process (Saidi, 2010).

3.5.3 EIA process under NEMA (No. 107 of 1998)

Chapter 5 of NEMA, 1998 (No. 107 of 1998), outlines EIA as the main tool to ensure IEM in South Africa, through a regulated environmental authorisation process (Sandham and Pretorius, 2008). Under NEMA any activity that would degrade or pollute the environment required an assessment of the effects to ensure that the impacts are managed accordingly without compromising the environment (DEAT, 2006). Such activities include agri-industry projects, energy projects, large-scale property developments, social infrastructure and housing projects and linear developments (DEA, 2010). EIA has a comprehensive scoping

[11] Regulation 35 in terms of the 2014 amended EIA regulations NEMA (No. 107 of 1998)

[12] Regulation 36 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[13] Regulation 1; Regulation 34 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[14] Regulation 26 (h)(iii) in terms of the 2014 amended EIA regulation under NEMA (No. 107 of 1998)

process to provide an assessment for larger projects that have the potential to adversely impact the environment during construction (Sandham *et al.*, 2013).

According to NEMA, the purpose of conducting an EIA is to assess, determine and evaluate the consequences of a proposed development activity or project (DEA, 2010). With this, it is required that an EIA of a development consider societal needs, public interest and the natural environment during preparation to minimise environmental impact during and after development. Prior to project development, an EIA process had to be conducted for authorisation (Saidi, 2010).

This EIA system consisted of the following main steps (Sandham and Pretorius, 2008):

1. Pre-application consultation;
2. Plan of study for scoping (including public involvement);
3. Scoping report (including public involvement);
4. Plan of study for EIA;
5. Environmental Impact Report (EIR) (including public involvement);
6. Authority review;
7. Environmental authorisation (including conditions of approval).

The environmental authorisation includes the authorities' approval of the EIA and the EMPr which then gets audited to ensure compliance. According to Saidi (2010), EIA facilitates planners and local government to develop alternate design, scale and location that would not compromise the environment which results in better planning. Using the principles[15] of NEMA (No. 107 of 1998), an EIA can be conducted to fulfil the aim and goals of the Spatial Development Framework and ultimately the Integrated Development Plan at a municipal level.

3.5.4 Integrated Development Plan and Spatial Development Framework

The Integrated Development Plan (IDP) is meant to address the inequalities of the apartheid era by formulating a plan for social, spatial, environmental and economic development in local municipalities in South Africa (eThekwini Municipality, 2014a). According to the

[15] Regulation 2 in terms of the EIA regulations under NEMA (No. 107 of 1998)

Municipal System Act (No. 32 of 2000), each local government has to prepare an IDP to facilitate management and development with their jurisdiction (eThekwini Municipality, 2014b). In the eThekwini Metropolitan Municipality, this plan is meant to guide development so that all services are provided in a coordinated manner for local residents. The Spatial Development Framework (SDF) is a core component of the IDP which fulfils a crucial role in the implementation of the IDP (eThekwini Municipality, 2014b). It is a framework that guides spatial distribution of current land uses within a municipality which contributes to the objectives of the municipality IDP (RDLF, 2011). The aim of the SDF is to promote sustainable and integrated human settlements, increase access to resources and highlight regional identity. It is an essential component of a municipality's economic, sectorial, spatial, social, institutional and environmental vision (RDLF, 2011).

In the eThekwini Municipality, the SDF assists in ensuring that the natural open spaces are protected and managed sustainably with the effective use of scarce land resources (eThekwini Municipality, 2014a). This will require the sustainability of the air, water and land resources as important socio-economic and natural assets of the city (RELF, 2011). NEMA (No. 107 of 1998) has important principles that inform the SDF. These principles include sustainable development of the environment, society and the economy, protection of natural resources and maintenance of natural systems and accessibility to resources and environmental management with priority placed on society (eThekwini Municipality, 2014a).

Using the principles[16] of NEMA (No. 107 of 1998), EIA can be conducted to fulfil the aim and goals of the Spatial Development Framework and ultimately the Integrated Development Plan at a municipal level. EIA fulfils an essential role in ensuring that the goals of the IDP and SDF are met by identifying potential adverse environmental impacts that could hinder the environmental, social and economic development of the eThekwini Municipality.

In order to ensure compliance and enforcement of these regulations, institutional and administrative structures have to be in place. These institutional structures manage the system of values and polices and society's economic, social, political affairs through interactions within and among the state, civil society and private sector (UNDP, 2004)

[16] Regulation 2 in terms of the NEMA (No. 107 of 1998)

3.6 Institutional and administrative structures for EIA in South Africa

There are established institutions for environmental management in South Africa (Kidd, 2008). These institutions are highlighted in Chapter 2 of the EIA regulations 2006 and 2010 (RSA, 2006; 2010). The National Environmental Advisory Forum was established in 2005 under NEMA (No. 107 of 1998), Part 1 in Chapter 2 (Kidd, 2008). The Forum advises the Minister on any matter concerning environmental management, achievement of goals for environmental governance, and appropriate methods of monitoring compliance with the principles set out in Section 2 of the Act (Walmsley and Patel, 2011). The forum also represented EIA follow-up participants and informed the Minister on the application of the principle as set out in Section 2 of the Act (Walmsley and Patel, 2011).Unfortunately, the National Environmental Advisory Forum was discontinued due to continual changes in administrative structures (Kidd, 2014).

Part 2 of Chapter 2 of NEMA also makes provision for the development of a Committee for Environmental Co-ordination. This committee consists of the director-generals of specific government departments (national and provincial) involved in environmentally related functions (Kidd, 2008). The aim of the Committee is to promote the integration and coordination of environmental functions by the relevant organs of state. Furthermore, they ensure that the objectives and purpose of environmental implementation plan and environmental management plan are achieved (Kidd, 2008). This includes the mitigating, controlling and monitoring of negative impacts on the environment which is achieved through the conducting of EIA follow-up procedures. The South African government is divided into three tiers (national, provincial and local spheres) that are distinctive, interrelated and interdependent. Each of these spheres of government has executive and legislative authority over various environmental issues which are further discussed below (du Plessis, 2005).

3.6.1 National Department of Environmental Affairs

The National Department of Environmental Affairs is ultimately responsible for the administration of environmental legislation. National government departments are led by a cabinet minister (Kidd, 2011). The administration of environmental matters was restructured after the elections in 2009 with the establishment of the Ministry of Water and Environmental Affairs. This department was created from the former Department of Environmental Affairs

and Tourism as well as the Department of Water Affairs and Forestry (Kidd, 2011). This was further divided into two autonomous departments namely, the Department of Water Affairs (DWA) and the Department of Environmental Affairs (DEA) (DEA, 2013). Both departments are overseen by the Minister and Deputy Minister of Water and Environmental Affairs.

The department is guided by the constitutional mandate as outlined in section 24 of the Constitution. This mandate is accomplished by formulating, monitoring and the implementation of national environmental policies, legislation and programmes. The DEA is responsible for the EIA at the national and provincial level. At a national level there is formulation and coordination of EIA policies while the approval of the EIA for most development proposals occurs at a provincial level by competent authority (DEA, 2013). According to the Southern African Development Community (Walmsley and Patel, 2011: 317), the DEA are also responsible for:

1. Developing and enforcing compliance with environmental policy;
2. Developing and implementing an integrated and holistic environmental management system;
3. Coordinating and supervising environmental functions in all spheres of government; and
4. Developing and enforcing an integrated and comprehensive regulatory system.

The national structures are further divided into provincial structures. The DEA devolve responsibility for the authorisation of environmental impact assessments down to the provincial authorities i.e. DAEA, now referred to as Department of Economic Development, Tourism and Environmental Affairs (EDTEA) in KwaZulu-Natal (DEA, 2013).

3.6.2 Provincial Structures

The provincial departments are responsible for environmental matters on a provincial level (Kidd, 2011). In terms of section 42(1) of NEMA of 2003, provinces were granted, by the Minister of Water and Environmental Affairs, the responsibility for authorising proposed development activities in terms of the EIA Regulations. Provinces may in turn delegate this responsibility to local authorities. The National Department of Environmental Affairs has provincial departments across the nine provinces in South Africa. In most of these provinces,

the administration function for EIA is placed within portfolios dealing with rural development, natural resources management, conservation, economic development, agriculture or tourism. In KwaZulu-Natal there is the Economic Development, Tourism and Environmental Affairs with regional offices, district offices and local offices both north and south of the Durban CBD (DEA, 2014). The provincial departments are as follows:

Table 3.2 Provincial Structures in South Africa

Province	**Provincial Department**
Eastern Cape	Department of Economic Development and Environmental Affairs
Free State	Department of Economic Development, Tourism and Environmental Affairs
Gauteng	Department of Agriculture and Rural Development
KwaZulu-Natal:	**Economic Development, Tourism and Environmental Affairs**
Limpopo:	Department of Economic Development, Environment and Tourism
Mpumalanga	Department of Economic Development, Environment and Tourism
Northern Cape	Department of Environmental Affairs and Nature Conservation
North West	Department of Economic Development, Environment, Conservation, and Tourism
Western Cape	Department of Environmental Affairs and Development Planning

In terms of NEMA 2010 regulations, the main obligations of the provincial departments are as follows:

1. Provide the applicant with any relevant guidelines, departmental policies, decision-making instruments and information relevant to the application;[17]

2. Advise the applicant on the nature and processes that must be followed in order to comply with the Act and Regulations;[18]

3. Consult with other competent authorities and other organs of state to avoid duplication of effort;[19]

[17] Regulation 5 (a) in terms of the 2010 amended EIA regulations under NEMA (No. 107 of 1998)

[18] Regulation 5 (b) in terms of the 2010 amended EIA regulations under NEMA (No. 107 of 1998)

4. Receive and acknowledge receipt of applications within the stipulated time frame.[20] Such applications include the EMPrs which are created by the EAP of that particular project.

There are conditions for authorisation of the EMPr that inform the preparation of EMPr[21] that the EAP needs to comply with when preparing the plan. These conditions, as referred to in this study, include:

1. Detail of the person who prepared the EMPrs;
2. Information on any proposed management of mitigation measures that will be taken to address the environmental impacts identified;
3. Identification of the persons who will be responsible for the implementation of the measure contemplated;
4. Description of the manner in which it intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; and
5. Time periods within which the measures contemplated in the environmental management.

The provincial structures are responsible for enforcing regulatory requirements and the administrative framework for conducting EIA follow-up. They implement and communicate EIA policy and procedures regarding the follow-up with local government structures (Ahammed and Nixon, 2006). The final institutional and administrative structure is the local government. The local government structures are responsible for implementing policies, plans and programmes from provincial and national government (DEAT, 2006).

3.6.3 Local Government Structures

Local government structures are municipalities in South Africa. The local government structures are the closest to the communities and fulfil an important role, not only in the socio-economic development of their citizens but as an active agent for social, economic and

[19] Regulation 6 in terms of the 2010 amended EIA regulations under NEMA (No. 107 of 1998)

[20] Regulation 9 in terms of the 2010 amended EIA regulations under NEMA (No. 107 of 1998)

[21] Regulation 33 in terms of the 2010 amended EIA regulations under NEMA (No. 107 of 1998)

environmental development (du Plessis, 2005). These structures are responsible for the alignment of the IDP and the Environmental Implementation Plans in their respective municipalities (DEAT, 2006). With regard to the EIA process, they ensure compliance with and enforcement of environmental authorisation and participation on a local level. As compared to the provincial and national government, local government is able to govern according to their own initiative depending on the needs of the local community (du Plessis, 2005). The local government can focus and administer legislation on particular, direct or indirect, environmentally relevant areas. This may include building regulations, specified water and sanitation services, municipal roads, noise pollution, refuse removal and solid waste disposal (du Plessis, 2005). Local government structures administer and grant authorisations to proponents to commence with development (Ahammed and Nixon, 2006). These structures secure a balance between the interest of the proponent and the community as well as confirm compliance from proponents during the EIA follow-up (Marshall *et al*., 2005).

3.6.4 Other role players in the EIA process

At a local level, authorities control activities occurring locally. In addition to the competent authority, there are three other role players involved in the EIA process. They are the applicant (developer), environmental assessment practitioner (EAP) and the interested and affected parties or the public. Where appropriate, commenting authorities such as the Department of Water Affairs (DWA), the Department of Agriculture, Forestry and Fisheries (DAFF), Ezemvelo KZN Wildlife (EKZNW) ensure that there is compliance with respective authorisations and regulations during development.

Project proponents and developers

The applicant is the developer of the project and will have to acquire Environmental Authorisation from a competent authority. As the developer, he or she is responsible for hiring the environmental assessment practitioner at his or her cost to manage the application.[22] The developer has to make sure that the practitioner is independent with expertise and complies with the necessary legal requirements. The applicant must also provide the practitioner and competent authority with the relevant information for the application process. During the follow-up procedure, the proponent and project developers

[22] Regulation 16 (1) in terms of the 2010 amended NEMA Act (No 107 of 1998)

are responsible for ensuring that there is compliance with regulations, authorisations and audit reports.

Environmental Assessment Practitioners

The Environmental Assessment Practitioner (EAP) fulfils an essential role in educating and assisting clients in understanding legal environmental requirement (du Plessis, 2005). They ensure compliance with the legal requirements, highlighting sanctions for non-compliance and provide solutions to address non-compliance (du Plessis, 2005). The EAP is responsible for the pre-decision stage of the EIA process. This consists of compiling a report or undertaking a specialised process to manage the application for a Basic Assessment or an Environmental Impact Assessment as well as drawing up the EMPr for authorisation. The EAP works independently from the ECO [23] (RSA, 2010).

Environmental Control Officers

The Environmental Control Officer (ECO) is appointed by the client and is responsible for the post-decision stage of the EIA process. The ECOs are identified as being responsible for compliance monitoring, implementation and enforcement, ensuring legal compliance, advising, communicating, reporting and raising awareness (Wessels and Morrison-Saunders, 2012) They are not legally tied as ECOs in the EIA regulations; instead they are referred to as independent persons.[24] An appraisal conducted by Wessels and Morrison-Saunders (2011) disclosed that both proponent and regulator benefit from an independent ECO. They facilitate discussion among stakeholders, are adaptable and proactive while enforcing conformity. Their study was informed by growing debates and studies in this field. According to legislation, the holder of an environmental authorisation (client) must appoint an independent person with relevant environmental auditing expertise to prepare environmental audit reports and submit to the competent authority as indicated in the environmental authorisation (RSA, 2014). ECOs in South Africa are consultants from Environmental Companies, Environmental Departments and Engineering Companies. The ECO is meant to avoid, manage and mitigate environmental impacts associated with the authorised development[25] (RSA, 2014).

[23] Regulation 17 in terms of the 2010 amended EIA regulations under NEMA Act (No. 107 of 1998)

[24] Regulation 34(2)(a) in terms of the 2010 amended EIA regulations under NEMA (No. 107 of 1998)

[25] Regulation 34(2)(b) in terms of the 2010 amended EIA regulations under NEMA (No. 107 of 1998)

The ECOs also prepare and submit audit reports to the relevant competent authority. The objective of the audit report is to demonstrate the level of performance against compliance of a project to the EMPr. It also reports the measures that were used to manage and mitigate environmental impacts caused by developments. In addition it identifies potential impacts and risks that could be caused by the authorised project. With regard to the EMP, it assesses its effectiveness, accuracy for future reference regarding the avoidance, management and mitigation measures for authorised projects (RSA, 2014).[26] The EIA legislation provides guidelines for the ECOs on the content of environmental audit reports. An independent person, who is appointed by the client, conducts the follow-up and submits an environmental audit report to the relevant competent authority[27]. According to the 2014 amended EIA regulations, audit reports outline the level of compliance with the conditions of the environmental authorisation and EMPr. They also report on the management and mitigation measures provided for in the EMPr and identify any new impacts and risks associated with the undertaking of the activity[28].

Interested and Affected Parties (I&APs)

Public participation refers to the involvement of the local community in designing and evaluating the proposed plan or project (Yea, 2010). It includes procedures and methods that are designed to inform the public of potential decisions that can affect them thus allowing persons of all parties who may have an interest or are affected (I&APs) by a proposed development to have an input into the process (RSA, 2006; Yea, 2010). The latter are also known as EIA follow-up participants (Yea, 2010). They have a right to bring to the authorities, any issue or concern they believe needs to be considered by the authorities prior to granting authorisation (RSA, 2006). On a broader scale, stakeholder engagement is the framework of policies, principle and techniques that ensure the public and EIA follow-up participants (citizens and communities, groups, organisations and individuals) are provided with the opportunity to engage in the decision making process (Yea, 2010). Public participation is viewed as a practice of stakeholder engagement (Yea, 2010).

[26] Appendix 7 Regulation (2) in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[27] Regulation 37 (4)(b) in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[28] Appendix 7 Regulation (2) in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

The roles of I&APs in public participation include one or more of the following (RSA, 2006:12): theoretical

1. Assist in identifying and prioritising issues that need to be investigated;
2. Assist in or comment on the development of mutually acceptable criteria for the evaluation of decision options;
3. Make suggestions on alternative and means of preventing, minimising and managing negative impacts and enhancing project benefits;
4. Contribute information on public needs, values and expectation; and
5. Verifying that their issues have been considered.

Legislation was implemented and served as a guideline for ensuring and measuring compliance by the ECO during the follow-up procedure from the three case study sites assessed in this research. These sites are elaborated below.

3.7 Study Area

This section provides a brief background of the study area and a summary of each case study used for this research. The case studies developed here include Moss Kolnick Interchange Project, Dickens Road Retaining Wall and the BASF Chemical Plant Project in Umbogotwini). This study used a case study approach which enabled the researcher to examine data in detail within a specific context. It aimed to understand the case in its natural setting and in depth (Punch, 2005).

The three sites investigated in this research are located in eThekwini Metropolitan Municipality which is one of the ten district municipalities in KwaZulu-Natal (KZN) (SALGA, 2011) (see Figure 3.2). The eThekwini Municipal area extends for 2 297 km^2 from Umkomaas in the south, to Tongaat in the north and moves inland to Ndwedwe and ends at Cato Ridge in the west (COGTA, 2013).

As recorded in the 2011 census, the eThekwini municipality has a total population of 3 442 361 (Stats SA, 2011). It consists of 117 938 females and 110 468 males. The population continues to grow 1.08% per annum. Its population group consists of black (74%), Indian (17%), white (7%) and coloured (3%). Its labour market has an unemployment rate of

30.2% and a youth unemployment rate (ages 15-34) of 39% (Stats SA, 2011). This municipality is characterised with a diverse society that still encounters various economic, social environmental and governance challenges (eThekwini Municipality, 2014).

Currently, economic development in the eThekwini Municipality consists of manufacturing (30%), tourism (24%), finance, transport and communication (14%), as well as business services, community service, wholesale and retail (Makwethu, 2013). These economic sectors have been included in the Integrated Development Plan (IDP) for eThekwini Municipality. For the next 20 years, the economic sector for eThekwini Municipality includes capitalising on the role of the port, international airport and modern rail, road, infrastructure, information and communication technologies and promoting the city as a trading hub between Africa and the world (eThekwini Municipality, 2014). The tourism sector will entail marketing and promoting the city as an events and tourism destination as well as encourage manufacturing activities in the city (eThekwini Municipality, 2014). Based on the current trends, the IDP outlines future development trends for this Municipality. These plans include addressing social development issues, encouraging women empowerment and gender equality, ensuring access to health care and human capital development through education (eThekwini Municipality, 2014).

The eThekwini Municipality Area (EMA) is characterised by a diverse topography, from mountainous escarpments in the West and a flat coastal plain, with extensive beaches, in the East. This area has 98km of coastline, 18 major catchments and 16 estuaries and approximately 75 000 hectares of land identified as part of the Durban Metropolitan Open Space System (D'MOSS). D'MOSS supports a variety of ecosystems which are vulnerable and impacted by development projects. These ecosystems provide services which include water supply and regulation, food production, nutrient recycling, and provide economic benefits by through providing raw material for crafts and building and promoting tourism (COGTA, 2013). D'MOSS outlines the need to protect ecological features like these during development. The municipality aims to maintain the ecological integrity by building sustainability and ensuring that with economic development threatened ecosystems and the environment are protected (COGTA, 2013).

The three cases studies for this research are located in the south of the eThekwini Municipality (Figure 3.1). The sites used were appropriate since they were awarded environmental authorisations which required them to conduct an EIA follow-up procedure.

The ECO carried out the follow-up procedure for each site over the following time frames: for Site 1 from March 2011-October 2012 (nineteen months), Site 2 from May 2010-April 2012 (twenty-four months) and Site 3 from Jan 2011-April 2012 (seventeen months). A common criterion for these three sites and the reason for their selection was the application of the follow-up process and monthly post-project analysis through site inspections of these projects.

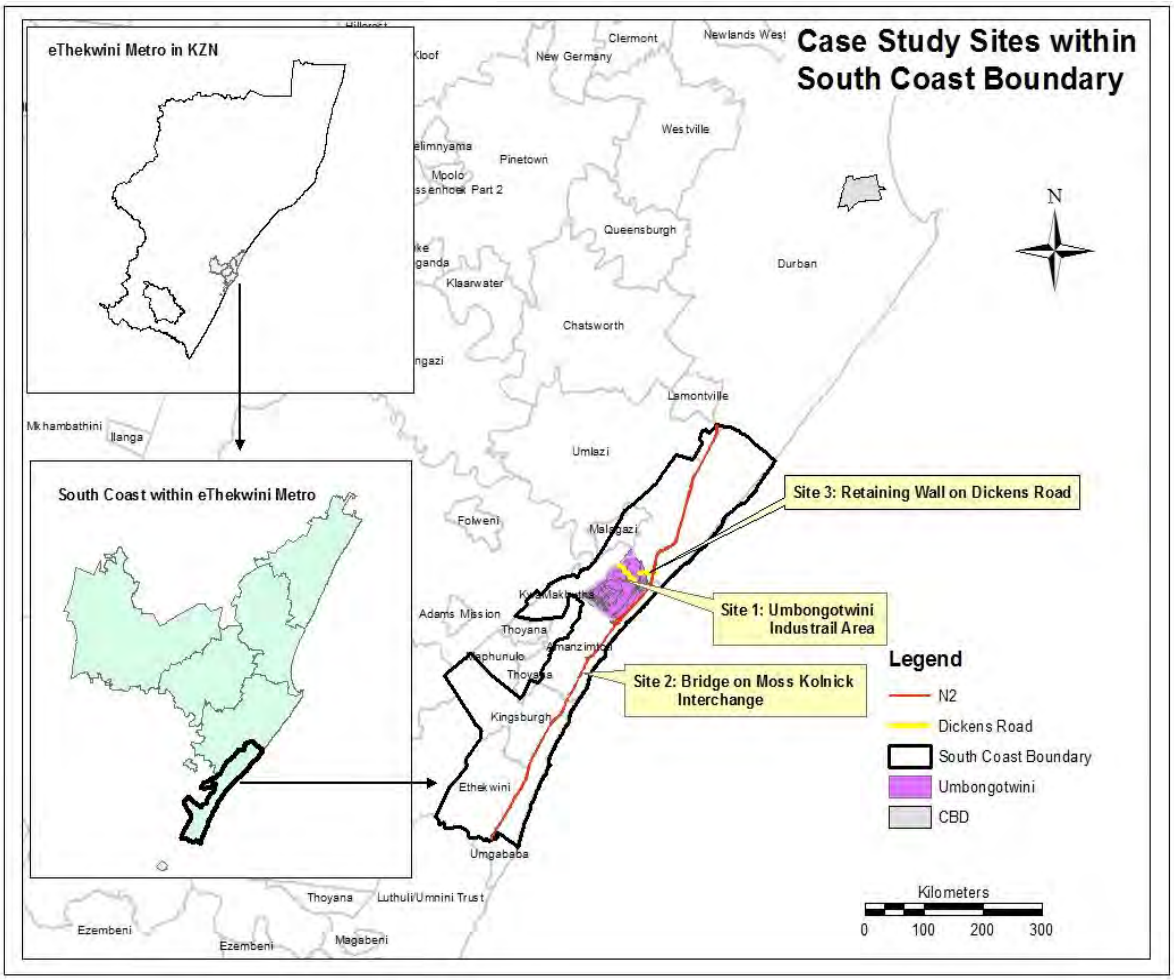

Figure 3.1 Map showing the three study sites in relation to the eThekwini Metropolitan and KZN (Researcher's own)

3.7.1 BASF (EIA reference No DM/0052/10) (SITE ONE)

At Site One a project was proposed to construct tanks for the relocation and expansion of a facility that would produce water based polymer dispersions (environmentally friendly paint) from the Dulux site to the Umbogotwini Industrial Complex. BASF is a chemical company that originated from Germany and has been operating in South Africa since 1966

(Bezuidenhout, 2014). The BASF Chemical Plant is located 31.5 km from Durban Central Business District (CBD) within the Umbogotwini Industrial Complex. It is surrounded by residential areas with scattered shrubs and trees as land cover. Since construction occurred in a demarcated industrial area, there was no significant impact on the nearby residents and surrounding vegetation (Figure 3.2).

