Reviewing the quality of EIA reports conducted in the O.R. Tambo region of the Eastern Cape Province

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ABSTRACT

Environmental