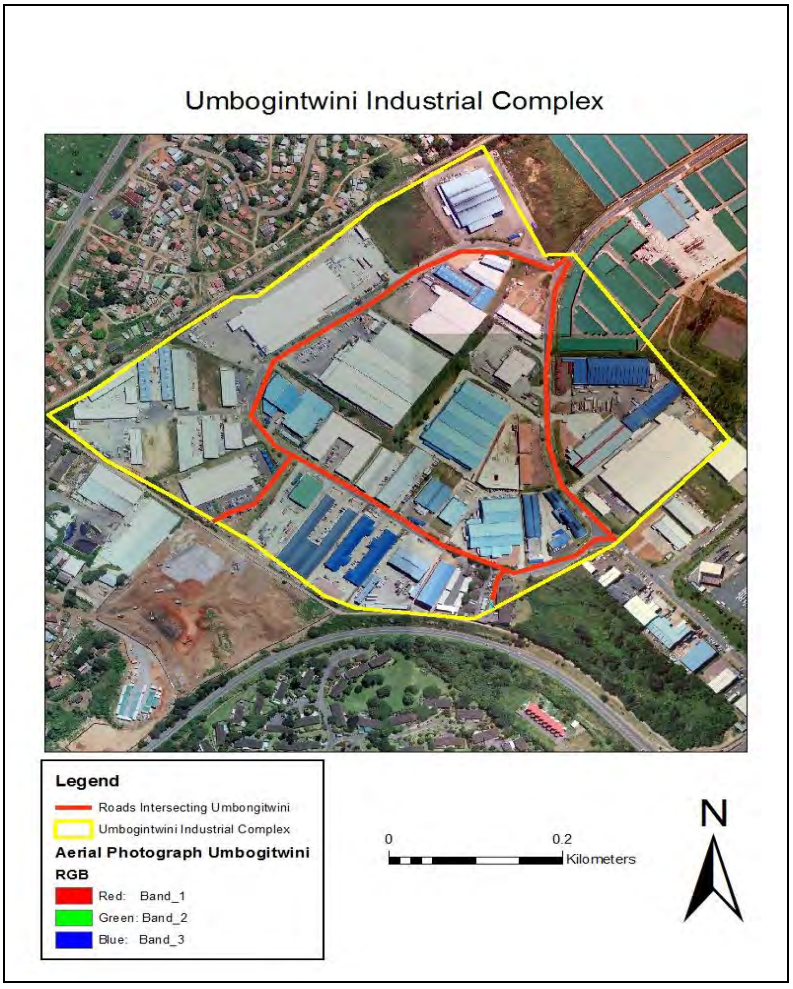

Figure 3.2 Map showing the Umbogotwini Industrial Complex with reference to KZN (Researcher's own)

According to McKeon (2013) the soil was contaminated with chemical and toxins and had to be removed and appropriately disposed of prior to the commencement of activity (Plate 3.1).

Plate 3.1 Site One prior to construction

This particular project required scoping for environmental impacts and a full EIA report before environmental authorisation could be granted since it was listed as an activity that involved:

a) The construction of facilities or infrastructure for the storage or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 500 m3 (GNR 545, 2010: 110).

b) Upon commencing of an activity, which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004), except where such commencement requires basic assessment in terms of Notice of No. R544 of 2010 (GNR 545, 2010: 115).

The client contracted an Environmental Assessment Practitioner to submit an application and conduct an EIA on the proposed site. Once the EAP identified issues on site and potential impacts, alternatives were provided as to how these impacts can be addressed. The EIA was submitted and approved by the provincial regulatory authority (DAEARD, eThekwini Municipality) who also issued them with a Record of Decision (RoD). The EAP also drew up an EMP where mitigation, management and control measures were outlined. The ECO used the RoD and the EMP as guidelines to design the audit report by which he monitored the development on site on a monthly basis.

In this project, BASTEC (supplier of paint) was being purchased by BASF (a German owned company); they were therefore working closely together and sharing EIA follow-up participants. The participants that were involved on this project included the client, project manager, site managers, sub-contractors and mechanical, chemical engineers. Since this is a

German owned project, a German client representative participated in the follow-up programme. The engineers were not involved in the EIA follow-up. Since this area was demarcated as a complex for industrial activity there were minimal issues with respect to gaining authorisation.

3.7.2 Moss Kolnick Interchange Project (EIA reference No 5769) (SITE TWO)

The proposed project consisted of the upgrading of the Moss Kolnick Interchange along the National Route 2 (N2) by constructing a bridge. The purpose of this construction was to develop a multi-use interchange that would facilitate the flow of traffic and access to the nearby shopping centre (Galleria) and development for the residential area. The Moss Kolnick Interchange project is a 13 hectare project located 32.7 km from the Central Business District (CBD) and parallel to the N2 (Appendix 2). Its surrounding land cover is predominately shrubs (Figure 3.3).

The shrubs from this site were cleared and eroded during the construction of the bridge. Machinery and construction activities caused and exacerbated soil erosion before it was rehabilitated. This project required a full EIA process. It is promulgated that activities that include construction, erection or upgrading of items including railways, road and dams require authorisation from a competent authority. It required environmental authorisation since it involved the upgrading of a road. This required scoping of environmental impacts and a full EIA report.

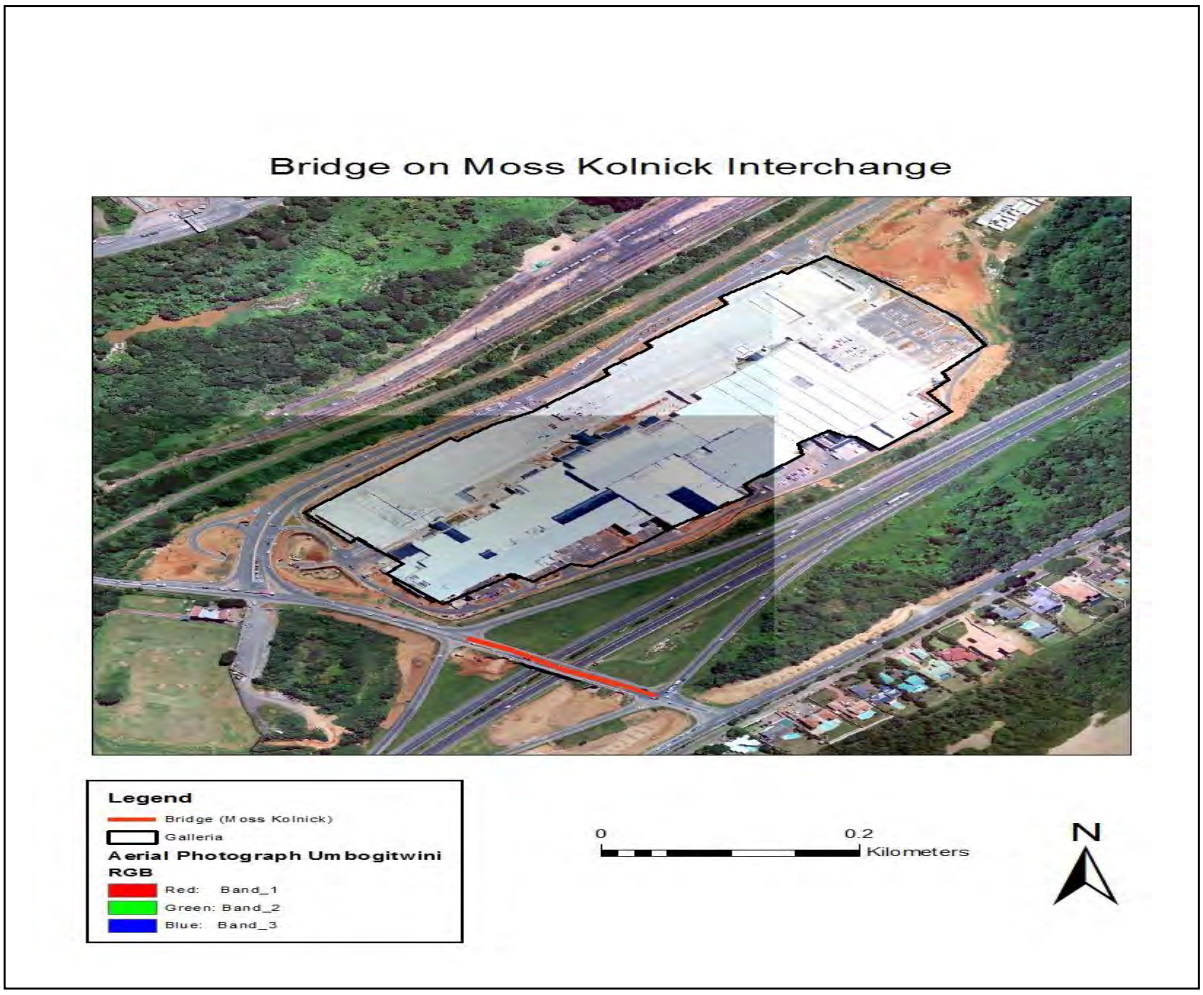

Figure 3.3 Map showing bridge on Moss Kolnick Interchange (Researcher's own)

This project required environmental authorisation (RSA 545, 2010: 113) since it was listed as an activity that involved:

> The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before 3 July 2006 and which have not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 or 2009, made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006,—
>
> (i) It is a national road as defined in section 40 of the South African National Roads

Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);

(ii) It is a road administered by a provincial authority;

(iii) The road reserve is wider than 30 metres; or

(iv) The road will cater for more than one lane of traffic in both directions.

For Site Two, the EIA had to undergo an appeal process. The client contracted an Environmental Assessment Practitioner to submit an application and conduct an EIA on the proposed site. Once the EAP identified issues on site and potential impacts, alternatives were provided as to how these impacts could be addressed. The EIA was submitted and rejected by the provincial regulatory authority (DAEARD, eThekwini Municipality) and a Record of Decision was issued highlighting reasons the application was rejected. Instead of the EAP redesigning the EIA, an appeal was submitted to the DEA (provincial authority) stipulating how concerns highlighted by the DAEARD were already addressed in the application. This appeal was approved by the DEA to the dissatisfaction of the DAEARD. For this site, the ECO had to recreate the EMP based on the EIA and approved RoD since the EMP created by the EAP was generic. This was done to ensure integrity and that the EIA follow-up was not compromised. An advert was place in the local newspaper to notify the public on the prospective development which also invited their comments and input.

EIA follow-up participants who were involved in the follow-up of this site included the project manager, site manager and the ECO. There were issues that emerged in respect of gaining environmental authorisation. The issues were soil and ground water contamination, the lack of approval of the SDF and traffic. Due to such issues, the project was not issued with an environmental authorisation from the then KwaZulu-Natal Department of Agriculture and Environmental Affairs (DAEA). The project gained environmental authorisation after an appeal to the National DEA.

3.7.3 Dickens Road (EIA reference No DM/0209/08) (SITE THREE)

The project consisted of the construction of an on-ramp for the N2 Freeway at Dickens Road. The purpose of this on-ramp was to facilitate traffic movement from the new Galleria and Arbour Crossing malls located south of Dickens' Road, on the Western side of the N2 (Bruwer, 2009). The Dickens Road Retaining wall is located 23.7 km from Durban CBD and

the site is located perpendicular to the M4 off-ramp. The land cover from Site Three constituted mainly of trees (Figure 3.4).

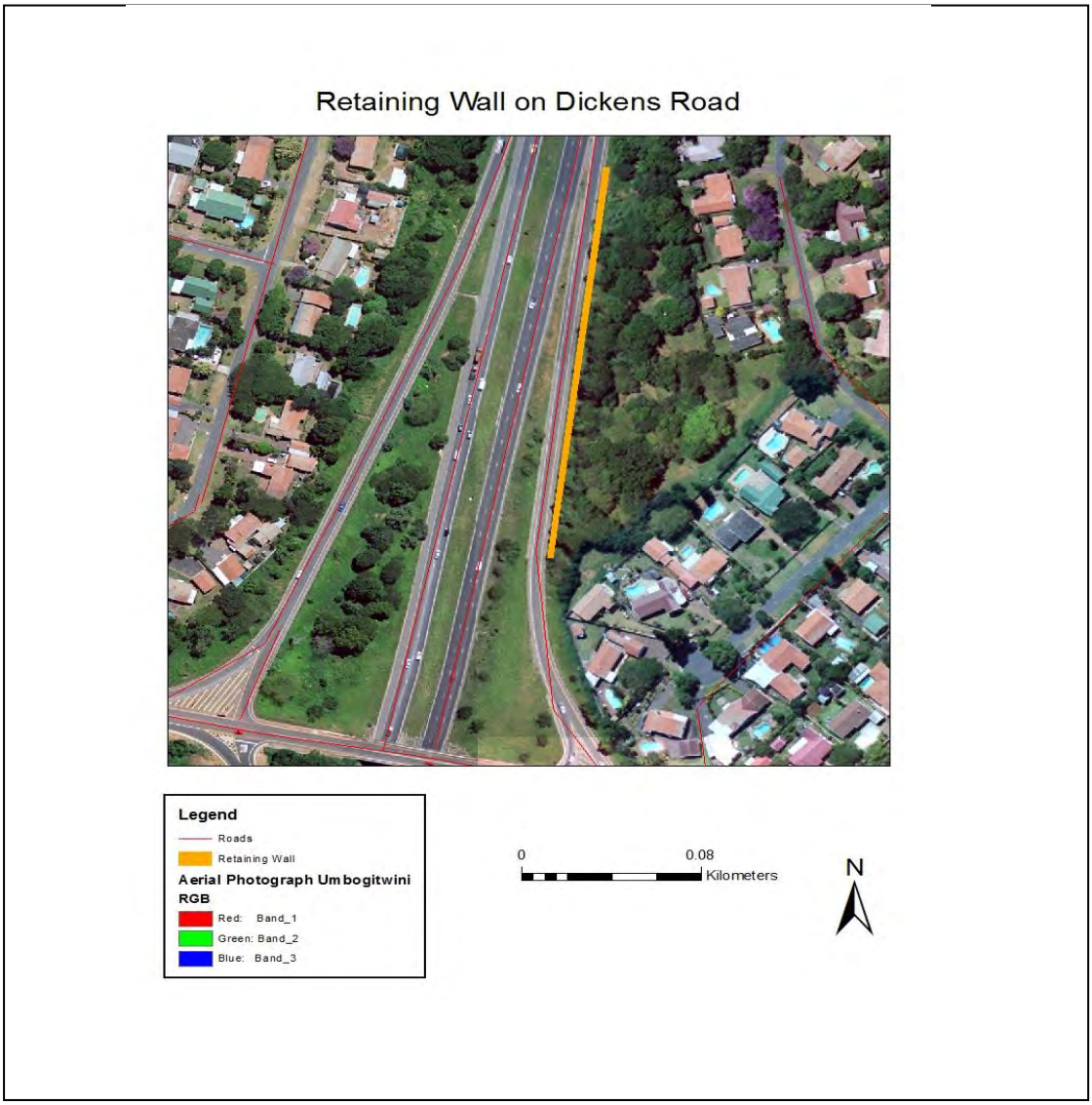

Figure 3.4 Map showing Dickens Road (Researcher's own)

The area was surrounded by indigenous trees that had to be protected during construction. The species of indigenous trees were not identified and recorded by the EAP and ECO. For construction, a few trees had to be removed. The removal and rehabilitation of these trees was authorised in the EIA and EMP. A Vegetation Management Plan was created and authorised to prevent additional removal or trees and guidelines to rehabilitation of vegetation. Ecological features that were impacted during construction were the additional unauthorised removal of indigenous vegetation along the road route and removal of trees to accommodate the widening of the road (Plate 3.2).

Plate 3.2 Site Three vegetation prior to construction

Since the project involved the construction of a retaining wall, it required authorisation from the KwaZulu-Natal DAEA in terms of RSA 545 (2010: 113):

> The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before 3 July 2006 and which have not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 or 2009, made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006,—
>
> (i) It is a national road as defined in section 40 of the South African National Roads
>
> Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);
>
> (ii) It is a road administered by a provincial authority;
>
> (iii) The road reserve is wider than 30 metres; or
>
> (iv) The road will cater for more than one lane of traffic in both directions.

Similar to Site One, the client contracted an Environmental Assessment Practitioner to submit an application and conduct an EIA on the proposed site. Once the EAP identified issues on site and potential impacts, alternatives were provided to how these impacts can be addressed.

The EIA was submitted and approved by the provincial regulatory authority (DAEARD, eThekwini Municipality) who also issued them with a Record of Decision (RoD). The EAP also drew up an EMP which outlined mitigation, management and control measures. The ECO used the RoD and the EMP as guidelines to design the audit report by which he monitored the development on site on a monthly basis. An advert was placed in the local newspaper to notify the public on the prospective development and also invited their comments and input.

The environmental authorisation required a construction phase to monitor, as well as monitoring the progress of vegetation removal and rehabilitation. The main issue that had to be addressed before gaining authorisation was the translocation and removal of indigenous tress along the off-ramp from the National N2 Highway (north bound). This project required scoping for environmental impacts and a full EIA report before authorisation. For the follow-up, participants included the project manager, the site manager, the ECO and nearby residents.

3.8 Conclusion

This chapter outlines the EIA legislative framework for this study and highlights the need for a follow-up after an authorised EIA. It provides an overview of the legislation the institutional structures and role-players involved in the EIA follow-up procedure. Compliance with the legislation and environmental authorisations is vital and contributes to the success of the EIA follow-up procedure and effectiveness of the EIA system overall. The three case study sites used were granted environmental authorisation and required a follow-up process thus making them appropriate for this research. Vegetation was the main impacted ecological feature among the selected sites. Data were collected from the participants of these three sites. The methodology and research design used to collect and analyse data is discussed in the following chapter.

Chapter Four: Methodology

4.1 Introduction

Research methodology is concerned with explaining the reasons for a particular research study and with describing how a research problem is formulated. It is also concerned with describing the sort of data collected, the methods used to collect the data and reasons for particular data analysis techniques (Rajasekar et al., 2006). The researcher was a full-time student conducting her own independent investigations, but who was granted permission, for the purposes of collecting primary data for this particularly study, to accompany project ECOs on site visits on a monthly basis. Such empirical fieldwork was undertaken between August 2011 and August 2012, with additional ad hoc data collected in December 2014 for Site Two. This chapter commences with a description of the study's qualitative research approach and research design, followed by a presentation of the site selection and sampling techniques. A description of the methods of data collection and data analysis is then presented, and this is supported by an overview of the strengths, weaknesses and applicability of the various methods used in this study. Lastly, the limitations encountered in this study, as well as an overview of the researcher's efforts and attempts to circumvent these challenges, are provided at the end of this chapter.

4.2 Qualitative research approach

Approaches to qualitative and quantitative research can be differentiated based on the type of data used (textual or numeric, structured or unstructured), the nature of the investigation (exploratory or confirmatory), the means of analysis (interpretive or statistical), the approach to explanation (variance theory or process theory), and the underlying paradigm (positivist or interpretive) (Creed and Freeman, 2004). Quantitative research is framed by the positivist paradigm, while qualitative research is framed by the constructivist, interpretive paradigm. For this study, a qualitative research approach was used, framed by a social constructivist paradigm which assumes that knowledge is socially constructed, and that subjectivity is part of the production of data. It describes events, persons, meaning and feeling of a situation observed scientifically without the use of numerical data (Rajasekar et al., 2006). It aims to reveal the patterns of meaning in the area under study.

Qualitative data is non-numerical, includes survey methodology and is concerned with descriptions (using words) and applying reasoning (Rajasekar et al., 2006). Some examples of qualitative research methods include observation (unstructured, structured, participant), interviews (face-to-face, semi-structured, unstructured and non-directive), group interviews (focus group), concept mapping, recordings (audio and video with structured or unstructured analysis), ethnography and documentary or policy analysis (Creed and Freeman, 2004). According to Patton (2002), in-depth, open-ended interviews, direct observations and written documents are the three main methods of data collection that produce qualitative findings. This study employed interviews, observation and documents and hence was qualitative in its design and framed within a constructivist and interpretative paradigm.

4.3 Case Study Approach

A case study approach is a way of exploring and investigating a contemporary phenomenon by contextually analysing the events or conditions and their relationships (Yin, 2009). It allows the researcher to engage and understand the issues at hand since it is a particular, descriptive and inductive approach to research (Stark and Torrance, 2005). According to Barbour (2008), a case study approach is a sampling method that enables comparisons and has the ability to question the potential of research. Case studies are not rigid; they give the researcher flexibility when conducting research (Barbour, 2008).

There are advantages and disadvantages to adopting a case study approach. According to Stark and Torrance (2005), the strength of adopting a case study approach is that it can select an example of an activity and utilise numerous methods and sources of data to explore it therefore creating a 'rich description'. The case study approach can be used for both theory building and theory testing and research questions can be altered during the research process if the original questions are found to be less relevant (Stark and Torrance, 2005). The case study approach also has inherent weaknesses. According to positivist thinking, the conclusions drawn from the case study approach can be argued to be weak since this approach lacks experimental control and internal validity and reliability (Merriam, 2009). This is due to the lack of robustness since it is categorised as a general research tool. A case study approach, however, seemed appropriate for this study for a number of reasons

A case study approach was adopted for this research to explore and create a better understanding of the EIA follow-up process in South Africa. This approach allowed the

researcher to examine and explore the follow-up process at three different sites during construction, and to determine the implementation or practice of the process at these sites. A case study approach was suitable since it was a viable and practical method of deriving implicit and explicit data from the subjects. Using this approach enabled the EIA follow-up process to be explored in its natural setting. The researcher was on site during construction alongside the ECO as he monitored for compliance with conditions of authorisation. To develop a more comprehensive picture, the researcher studied three case studies to gain a better understanding and learn about the phenomenon of the EIA follow-up procedure. Certain sites and the related respondents were specifically selected to achieve the overall aim of this study; this is further discussed below

4.4 Site selection and sampling

4.4.1 Case studies

The case studies used in this study included the BASF'S chemical plant in Umbogotwini (Site One), the Moss Kolnick Interchange Project (Site Two) and the Dickens Road Retaining Wall (Site Three). The three sites investigated in this research are located in eThekwini Metropolitan Municipality which is one of the ten district municipalities in KwaZulu-Natal (KZN) (SALGA, 2011). The three case studies were selected through purposive sampling by the researcher. Purposive sampling or judgemental sampling is a non-random sampling technique where there is a purposeful selection of a representative sample by the researcher based on a set of defined characteristics (Michael, 2002; Patton, 2003). With judgemental or purposive sampling, the researcher's judgement influences the selection in terms of who will provide the best information to achieve the objectives of the study. The three sites that were selected had EIA reports and EMPs that had been authorised prior to construction. This meant that an EIA follow-up process would need to be conducted. The proponents or clients and ECOs were willing to have the researcher on site during the monthly site inspections for observation, making it possible for these sites to be studied.

The case study sites were selected on the basis that EIA follow-up was being carried out, and the researcher was thus able to monitor the follow-up process over a period to determine its success in ensuring the effectiveness of the overall EIA. Access to the case studies was gained by first liaising with ECOs at the relevant sites. Through the ECO, the researcher was then able to approach clients and request being part of monthly site visits for research

purposes. Once permission was granted, an informed consent form was signed between the researcher and client. This clarified that information derived from the site visits would only be used for research purposes. Documents on the follow-up (audit reports) and the outcomes were provided to the researcher by the ECO. Written agreements were required to ensure the anonymity of participants and only activities relevant to the study were reported by the researcher. Paperwork was also required to provide assurance that the information the researcher received on site was for research purposes and no information would be falsified or used for personal gain. For Site One, the Germans were sensitive about their technology being duplicated. The researcher had to reassure them that all data collected would be interrogated through an environmental management and sustainability 'lens', and that the research did not focus on any specific structural or civil engineering and design facets. Companies and clients were not forthcoming about the monitoring of compliance during project development as not all had conducted the follow-up as stipulated in the authorisations. The research would thus expose their non-compliance. Overall, as a student, the researcher experienced difficulties with the granting of physical permission for some of the case studies. Clients were just not willing for their projects to be used as case studies. These case studies were projects that were authorized with EIA reports but were not fully complying in terms of the implementation of the EIA follow-up. Permission was required to gain physical access to all three of the sites, as well as access to and use of the EMPs and audit reports related to site inspections for the three sites respectively. Gaining permission proved to be a time-consuming and rigorous, but necessary, process of paperwork for the current research. For Site One access was gained via the ECO who was referred to the researcher by the competent authority working on that site. At this Site, the researcher was able to meet the client and verbally request permission beforehand. Site two and Site three had the same ECO who was referred to the researcher by the supervisor. The ECO spoke to the client on behalf of the researcher with regards to obtaining the necessary permission to visit the site and access the related follow-up documentation.

4.4.2 Interviews

The respondents interviewed were selected using a non-random purposive sampling method as described above. The respondents (EIA follow-up participants) that were selected for this study consisted of the ECO, project manager, site manager, client and the authorities for each case study. The participants involved in the EIA follow-up were developed from the literature

reviewed on the stakeholders involved in the EIA follow-up (Baker, 2004; Marshall et al., 2005; Ahammed and Nixon, 2006). These EIA follow-up participants were interviewed to explore stakeholder perspectives on the EIA follow-up procedure to fulfil an objective of this study. Respondents were sought out and interviewed to determine their roles and responsibilities in designing and executing the follow-up procedure, to gain insights into the procedural aspects of the follow-up programme, and gauge the attitudes and perspectives of the participants towards EIA follow-up and its implications for EIA effectiveness.

4.5 Data Collection

Data can be collected from a number of sources that include interviews, telephone interviews, focus groups, taped social interaction, filed notes or questionnaires (Heaton, 2004). In-depth interviews were conducted with the main participants from the three above mentioned sites. For confidentiality, the participants remain anonymous and are only referred to in this study by their roles in the follow-up. For this study, a set of semi-structured interviews were conducted using an interview schedule.

4.5.1 Interviews

An interview is a technique which involves the questioning of a representative sample of a pre-selected population in person for research analysis or marketing research (Cargan, 2007). Interviews are often in-depth and unstructured and are usually in the form of 'conversations'. Interviews can include key informants and/or individuals who represent various cultural groups and roles in society (O'Leary, 2009; de Vaus, 2002). Interviews can be conducted face to face, over the phone, or on the internet (Kuma, 2005). One can conduct fully structured and rigid interview questions or unstructured interviews with flexible questions and content. (Cargan, 2007). There are different forms of interviews: structured, unstructured and semi-structured (Wilkinson, 2004).

Structured interviews use pre-established questions, in a pre-arranged order and are used under defined circumstances. Such interviews are more suitable when consistent data is a goal (O'Leary, 2009). In contrast, semi-structured interviews are not standardised and adopt a more flexible structure where interviewers may, with a defined questioning plan, proceed into a natural free flowing conversational style (O'Leary, 2009). Interviewers may deviate from the plan to pursue other areas of interests related to the study (O'Leary, 2009). Unstructured interviews are conducted without predetermined questions and attempt to get information,

opinions, beliefs and attitudes on particular themes, ideas and issues (O'Leary, 2009). They adopt a more flexible method without following a detailed interview guide with predetermined questions in order to allow for subjective responses from interviewees (Klenke, 2008). This study made use of semi-structured interviews which enabled the interviewer to deviate from the set questions and explore other areas of interest related to the study.

Semi-structured interviews are most commonly used in qualitative analysis where the interviewer does not research in order to assess a particular hypothesis (David and Sutton, 2004). For semi-structured interviews, the interviewer is guided by a list of the main themes, issues and questions. In a semi-structured interview, the interviewer has the freedom to explore questions without having to follow a detailed interview guide (David and Sutton, 2004). In semi-structured interviews, the interviewer uses sub-questions and themes and questions to explore unforeseen encounters (David and Sutton, 2004).

There are both strengths and limitations related to semi-structured interviews. The strengths include the researcher's ability to prompt and probe when given the opportunity (Patton, 2002). In addition, unlike the structured interviews, the researcher can explain or re-phrase the questions if respondents are uncertain and need clarity. However, probing questions may also serve as a limitation when the researcher is unable to ask prompt questions thus preventing the gathering of some relevant data (Patton, 2002).

There are several interviewing techniques. These include focus groups, in-depth and telephone interviews (Cargan, 2007). Compared to structured or semi-structured interviews, in-depth interviews aim to learn more about respondents' views, opinions and beliefs about a specific phenomenon. Structured or semi-structured interviews aim to access data based on open-ended questions. This study used in-depth interviews with verbal questions that were direct and open-ended. According to Patton (2002: 343), in depth interviews "explore, probe, and ask questions that will elucidate and illuminate that particular subject to build conversation within a particular subject area, to word questions spontaneously, and to establish a conservational style but with a focus on a particular subject that has been predetermined". In-depth interviews were essential for exploring stakeholder perspectives on the EIA follow-up, their roles and responsibilities, as well as lessons learnt which contributed to determining the effectiveness of the EIA follow-up.

The respondents were participants in the EIA follow-up process which was conducted at each of the three sites (Table 4.1). They were initially contacted by the ECO who requested permission on behalf of the researcher to use their projects as case studies. The researcher attended site visits and 'work shadowed'[29] the ECO. A verbal agreement between the researcher and the relevant EIA follow-up participants was followed by a formal email requesting that interviews be conducted with the respondents. Interviews were based on predetermined questions as part of an interview schedule that was emailed to the respondents prior the interview. These interview schedules were designed by the researcher (see Appendix 3). For this study sixteen interviews were conducted with ten participants. Site Two and Site Three had similar participants, and one regulatory authority (Compliance, Monitoring and Enforcement officer) was responsible for all three sites.

Interviews were conducted once the researcher received Ethical Clearance from the University of KwaZulu-Natal: Howard College. The respondents participated willingly thus creating an agreeable and cooperative setting for the interviews. Interviews were all recorded, transcribed and thematically analysed.

Table 4.1 Participants in follow-up and respondents interviewed from the three sites

Participants in the follow-up process	Organisation	Term assigned for the respondents for the current study	Date of interview
SITE ONE			
Client	South African paint company	Client 1	16/05/2012
German client representative	International polymer and paint company	Client Representative	16/05/2012
Site manager	Contracting and construction company	Site Manager 1	30/05/2012

[29] In the context of this research, work shadowing refers to an individual spending time and observing someone through the day as a shadow to a competent worker which is a particular job of interest to the person doing the 'shadowing'(Paris and Manson, 1995)

Project manager	Engineering company	Project manager 1	38/05/2012
Regulatory/competent authority	EDTEA (formerly DAEA)	CA 1	22/05/2012
Environmental Control Officer 1	Private Engineering and Environmental Consulting Company	ECO 1	17/05/2012
SITE TWO			
Client	National Roads Agency	Client 2	05/06/2012
Site manager	Contracting and construction company	Site manager 2	04/06/2012
Project manager	Contracting and construction company	Project manager 2	04/06/2012
Environmental Control Officer 2	Private Engineering and Environmental Consulting Company	ECO 2	07/06/2012
Regulatory authority	EDTEA (formerly DAEA)	CA 1	10/10/2012
SITE THREE			
Client	National Roads Agency	Client 3	05/06/2012
Site manager	Contracting and construction company	Site manager 3	04/06/2012
Project manager	Contracting and construction company	Project manager 3	04/06/2012
Regulatory authority	EDTEA (formerly DAEA)	CA 1	10/10/2012
Environmental Control Officer 2	Private Engineering and Environmental Consulting Company	ECO 2	07/06/2012

The same ECO was appointed to conduct monthly site inspections for both Sites Two and Three. SANRAL was the client for Sites Two and Three; therefore they had the same ECO, site manager and project manager. The same Compliance, Monitoring and Enforcement officer from the DEARD (now EDTEA) from the eThekwini Municipality, was interviewed for all three sites.

4.5.2 Observation

Observation is a systematic source of qualitative data that is conducted in a natural setting and the phenomena of interest is represented first hand (Merriam, 2009). Observation involves the cultural immersion of the researcher into the population being studied (O'Leary, 2009). Data from observation consists of fieldwork descriptions in which the researcher is able to observe the actions, behaviours, conversations, interpersonal interactions, activities, organisational or community processes or any other human experience that can be observed of a particular phenomenon. Data collected from observations consists of field notes, detailed descriptions of observation during fieldwork and the context in which the observation was made is included (Patton, 2002).

There are various kinds of observation techniques, namely, non-participant, participant, unstructured and structured observation (Kothari, 2004). In participant observation the researcher is actively involved in the activities of the group being observed, with or without their knowledge (Kuma, 2005). Non-participant observation, on the other hand, is when the researcher does not actively participate with the activities of the group being observed but remains a passive observer, watching and listening and drawing conclusions from such observations (Kuma, 2005). For this study, the researcher accompanied the ECO on monthly site visits for a period of twelve months for Site One (8 August 2011 – 3 July 2012), eleven months for Site Two (28 April 2011 – 06 June 2012, ad hoc 12 December 2014) and seven months for Site Three (28 April 2011 – 21 November 2011) (see Appendix 4). The site visits consisted of inspections around the site, recording areas of compliance and non-compliance against the ECO audit criteria. Various EIA follow-up participants attended site inspections. For Site One, the client, project manager, site manager and engineers would accompany the ECO. For Sites Two and Three, the site manager and engineer would accompany the ECO during his site inspections. The presence of the EIA follow-up participants during the site inspections was necessary since they answered the ECO queries and accounted for any activities on site. Information that was recorded during the site inspections included the

progress of the development, compliance and non-compliance issues and the ECO advice on preventive measures, mitigation, rehabilitation and control measures.

There are advantages and disadvantages to adopting an observation method for collecting data. According to Kothari (2004), the main advantage is the collection of information through this method which provides present and current information but which is complicated by past behaviour or future intentions or attitudes. Secondly, this method is independent of respondents therefore the researcher does not have to deal with lack of participation from respondents (Kothari, 2004). As with every research method, the observation theory has limitations. Firstly, it is an expensive method since it requires a researcher to go to communities or various sites for research and information gathered through this method may be inadequate (Kothari, 2004). Secondly, data collected could be distorted if the behaviour of the members being observed alters, negatively or positively, once they become aware that they are being observed (Kuma, 2005). Thirdly, research may be interrupted by unforeseen factors which may interfere with the observation. Lastly, the fact that some sites and communities are inaccessible, serves as a hindrance to conducting this method of data collection effectively (Kothari, 2004). The site inspection team was notified and aware that the data collected by the author was for research purposes.

Based on the researcher's observation, the overall performance on the follow-up procedure was ranked and discussed according to a rubric adapted from the Lee and Colley review package (Table 4.2) (Lee et al., 1999). The application of this rubric occurred once the procedural outcomes for this study were obtained. It reflected these procedural outcomes as a result of compliance or non-compliance with authorisations and fulfilment of tasks and responsibilities by respective EIA follow-up participants.

Table 4.2: Rubric for evaluating performance of EIA follow-up
(Source: Lee *et al*., 1999)

RATING	EXPLANATION
A	Well performed, important tasks completed
B	Satisfactory and complete, only minor inadequacies
C	Can be considered satisfactory despite inadequacies

D	Parts well attempted but must, as a whole, be considered unsatisfactory due to inadequacies
E	Unsatisfactory, significant inadequacies
F	Very unsatisfactory, important tasks (s) poorly done or not attempted
N/A	Not relevant, the review topic is irrelevant in this project

Furthermore, this study aimed to present the environmental impacts of procedural outcomes by colour coding the level of impact (Table 4.3). The level of impact on the environment was due to compliance or non-compliance with authorisation as well as fulfilment of tasks and responsibilities. The procedural outcomes from the respective sites could have improved the receptive environment and restored the receptive environment from adverse impacts.

Table 4.3: Colour coding indicating impacts made on the receptive environment (Source: Researcher)

RANKINGS	RATE	EXPLANATION
1		Improved receptive environment
2		Environment restored
3		Adversely impacted receptive environment

4.5.3 Documentary sources

Documentary sources that were accessed and reviewed for this study included policy documents, legislation pertaining to environmental impact assessment and compliance and enforcement, including NEMA (No. 107 of 1998) as well as associated regulations. Other documents associated with individual case studies included the EIR, EMPs and Compliance Audit Reports drawn up by ECOs. Additionally, newspaper reports, public meeting minutes and the South African government guideline documents were reviewed. The government guideline documents that were reviewed included the National Framework for Sustainable Development in South Africa (2008), the National Strategy and Action Plan for Sustainable Development (2010) the National Strategy for Sustainable Development and Action Plan (2011-2014), the Environmental Impact Assessment and Management Strategy (2014) and the Spatial Development Framework (SDF) Report 2014/2015) Review.

4.6 Data analysis and interpretation

4.6.1 Documentary Analysis

According to Patton (2002), documentary analysis involves the analysis of texts the researcher has produced herself. Depending on the nature of the cultural group being examined, this might involve local newspapers, reports, locally produced radio broadcasts and/or television, official publications and reports, as well as written responses to questionnaires and surveys. It could also involve local art, poetry journals and diaries and/or doctrine and dogma (O'Leary, 2009). This study used content analysis to analyse texts.

Content analysis involves the examination of data for recurrent instances of some kind (Atkinson and Coffey, 2011). Its purpose is to determine the characteristics of a document and establish who said what, to whom and for what effect (Bloor and Wood, 2006). Content analysis is defined as a quantitative method that allows for large numbers of texts to be analysed (Atkinson and Coffey, 2011). Documentary analysis differs in that it is the examination of the content of documents to draw conclusions regarding the social circumstances in which documents are produced and read (Bloor and Wood, 2006).

Documentary analysis, as a source of secondary data (Atkinson and Coffey, 2011), was critical for this research since the implementation of the follow-up process in South Africa is measured against compliance with the EMP and the Environmental Authorisation issued by the DAEA in KZN (now called EDTEA). Documents that were analysed for this study included the EMP, Environmental Authorisation Report and the monthly audit reports drawn up by the ECO of each site. However, it must be noted that this research does not focus on EIA effectiveness in terms of quality of the EMP and Compliance 'Audit' Reports, but rather on the procedure of preparing them and complying with them according to the set regulations and authorisations. Compared with Site One and Site Two, Site Three was less reluctant to provide the researcher with the necessary documents. Site Three could readily access the documentation on site and it was up to date. Documentation on Site Three was incomplete: there were missing management plans on site which could not be analysed. For Site Two, the contractors were meant to meet with the community on a monthly basis. However, since the researcher could not gain access to the community's attendance register, the occurrence of these monthly meetings could not be verified.

4.6.2 Thematic Analysis

Thematic analysis, as a grounded theory, is a qualitative method used for identifying, reporting patterns (themes) and analysing the data in which one is interested (Braun and Clarke, 2006). It goes beyond counting words or phrases to identifying and describing themes within the data collected. Braun and Clarke (2006) identify a theme as capturing something vital in the set of data collected in relation to the research question, and represent the patterns in the responses or meaning within the data collected. Themes identified that are important for a certain phenomenon are used as categories for analysis once coded (Feredat and Muir-Cochrane, 2006). Coding refers to the creation of categories in relation to the data prior to a process of interpretation (Braun and Clarke, 2006).

According to Joffe and Yardley (2004) in thematic analysis, a coding category can refer to something directly observable in the data, that is it can refer to the manifest or semantic content of the data, such as the mention of 'climate change' in a series of transcripts. Then again, reference to 'climate change' may be implicitly referred to at a more latent level (for example, by comments or perceptions made from people on global warming, the heating up of the Earth) (Joffe and Yardley, 2004). Therefore, with the semantic approach the researcher is not looking for anything beyond what the participant has said or written since the themes are identified within the explicit meaning of the data. As identified, the latent level examines the underlying ideas, assumptions, and ideologies that form the semantic content of the data (Braun and Clarke, 2006). Thematic analysis often draws upon both themes: the manifest poses as the main theme but one needs to understand the latent meaning of the manifest themes observed within the data, which requires interpretation.

There are two primary ways in thematic analysis of identifying the patterns or themes within the data collected (Braun and Clarke, 2006). A distinction is made between the theoretical or deductive 'top down' approach, whereby coding is derived from existing theoretical ideas that the researcher brings to the data and an inductive or 'bottom up' manner where the researcher derives themes from the raw information itself (Joffe and Yardley, 2004). The 'theoretical' form of approach is selective in that it provides a more detailed analysis of a certain aspect of the data, as identified by the researcher, instead of an overall description of the data. Moreover, this approach uses a pre-existing coding frame for the coding of themes (Braun and Clarke, 2006). In contrast, an inductive approach is not driven by the researcher's theoretical interest. Instead it identifies themes connected to the data themselves. Themes

identified may have very little relation to the questions asked of the participants and are independent of the pre-existing coding frame (Braun and Clarke, 2006). For this research, themes identified in the raw data were influenced by existing theoretical ideas adopted by the researcher to assist in deductively exploring the research question and fulfilling the set objectives. Additionally, themes independent of theoretical influences were derived from the raw data for the current research, therefore, the inductive approach to data also proved essential. These themes connected to the data themselves, and independence from the pre-existing coding frame was vital and contributed to fulfilling the overall research aim. Both these approaches were appropriate to this study since an existing practical framework for an EIA follow-up (deductive) was used to thematically analyse the raw data collected (inductive) which presented its own themes.

4.7 Limitations

Several limitations and challenges were experienced prior to and during the collection of data and it should be noted that the 'effectiveness' for the purposes of this research was measured from information available at the time of the research. These challenges included firstly a lack of physical access to case study sites and the taking of photographs due to stringent company policies and protocols. ECOs advised that such case studies are confidential and permission was required from the various companies. The researcher emailed the respective companies and clients for permission to use their projects as case studies for the current research.

Secondly, access to all documents and audit reports was limited due to confidentially clauses. Respondents associated with Site One (German-owned) were protective of their documentation (the EMP and audit reports), although it was available for public viewing on site. Respondents at Sites Two and Three were willing to provide their respective documentation (EMP and audit reports), but some of the documents were missing. For instance, at Site Three in particular, missing documents included the Water Management Plan, Tree Removal Plan and the Complaints Register. This was largely due to the mismanagement of documents by the contractors (particularly site manager) and poor organisation on site. For Site Three, access to the Complaints Register and attendance registers which were taken during community meetings was not granted to the researcher by the contractor. This prevented the researcher from clearly determining the efficiency and effectiveness of public participation in the EIA follow-up process. Factoring in these

limitations, the audit reports and other associated documentation that were available were used in the analysis.

Another challenge included the lack of willingness from the EIA follow-up participants to openly discuss certain issues due to confidentiality purposes. The researcher had to emphasis that the study was being conducted for research purposes only. It had to be stressed that the researcher was a student and not an external auditor or inspector. Additionally, the time-consuming process of transcribing became a challenge due to inarticulate responses from some participants. To overcome this, second opinions were required to assist with the inarticulate responses from participants. Participants also had biased responses regarding the practice of the EIA follow-up in their respective sites. Participants asserted that their sites were fully compliant to the conditions of authorisation, and would not readily discuss any environmental challenges experienced on site without being prompted or questioned by the researcher. Lastly, in terms of documentary sources, audit reports drawn up by the ECO also had their own limitations. Auditing and monitoring on site proved to be slightly subjective. ECOs did not monitor sites strictly according to their audit criteria instead they based their monitoring and reports on what they observed on site. Having an audit criteria present can be time consuming, however, without the pre-determined criteria certain parameters and issues were overlooked, for example issues relating to worker conduct. Finally, observation of the monthly site inspections which were conducted by each respective ECO was an expensive method of collecting data. It required the researcher to travel by public transport to these three sites regularly over a period of 12 months.

4.8 Conclusion

This chapter presented the methods used to collect data for this research study. To determine the performance of an EIA follow-up and its implications for the overall effectiveness of EIA in KwaZulu-Natal, South Africa, a case study approach was used, in-depth interviews were conducted, observation techniques for monthly inspections were employed, and a documentary analysis of main documentation (i.e. EMPs now referred to as EMPrs), environmental authorisation reports and audit reports) from the three sites was undertaken. Interviewees were selected through a non-random purposive sampling technique. The theories of EIA and EM together provided a conceptual framework for analysing and interpreting the results for this study. The results are presented and discussed in the next two chapters.

Chapter Five: EIA follow-up procedures and outcomes

5.1 Introduction

The effectiveness of an EIA depends, among other factors, on the successful performance of the EIA follow-up which is outlined in the evaluation stage of the follow-up procedure. For this study it is measured against the procedural criteria and substantive outcomes from the EIA follow-up procedure, as derived from the three case study sites. This chapter is the first part of the results section which interprets and discusses the second research objective. By using the practical framework, as developed by Baker (2004), it presents and evaluates the procedural steps conducted at the three sites. The substantive outcomes from this study are presented in terms of the deliverance of environmental goals (decision-making and environmental protection) during the EIA follow-up. This chapter is divided into two sections: procedural steps and substantive outcomes. The procedural steps section will outline and discuss the practical framework and its application in each of the case studies. The substantive outcomes section will provide pictorial evidence of the outcomes from the EIA follow-up.

5.2. Procedural Steps

The procedural steps are the content and process of conducting the EIA follow-up. In the context of the current research, procedural requirements involve the EIA being undertaken according to established expectations (Cashmore *et al.*, 2004). These procedural steps of the three sites have been interpreted and presented according to a practical framework developed by Baker (2004) and adapted to incorporate the principles of follow-up (Marshall *et al.*, 2005). The practical framework consists of determining the need (step 1); follow-up programme design (step 2); implementation stage (step 3); evaluation of findings (step 4); and issue management (step 5) (Baker, 2004). A diagram (Figure 5.1) is provided to demonstrate the five stages of the practical framework. The results are presented according to the various steps. The findings for all three sites have been further assessed according to the main principles of follow-up which included both operating and guiding principles (Marshall *et al*., 2005) which are discussed below.

5.2.1. Determination of need (step 1)

The need to conduct an EIA follow-up procedure is outlined in the EIA legislation (Figure 5.1) which stipulates that the management, monitoring, and reporting of the impacts of the activity is required throughout the life cycle of the activity as contained in the approved EMP (RSA, 2010).

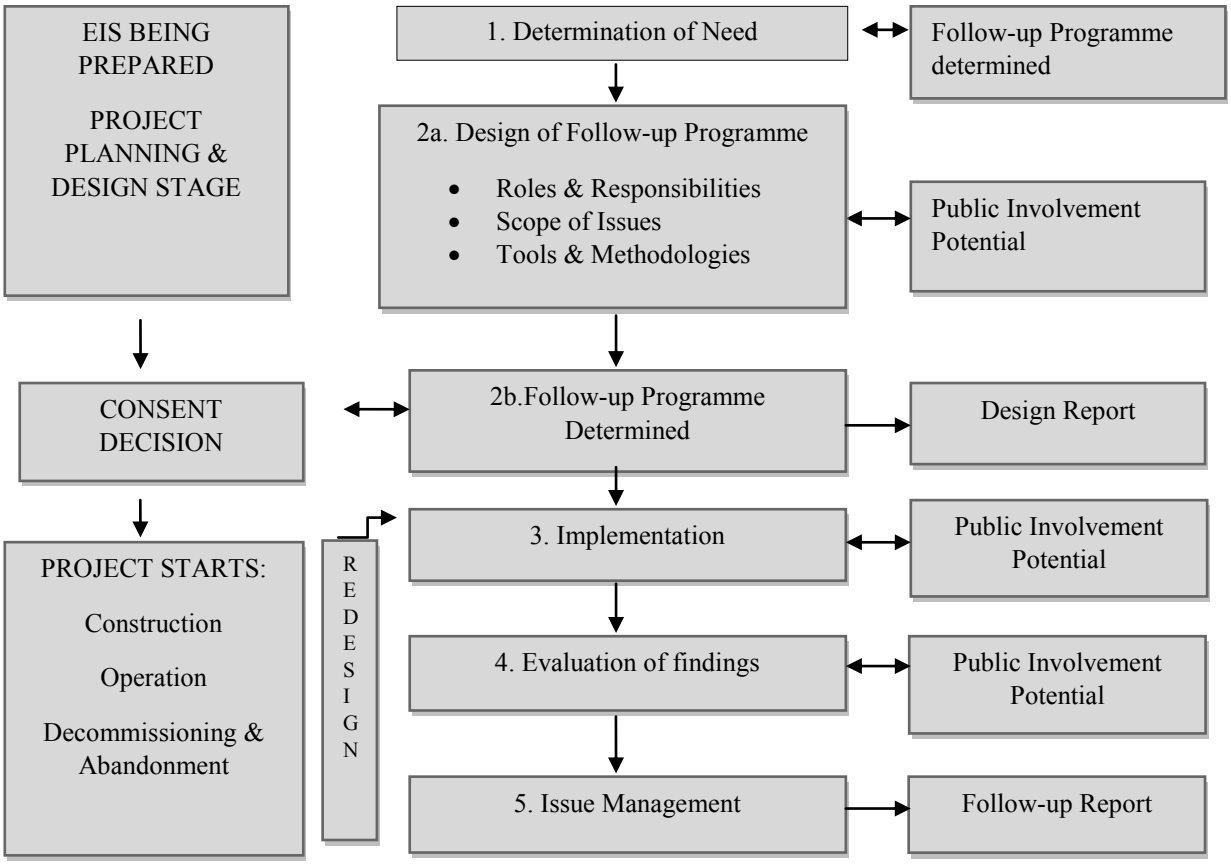

Figure 5.1 EIA practical framework: Determining the need (Source: Baker, 2004)

EIA follow-up was conducted at all three sites in compliance with the statutory requirements in South Africa's EIA legislation. According to Morrison-Saunders and Arts (2004), these legal requirements are important since they provide the administrative framework for conducting follow-up in the EIA system. The EIA regulations stipulate for any activity there are requirements to avoid, mitigate, monitor and report impacts of the activity on the environment throughout the life of the activity.[30] The legislation also stipulates the frequency of auditing of compliance with the conditions of the environmental authorisation and of

[30] Regulation 26 (d) (iv) in terms of the 2010 amended EIA regulations NEMA (No 107 of 1998)

compliance with the EMPr.[31]. All three sites complied with these regulations and conducted monthly audits.

This regulatory and institutional arrangement provided the legal requirements and an administrative framework for conducting follow-up in the EIA system which contributes to the successful performance of the follow-up (Morrison-Saunders and Arts, 2004). For the three sites the follow-up was conducted in compliance with the EIA regulations:

> *"It's a procedure; we have to do the audit. It is according to the legislation as well as company policy".* (Client 2, 05/06/2013)

Natural resources and environmental services should be protected for human well-being for both the current and future generation (Our Common Future, 1987:41). Once the need of EIA follow-up was determined, the follow-up programme was designed for the implementation stage.

5.2.2 Follow-up programme design (step 2)

The follow-up programme was designed according to the contents of the EMP created by the EAP. The follow-up programme design (Figure 5.2) shows step 2 and includes the principles that outline the roles and responsibilities of the EIA follow-up participants involved in the EIA follow-up procedure. This step also outlines the methods and techniques employed for the follow-up programme. Morrison-Saunders and Arts (2004) stated that these methods and techniques employed are important for the contextual setting of the EIA follow-up and for the development of skills and techniques. Such skills and techniques include report writing and impartial decision making. The follow-up programme was designed by the EAP during the pre-decision process, as appointed by the client. The EAP created the EMP which outlines the various roles and responsibilities determines issues that would need to be followed up as well as methods for conducting a follow-up programme.

5.2.1.1 Determination of Roles and Responsibilities

It was evident in all three sites that there were different participants in the EIA follow-up procedure with various roles and responsibilities. These EIA follow-up participants included

[31] Regulation 26 (e) in terms of the 2010 amended EIA regulation NEMA (No 107 of 1998)

the proponent (client), the contractor (project managers and site managers), the ECO and the regulator (competent authority). The regulator was represented the Department of Economic Development, Tourism and Affairs (EDTEA) under the Compliance, Monitoring and Enforcement (CME) Office in KwaZulu-Natal: eThekwini Municipality. According to Morrison-Saunders and Arts (2004), these are the four groups mainly responsible for the EIA follow-up procedure. For Site Two and Site Three site managers, project managers and ECOs were involved in the follow-up. In contrast to Site Two and Site Three, the client and the German client representative were involved in the EIA follow-up programme for Site One. A study conducted by Wessels *et al*. (2015), indicated that ECOs are also in a position to assist in identifying, defining and allocating roles and responsibilities on site.

The distinct roles and responsibilities, as outlined in the EIA regulation, amongst the EIA follow-up participants facilitated and ensured that the participants were accountable for their actions. At all three sites, the **clients** were responsible for controlling the overall project and ensured that it remained within the initial time and budget allocated for the project. They were responsible for hiring practitioners to oversee the EIA follow-up process. According to Ahammed and Nixon (2006), these practitioners advise proponents on relevant EIA policies, practices and procedures, help proponents with the administrative aspects of EIA, and assess and mitigate the potential impacts of the proposal, e.g. baseline studies. Indirectly, the client ensured that there were mechanisms in place for the contractors to comply with the authorised EIA, audit report and environmental regulation without excess expenditure for mitigation measures. This was achieved without direct involvement in site activities. As an operating principle, Marshall *et al*. (2005) stated that clients should communicate the follow-up results with the participants and viewed the EIA follow-up as a management tool and as a measure to reduce potential costs, as reported by the Site One client:

> *"As the client I make sure that the project is within the allocated time, and in budget. My environmental role is to make sure that we follow all the rules and regulations. My responsibility in the monitoring is to make sure that our contractor rectifies non-compliance".* (Client Representative, Site 1, 16/05/2012)

Project managers at all three sites were responsible for leading their team of engineers, technicians and construction workers in project development. They were responsible for

adhering to local and national statutory environmental requirements (2010 EIA Regulations, NEMA No. 107 of 1998) to ensure maximum environmental protection as "doers" on the site. As "doers" on the site, project managers were accountable for mitigating issues that arose during the site inspection. This was to ensure that these issues would not have an adverse impact on the environment. In addition, they were responsible for implementing the EMP during the construction phase and also for taking responsibility during the operational phase. Project managers worked closely with site managers.

The **site manager**s at all the sites were responsible for the supervision and managing of all activities that occurred on site during construction, operation, and maintenance on site. The site manager ensured that all environmental impacts and issues on site were well taken care of and the environment was protected during construction. This is further outlined by Marshall *et al*. (2005) who argued that the proponents must consider their action towards the environment and the necessity for an EIA follow-up, as emphasised by the site manager.

> *"As a site manager my role is to ensure that we as the contractor comply with the environmental regulations and ensuring that all the environmental impacts on site, are well taken care off. It is to ensure that whatever is pointed out by the site inspections or during site inspection is acted upon it to make sure we comply".* (Site manager 2, 30/05/2012)

The **ECO**s from the three sites fulfilled the most important role in EIA follow-up procedure. The duties of the ECO commenced once authorisations were granted for the EIA and EMP that were created by the EAP. The ECOs implemented the follow-up programme as designed by the EAPs. The ECO provided the clients with advice and guidance during the site inspection. This promoted the protection of the environment during and after construction. The monitoring of the site facilitated accountability and transparency amongst participants which was an important component in the success of the EIA follow-up procedure. The role and responsibilities of the clients demonstrated their acknowledgement and accountability in implementing the EIA follow-up, as was evident in Site Two and Site Three:

> *"My role and responsibility is to ensure compliance with the EMP and environmental authorisation as well as assist the developer in improving their overall environmental*

> *performance. Further to which the responsibility extends to preventing any possible impacts not identified in the EIA".* (ECO 2, 07/06/2012)

The participants fulfilled their roles and were accountable for their various roles in implementing the EIA follow-up procedure. Stakeholder involvement was essential in ensuring that such impacts are mitigated, controlled or rehabilitated. This study demonstrated that there were various participants involved in the EIA follow-up procedure as stipulated in the EMP which facilitated the successful performance of the EIA follow-up procedure. The participants had clear and distinct roles and responsibilities in the follow-up procedure. This is further outlined in the 2014 amended EIA regulations which stipulate that an EMPr (previously referred to as Environmental Management Plan) should specify roles and responsibilities of EIA follow-up participants and persons responsible for managing environmental impacts.[32] Clear role and responsibilities facilitate effective monitoring as well as accountability of one's actions (Morrison-Saunders and Bailey, 2009).

The EDTEA were responsible for authorising EIA and EMP applications from the various projects. In this context, the **regulator** was an environmental officer from the CME department. These officers are meant to monitor compliance and enforce environmental regulations on all authorised projects. They ensure that the follow-up procedure is conducted. Although the EIA follow-up procedure is a legislative requirement, legislation does not outline 'how' it should be conducted. Ultimately, the EDTEA representative noted that their role is ensuring that the environment is protected during construction activities:

> *"As an authority representing the Department of Environmental Affairs, my responsibility is to protect the environment by ensuring that there is no severe environmental degradation caused by construction to the environment".*(CA, 22/05/2012)

During the design of the follow-up, the EAP communicated with the public through advertisements in vernacular newspapers and hosted large group meetings. The public provided information that was important for the assessment of impacts on the physical and

[32] Regulation 23 (4); Appendix 4 (1) in terms of the 2014 amended NEMA Act (No. 107 of 1998)

social environment. The indigenous knowledge base of the nearby residents assisted the EAP during the formulation of the EIA and EMP. Due to public participation, the EAP for Site Three became aware that the trees that were going to be removed acted as a noise barrier. Consulting with the nearby community provided the EAP with suggestions on alternative means of managing issues on site to enhance project development without compromising the environment. According to Marshall *et al*. (2005) direct participation from the community is desirable. It allows for the sharing of local information, focused programme designs and building of trust and partnerships. As a result, the EAP was able to identify the number of trees that could be removed and the need for a temporary barrier during construction as an alternative. It is important that the EIA follow-up participants know the principles of sustainable development. These can serve as a form of guidance for environmental protection, sustainable use of natural resources and can promote public participation and communication during EIA follow-up (NEMA, 1998). Once roles and responsibilities are established, issues that needed to addressed and rectified can be determined.

5.2.1.2 Determination of scope of issues

Determining the scope of issues refers to the process of identifying critical issues that need to be considered in the EIA. Although issues can be generic, for this study the focus was on site specific issues. The scope of issues was identified by the EAP during the pre-decision stage of the EIA. The issues were outlined and addressed in accordance with the proposed activity. For Site One, tanks were constructed to host paint that would not be detrimental to the environment. The main issues the EAP outlined in the EMP included atmospheric pollution and obtaining the Atmospheric Emissions License. Due to large construction vehicles and machinery, the EAP was concerned about the environmental impact of high levels of noise. The EAP also reported on waste water and disposal of hazardous waste. With regard to solid waste, a particular reference was made to chemical paints or lubricants. The EAP outlined soil erosion, conservation of the natural environment as well as storm water management as issues that needed to be addressed at Site Two. The erosion of soil would have been a direct result of the stripping of areas and removal of topsoil for construction. Storm water management was viewed as necessary to avoid and control soil erosion. In order to conserve the natural environment, the EAP stipulated that vegetation could not be cleared and areas should be marked with danger tape. The main environmental impacts at Site Three as identified by the ECO involved the removal of trees for construction purposes. The ECO

drew up a Vegetation Management Plan to facilitate the rehabilitation on site, monitor transplanted trees and prevent any unauthorised removal of trees.

5.2.1.3 Determination of methods and techniques

The EAP determined the methods and techniques that were implemented by the ECO during the EIA follow-up. The methods and tools used to implement the follow-up programme were similar for all the three sites, varying slightly for site-specific issues that the ECOs needed to address. The methods and techniques for inspecting sites were formulated by the ECOs from the three sites. They were responsible for creating audit criteria that each site was inspected against and drawing up monthly audit reports outlining results from these inspections. The ECOs from all three sites conducted monthly site visits with two ad hoc site inspections at each. A contract was drawn up with the client permitting the ECO to conduct a spontaneous site visit if the ECOs believed it was necessary. The ECO used a camera as a tool for collecting photographic evidence to present the progress of development, compliance and non-compliance with authorisations.

The methods and techniques that were implemented by the ECO varied from site to site. For Site Two, the clearing of vegetation required an adaptive management approach where mitigation and rehabilitation strategies were implemented. Such strategies included the planting and watering of grass and removal of weeds where necessary as well as waste management for the removal of debris and waste washed along banks after rainfall. Site Three used the complaints register as an effective tool and method for addressing the issues and concerns raised by the nearby community. This was formally documented in audit and monitoring reports which facilitated accountability. These methods and techniques form part of environmental assessment which predicts and evaluates the consequences of human actions towards the environment. It is one of the primary measures used to manage the environment and achieve environmental sustainability (Kidd and Retief, 2009).

5.2.1.4. Design of the EMP

The follow-up programme design stage, for all the three sites, was relevant since it involved the preparation of EMPs which provided clear performance criteria through well-defined methodologies and approaches to monitoring, evaluation, management and communication. Marshall *et al.* (2005) explained that with the follow-up design, useful information can be developed where outcomes are measured easily and used to prevent and reduce the adverse

consequence of the developments. This study demonstrated that EMPs are important tools for sustainable development. They ensure that negative impacts on the environmental and people's environmental rights are anticipated and prevented (NEMA, 1998). The EMP is designed during the pre-decision stages by the EAP. As a living document, it is adapted by the ECO during the implementation of the follow-up (post-decision). To conduct the EIA follow-up procedure, each ECO from the three sites created an 'audit form' with various criteria derived from the approved EMP. As reported by the client from Site One:

> *"Upon the receipt of the EMP an audit checklist was developed for the pre-construction, construction and operational phases respectively".* (Client, Site 1, 16/05/2012)

The ECO monitored compliance or non-compliance against the audit criteria (for example the disposal of chemical and solid waste) throughout the pre-construction, construction and operational phases of the project. According to Marshall *et al*. (2005), as a guiding principle, the EIA follow-up should be timely and adaptive. Therefore no audit report or EMP should be the same as the next. The EMPs for Site One and Site Three were site specific, while Site Two submitted a generic EMP for approval. According to Marshall *et al.* (2005), an EMP needs to be site specific in order for the audit checklist to be "fit-for-purpose". As a guiding principle, it should be custom made to suit legislative, administrative, socio-economic and cultural circumstances, merged with decision making and project management activities (Marshall *et al*., 2005). This highlights the need for each EMP to be site specific. With regard to the generic EMP, the ECO of Sites Two and Three stated that he used his experience and best practice principles to design a set of audit criteria for Site Two. These principles were derived from Marshall *et al*. (2005) and served as guidelines for conducting an EIA follow-up procedure. The ECO from Site Two and Site Three stressed that even though some elements would be similar from one project to the next, each EMP has to be site specific:

> *"The first thing I did for Site 2, because it was a generic EMP, I drew up an environmental site inspection form in which I added additional criteria which I gave to the clients and the regulator and that were the basis for my site inspections. If I had to audit against that generic EMP, it would have been the worst practice on my part".* (ECO 2, 07/06/2012)

The authorities were also responsible for designing audit criteria according to the environmental authorisation and the EMP. They used the audit criteria to monitor the development of the project during its initial and final stages for departmental purposes. This was done to ensure that all the conditions for that development were compliant, as this could credit or discredit the responsibility of the contractors and clients as EIA follow-up participants for compliance or non-compliance.

An EMP, as stated by Lochner (2005), describes how negative impacts of construction, operation and decommissioning of a project can be mitigated, controlled and monitored. It provides information on environmental activities, controls, and monitoring and review details from one site to the next (DIPNR 2004). This needs to be demonstrated in the design of the EMP.

For Site One and Site Three, the EMP was separated according to the following phases:

1. Planning and design phase EMP;
2. Pre-construction, construction and commissioning phase EMP; and
3. Operational phase EMP.

Each of these phases was divided according to the environmental aspect, additional information on the aspect, the responsible party, target date and the mitigation (comments/action). This was in compliance with the EIA legislation.[33] According to the EIA regulations, an EMP should contain the details of the person who prepared the programme, as well as mitigation measures for any identified environmental impact in respect of planning and design, pre-construction and construction activities, rehabilitation of the environment and closure where relevant (RSA, 2010:40). As a predictive document, some of the rehabilitation measures were not outlined in the EMP from Site Two since the impacts was unforeseen, for example, the spillage of bitumen and the need to remove the topsoil before the chemical penetrates and pollutes the ground. The EMP was adapted to include some rehabilitation measures that had to be implemented during the ECO's site inspection and noted in the monthly audit reports.

[33] Regulation 33 in terms of the 2010 amended NEMA Act (No 107 of 1998)

The final EMP, as approved by the DEA, for Site Two was generic and vague. It provided a general scope for the EMP, which should be covered in any construction site. The environmental aspects and impacts identified were general with no reference to the responsible party, target date and any mitigation measures that would be required for that particular environmental aspect. The generic EMP initially submitted by the client was not authorised at a provincial level, since it did not fulfill the requirements of an EMP as outlined in the EIA legislation.[34] According to the provincial authorities, the EMP did not have a proper water management plan, therefore the EMP was denied. The applicant submitted a detailed rebuttal of every aspect allegedly reported by the DAEA (provincial level). The applicant also provided additional grounds relating to the DAEA's alleged bias against the development and highlighted how the issues outlined by the DAEA were already addressed (Department of Agriculture, 2006). According to Lewis (1999), bias in environmental decision-making frequently occurs when dealing with environmental issues. This is largely due to the spatial and temporal resolution of data and lack of projection after an authorised development. Decisions are meant to be made on long term environmental impacts based on data collected over a small environmental plot. Such decisions also have to be made to promote social development, economic prosperity and the integrity of the environment (Lewis, 1999).

Difference of opinion occurs when authorities make decisions for various levels in society. At a township level, primary concern would be decisions focusing on air and water quality, zoning, waste management whilst at the regional level, decisions would focus on broader environmental issues such as river systems air sheds. However, it could not be determined how the DAEA was being biased. The DEA (national level) reviewed the grounds of appeal and approved the application based on proof that soil and ground water would not be contaminated during development (this was reviewed in the specialist report of GSE Water Environmental and Earth Science Consultants) and that the lack of a Spatial Development Framework of the area should not, in itself, be a factor to the dismissal of the application (Department of Agriculture, 2006). Other issues identified by the DAEA that were dismissed by the DEA included loss of recreational amenities and threat to any indigenous vegetation. According to the DEA, the applicant satisfactorily addressed the concerns raised by DAEA

[34] Regulation 33 in term of the 2010 amended NEMA Act (No 107 of 1998)

(Department of Agriculture, 2006). After the application was approved, the ECO was able to redesign the generic EMP from which his audit checklist had been designed.

The investigations for the current research were based on the ECO's audit form which was sent to the relevant authority for approval. This occurred for all three sites. The audits included background of the sites as well as review and update of the EMP and methodology used to conduct the ECO's monthly monitoring of sites. The audit form was divided according to the pre-construction/planning phase, environmental management of construction activities, post construction phase environmental management and the evaluation of follow-up. These audit criteria served as a checklist for the ECO when monitoring for impact on the environment due to development and compliance or non-compliance with the conditions of authorisation from Site Two.

According to the amended EIA regulations, whenever there is an amendment to the EMPr (previously known as EMP), prior to the first audit, the ECO does not have to notify the competent authority.[35] Overall, with site-specific EMPs, environmental protection is enhanced since potential impacts that construction would have on the environment as well as measures that can be used to mitigate, control and monitor such impacts are outlined. Once the follow-up programme was designed and determined, it was submitted to the relevant authority for authorisation. Designing an EIA follow-up facilitated an efficient implementation of the follow-up.

5.2.3 Implementation Stage (step 3)

For all three sites, once the follow-up programme had been designed, it was placed into operation by the ECO during the implementation stage. The implementation stage is when the ECO is appointed with the responsibility of monitoring compliance with the EMP, as was prepared by the EAP in the previous steps (5.2.1.4). Polonen *et al*., (2011) acknowledges that the implementation stage controls projects and their environmental impacts through compliance monitoring.

[35] Regulation 36 in terms of the 2014 amended NEMA Act (No. 107 of 1998)

The implementation stage is the point when the follow-up programme is placed into operation. The ECO ensured that the contractors addressed environmental issues and concerns during a 'toolbox talk'. Some of the common issues discussed included proper maintenance of site and disposal of waste around the site. The ECO's site inspections were characterised by monthly audits checked against predetermined criteria. These site inspections were colloquially referred to as 'audits' by the ECO and EIA follow-up participants.

The ECOs from Site One, Two and Three implemented the follow-up programme, based on the predetermined EMP. This consisted of site-inspections where the ECO checked for compliance or non-compliance against his audit checklist and the biophysical impacts of development on the environment. The ECO reviewed documents and collected photographic evidence as a record presenting development progress, compliance and negligent behaviour from the various sites. This was communicated through audit reports and monthly meetings amongst the relevant EIA follow-up participants, namely site managers, project managers, and clients. Audit reports were distributed to the EIA follow-up participants and the relevant competent authority from the Compliance, Monitoring and Enforcement. For all three sites, the ECOs signed contracts indicating their commitment to conducting monthly site inspection as well as a few ad hoc inspections. According to Wessels and Morrison-Saunders (2011), ECOs are involved with ad hoc verification. Ad hoc verifications were conducted by the ECO as impromptu site inspections. This was to make sure that there was continual compliance on site irrespective of the ECO's scheduled site visits. Site One and Site Three were inspected by the ECOs from the pre-construction decommissioning phase of the development while inspection on Site Two began two months after the development commenced.

For this study, this stage was essential since the various measures that are predetermined in the EMP need to be implemented to ensure the overall protection of the environment. Measures were implemented to prevent the environment from degradation during development, to employ mitigation measures and to rehabilitate the environment during and after the development. This supports efficient use of natural resources as well as the sustaining of our ecosystem. It ensures that with economic development, social and economic goals towards ecological sustainability are recognised (DEAT, 2011). As previously outlined, ECOs from the three sites used various methodologies and tools to conduct site inspections. The legislation (NEMA, No. 107 of 1998), experience and best practice principles also served

as guidelines to implementing the follow-up programme. The ECO's best practice principles were the operating principles established by Morrison-Saunders *et al*. (2005). These principles indicate, amongst others, that an EIA follow-up procedure should be objective-led and goal oriented which may include controlling and monitoring projects and their environmental impacts (Morrison-Saunders *et al*., 2005). The ECOs from all three sites audited their respective sites against pre-determined criteria. The ECO on Site Two also consulted secondary sources to assist when auditing or drawing up audit reports for this site. Secondary sources included literature on indigenous species and specialists in that particular field prior to advising and writing up the monthly site inspections reports. Secondary sources included literature published

> *"With site inspection, I also made reference to various literatures for some control measures and I consulted with a specialist with the implementation of rehabilitation measures".* (ECO, 07/05/2012)

During the implementation of the follow-up programme, the ECO provided the community with the opportunity of voicing their concerns and suggestions to the contractors. It is however, argued in the literature that the role of the ECO extends beyond being a mediator with the public to being an informant. They should communicate the results of the follow-up with the public on an ongoing basis to develop public trust in the EIA follow-up (Wessels *et al*, 2015).

At Site Three nearby residents complained about the lack of access to their properties due to the construction islands that were placed adjacent to their driveways as well as the removal of grass on their lawns due to machinery. It is highlighted that for development to be sustainable, society needs to be considered along with economic development and environmental management (Rogers *et al*., 2008; RSA, 2008). However, in instances where consensus was not reached between the parties, amicable decisions need to be made as it is difficult to please everyone. This questioned the ability of decision makers to take into account the interest, need and values of all interested and affected parties with project and economic development whilst maintaining the integrity of the biophysical environment. Once the EIA follow-up was implemented by the ECO, the outcomes from the EIA follow-up were recorded by the ECOs in the form of an audit report and communicated amongst the EIA follow-up participants.

5.2.3.1 Environmental Audit Report

Audit reports were submitted on a monthly basis. On a monthly basis, the ECO submitted two audit reports to the regulatory authorities. He submitted the audit report and the audit form which he audited against. The audit reports provided details of the project and details of the ECO responsible for the site inspections. They contained project details including the background and the status of the project on a monthly basis. The report used photographic evidence to outline activities on site, any environmental impact and measures required to address such impacts. The ECO also incorporated licenses that were currently still in process for authorisation by the local DAEA such as the Atmospheric Emissions License. The audit form on the other hand, outlined compliance and non-compliance on site. The ECO audited an activity on site and rated its level of compliance (y=yes, p=partial, n=no, nr=not relevant and na=not applicable).

The ECO for Sites Two and Three submitted a single document on a monthly basis. This document contained the audit report which highlighted activities on site and compliance or non-compliance on site. These audit reports included the details of the project, the EIA reference number and details of the ECO. They noted the progress and status of the project, identified non-compliance issues, and adverse environmental impacts caused due construction activities. The audit reports also highlighted mitigation, rehabilitation or control and preventative measures that needed to be implemented to address any environmental impacts on site. As compared to Site One, the ECO for Sites Two and Three did not have audit criteria for inspections. He used his discretion and based his audit on what was observed on site. As a result, it cannot be determined whether all parameters that were in the EMP were audited on site. However, it should be noted that ECOs monitor sites differently. As a result, in some documents sent to the authorities, the ECOs relied heavily on pictorial evidence to demonstrate compliance or non-compliance.

All three audit reports contained the detail and content stipulated in terms of the 2010 EIA regulations. The audit reports had details of the independent person who prepared the audit report; they highlighted the purpose of the audit reports; and provided measures that would avoid, management and mitigation of environmental impacts associated with that particular development. They also provided the methodology adopted in preparing environmental audit report before the first site inspection. Audit reports served as an important tool for environmental protection. They provided EIA follow-up participants with guidelines for

mitigation, rehabilitation and preventative measures. This promoted the protection of the environment and natural resources. This ensured that development was socially, economically and environmentally sustainable (NEMA, 1998).

Glasson *et al*. (2004) asserted that the auditing of sites during site inspections should provide feedback to improve the overall EIA system. The outcomes from implementing the follow-up programme determined whether EIA follow-up was successfully performed. Overall feedback from the implementation of the follow-up programme can be summarised as follows (also see Table 5.1).

For each of the three sites, there were site inspections once a month during the project development. Site One and Site Three both had the pre-construction and post-construction site inspections whilst Site Two had only the post-construction inspection due to changes in appointment of an ECO. However, Site Three required more site inspections to address non-compliance and the unauthorised removal of trees.

Table 5.1 Overall outcomes from the implementation of EIA follow-up (Researcher's own, 2014)

IMPLEMENTATION ACTION	**SITE ONE**	**SITE TWO**	**SITE THREE**
Construction and operation period of project development (in months)	13	18	12
Total number of site inspections over duration of construction	14	19	13
Average frequency of site inspections (per month) by the ECO	1	1	1
Total number of site inspections by the competent authority	1	0	1
Fines issued and paid due to non-compliance	0	5	3
Number of meetings with the I&AP to address concerns	1	0	5

In KZN, the competent authority from the Compliance, Monitoring and Enforcement of EDTEA is scheduled to conduct the first and last site inspection. However, this does not often occur in practice. Site One was only inspected during the early development stages, Site Two was not inspected at all and Site Three was only inspected by authorities to address the unauthorised removal of trees and discuss possible rehabilitation measures.

Fines were issued for repeated non-compliance. According to the amended EIA regulation, penalties and fines can be issued for non-compliance with the EMPr (previously referred to as EMP) and environmental authorisations.[36] The ECO for Site One did not issue any fines and penalties due to the high level of compliance here. Site Two, the largest site (in terms of developmental footprint) had the most penalties. Penalties at Site Two included repeated non-compliance with emptying contaminated water, not demarcating excavation sites and not having required documents on site (Richardson, 2011)[37].

Since Site One was within an industrial complex; meeting with the nearby community I&APs occurred prior to commencement of the activity and no further meetings were required. Meeting with the nearby community and I&APs was requested and required for Site Two and Site Three, particularly for Site Three to address issues raised. In accordance with literature, public participation is important for educating participants on environmental issues, allowing for their views to be heard and ensuring that they share in the benefits of an affluent society from development (Arnstein, 1969). Site Two used the complaints register to address some of the concerns of the I&APs. Some of these concerns included the encroachment of an invasive species (yellow nutmeg) which was duly removed by the site manager. Site Three required the most meetings with I&APs. The meetings with I&APs were set up by the ECO and were communicated to the nearby community through notices. The issues that were raised by theI&APs included the increased level of noise and removal of vegetation on their lawns due to the parking of heavy vehicles. Not all issues could be addressed therefore an amicable decision had to be reached between the two parties, for instance, the contractors negotiated that they would rehabilitate their lawns once construction was completed.

Joshi *et al.* (2007) stated that sustainable development recognises the interdependence and interrelation between social (equity), economic (growth) and environment (conservation)

[36] Regulation 48 in terms of the 2014 amended NEMA (Act No. 107 of 1998)

[37] Audit Report with findings of the site audit conducted on Monday 22 August 2011

which highlights the importance of public participation in environmental decision-making. Public participation and the involvement of I&APs needs to be promoted as a principle of sustainable development (NEMA, 1998).

5.2.4 Evaluation Stage (step 4)

The substantive outcomes and findings from the follow-up activities were assessed during the evaluation stage by the researcher. Audit reports were used to evaluate the findings from the ECO and the stakeholder's response to such findings. The EIA follow-up participants outlined measures that were implemented to ensure that the environment was protected from negative impacts created by development. Part of the evaluation process included determining whether all decisions that were made during evaluation of results had to take into account the interested, needs and values of interested and affected parties (NEMA, 1998). Several issues were explored in the audit reports and these are discussed below.

- ***Whether information provided during follow-up was adequate (i.e. accuracy of audit report)***

Audit reports depicted actual issues that were uncovered by the ECO on site and highlighted various measures that could protect and maintain the integrity of the environment. This outlined the importance of EIA follow-up in ensuring that the environment is not compromised during development. Sadler (2004) evaluated that the quality of the Environmental Impact Report contributes to the effectiveness of the EIA process. Information for this was provided through regular audit reports. The audit reports reviewed, as drawn up by the ECO, were concise, well-articulated, and provided clear instructions for protecting the environment during construction. The ECOs from all three sites communicated the findings of the inspection to the EIA follow-up participants and the authorities. With this, they were able to advise relevant participants accordingly to ensure environmental protection. They were also able to assess the level of compliance or non-compliance with authorisations and implemented measures required to protect the environment during construction. Legislation reports should specify proof of compliance i.e. the extent to which the conditions of the authorisations are being or not being complied with, the reasons for such behaviour and any action taken with regard to mitigation measures (RSA, 2010). This was adequately fulfilled by the ECOs who provided the EIA follow-up participants and the EDTEA with accurate and adequate information within the audit reports:

> *"The issues identified were addressed based on the consultant's audit reports and none of issues raised during his audits alerted the department. During the developments there was also adherence. There was some non-compliance identified on site but the ECO addressed all of that and they did eventually comply"*. (CA, 10/10/2012)

An accurate report was important since it outlined issues that needed to be addressed on site and provided guidelines for the participants in addressing the outcomes from the site inspections and for decision making. Such decisions were made to ensure that the environment was not compromised during development, thus ensuring sustainable development. This prevented what was highlighted by Glasson *et al*. (2005), who argued that inadequate information on a project and its likely consequences negatively impacts on decision making, and hence a poor quality report impacts on the degree of effectiveness.

The project and site managers from all three sites stated that the audit report was an important guideline and tool during the project in terms of facilitating adherence to environmental regulations and implementing measures recommended by the ECO since it yielded positive outcomes and contributed to the successful performance of a follow-up procedure. Audit reports served as guidelines for the participants by ensuring that pollution and degradation of the environment during construction was avoided which was important for sustainable development (NEMA, 1998):

> *"Everything was accurate and clear, because when he [the ECO] would come to site I would walk with him and when he did his reports he put photos and would refer to those photos and you would know exactly which sections he's talking about"*. (Site manager 2, 04/06/2012)

Furthermore, the audit reports were essential in determining the course of action to improve environmental protection through compliance. Findings from the audit reports were discussed amongst the EIA follow-up participants during monthly meetings to address issues outlined in the reports. Meetings were also held on site to discuss the audit reports. Audit reports served as important tools for the protection of the environment during development and safeguarding sustainable development. The quality and accuracy of the audit report

contributed to the successful performance of the EIA follow-up. A good and well written report is important for the communication of results from assessment and for providing descriptions and possible solutions relating to proposed activities (Sandham and Pretorius, 2008; Sandham *et al*., 2013).

- ***Legal compliance with any other standards / regulations***

The evidence shows that there was legal compliance with other standards, particularly at Site One. The EIA follow-up participants had to comply with both the South African and German environmental standards. Site one was run by a German environmental regulations company which had to comply with regulations promulgated under the Environmental Impact Assessment Act of 2001. In addition to this South African Act, they had to comply with the Environmental Audit Act (2002), the Environmental Information Act (2004) and the Environmental Legal Remedies Act (2006) which is all part of procedural environmental law in Germany (Glaser, 2011). Upon receiving the audit reports for Site One, the authorities reported that there were no major non-compliance or environmental issues that required the authorities' intervention since the levels of compliance were high.

The level of compliance differed between the three sites. With the need to maintain its good reputation, the contractors and clients from the German owned site, complied with both international and South African environmental regulations. They were further assisted by German technology which facilitated efficiency in compliance and reduced negative impacts on the environment during development. Such technology, as relevant to this study, included a drainage system that drained and emptied waste water, stored rain water and filtered water for purification for it to be reused around the site. They also used low carbon emitting vehicles and machinery during construction. This exemplifies the application of eco-innovative technology to benefit the environment and improve its outcome (Fredenburg, 2001).

Application and access to such technology was only visible on Site One (German owned site) and not on Sites Two Three (sites owned by a South African company). This was due to the need to address social issues, environmental injustices and democracy in South Africa as a developing country (Scott and Barnett, 2009). South African companies often cannot afford to invest significantly in technology. Once the EIA follow-up procedure was evaluated, issues

that were unforeseen or incorrectly dealt with are managed in the final stage of the practical framework.

- ***Did the regulators ensure that EIA was followed up?***

According Morrison-Saunders and Arts (2004), strong commitment is required by the EIA regulators in undertaking EIA follow-up. Evidence shows that this was partially fulfilled in this study. The EIA had to be followed up by the ECO and the authority. Through the submission of the monthly audit report, the regulators were kept informed that the EIA was being followed up by the ECOs. The authorities were required for the project's first and final site inspection in order to ensure that the contractors had complied with the authorised agreement, and were co-working harmoniously with the nearby community. The competent authority was also meant to be on site in order to enforce regulations and address repetitive non-compliance by contractors on site. According to Marshall *et al*. (2005), their role pertained to enforcing regulatory requirements, securing a balance between the interest of the proponent and the community, enforcing compliance from proponents and facilitating learning from experience. Due to staff shortages at the Durban office, this was not adequately fulfilled. The eThekwini Department of Monitoring, Compliance and Enforcement Department have three officers (Asmal, 2012). These officers are meant to monitor compliance and enforce environmental regulations on all authorised projects in the whole of eThekwini Metropolitan Municipality. Due to the lack of staff, these officers were unable to address every authorised project hence they relied heavily on the ECO's audit reports.

The need for more staff is further highlighted by Kidd (2008) who stated that the EIA follow-up requires considerable resources in terms of time, money and staffing in both proponent and regulatory agencies. Lack of such resources in South Africa hinders the capacity of authorities to take steps in addressing problems, complaints and ensure enforcement of legislation and authorisation. Due to this, authorities rely on the integrity of developer, their consultants and the complaints of neighbours or I&APs (Kidd, 2008).

According to Rogers *et al.* (2008), monitoring, measuring and enforcing compliance with sustainability targets are key requirements for a sustainability led approach. This in turn will promote sustainable development as a key support tool for EIA (Rogers *et al*., 2008). With regard to the EA process, du Plessis (2005) highlighted that local government structures should ensure compliance and enforcement to environmental authorisation and participation

at a local level. In order for KwaZulu-Natal as a province to progress towards sustainability, cooperative governance is required. According the EIAMS, authorities should enhance integrated planning and development as well as sustainable environmental management (DEAT, 2014). This cannot be fulfilled with the lack of human resources within government.

5.2.5 Issue Management (step 5)

The issue management stage occurs once the follow-up programme has been implemented and the results have been evaluated by the regulator. This stage refers to the actual purpose of follow-up. It determines whether further measures need to be taken to manage issues that were mitigated unsuccessfully and assists in managing adverse environmental impacts that were not identified or predicted during the EIA itself (Baker, 2004).

For this study, mitigation measures that were implemented effectively dealt with issues that occurred during development (DEAT, 2011). This is largely credited to the ECO and the co-operative work among the follow-up participants. However, since the EMP is a predictive document, there were actual issues that were present at these sites that had not been anticipated and that required management. As stated by Nobel and Storey (2005), this outlines the importance of an EIA follow-up, whereby the unforeseen impacts are identified in order to implement mitigation and control measures where necessary since it is not the predicted impacts, but the real impacts of the project on the environment that are important. Issues that required further management were caused from the unforeseen impacts of development on the biophysical environment. Such issues included the effects of excessive rainfall on the site, oil, spillages and litter and the unauthorised removal of trees, as detailed in the final part of this chapter.

Due to excessive summer rainfall the soil was eroded down banks and excavated areas were flooded at Site Two. The contractors managed this by installing stronger pipes for a more effective drainage system. The intense rainfall caused oil, petrol and chemical spillages as well as litter from the nearby shopping centre to be transported to Site Two. In order to manage the problem gabions were created to trap waste during rainfall activities and prevent infiltration of oils and chemicals. At Site Two, the spillage of bitumen (a hazardous black substance used for tarring roads) was remedied by removing top soil to prevent further infiltration. The most challenging issue was the unauthorised removal of trees for construction. More trees had to be planted and rehabilitated by the contractors in order to

manage the problem. Unfortunately those responsible failed to monitor their growth and they all failed to grow on Site Two. Although it was not highly significant, the involvement of the community contributed to ensuring that the contractors managed issues identified and addressed concerns that arose from the community. Any unauthorised disturbances and altering of the natural environment were reported to the authorities, e.g. the unauthorised cutting of trees that served as a noise barrier from oncoming traffic at Site Three. According to Ahammed and Nixon (2006), reporting to the regulatory authorities is important since they ensure that proponent comply with the EIA approved conditions and learn from experience to improve future EIA processes. This ensured that the contractors complied with the authorised EMP and environmental authorisation. However, public participation was not designed for the post-decision, follow-up procedure. Instead it stipulates that the EAP (from the pre-decision process) should ensure that the comments of interested and affected parties are recorded in reports and that such written comments, including records of meetings in the form of a report, are submitted to the competent authority (RSA, 2010). The ECO implemented the above legislation to encourage community participation and build rapport between the two parties. Overall, the EIA follow-up programme was successful in that very minimal issues had to be managed. As established, the EMP predicted potential impacts caused by construction on the environment. Under the guidance of the ECO, these impacts were effectively managed.

5.2.6 Communication among EIA follow-up participants

All parties communicated and cooperated openly in the EIA follow-up procedure which was required to ensure the successful performance of the procedure. The ECO cooperated with the authorities and submitted monthly audit reports detailing the activities on site, progression of the development and any non-compliance issues that required intervention from the authorities. The project managers, site managers and the ECO had a professional and productive relationship whereby the ECO communicated with them the substantive outcomes from the follow-up procedure, compliance issues, and necessary mitigation measures and rehabilitation methods on site. According to Marshall *et al*. (2005), the EIA follow-up procedure should be provided for the EIA follow-up participants and decisions from the follow-up procedure should be transparent, fair and communicated to them. This is further supported by the principle of sustainable development which stipulates the need for open and transparent decision making and access to information as agreed by law (NEMA, 1998). This

was achieved by the follow-up participants from all three sites where the client and ECO communicated with them.

Marshall *et al*. (2005) reported that in a follow-up procedure in his study all parties co-operated openly with a shared sense of purpose to avoid, reduce or remedy the adverse environmental effects and thus a good working relationship was developed amongst the EIA follow-up participants. Evidence shows that this relationship existed on all three sites and was based on mutual and agreeable understanding of environmental protection during development. The site manager of Site One stated that this contributed to the success in the project's level of compliance:

> *"We are happy with way the ECO did his site inspections. I think it was very straight forward, I think he's a good ECO, he understands construction very well. We might not agree on everything but his instructions were clear".* (Site manager 1, Site 1, 30/05/2012)

As a product of these cooperative relationships, the environment was not compromised during development. Clients consulted with the contractors to rectify repetitive non-compliance. Non-compliance included the non-removal of waste around the site and irregular watering of vegetation. The client's representative from Site One was constantly on site. Therefore, the conditions of the authorisation and the EMP were communicated effectively and regularly to the contractors without solely depending on monthly site inspections from the ECO. Project managers had a close relationship with the site manager. The site managers were required to support project managers in enforcing the request of the ECO when implementing measures that would prevent and reduce environmental impacts. This yielded impressive results with optimum protection of the environment. According to Marshall *et al*. (2005), sharing a sense of purpose to avoid, reduce or remedy the adverse environmental effects provides a platform for all parties to co-operate openly.

5.2.6 Overall Evaluation

This study also used observation to collect data. This method was important as it enabled the researcher to objectively observe the actions, behaviours, conversations and activities that occurred off and on site during the follow-up. The researcher achieved this by accompanying the ECOs on monthly site visits. The site visits consisted of inspections around the site and

recording areas of compliance and non-compliance against the ECO's audit criteria. The level of compliance and non-compliance with environmental authorisations and with the audit reports influenced the environmental outcomes from development; this level was established during the auditing of sites by the ECO. It also highlights the performance of the follow-up from the observation conducted during the site inspection. The researcher formulated a table ranking the performance of the follow-up programme, impacts on the receptive environment and how it contributed to the overall effectiveness of EIA (Table 5.2).

Table 5.2 shows that the follow-up participants from each site responded positively to the EIA follow-up (see Tables 4.2 and 4.3 reproduced from Chapter Four here for easy reference to rubric and colour coding). Site One displayed the highest level of compliance while Site Three demonstrated the least compliance. The lack of documentation on site contributed to the shortfall in compliance with authorisations and EMP on the latter site. Site One had the EMP on site which enabled the stakeholder to constantly refer to the document. Site Two had an updated EMP on site once requested by the ECO. Site Three, on the other hand, had most of their document missing on a regular basis. As a result penalties and fines were issued by the ECO for non-compliance.

Table 5.2: Ranking of the performance of follow-up programme (Researcher's own)

Variables measuring performance	*SITE ONE*	*SITE TWO*	*SITE THREE*
Payment of penalties issued	N/A	A	A
Compliance with conditions of authorisations and EMP	A	B	E
Management of impacts	A	B	E
Public participation	N/A	C	D
Site inspection by ECO	A	A	A
Site inspection by CME officer (authority)	C	E	F
Accuracy of predictions	B	B	C
Enforcement of Regulations by ECO	A	A	A
Enforcement of Regulations by CME officer	C	C	F

Table 4.2: Rubric for evaluating performance of EIA follow-up

(Source: Lee *et al*., 1999)

RATING	EXPLAINATION
A	Well performed, important tasks completed
B	Satisfactory and complete, only minor inadequacies
C	Can be considered satisfactory despite inadequacies
D	Parts well attempted but must, as a whole, be considered unsatisfactory due to inadequacies
E	Unsatisfactory, significant inadequacies
F	Very unsatisfactory, important tasks (s) poorly done or not attempted
N/A	Not relevant, the review topic is irrelevant in this project

Table 4.3: Colour coding indicating impacts made on the receptive environment
(Source: Researcher)

RANKINGS	RATE	EXPLANATION
1		Improved receptive environment
2		Environment restored
3		Adversely impacted receptive environment

Site Two and Site three relied on the guidelines provided by the ECO during his site inspections to ensure that they were compliant with the authorisations for the overall protection of the environment. Enforcement of regulations and site inspections conducted by the ECOs were well performed and completed on all sites. The ECOs used various strategies, methods and tools to maintain the balance between the three spheres of sustainable development. The ECOs encouraged the interdependency between human development (people), ecological protection (the planet) and economic growth (prosperity) by ensuring that the environment was not compromised during development (RSA, 2011).

The authorities could not inspect the three sites against their own audit criteria for EDTEA records. Their inspection at Site One was satisfactory as they were able to inspect the site during the initial stages. Their conduct was unsatisfactory for Site Two because they did not respond to the ECO's request for their intervention. They did, however, approve the rehabilitation of trees that were removed during construction. They did not make any follow-ups on the success of the growth of the trees. The enforcement of regulations by the authorities was unsatisfactory for all three sites. The lack of success in the rehabilitation of these trees hindered ecological sustainability and overall sustainable development.

Predictions on environmental impacts caused by development were accurate for Site One and Site Two. For Site Three, the removal of extra trees and their impact was not accounted for. According to the contractors, they required more room for construction which was not addressed in the EMP. This facilitated proper site inspections for the ECO and effective management of issues. Site One excelled in the management of issues; some of the issues were even rectified while the ECO was on site conducting site inspection. Issues included the removal of contaminated soil, demarcation of excavated areas, litter cleanup and exercising proper safety measures. EIA follow-up participants from this site, as compared to Site Two and Site Three, perceived environmental management as a moral and not a legislative obligation. Site Two managed environmental impacts successfully due to their obligation to comply with legislation as well as persistence from the ECO. Public participation during EIA follow-up was not relevant for Site One since development was within a demarcated industrial complex. Public participation at Site Two was satisfactory despite its weaknesses as there was little communication on the follow-up results with the nearby community. Public participation was poor at Site Three even though it was required.

From Table 5.2 above, it can be deduced that Site Three adversely impacted the environment the most with the removal and unsuccessful rehabilitation of trees. In order to promote sustainable development, EIA follow-up participants need to be cautious when adopting economic development projects and take into consideration the limitations of the environment thereby not compromising its integrity during development (Meadows *et al*., 1972). The receiving environment was restored and improved at both Sites One and Two. The environment was improved at Site Two with the removal of contaminated soil on site, plantation of grass and removal of weeds on site. Overall, the EIA follow-up was successfully performed thus contributing to overall EIA effectiveness.

5.3. Substantive Outcomes

Cashmore et al. (2004) argued that determining the substantive outcomes of an EIA is the ultimate criteria to test its effectiveness. According to Sadler (2004), the substantive outcomes of a study determine whether the EIA meets its purpose and objectives, e.g. supporting informed decision making (immediate aim) and achieving environmental protection (ultimate aim). For this study, the substantive outcomes are determined by whether the EIA achieved its purpose. The section below discusses the environmental performance of all three sites according to the substantive outcomes of the prediction, mitigation and / or correction action for impacts on the biophysical environment at each site. The outcomes are categorised in this section according to the important environmental issues as stipulated in the EMPs (now known as EMPrs) prepared for each of the three sites, with an emphasis on issues that were the most prominent at the three sites. These outcomes were determined though the collection of empirical evidence by the ECOs during their site inspections on all three project developments. All aspects of the development were inspected and photographic evidence was gathered to highlight issues that needed to be monitored, mitigated with enforcement of compliance before, during and after development. Implementing mitigation measures aims to avoid impacts and if unavoidable, minimised and mitigated to maintain sustainable ecosystem and basic human well-being (DEAT, 2014). Evidence shows that environmental issues that were identified included soil contamination, disposal of storm and waste water, storm water run-off and soil erosion, vegetation establishment, forestry demarcation and forestry rehabilitation.

5.3.1 Soil contamination

According to the EMPs for all three sites, all fuels and any other hazardous material required for construction on site had to be stored on an impervious area (preferably bunded) to prevent soil contamination. In addition, any machinery or vehicles on site have to be checked for oil or diesel leaks prior to arriving on site. According to the principles of sustainability, the disposal of contaminated soil and prevention or, if unavoidable, minimising of chemical waste, contributes to sustainable environmental management (NEMA, 1998). In addition,

Site One encountered the most chemical leakages from vehicles, machinery and the TLB hydraulic tank that could have contaminated the soil (BASF Audit Report, 2012 as listed in Appendix 5). This occurred during the initial stages of the construction process (Plate 5.1).

Plate 5.1 Leakages from vehicles on Site One (Source: Thornhill, 2011)

During one of the site inspections (26/08/2011), the ECO recommended the contractors to place drip trays below the machinery with leakages until the issue has been resolved and machinery fixed. It was suggested that the site manager ensure that no faulty vehicles entered the site during development (Appendix 5). The site manager complied by placing drip trays and replacing leaking vehicles before the ECO's next site inspection (23/09/2011). As a result, chemical run off and infiltration as well as soil contamination were prevented.

According to Polonen *et al.* (2011) this demonstrates the purpose of EIA follow-up which is to prevent and reduce the adverse consequences of development whilst securing the protection of the environment.

At Site Two, top soil was contaminated with an overnight spillage of bitumen (a hazardous black substance used for tarring roads) which was worsened with the rainfall activity (23/03/2011). This occurred during the construction of roads along and around the bridge. This was effectively mitigated with the removal and proper disposal of the contaminated soil before it infiltrated further into the soil. This top soil was thereafter rehabilitated. Such results demonstrate the effectiveness of an EIA follow-up, which according to Ahammed and Nixon (2006), contributes to long term sustainable development. This was achieved by placing new top soil and planting grass to steady and keep the top soil intact. Although Site Two was able to efficiently control and mitigate the spillage of bitumen and the contaminated soil, they failed to dispose of the waste water correctly on a regular basis (Appendix 5). Site Three, on the other hand, did not experience any difficulties with soil contamination due to chemicals or leaking vehicles.

5.3.2 Storm and waste-water contamination

According to the Presidency Outcomes (Outcome 10) as outlined in the EIAMS, the quality and quantity of water resources need to be enhanced to ensure that environmental assets and natural resources are protected (DEAT, 2014). To achieve this, proper disposal and drainage of waste water is required. The EMPs for all three sites stipulated that storm and waste-water tanks were to be emptied on a regular basis. This was to ensure that there is no obstruction of water flow and storage of contaminated water on the sites. Site managers had to make sure that tanks and vessels were dewatered in a controlled manner with no wastage of water or contamination of soil or ground water.

The construction team at Site One dewatered and emptied their tanks and vessels on a regular basis. This site constructed a piping structure that would empty water from bunded areas which were created for waste-water, contaminated water and rain water (Moss Kolnick Upgrade Audit Report, 2012 as listed in Appendix 5). The German-owned site had the technology and facilities to purify, recycle and reuse water as well as dispose contaminated water from site on a regular basis. For Site One, the environment was improved with recycling of water and proper disposal of waste-water (Table 5.2). Emptying storm and

waste-water from tanks and vessels became a serious issue of repeated non-compliance at Site Two (Plate 5.2).

Plate 5.2 Contaminated waste water at Site Two (Source: Richardson, 2011)

The ECO recommended that the site manager ensure that bunded areas were drained of storm water after every rainfall event and that the contaminated water was drummed and disposed of appropriately (Moss Kolnick Upgrade, 2012 as listed in Appendix 5). Storage of chemical tanks adjacent to the site resulted in the contamination of the bunded water with chemical, lubricants and oils, which could have been potentially hazardous in the event that a spillage occurred. The site manager was first reminded (ECO's tenth inspection 03/03/2011) to empty the chemical bunded area on a regular basis after every rainfall event. Irrespective of the ECO's site inspections and requests, there was non-compliance from Site Two for four consecutive months. On his 18th site inspection (04/11/2011) the ECO issued a penalty of R1 000.00 which was to be deducted from the contractor's salary by the client (Moss Kolnick Upgrade, 2012 as listed in Appendix 5). Compliance only occurred after the penalty was issued. The funds deducted from the contractors salary were used for the clean-up and rehabilitation of the site. As an outcome, the ECO's site inspection ensured that storm and waste-water was emptied on a regular basis. In some instances storm water was collected in bunded areas and disposed of or recycled appropriately (Moss Kolnick Upgrade, 2012 as listed in Appendix 5). In other instances, storm water caused excessive soil erosion scars,

particularly at Site Two. Site Three were not as organised as Site One: they did, however, dewater their tanks and vessels at the request of the ECO.

Due to the heavy summer rainfall, chemical waste and oils were transported from the nearby shopping centre to Site Two (27/01/2012) (Plate 5.3). Through the drainage of water, the site manager ensured that no chemicals or hazardous substances contaminated the soil or ground water on site (29/02/2012) (Moss Kolnick Upgrade, 2012 as listed in Appendix 5).

Plate 5.3 Discharge from nearby shopping at Site Two (Source: Richardson, 2011)

With regard to the waste, gabions were installed to trap waste from the nearby shopping centre and stronger pipes were installed to assist with chemical discharge from the centre (Moss Kolnick Upgrade, 2012 as listed in Appendix 5). Joshi (2007) recognises that economic development cannot occur at the expense of the environment, and emphasises the importance of environmental protection as well as social development, economic growth in sustainable development. With the oil discharge, it was not clear whether the site manager or the nearby shopping center was responsible for remedying the effects. It could have been clearer if it was stipulated in the audit report to avoid any confusion and ensure fulfillment of responsibilities. This lack of clarity could have delayed remediation and compromised the performance of the EIA follow-up. Due to the oil discharge, the site manager had to notify the shopping centre as it was their responsibility to rectify the problem in terms of Section 28 of NEMA (Duty of Care). This highlights that anybody who causes harm and degrade the environment should be held responsible to take reasonable measures to prevent any harm or

degradation from occurring, continuing or recurring (RSA, 2010). The "polluter pays" principle is specified in the EIA legislation, and it is one of the principles that underpinning the IEM philosophy (DEAT, 2004). These principles enforce accountability for one's actions and prevent damage to human health and the environment and contribute to the sustainability of natural resources and sustainable development. According to Marshall *et al*. (2005), the EIA follow-up procedure offers an opportunity to prevent, rehabilitate, mitigate and control adverse impacts on the environment due to developments. This meant that the banks eroded due to heavy rainfalls, and the removal of land cover during construction, had to be rehabilitated.

5.3.3. Soil erosion

The storm water at Site One did not cause soil erosion. Instead it filled excavation sites which had to be emptied and dried thus delaying development. Compared with Site One and Site Three, Site Two was characterised by steep banks adjacent to the site making it susceptible to soil erosion (Moss Kolnick Upgrade Audit Report, 2012 as listed in Appendix 5). To avoid this, the EMP stipulated that the un-channeled flow of water needed to be controlled to avoid soil erosion. This could be achieved by creating temporary cut drains and berms to capture storm water and promote infiltration. This controlled the impact the project had on the environment which, according to Polonen *et al*. (2011), can be achieved through compliance monitoring, evaluation and ongoing monitoring on site. It was recommended that where there was concentrated runoff on slopes or surfaces, the flow must be slowed down by contouring (Plate 5.4).

Plate 5.4 Soil erosion scars at Site Two (Source: Richardson, 2011)

For Site Two, the ECO recommended the site manager temporarily cut drains and berms to capture storm water and promote infiltration while stronger pipes were being installed (Appendix 5). Such preventative measures are further supported by Polonen *et al*., (2011) who states that implementing preventative measures during the EIA follow-up is vital in reducing adverse impact caused by development on the environment.

To intercept the rainfall and manage the situation, the ECO suggested the site manager plant grass along contour lines of the slope to decrease the velocity of runoff down the slope to increase opportunities for infiltration, thus preventing soil erosion (Appendix 5). According to Arts *et al*. (2001), management of impacts is an important component of an EIA follow-up. It allows for decisions and appropriate measures to be implemented in response to issues arising from monitoring and evaluation activities. With the drainage of water, the site manager was to ensure that no chemicals or hazardous substances contaminate the soil or ground water on site. The contamination of soil has the potential to cause negative environmental consequences, which according to Noble (2006), needs to be prevented since it, in turn, can have negative effects on human activities such as agricultural practices. This is achieved by conducting the EIA follow-up. As a preventative measure, the site manager had to identify areas around the site susceptible to erosion and install the control measures. Exercising this precautionary principle to prevent further environmental degradation contributed to the protection of the environment and natural resources (DEAT, 2014). The site and project manager complied by installing proper and stronger pipes as well as planted grass along contour lines. This indicates the importance of EIA follow-up where adverse consequences (such as soil erosion) are reduced and the environment is protected during project development (Polonen *et al.* 2011).

5.3.4. Vegetation establishment

For the post-construction phase and the management of the environment, vegetation removed at all three sites due to construction activities had to be rehabilitated and maintained where appropriate. With this type of economic development, Jorna *et al.* (2005) argued that it can cause the ecological systems and habitats to deteriorate; therefore it is important to rehabilitate and restore such systems and habitats. To address the concept of sustainability was introduced. Site One did not require any planting of grass since it was located in a

concreted industrial area. Site Three required rehabilitation particularly in the surrounding areas and this also included the adjacent residents' lawns after the retaining wall was completed. Vegetation establishment was only applicable for Site Two since it experienced excessive soil erosion during rainfall activities (29/02/2012) (Plate 5.5). According to the ECO, the site manager had to facilitate the watering and weeding of rehabilitated areas until vegetation was fully established (Moss Kolnick Upgrade Audit Report, 2012 as listed in Appendix 5).

Plate 5.5 Ramp C embankment at Site Two in need of additional vegetation cover
(Source: Richardson, 2012)

The ECO requested that grass be planted along the embankment (Ramp C) to be re-vegetated due to erosion by storm water. According to the guidelines prepared by Jones and Jones (2002), re-vegetation on site after construction is important for storm water management, topsoil management from erosion, seed collection and plant supply, as well as for preventing unnecessary spread of weed seeds. During the site inspections (27/01/2012; 27/01/2012) the ECO noted the dry grass and requested the contractors water the re-vegetated areas as frequently as required as there had been little rain that month (Moss Kolnick Upgrade Audit Report, 2012 as listed in Appendix 5). As a result of a lack of water, trees and plants were wilting. The rehabilitated areas were to be irrigated approximately twice a week for 4-5 weeks, depending on the growth stage and weather conditions. The site and project manager complied and placed pegged sods to prevent the soil from being eroded down the banks and since the water truck could not reach certain areas on site, the site manager requested the

workers manually water those areas on a regular basis which facilitated plant growth (Moss Kolnick Upgrade Audit Report, 2012 as listed in Appendix 5). As a result of the ECO's site inspections, vegetation was rehabilitated, soil erosion was reduced and infiltration increased. Vegetation was able to mature and become properly established with continual rehabilitation and maintenance (30/01/2013) (Plate 5.6). Maintenance of the site also included removal of weeds as requested by the ECO (Appendix 5).

Plate 5.6 Growth of grass (mature stage) along Ramp C at Site Two (Researcher's own, 2013)

5.3.5 Forestry Demarcation and Forestry Rehabilitation

Areas that were identified by the ECO as ecologically sensitive or adjacent to any construction work were to be demarcated to prevent damage by plant and labour. This was undertaken to prevent the unauthorised removal of trees. Lozano (2008) further elaborates that conducting EIA follow-up ensures that natural resources, in this case indigenous vegetation, are not compromised during developments. However, this did not occur on Site Three, therefore trees that were already removed had to be replaced and rehabilitated. Rehabilitation contributes to sustainable development and restores the protection of society and ecosystems during development (DEAT, 2006). It also ensures that necessary mitigation and remedy measures are implemented to protect and promote the quality of natural resources

Site One and Site Two did not need to demarcate any trees or rehabilitate trees that were removed (Dickens Road Audit Report, 2012 as listed in Appendix 5). The indigenous trees that were located along the forest in the vicinity of Site Three were identified by the ECO as ecologically sensitive; however, this species was not identified and recorded. The ECO requested from the contractors that the forested area in the north-eastern portion of the site be clearly demarcated with dander tape (25/07/2011) (Plate 5.7) (Dickens Road Audit Report, 2012 as listed in Appendix 5). This was to avoid further disturbance of the forested area during construction and prevent further removal of trees.

Plate 5.7 Demarcation of Forest Site Three (Source: Richardson, 2011)

Compliance in this regard was prolonged. With repeated non-compliance after two site inspections, the ECO requested the Resident Engineer to stop all construction work in that area until it has been demarcated (02/02/2011). The ECO issued a penalty of R1000 that was deducted from the contractor's payment for failing to comply with the conditions of the EMP and the previous site inspection report findings (05/10/2011) (Appendix 5). This supports Polonen *et al*. (2011) who stated that EIA follow-up controls projects and their environmental impacts by making sure that through compliance monitoring, the consent decision and relevant environmental standards have been implemented properly.

These environmental standards where addressed in South Africa's 2014 amended EIA regulations provisions are made for dealing with offences.[38] It also stipulates that failure of the holder of an environmental authorisation to notify the competent authority of its intention to amend the EMPr,[39] failure to comply with the conditions of environmental authorisation and EMPr and audit requirements,[40] and when activity commences where the environmental authorisation was suspended or withdrawn. This amendment is necessary for enforcing compliance amongst the contractors during development. Ahammed and Nixon (2006), highlights the importance of local government in enforcing such regulations and communicating the EIA policy and procedures to proponents. Trees from this area had to be demarcated to prevent further, unauthorised removal of trees.

Due to the cutting down of ten mature trees on Site Three, the ECO requested the site manager plant 100 indigenous trees as issued by the Department of Agriculture, Forestry and Fisheries (DAFF) in eThekwini Municipality (Dickens Road Retaining Wall, 2012 as listed in Appendix 5). The trees that were already removed had to be replaced and rehabilitated. Rehabilitation contributes to sustainable development and restores the protection of society and ecosystems during development (DEAT, 2006). The trees struggled to grow to a mature stage due to the lack of maintenance and watering (15/12/2011).

After the ECO's close out audit (06/12/2011), the contractors were responsible for the maintenance and watering of these trees during the development's rehabilitation period. Eighteen months (06/06/2011) after the close out site inspection, the rehabilitation of these trees was a complete failure (Dickens Road Retaining Wall, 2012 as listed in Appendix 5). When questioned, no participant involved was willing to take responsibility, thus section 28 of NEMA had not been complied with (Duty of Care). With the application of the "polluter pays" principle, the cost of rehabilitation of these trees was the contractor's (site and project manager) responsibility. This principle, as outlined by Berder (2006), is to ensure that the polluter place control measures to prevent pollution or remediation measures if they fail. The intention is not support payment but to ensure minimal pollution during construction. The client's responsibility was to follow up and confirm that contractors had successfully fulfilled

[38] Regulation 48 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[39] Regulation 37 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

[40] Regulation 34 in terms of the 2014 amended EIA regulations under NEMA (No. 107 of 1998)

their responsibility. The audit report, as their final instruction, could have stipulated clearer instructions in terms of the various roles and responsibilities during the rehabilitation period. This would have indicated who is responsible for what, what is too be done should anything fail, and most importantly, who will follow-up to ensure vegetation has been rehabilitated. This could have compromised the performance of the EIA follow-up process and overall effectiveness of EIA.

The researcher's recent visit (12/12/2014) to the rehabilitation area confirmed that the area was grassed with no tree growth. The failure of these trees species to grow demonstrated the lack of post-construction follow-up from the contractors and clients as well as the lack of enforcement from DAFF. This is further substantiated by Ahammed and Nixon (2006) who stated that regulators ensure that proponents comply with the EIA approved conditions and learn from experience to improve future EIA processes. This highlights the important role of the ECO in the follow-up procedure as well as indicating the importance of the follow-up procedure in ensuring compliance and protecting the environment.

Chapter Six: Participants perspectives on EIA follow-up

6.1 Introduction

This chapter presents the second part of the results pertaining to the third objective, which explores the perspectives of participants[41] on the EIA follow-up and EIA effectiveness overall. It reveals the emotive and subjective responses from the EIA follow-up participants interviewed regarding their attitudes to the EIA follow-up. According to Polonen *et al.* (2011), follow-up processes can be strengthened by allowing participants to express their opinions on the monitoring of results. The perspectives of the EIA follow-up participants towards the EIA follow-up, differed according to their professional backgrounds. Participants that were approached included the client, project manager, site manager, the ECO and the authorities. These EIA follow-up participants were selected due to their involvement in the follow-up process. The findings were grouped and presented according to the understanding of the follow-up, strengths and weaknesses, implications for EIA effectiveness and the future direction of the EIA as perceived by the participants.

6.2 Understanding of EIA follow-up

The participants' understanding of the importance of EIA follow-up procedure improved with the progression of the project for all the three case studies and monthly on-site inspections. They all understood the importance of compliance and the purpose of the EIA follow-up in reducing the negative impacts of development on the environment and implementing recommendations from the EIA. This is consistent with the study conducted by Hulett and Diab (2002) where the majority of the respondents (67% of EAPs) understood that the EIA follow-up ensures that the recommendations made in the EIA and conditions by set by competent authority are implemented. Although the participants understood the value of follow-up regarding environmental protection, the researcher discovered that the participants (clients and contractors) were motivated by the desire to achieve financial profit with minimal costs. This became a contributing factor to compliance; additional and unnecessary costs were to be avoided. To the clients, the EIA follow-up procedure was a process that alleviated unnecessary expenditure and fines during development.

The clients unanimously understood the procedure of follow-up whereby compliance with the authorised EIA and EMP were monitored by an ECO. Monitoring and compliance ensured that the environment was preserved and was not adversely impacted during construction. Although they focused greatly on the need for compliance with statutory requirements and protocols, they acknowledged that pro-activity and immediate compliance with the implementation of the mitigation measures decreased potential and unnecessary costs. As an EIA follow-up principle (Marshall *et al.*, 2005), participants understood that the proponent of change must accept accountability for implementing the EIA follow-up and that EIA follow-up should be timely, adaptive and action oriented:

> *"It is the preservation of the environment, making sure that the environment is well taken care of while we are doing our construction on site".* (Client representative, 16/05/2012)

The client representative expressed his disagreement with perspectives articulated during the ECO's monthly visit especially when they demonstrated a high level of compliance on a monthly basis. He suggested that the visits should only take place every second month. Similarly, site managers and project managers from all three sites understood the EIA follow-up as a procedure to ensure compliance with environmental authorisations. This was largely due to pre-existing understanding of the follow-up and through witnessing the ECO's monthly site inspection. Compared to clients, the contractors worked closely with the ECO and thus they had a more practical understanding of the EIA follow-up procedure. The contractors understood the EIA follow-up as a procedure for mitigating unforeseen impacts and rehabilitating the environment (Wessels and Morrison-Saunders, 2011), as advised by the ECO. They also understood the value and need of implementing measures advised by the ECO during the monitoring and site inspections as noted by the Site One client:

> *"It is monitoring compliance with the environmental statutory requirements and protocols that we are meant to follow to aid in protecting the environment".* (Client representative, 16/05/2012)

With regard to the three sites, an understanding of EIA follow-up by all participants is important as they are responsible for applying the necessary measures to reduce and prevent degradation of the environment during development. This was in accordance with the theory

of the EIA follow-up procedure which states that this can be achieved by checking, learning, communicating, monitoring and evaluating impacts of a project of plan or development proposal (that has been subject to EIA) (Marshall and Morrison-Saunders, 2003). It also includes the effectiveness of mitigation measures which provide feedback that can improve the overall EIA system and provide some follow-up on the environmental management plan (Marshall and Morrison-Saunders, 2003).

The client representative from Site One argued that protecting the environment extended beyond regulations to being a moral duty. This attitude was visible amongst the EIA follow-up participants at this site. Compliance with the environmental authorisation, EMP and the audit reports ensured that the contractors fulfilled their duty in protecting the environment. Although most the EIA follow-up participants demonstrated an understanding of the follow-up procedure, they also had concerns regarding the process.

From the perspective of the authority, the EIA follow-up monitors and ensures that the clients and contractors adhere to the approved environmental authorisations and all permits or licenses such as the Atmospheric Emissions License (AEL) and a Schedule Trade Permit (Thornhill, 2012). This depends on the agreement as the EIA follow-up can be conducted on a monthly or a weekly basis. Furthermore, the follow-up provides the authorities with insight into the activities on site to make sure that the environment is not compromised during development.

6.3 Strengths and weaknesses of EIA follow-up

The aim of this research was to glean from participants what they perceived as the strengths and weaknesses of the EIA follow-up procedure in South Africa and KwaZulu-Natal specifically. This evidence was derived from the participants' experience with EIA follow-up. According to the EIA follow-up participants, the strengths of the EIA follow-up procedure include its ability to protect the environment during construction, and provide lessons from feedback for future projects. The weaknesses, on the other hand, included staff shortages and lack of public participation. For this study, communication served as a strength as well a weakness, as perceived by the various EIA follow-up participants.

As previously stated, effectiveness of an environmental tool is determined by whether it works and whether it satisfactorily meets the purpose for which it was intended (Sadler, 2004). According to the participants, the EIA follow-up procedure was successful since it

fulfilled the overall aim of environmental protection. This was achieved through the ECO's monitoring for compliance with authorisation and the provision of control and rehabilitation measures during development. This promoted environmental protection and ensured that the environment was not compromised during and after development activities (Morrison-Saunders, 2004). The ECO became the authorities' 'second pair of eyes' for site monitoring so that the environment was not compromised during construction, as note by the ECO on Site One:

> *"It's like walking through the same door all day, every day for months; so when there is a snake by the door, they don't see it until someone else points its out. I become their second pair of eyes when they are so busy and caught up with construction."* (ECO 1, 17/05/2012)

According to seven of the ten participants, valuable lessons were learnt from the feedback of the ECO's monthly site inspections, which improved their leadership roles and understanding of the negative impact of development on the environment and how this can be prevented. Participants (particularly site managers) further stated that lessons learnt during site inspections were going to be implemented more effectively and accurately in their future projects. According to Polonen *et al.* (2011), learning furthers understanding of the effects behind the impacts of a project and promotes more accurate predictions for future projects. The lessons learnt included proper disposal of waste, removal of alien species and contaminated soil as well as proper drainage systems to accommodate the summer rainfall in KwaZulu-Natal. Site manager for Sites Two and Three noted that:

> *"Next time I know that waste needs to be separated into different skips and disposed correctly. We can also separate solid waste to plastic, tins and general; maybe try recycling in the future".* (Site manager 2, 04/06/2012)

According to Polonen *et al*. (2011), learning is vital since monitoring furthers our understanding of the effects behind the impacts of the project, and promotes more accurate predictions for future projects. Similarly, Polonen *et al.* (2011) further contend that the lessons learnt from the implementation of mitigation measures in the three case studies can be

recorded in audit reports for future reference. Effective communication amongst the EIA follow-up participants facilitated the learning of lessons from the EIA follow-up procedure.

Communication amongst project managers, site managers, clients and the ECO occurred on a monthly basis after each site inspection guided by the audit reports. Communication amongst EIA follow-up participants ensured a positive performance of the follow-up procedure. It was positive because of the discussion, decision-making and accountability on certain issues. It highlighted and determined the success of mitigation measures employed. This also occurred in a study conducted in the UK, where the benefits of the EIA follow-up, as assessed by the consultants, are the implementation and effectiveness of mitigation measures (Clare, 2005). According to Baker (2004), communication among the EIA follow-up participants, whether it is verbal or written, is a vital component of the EIA follow-up programme. It ensures accountability and credibility, determines whether commitments were honoured and provides lessons for other EIA follow-up participants for future use which is evident in this study.

Communication with the authorities was in the form of audit reports which presented the progress of the developments to the authorities. The ECO from Sites Two and Three expressed concerns regarding the lack of communication, intervention, enforcement and support from the DAEA (Compliance, Monitoring and Enforcement office). The ECO requested, on several occasions, for the EDTEA (DAEA at the time) to enforce compliance on Site two and Site three. This was due to repetitive non-compliance on these sites. Without the support of the EDTEA, compliance was not immediate and this impacted negatively on achieving the set environmental protection goals.

The role of the regulator, as outlined by Morrison-Saunders and Arts (2004), is to ensure that the proponents comply with the EIA approved conditions as well as learn new lessons that can be implemented to improve the future of EIA follow-up procedure. The ECO from Site Two stated that South Africa's greatest barrier to the progress of the monitoring and auditing process was lack of compliance and support from authorities. This hindered the performance of the EIA follow-up procedure as compliance was prolonged by the site and project manager:

> *"Lack of support from the DEA from the Compliance and Monitoring is a major barrier. They could be supporting the ECO*

when he raises a particular non-compliance issue repeatedly in request for their intervention". (ECO 2, 07/06/2012)

The regulators have an important authoritative role to play which was not fulfilled. On that note, the ECOs stated that the EIA follow-up procedure would have been successful if the DAEA enforced compliance and monitored the sites regularly:

> *"Being an ECO you've got to have the backing of the contractor and of the department because if you don't you are fighting a losing battle because you can write as many non-compliance reports as you want and nothing can happen".* (ECO 2, 07/06/2012)

The request by the ECO for Sites Two and Three for intervention from the DAEA could not be fulfilled due to staff shortages. According to the supervisor assisting in the CME division, three instead of eight or nine officers were responsible for monitoring, ensuring compliance and enforcement in the whole of eThekwini Municipality. Due to shortage of staff, the officers prioritised visits to illegal developments and unauthorised developments in sensitive environments. Kidd (2008) reported that the lack of finance and staff resources was a challenge to the EIA follow-up procedure. This is therefore not a new phenomenon: the department could have anticipated and addressed the issue of staff shortages. EIA follow-up requires considerable resources in terms of time, money and staffing in both proponent and regulatory agencies. Therefore the lack of resources and capacity hinders authorities to take steps to address problems, complaints and ensure enforcement of legislation and authorisation (Kidd, 2008). This adversely impacts the effectiveness of the EIA follow-up procedure and sustainable development.

The Compliance, Monitoring and Enforcement Officers argued that they could not be on site and follow up on offences, penalties and decisions produced by the ECO, due to the lack of staff resources (Asmal, 2012). The lack of staff resources is also common in African countries like Eritrea. According to a study conducted by Zeremariam and Quinn (2007), Eritrea not only lacks legal provisions for EIA, but lacks human resources and adequate environmental data. Similar to Eritrea, Sosovele (2011) noted that Tanzania still struggles

with governance issues, capacity building and the institutional arrangement for the EIA administration process with a lack of accountability and environmental enforcement authorities. The department therefore relies on the ECO's audit reports and the ECO's role in ensuring that the EIA follow-up participants are responsible for complying with environmental regulations and standards. The environmental officer from the DAEA stated that there are only three officers for the whole of the EThekwini region. An increase of development in the Durban Metropolitan area, coupled with staff shortages, means that every development cannot be monitored and they thus rely on the ECO's audit reports:

> *"We monitor the entire Durban metropolitan area; there is obviously, shortage of staff. With increased development, it's hard for us to keep monitoring and auditing them all. I think that's one of the challenges within the department as whole*." (CA, 22/05/2012)

In order to address the lack of communication between the ECO and the authorities, a Partnering Agreement Strategy[42] needs to be developed for which a meeting would be set between the ECO and authority on a regular basis to discuss concerns and improvement of environmental management (Morrison-Saunders and Bailey, 2009). The authorities need to be involved and promote sustainable development. Sustainable development integrates the economic system, socio-political system and ecosystem which are all linked and held together via the governance systems and regulatory framework. Governance enables social sustainability, economic sustainability and environmental sustainability (Rogers et al., 2008). Therefore, authorities need to enforce compliance and be present when their intervention is required to safeguard the environment and encourage sustainable development.

The contractors identified public participation as a problem in the EIA follow-up procedure. They were unable to work effectively with the nearby communities and felt there was minimal communication and understanding between the contractors and the community regarding project development and environmental protection. As the site manager for Site Three commented:

[42] This strategy allows ECOs to work with authorities to ensure optimum protection of the environment. This includes compliance with stipulated regulations.

> *"The residents are all "environmentalist". They wanted immediate compensation and rehabilitation of their grass. They did not understand rehabilitation of grass needed to be at the end of construction".* (Site manager 2, 30/05/2012)

Public participation in the EIA follow-up procedure should create pressure on the contractors to comply with the authorisations and implement the necessary measures as advised by the ECO. This is further elaborated by Morrison-Saunders and Arts (2004) who stated that the public's independence from regulators and proponents enables the community to evaluate the performance of both these EIA follow-up participants in the EIA process. Evidence from this study shows that public participation during the follow-up procedure was difficult especially since the contractors had to fulfil both the client's brief and environmental regulations. Public participation was initiated by the ECOs at the three sites. However, the public in this study lacked citizen power since there was no public participation in decision-making and communication between the community and EIA follow-up participants, namely the site and project managers. As a result they could not ensure that contractors complied with authorisations and rehabilitated the environment during and after construction.

6.4 Lessons Learnt

According to Polonen *et al*. (2011), learning is vital since monitoring furthers our understanding on the effects behind the impacts of the project, and promotes more accurate predictions for future projects. It is concluded that the follow-up procedure promoted continuous learning on a daily basis on site. Lessons were learnt through the assessment of the outcomes and results from the EIA follow-up procedure which was usually done during the evaluation of the follow-up programme (Morrison-Saunders and Arts, 2004). Lessons learnt by the EIA follow-up participants included proper site management, communication, management of the biophysical environment during construction, implementation of preventative measures, rehabilitation, and mitigation and control measures. These were outlined in audit reports to serve as guidelines and reminders for the relevant EIA follow-up participants and for future reference. This is supported by Morrison-Saunders *et al*. (2004) who argued that the EIA follow-up procedure should facilitate continuous learning from experience and increase learning through active feedback. The active feedback was enabled through the regular meetings and audit reports. This feedback focused more on compliance and deliberation of environmental issues than on outlining lessons that can be learnt. This can

explain why most participants were hesitant and struggled to answer the question on lessons they had learnt. In addition, there were deliberations on environmental issues and concerns during monthly meetings with the ECO, for example at Site One on Monday 25 October 2011 where the continual infestation of weeds was deliberated. These provided an agreeable platform for the participants to question and learn from the EIA follow-up procedure. This was vital in ensuring that the lessons were learnt and that there was adherence to the requirements from the audit report thus contributing to the successful performance of the EIA follow-up procedure.

The lessons learnt on issues of managing could be implemented for future projects. However, one has to question how this will be possible considering these lessons were not recorded and therefore cannot be referred to for future reference. Furthermore, measures highlighting the importance of protecting the environment cannot be compromised during development. Due to lessons learnt from managing issues, site and project managers can be better prepared to manage storm water from excessive rainfall, can take more precautions in managing chemicals on site in order to avoid spillages and can avoid compromising the environment for construction purposes. The project managers learnt that compliance with authorisations is vital in order to ensure that the company complies with environmental laws and, more importantly, to ensure that the environment is not compromised during construction. A reference made by the project manager from Site One highlighted the necessary compliance of the storage of chemicals and diesel:

> *"I learnt that there is no compromise to compliance. It is important for us (company) and environment. We had to comply 100% with the storage of chemicals and diesel, there is no way around it*." (Project manager 2, 04/06/2012)

The site manager from Site One admitted to having learnt proper environmental management from the follow-up programmes. Reflecting on his past experiences in South Africa, the site manager noted how negligent they had been towards the environment. Through the site inspections process of this project, the site manager focused on the potential negative impacts of hazardous material on the environment if not disposed in a proper manner, e.g. the impact of paint spillage on marine life after it has been washed off into a water body:

> *"I did of course, I learnt a lot. Normally on construction we do things without noticing impacts on the environment. With this (monitoring and site inspection) I learnt of the impacts and what can be done to prevent them."* (Site manager 1, 05/06/2012)

The project manager from Site One learnt that keeping the site well managed, clean and performing well on a regular basis was essential. He learnt that this could be done on a regular basis, with or without the presence of the ECO. The project manager also learnt good management habits such as ongoing management rather than reaction to issues and being proactive rather than reactive about issues outlined on site. He felt that this prevented unnecessary environmental impacts and minimised issues that needed to be managed:

> *"It's the best way to say, rather than anything specific that might have been new in the monitoring process, so I think what you learn is the procedure of keeping the site well managed and keeping it clean and performing smoothly. In addition: a good habit is ongoing management*." (Project manager 1, 28/05/2012)

The ECOs implemented lessons learnt from follow-up procedures from previous projects. One of the lessons learnt that was implemented was effective communication between the community and contractors before and throughout the construction process. Based on his experience, the ECO was able to advise the contractors and engineers in meetings, negotiating and communicating with the nearby community. As a result of the consultations, the issue of communication breakdown was managed by the contractors on behalf of the community. The ECO noted that:

> *"From previous experiences I recommended to the contractors to sit down and have meetings with the residents and address the issues. A difference was made with vegetation screening along the pedestrian walkway on Kingsway Road: although it was small, there was an outcome from those consultations."* (ECO 2, 07/06/2012)

A study by Wessels *et al.* (2011) highlighted that an ECO adds educational value to the project. This helps to ensure the client, contractors and project advisors are more sensitive to the environment. Follow-up participants from Site One were more sensitive to the

environment when compared to the participants from Sites Two and Three. For the latter, there was more of a sense of compliance with authorisations and audit reports.

The need for a proper water management plan was advised by the authorities and ECO for Site Two. This occurred once the water management plan in place failed to fulfill its duty. Failure to implement proper drainage and management of storm water created issues on the construction site for Sites One and Two particularly after heavy rainfall events. Such issues included soil erosion, removal of top soil, storing of contaminated water, pollution and blockage of piping.

As outlined in the environmental audit report, from Site Two, the unchanneled flow of water needed to be controlled to avoid soil erosion (Richardson, 2012). This can be achieved by creating temporary drains and berms and to capture storm water and promote infiltration. On slopes or surfaces with concentrated runoff, the flow needed to be slowed down by contouring. Through the use of proper water drainage, the site manager would be able to ensure that no chemicals or hazardous substances would contaminate the soil or ground water on site. However, such lessons can only provide guidance for future projects and not the entire EIA process.

The EIA follow-up process is important for making informed decisions and providing feedback into the EIA process (Morrison-Saunders, 2004; Polonen *et al*., 2011). During project development for all three sites, environmental impacts were only recorded in an audit report. Not a single participant indicated that lessons were being recorded electronically or in a document for future purposes. This questions the ability and the success of the EIA follow-up to contribute to further understanding of the effects behind impacts of the projects and does not contribute to accurate predictions for future projects. The EDTEA (formerly DAEA) used the audit reports to monitor sites they were unable to visit and enforce compliance; these findings were not recorded. Jha-Thakur (2009) noted that feedback into the EIA system improves future practice and knowledge of consequences of a development activity. This would be plausible if events from all three sites were recorded to improve the EIA process and not simply to monitor for compliance on projects.

6.5 Future of EIA follow-up

The perspectives on the future of EIA follow-up varied among the participants, according to their experience. One of the functions of the EIA follow-up was to facilitate learning. Learning is vital and monitoring can further our understanding on the impacts of the project and promotes more accurate predictions for future projects (Polonen *et al.*, 2011). As commendable as the EIA follow-up procedure was, in general the participants believed that it could still be improved. The issues of institutional arrangements, techniques, communication and participation as well as training and development were highlighted as being in need of improvement and are discussed below.

Institutional Arrangements

According to the ECO for Sites Two and Three, more staff is required in the Compliance, Monitoring and Enforcement component in DAEA. According to Kidd (2008), the lack of resources and capacity delays the authorities in addressing problems, and enforcing legislation and authorisation. Therefore, an increase in staff members in the department could allow the Compliance, Monitoring and Enforcement officers to respond more efficiently when their intervention is required on various sites. In addition, staff and financial resources are also required since the EIA follow-up procedure can extend over long periods of time and can become complex (Kidd, 2008). The interventions are usually required to enforce compliance and environmental regulations. Furthermore, the ECO suggested that the provincial DAEA environmental offices should duplicate the model of follow-up by the national DEA offices wherein Compliance and Monitoring and Enforcement are two separate offices. This could enable the department to hire more staff to occupy and fulfil set duties:

> *"The DAEA, like the DEA has two offices, one for Compliance and Monitoring and the other for Enforcement. This will force the government to hire more people to get the job done.*"(ECO 2, 07/06/2012)

Techniques

According to the site and project managers of the three case studies, the techniques and methods used for the follow-up were complementary; they were, however, quite rigid. Such techniques and methods included monthly site inspections and photographic evidence.

According to the client from Site One, the techniques used to conduct the follow-up procedure need to be more flexible and site specific. This is highlighted in legislation, as an IEM principle whereby the EIA follow-up procedure should be flexible and adaptive to realities issues and circumstances (DEAT, 2004). The German client argued that the level of compliance differs from one site to the next and so techniques should differ too. This is further elaborated by Marshall *et al.* (2005), who stated that the EIA follow-up, as an operating principle, should be 'fit-for-purpose'. This implies that each project is different, and therefore an EIA follow-up programme must be tailored to suit the proposed activity, its stages and dynamic context. There was continual compliance with the EMP and instructions provided by the ECO at Site One, thus the clients claimed the monthly on-site visits were excessive. The client from Site One suggested that the ECO conduct an evaluation every second or third month instead of monthly audits:

> *"The ECO comes in every month with very little to correct. The little he corrects is for monitoring purposes. He is a professional but sometimes I think it is a waste of time and money because we are very compliant*." (Client representative, 16/05/2012)

> *"The EMP for Site Two was generic. I had to recreate an audit form and establish criteria to use when auditing. It's a best practice principle*." (ECO 2, 07/06/2012)

Communication and Participation

Communication between the ECO and the authorities need encouragement. Morrison-Saunders and Bailey (2009) pointed out that the relationship between the ECO and the regulator is essential in ensuring overall protection of the environment. It is important for the authorities to participate and engage with the follow-up procedure and where required, to respond. With policies in place, regulators ensure that clients comply with the EIA approved conditions and learn from their experience to improve future EIA processes. Evidence from this study shows that communication between the ECO and DAEA occurred through audit reports. Although this was adequate in general, some issues required face-to-face communication. Such issues included the continual lack of compliance regarding the demarcation of the forested area at Site Three.

It was also found that the concerns of the local community were not properly addressed during the EIA follow-up for Site Two. According to the ECOs, structures need to be established to facilitate effective communication between the local community and the proponents. They added that the local communities needed to be involved and informed about follow-up outcomes. Marshall *et al*. (2005) argued that the indigenous knowledge and feedback from local communities on project implementation is crucial in ensuring the success of the follow-up.

Training and Development

Training and development of student interns and increase in employment of permanent staff of the DAEA were proposed. This will increase human capacity within the Compliance, Monitoring and Enforcement office. As a result, the work load will be shared amongst the officers and student interns and more time will be allocated to reviewing projects and attending to issues on site by the more experienced officers, when required. According to the ECO and the Compliance, Monitoring and Enforcement Officer, environmental education should extend beyond construction workers to the clients, project managers, site managers and engineers:

> *"Environmental management is simplified when you working with people that are conscious on the environment. It would be beneficial if people that worked on these projects have prior training on protecting the environment*." (CA, 22/05/2012)

6.6 Implications for EIA effectiveness of the follow-up procedure

The purpose of an EIA follow-up is to highlight and manage environmental uncertainties inherent in a prospective activity, such as project planning and decision making (Arts et al., 2001). This enables learning from experience and provides feedback into the pre-decision EIA activities (Marshall *et al.*, 2005). It further highlights the implications of EIA follow-up for an effective EIA system. An effective EIA system will be able to maintain and improve the quality of the environment and meet sustainable development goals through its application (Jay *et al.*, 2007; Polonen *et al.*, 2011). As derived from the EIA follow-up participants, an effective EIA process will ensure that, for future projects, the environment is protected.

As previously described (sub-section 6.4), the EIA follow-up participants unanimously agreed that they had learnt various practical lessons during the follow-up procedure. The effectiveness of the EIA process can facilitate lessons that can be learnt to improve future EIA processes. According to Glasson *et al.* (2004), the monitoring and auditing that occur during site inspections contribute to the learning process of an EIA. These processes assess the quality and effectiveness of mitigation measures. The purpose of an EIA follow-up is to highlight environmental uncertainties inherent in a prospective activity such as project planning and decision making (Arts *et al.* 2001). This enables learning from experience and provides feedback into the pre-decision EIA activities (Marshall *et al.*, 2005). Lessons learnt from unforeseen impacts of current projects, as determined during the follow-up procedure, could influence the accuracy of future EMPs.

According to DEAT (2004), an EMP is a predictive document that is used to identify the adverse impacts on the environment due to the proposed activity and to develop measures to mitigate, minimise and manage these impacts. EIA follow-up participants were requested to measure the accuracy of the EMP. The evidence shows that when the accuracy of the EMP was measured, as a percentage, the participants felt that the EMP, on average, was 80% accurate. The EMP is a predictive document and not all parameters can be foreseen prior to construction. However, for all the three case studies, the EAPs had some knowledge of the life cycle of construction therefore some EMP parameters of construction were generic in the EMP. The client for Site One elaborated:

> *"I'd would say it is 75% or 80% accurate EMP drawn up well before project starts (and EIA), most cases its drawn up based on your experience, a lot of what you think is based on experience you can never predict with 100% certainty what would happen on the site. The EAP was thorough so there were no surprises."* (Client 1, 16/05/2012)

The authorities were familiar with the structure of the EMP and assessed sites according to the EMP template as well as more specifically.

> *"I would say I would give it [the EMP] a rating of 80%. Obviously now, the EMP is developed pre-construction and obviously they take into account all phases of development*

because remember the life cycle of the development."(CA, Site One, 22 /05/2012)

As previously outlined, the EMP for Site Two was generic in nature and thus did not identify all the measures required to ensure environmental protection at Site Two. EIA follow-up participants from Site Two did not acknowledge the role of a generic EMP but commended the ECO on the positive performance of his monthly site inspections. According to the project manager, the generic EMP did not cater for changes regarding the 10km removal of vegetation during construction. However, the project manager did not read the EMP which questions his credibility regarding the accuracy of the EMP. The conditions of the EMP improved when the ECO created a new EMP specifically for the site:

"I did not read the EMP but based on the ECO's monthly audits and criteria I would say it was 70% accurate." (Project Manager 1, 04/06/2012)

For Site Three, the EIA follow-up participants argued that the EMP was detailed and served as a guideline to implement mitigation measures. On average they perceived that the EMP was only 60% accurate. This was largely influenced by the removal of trees that were not accounted for in the EMP. In terms of the EMP specifications of the project, the project development activities were covered so all the mitigation measures as contained in the EMP were implemented on site:

"The EAP made it site specific. He did the best he can when he predicted. The time you are busy with the project you realise the need to improve here and there. There are factors that come up once the EAP has left." (Project Manager 1, 04/06/2012)

6.7 Conclusion

This chapter discusses the findings of the study and highlights that the EIA follow-up procedure was strengthened by the views and opinions of the EIA follow-up participants. By understanding and acknowledging the purpose of the EIA follow-up procedure, the participants were able to fulfil their roles and responsibilities in the operation of the EIA

follow-up procedure. The responses from the participants primarily revolved around the EIA follow-up as a procedure that ensures the environment is protected from negative development. This included their response to the understanding of the follow-up, strengths and implications of an effective EIA system. While commending the EIA follow-up procedure, the EIA follow-up participants believed the procedure still needs to be improved and its weaknesses addressed. This study allowed the researcher to draw conclusions and provide recommendations to improve the performance of an EIA follow-up procedure and the effectiveness of the EIA system.

Chapter Seven: Conclusion

7.1 Introduction

Over the past 40 years the concept of environmental management has evolved from pollution control and no action to global environmental protection and sustainable development by means of proactive environmental strategies and tools based on economic, ecological and social considerations. The aim of this study was to investigate the performance and perception of participants' follow-up activities and understand the implication for EIA effectiveness in South Africa by means of three case studies in KwaZulu-Natal. This study used a qualitative research approach and case studies were selected through non-random purposive sampling by the researcher.The research highlighted that successful performance of an EIA follow-up contributes to overall EIA effectiveness by fulfilling its ultimate goal of environmental protection.

This chapter is divided into three parts. Firstly, it provides a brief overview of this study's method. It then proceeds to discuss how the stated aims and objectives were achieved. Thirdly, it discusses the last objective pertaining to the recommendations for good practice and improvements in the application of EIA. This was derived from the operational experience of the three sites. Finally, the chapter presents the overall conclusion of the study.

7.2 Overview of Methodology

A qualitative research approach was used for this study. Data was collected through informant interviews for which participants were selected purposively. This sampling method was also used for the selection of the three case studies for this study. The case study approach and the observation technique assisted the researcher in determining and documenting the substantive outcomes from the EIA follow-up procedure at the selected sites. Through semi-structured interviews, the researcher was able to gain insights into the perspectives and opinions of participants on EIA follow-up in South Africa. Secondary sources were essential for determining the value and importance of the EIA follow-up procedure and investigating the content, process and procedural steps of follow-up programme. The method selected successfully achieved the objectives outlined in this study.

7.2 Key Findings as per Objectives

The main findings as per objectives were as follows:

To explore the role, value and importance of EIA follow-up

The role, value and importance of the EIA follow-up was presented through the literature reviewed. The role of the EIA follow-up procedure is to address environmental certainties inherent in a prospective activity and improve decision making. The value of conducting an EIA follow-up procedure is the ability to implement corrective measures to actual and sometimes unexpected, impacts of a project without compromising the quality of the environment (Arts *et al.*, 2001; Morrison-Saunders and Arts, 2004). The importance of the EIA follow-up can be seen in its ability to prevent, rehabilitate, mitigate and control adverse impacts on the environment caused by developments (Marshall *et al.,* 2005). It provides feedback into the EIA which assists in learning about pre-decision EIA activities (e.g. the accuracy of impact methods). Lastly, the EIA follow-up procedure improves decision making and highlights the consequences of the pre-decision EIA activities (Marshall *et al.,* 2005). The role, value and importance of the EIA follow-up procedure was further explored through the procedural steps and substantive outcomes from this study.

To investigate and document the content, process and procedural steps of follow-up programmes and associated outcomes from selected case studies

This objective was fulfilled through the exploration of the procedural and substantive outcomes from the EIA follow-up procedure at three sites in KwaZulu-Natal. The results were interpreted and presented according to a practical framework (developed by Morrison-Saunders and Arts, 2005), adapted to incorporate the principles of follow-up (Marshall *et al*., 2004) and further supported by legislation (NEMA, 1998; NEMA, 2010; NEMA, 2014). The practical framework included the following steps: determination of need, follow-up programme design, implementation stage, evaluation stage and issue management stage.

The EIA follow-up programme is conducted by the ECO as a statutory requirement to South Africa's EIA legislation. The follow-up procedure is designed and executed by the ECO. This is achieved by using the EMP and environmental authorisations as guidelines to creating audit criteria. The audit criteria are used at the implementation stage of the follow-up. The implementation stage of the follow-up procedure requires the monitoring of sites and

conducting site inspections. This is to ensure compliance with authorisations, address the unforeseen impacts and employ measures to ensure the overall protection of the environment during development. During the evaluation stage of the follow-up, the substantive outcomes and findings from the follow-up activities are assessed by the EIA follow-up participants. The audit reports, as drawn up by the ECO, assist the EIA follow-up participants with evaluating the follow-up procedure. The issue management stage refers to the actual purpose of the follow-up. It determines whether further measures needed to be taken to manage issues that were not identified or predicted during the EIA itself. Overall, the EIA follow-up participants interacted positively with the contextual factors which include regulation and institutional arrangement as well as approaches and techniques of the EIA follow-up, thus contributing to its success.

The ultimate purpose of the EIA and EIA follow-up procedure is to ensure that the environment is protected during development. This was visible from the substantive outcomes of this study. Under the guidance of the ECO, rehabilitation, preventative, control and mitigation measures were employed. These measures ensured that the environment was not harmed during development. Through semi-structured interviews, the EIA follow-up participants discussed lessons learnt from the substantive outcomes of this study. Such lessons can be used for informing future practice and feedback into the EIA system.

To explore the perspective of participants on the EIA follow-up procedure

This study used semi-structured interviews in order to explore the EIA follow-up participants' perspectives on the EIA follow-up. The EIA follow-up participants' inputs into the follow-up procedure were significant as they were indicative of their attitudes and fulfillment of their roles towards the operation of the EIA follow-up procedure. The EIA follow-up participants understood the purpose of an EIA follow-up procedure, as a tool used to prevent environmental impacts during developments. This enabled them in general to cooperate with the ECO, communicate effectively and comply with the environmental authorisations. Unfortunately, some of the EIA follow-up participants viewed the protection of the environment as merely an obligation to the EIA legislation, disregarding the basic importance of environmental protection. This was evident in the unsuccessful rehabilitation of trees in Site Three. EIA follow-up participants were aware of their roles and responsibilities which facilitated accountability of their actions during development. This contributed to the overall successful performance of the EIA follow-up procedure. The EIA

follow-up participants also outlined the strengths and weakness of the EIA follow-up procedure and made plausible suggestions for the future of EIA follow-up.

7.3 Recommendations

From the operational experience of this study and the critical findings from Chapters Five and Six, a number of recommendations are made to ensure future successful performance of an EIA follow-up and the overall effectiveness of the EIA process.

Attention to EIA follow-up

Although the EIA process has iterative stages, it should still be a viewed as a cyclical process with equal attention on both the pre- and post-decision processes. The South African EIA legislation mentions both the pre- and post-decision process; however the post-decision process has been neglected and been paid minimal attention and detail. For the pre-decision process, legislation provided set criteria in terms of qualifications for the appointment of an EAP whilst the ECO is not even mentioned in the legislation. The EIA post-decision process needs to be recognised as equally important as the pre-decision process. This will include acknowledging the ECO as a legal practitioner to conduct the post-decision process and create a set of criteria regarding the terms of qualification for the appointment of an ECO.

Environmental education

Environmental education and awareness needs to be integrated into environmental management for all EIA follow-up participants prior to commencement of activity on site. The EIA follow-up participants understood and appreciated the follow-up procedure as a tool to protect the environment during construction; however their motivation in participating in the follow-up was different. Some of the EIA follow-up participants participated in the operation of the follow-up programme out of obligation with the EIA legislation without regard for the protection of the environment. The need for environmental protection needs to be emphasised and communicated with the EIA follow-up participants. This will facilitate the protection of the environment in the absence of the ECO, particularly during the six month post-monitoring rehabilitation process.

Staff resources and capacity

The lack of staff resources in the Compliance, Monitoring Enforcement offices in the DAEA hindered the enforcement of legislation and contributed to the prolonged compliance. Policies and budgets should be reviewed to support the employment of staff in that department. According to the supervisor at DAEA, the government offers internships for graduates but then does not employ them. It is also recommended that the structure of the district offices could emulate that of the provincial offices. Provincial offices have Compliance and Monitoring as one office and Enforcement as another separate office. The Environmental Management Inspectors supported this by outlining in the NECER of 2012/2013 that provincial office should be duplicated at a provincial level. This, inevitably, will result in the generation of qualified staff who could allocate adequate time and attention for effective and timely compliance and enforcement.

Communication

This study demonstrates that the lack of communication between the ECO and the authorities hindered the success of the follow-up procedure. A stronger partnership between the ECO and the environmental officers needs to be developed to improve communication between the two parties. This could be achieved by developing a Partnering Agreement strategy[43] where the ECO and the regulator can meet regularly to collaborate and discuss improvement of environmental management (Morrison-Saunders and Bailey, 2009). This will assist in building a favourable support system for the ECO, especially, when issuing penalties and fines to site managers for non-compliance. ECOs will be taken more seriously and this should minimise delayed compliance by the relevant EIA follow-up participants. Moreover, the authorities' intervention will increase the confidence of EIA follow-up participants in the 'effectiveness' of the EIA system overall.

In conclusion, a successful EIA follow-up contributes to the overall effectiveness of an EIA system. The follow-up should be used as a tool for ensuring environmental protection during construction, assist in decision making and provide feedback into the EIA for future projects. Through the implementation of the follow-up, environmental goals are achieved whereby

[43] Partnering agreement strategy refers to alliances formed between two or more parties in prospect of meeting similar goals.

mitigation, rehabilitation, prevention and control measures were utilised for foreseen and unforeseen environmental impacts. EIA follow-up participants have crucial responsibilities in ensuring positive outcomes of the follow-up during construction, particularly the ECO who plays a critical role in designing and conducting the follow-up. Lessons can be learnt and improvements can be made to reduce prolonged periods to achieve compliance, instil the need for environmental protection amongst stakeholders and increase staff resources thus ensuring environmental protection and sustainable development.

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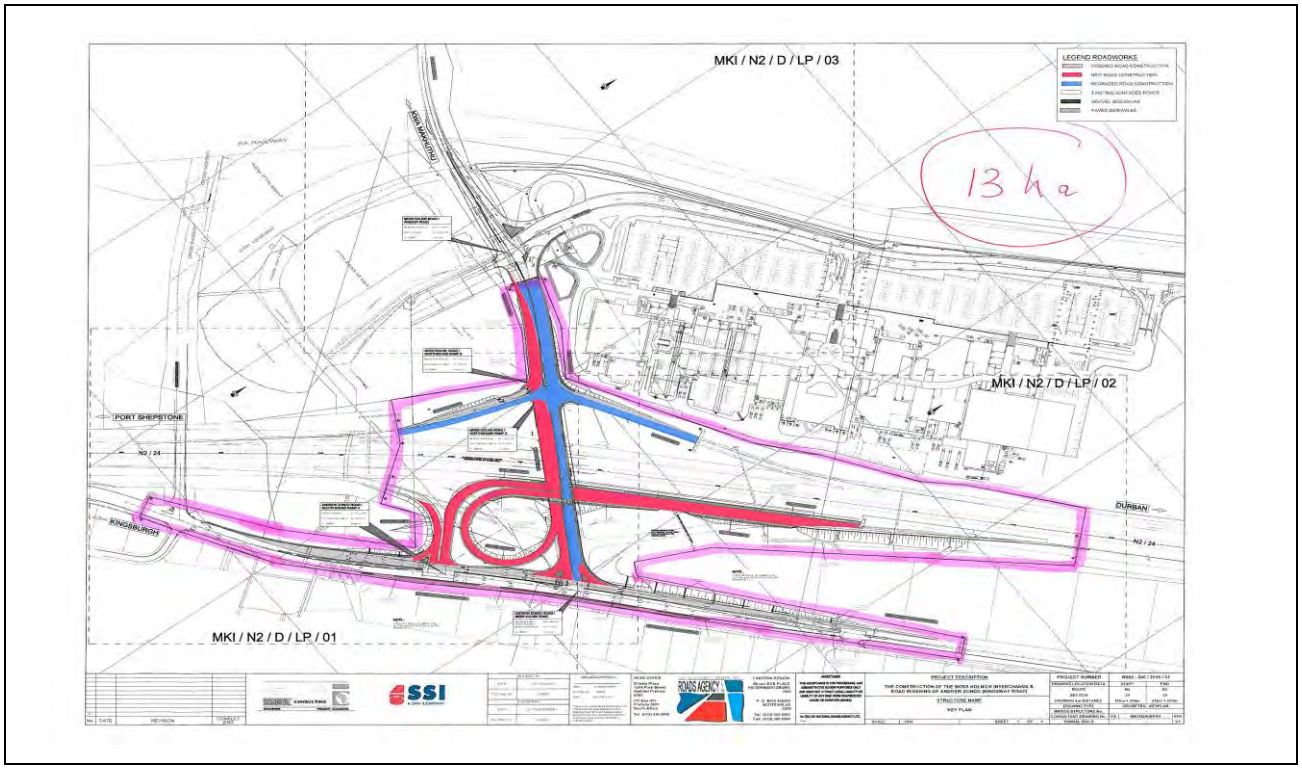
Appendices

Appendix 1: Moss Kolnick prior to construction



Appendix 2: Informed Consent form

INFORMED CONSENT FORM

Discipline of Geography

School of Environmental Science

Faculty of Humanities

University of KwaZulu-Natal: Howard College

2011

To whom it may concern

RE: Informed Consent

My name is Charity Cele, a Masters student in Geography and Environmental Management at UKZN: Howard College. My Masters research project involves exploring post-authorization follow-up and its impacts on EIA effectiveness in South Africa. This will be achieved by assessing the monitoring and auditing process of EIA development projects on selected case studies in KwaZulu-Natal.

In partial fulfillment of collecting data for my dissertation, my research will be conducting semi-structured interviews with the relevant environmental assessment practitioners (EAPs), developers, construction coordinators, environmental compliance officer (ECO) and environmental authorities: the Department of Agriculture, Environmental Affairs and Rural Development (DAEARD). Participation is voluntary and participants may withdraw from participating with no penalty and loss of benefits on their behalf. Responses from participants will be treated in a confidential manner and any limits on confidentiality as requested by the participants will be respected. Moreover, this research will be conducted with openness and honesty.

Your time, cooperation and participation is highly appreciated. For further details, information or queries regarding my research, please feel free to contact either me or my supervisor, Ms Dayle Trotter-Richardson.

Kind Regards,

Sinethemba Charity Cele	Dayle Trotter-Richardson
(Masters student)	(Supervisor)

PLEASE COMPLETE THE FOLLOWING:

I _____ (name and surname), give my consent to be interviewed with the understanding and acceptance to be interviewed with the understanding and acceptance of the above conditions. I **do/ do not** wish to remain anonymous for the purpose of this research.

Upon completion of my master theses, a copy shall be given to Mr Harold Thornhill.

Sign: _____ Date: _____

Appendix 3: Schedule of Questions

INTERVIEW: Authority

Procedural

1. What is your role and responsibility as the authority towards the environment?

2. What is your understanding of environmental monitoring and auditing of this project?
3. Do you feel that only sensitive projects should be monitored and audited?
4. What role and responsibility did you fulfill in designing and executing the monitoring and auditing process for BASF?
5. What tools or methods have you adopted to monitor the projects' compliance with the set Environmental Management Plane (EMP) and environmental regulations?
6. In the life cycle of the project, when were these tools and methods implemented?
7. According to the ECO, Moss Kolnick's original EMP submitted was the company's generic EMP that he had to rework on. Does the Department deal with such practices? If so how?
8. Was the EMP effective/successful in predicting impacts of development on the environment?
9. On the scale of 1-10, how would you measure the accuracy of the EMP (both Moss Kolnick and Dickens Road) in outlining environmental issues and mitigation measures? (10 being very accurate, 5 being average and 1 complete lack of accuracy).
10. Based on your expertise, did you have any reservations or environmental concerns with the project prior to construction?

11. The Moss Kolnick Interchange project was authorised at a provincial level after undergoing an appeal process prior to commencing with the project. What were the reasons provided by the local Department of Agriculture and Environmental Affairs in not authorizing the project?

12. Reflecting on the life cycle of Moss Kolnick thus far, would the department still stand-by their decision of not authorizing the project? Please substantiate.

13. How did you evaluate the outcome and result from the auditing process?

14. Based on the audit reports have the proponents complied with the EMP approved conditions?

15. As highlighted by the ECO, in the audit reports, there were several non-compliance issues by both the Moss Kolnick Interchange and the Dickens Roads Retaining Wall project. (eg 02/09/2011 in Dickens Road due to the lack of compliance on several occasions on the demarcation of the forested area, the ECO ordered construction to pause until compliance. 23/03/2011, 02/09/2011, 05/10/2011 at Moss Kolnick penalties were issued due to the lack of compliance in emptying out the contaminated water in the storage bund in various instance). Does the department have any influence in dealing with such non-compliance issues? If so how?

16. Did the department follow-up on the non-compliance? Please substantiate.

17. Has the client (SANRAL) and contractors (Stefanutti Stocks) been compliant to the EMP and environmental regulations?
18. Are you satisfied with the project's environmental monitoring and auditing procedure?

19. Was there form of communication between participants during the monitoring and auditing process?
20. If yes, how often?
21. Were there any lessons learnt from the information gathered during the follow-up programme?
22. If yes, what lessons did you learn and how can they be applied for future projects?
23. According to your opinion, what are the major barriers and challenges to EIA follow-up in South Africa?
24. What recommendations would you provide to improve the monitoring and auditing process of EIA in South Africa?

Substantive

25. When and how often must a DEARD representative be on site?
26. How often have you been on site?

27. Based on your experience on site have the proponents complied with the EIA approved conditions.
28. Were there any issues or unforeseen impacts, as stipulated in the EMP, you identified during the monitoring and auditing process?

    28.a. If yes, what were those issues?
29. Were they resolved?

    29.b. If yes, how were they resolved?
30. Has the project had any negative environmental impacts during its construction thus far?

    30.a If yes, how was the damaged managed and was the environment rehabilitated?

31. According to the ECOs audit report (27/01/2012), a DEARD representative was required on site at a later stage for a close out audit and to monitor progress, or lack thereof, in the rehabilitation management etc), was this implemented?

INTERVIEW: Client

Procedural

1. What is your environmental role and responsibility as the client?

2. According to your understanding, what is an environmental monitoring and auditing process?
3. Do you think it was necessary for this project?

3.1. If yes, why?

4. As the client, are you involved in the environmental monitoring and auditing process for this project?
5. How was the need for an environmental monitoring and auditing process determined?
6. What role and responsibility did you fulfill in designing and executing the environmental monitoring and auditing process?
7. Is conducting an environmental monitoring and auditing process with compliance costly?
8. Was the EIA effective/successful in predicting impacts of development on the environment?
9. On the scale of 1-10, how would you measure the accuracy of the Environmental Management Plan (EMP) in outlining environmental issues and mitigation measures? (10 being very accurate, 5 being average and 1 complete lack of accuracy).
10. How was the outcome and result from the environmental monitoring and auditing process evaluated?
11. Were there any lessons learnt from the data collected during the environmental monitoring and auditing process?
12. Was there communication between participants during the follow-up process?

12.1. If yes, how often?

13. As the client, are you satisfied with the environmental monitoring and auditing process conducted for the project?
14. As noted by the ECO, there were several with non-compliance issues with the Moss Kolnick Interchange Project, what method did you use to deal with such issues?

14.1. Was that method effective in dealing with the issues?

15. Have you had any issues with regards to compliance as stipulated by the ECO?
16. Do you have an appointed Safety and Environmental Officer for this project?

INTERVIEW : Environmental Control Officer

Procedural

1. What is your role and responsibility as an Environmental Control Officer (ECO)?
2. What is your understanding of an environmental monitoring and auditing process?
3. Do you think the environmental and auditing process is currently achievable and successful in KwaZulu Natal?
4. Do you feel that only a sensitive project should be subject to environmental and auditing process?
5. How was the follow-up programme for Dickens Road designed?
6. What procedures or steps were used to design the environmental and auditing process for Dickens Road?
   6.1 Did you use a particular framework or set of guidelines when designing the environmental and auditing process for Dickens Road?
   6.2. Are the steps or procedures that you used generic or project specific?
7. What role and responsibility did you fulfill in designing and executing the environmental and auditing process?
8. What tools or methodologies did you use in the environmental and auditing process?
9. How did you conduct the monthly audits?
10. What did you use to get the information needed to write up the report?
11. When did the implementation process of the environmental and auditing process?
12. Was the EMP effective/successful in predicting impacts of development on the environment?
13. Did you communicate with the client, project managers, site manager and contractor about the relevant EIA policies, practices and procedures?
14. On the scale of 1-10, how would you measure the accuracy of the EMP in outlining environmental issues and mitigation measures? (10 being very accurate , 5 being average and 1 complete lack of accuracy)
15. How was the outcome and result from the environmental and auditing process evaluated?

16. Were there any lessons learnt from the data collected during the environmental and auditing process?
17. Was there any form of communication between participants during the environmental and auditing process?
18. If yes, how often?
19. What are the major barriers to environmental and auditing process in KwaZulu- Natal, South Africa?
20. What recommendation would you provide to improve the effectiveness environmental and auditing process KwaZulu-Natal, South Africa?

Substantive

21. How accurate was the assessment of environmental impacts as stipulated in the EMP?
22. Were mitigation measures put in place during the follow-up?
23. If yes, what were they and were they effective?
24. Where there any issues or unforeseen impacts identified during the follow-up programme?
25. Did the project have significant environmental damage during construction?
26. If yes, how was this damaged managed and was the environment rehabilitated?
27. Were there any further steps needed in order to manage the issues identified?
28. Were there any non-compliance issues?

    28.1.1 If yes what were they?

    28.1.2 How did you deal with non-compliance and was it effective?

29. Did you communicate with the project manager, site manager, contractors and engineers the relevant EIA policies, practices and procedures?

30. Are they aware of how the follow-up process is conducted?

31. What has been the most challenging part of the EIA follow-up process for the Dickens Road construction site?

INTERVIEW: Site manager:

Procedural

1. What is your environmental role and responsibility as a site manager?

2. Were you aware of an environmental monitoring and auditing process prior to this project?

3. According to your understanding, what is an environmental monitoring and auditing process?

4. What is your role and responsibility in the environmental monitoring and auditing process?

5. Do you think conducting an environmental monitoring and auditing process is necessary for this project?

5.1 If yes, why?

5.2 If no, why?

6. On the scale of 1-10, how would you measure the accuracy of the Environmental Management Plan (EMP) in outlining environmental issues and mitigation measures? (10 being very accurate , 5 being average and 1 complete lack of accuracy)
7. What environmental challenges have you experienced regarding the project?
8. Did you experience any difficulty with compliance as stipulated, during the environmental monitoring and auditing process?

8.1 If yes, what difficulties did you experience?

9. How did you evaluate the outcomes and results from the environmental monitoring and auditing process (as stipulated in the audit report)?
10. Were there any lessons learnt from the information gathered during the environmental monitoring and auditing process?

10.1 If yes, what lessons did you learn and how can they be applied for your future projects?

11. Were there any further steps needed in order to manage the issues identified?

11.1 If yes, what were they?

12. According to your opinion how can the environmental monitoring and auditing process be improved?

Substantive

13. What has been the general condition of the site from when the project was initiated?
14. Where there any issues or unforeseen impacts identified during the follow-up programme by the ECO?
15. 2.1. If yes, what were those issues?
16. How were those issues or unforeseen impacts mitigated?
17. Did you/do you understand these impacts and the need to mitigate them?
18. Were the mitigation measures effective?
19. 5.1. If not, why do you think they were not effective?
20. Has the project had any negative environmental impacts?

    30.1. If yes, how was this damage managed and was the environment rehabilitated?

Audit Reports

21. During the audit, were there any instructions or questions by the ECO that you did not understand?

    1.1 If yes, what were they?
22. Has the rehabilitation of the embankment where soil erosion occurred been effective?
23. What is the current status of the re-vegetated areas, especially the 100 indigenous trees that were planted?
24. What is the current status of the storm water drainage system, were you able to remedy the problem (audit conducted: 27/01/2012 and 29/02/2012)?
25. 4.1. If so how?

INTERVIEW: Project Manager

Procedural

1. What is your environmental role and responsibility as a project manager?

2. Were you aware of an environmental monitoring and auditing process prior to this project?

3. According to your understanding, what is an environmental monitoring and auditing process?

4. What is your role and responsibility in the environmental monitoring and auditing process?

5. Do you think conducting an environmental monitoring and auditing process is necessary for this project?

5.1 If yes, why?

5.2 If no, why?

6. On the scale of 1-10, how would you measure the accuracy of the Environmental Management Plan (EMP) in outlining environmental issues and mitigation measures? (10 being very accurate , 5 being average and 1 complete lack of accuracy)
7. What environmental challenges have you experienced regarding the project?
8. Did you experience any difficulty with compliance as stipulated, during the environmental monitoring and auditing process?

8.1 If yes, what difficulties did you experience?

9. How did you evaluate the outcomes and results from the environmental monitoring and auditing process (as stipulated in the audit report)?
10. Were there any lessons learnt from the information gathered during the environmental monitoring and auditing process?

10.1 If yes, what lessons did you learn and how can they be applied for your future projects?

11. Were there any further steps needed in order to manage the issues identified?

11.1 If yes, what were they?

12. According to your opinion how can the environmental monitoring and auditing process be improved?

13. *Substantive*

14. What has been the general condition of the site from when the project was initiated?

15. Where there any issues or unforeseen impacts identified during the follow-up programme by the ECO?

16. 2.1. If yes, what were those issues?

17. How were those issues or unforeseen impacts mitigated?

18. Did you/do you understand these impacts and the need to mitigate them?

19. Were the mitigation measures effective?

20. 5.1. If not, why do you think they were not effective?

21. Has the project had any negative environmental impacts?

21.1 If yes, how was this damage managed and was the environment rehabilitated?

22. During the audit, were there any instructions or questions by the ECO that you did not understand?

23. 7.1 If yes, what were they?

Appendix 4: List of all site visits conducted by the researcher

Site One

No. of site visits	Date of Visits
1	8 August 2011
2	8 September 2011
3	3 October 2011
4	7 November 2011
5	7 December 2011
6	18 January 2012
7	1 February 2012
8	1 March 2012
9	5 April 2012
10	3 May 2012
11	7 June 2012
12	3 July 2012

Site Two

No. of site visits	Date of Visits
1	28 April 2011
2	26 May 2011
3	02 September 2011
4	05 October 2011
5	21 November 2011
6	6 December 2011
7	27 January 2012

8	1 March
9	29 March 2012
10	06 June 2012
11	12 December 2014

Site three

No of site visits	**Date of Visits**
1	28 April 2011
2	26 May 2011
3	26 July 2011
4	02 September 2011
5	05 October 2011
6	21 November 2011
7	6 December 2011

Appendix 5: Documentary sources

5.1. List of Audit Reports

BASF Audit Reports (Site 1)

Author: Harold Thornhill

AUDIT REPORT	DATE
Audit BASF	8 August 2011
Audit BASF	7 September 2011
Audit BASF	3 October 2011
Audit BASF	7 December 2011
Audit BASF	1 February 2012
Audit BASF	14 March 2012
Audit BASF	4 April 2012
Audit BASF	4 June 2012
Audit BASF	14 August 2012
Audit BASF	22 September 2012
BASF Audit Report	26 August 2011
BASF Audit Report	22 September 2011
BASF Audit Report	3 October 2011
BASF Audit Report	7 November 2011

Moss Kolnick Interchange Upgrade Audit Reports (Site 2)

Author: John Richardson

Audit Report	**Date**
3rd Site Audit Form: Moss Kolnick Interchange Upgrade	23th July 2011
9th Site Audit Form: Moss Kolnick Interchange Upgrade	18th February 2011
10th Site Audit Form: Moss Kolnick Interchange Upgrade	16th March 2011
13th Site Audit Form: Moss Kolnick Interchange Upgrade	25th July 2011
14th Site Audit Form: Moss Kolnick Interchange Upgrade	2nd September 2011
15th Site Audit Form: Moss Kolnick Interchange Upgrade	5th October 2011
16th Site Audit Form: Moss Kolnick Interchange Upgrade	21 November 2011
18th Site Audit Form: Moss Kolnick Interchange Upgrade	27th January 2012
19th Site Audit Form: Moss Kolnick Interchange Upgrade	27 February 2012

Dickens Road Retaining Wall Reports (Site 3)

Author: John Richardson

Audit Report	**Date**
9th Site Audit Form: Dickens Road Retaining Wall	18th February 2011
10th Site Audit Form: Dickens Road Retaining Wall	16th March 2011
13th Site Audit Form: Dickens Road Retaining Wall	25th July 2011

14th Site Audit Form: Dickens Road Retaining Wall	2nd September 2011
15th Site Audit Form: Dickens Road Retaining Wall	5th October 2011
16th Site Audit Form: Dickens Road Retaining Wall	21 November 2011
18th Site Audit Form: Dickens Road Retaining Wall	27th January 2012
19th Site Audit Form: Dickens Road Retaining Wall	27 February 2012

5.2. Environmental Management Plans, Audit Criteria and Authorisations

Department of Agriculture, 2006, *Appeal Decision; Rezoning of Umbogintmini Golf Course to develop a Multi-Use Complex including Commercial and Residential Development on REM of Portion 2191 (of 2105) of Umlazi Location*, Pretoria, KwaZulu-Natal Department of Agriculture and Environmental Affairs.

eThekwini Municipality., 2009, *Environmental Management Specifications: Generic EMP ,for Construction Activities*, Durban, eThekwini Municipality.

Monsoor, N., 2011, *KZN DAEA&RD Audit Inspection, Relocation And Expansion Of The Dulux Site In Umlazi To Umbogintwini Industrial Complex*, Durban, Department of Agriculture, Environmental Affairs & Rural Development.

Richardson, J., 2010, *Environmental Audit Form*, EIA Reference No 5769 Rezoning Of Umbogintwini Golf Course To Develop A Multi-Use Complex Including Commercial And Residential Development On Rem Of Portion 2191 (Of 2108) Of Umlazi Location. Construction Component - National Route 2, Section 24 – Upgrading Of Moss Kolnick Interchange (Km 21,238). Durban.

Rodewald, D, 2006, *Dickens Road Off-Ramp (Western Portion)-Environmental Compliance Closure Report: Arbout Town*, Westville, WSP Environmental and Energy.

Rodewald, D, 2006, *Environmental Management Plan*: *Arbour Town, Dickens Road Off-Ramp (Western Portion),* Westville, WSP Environmental and Energy.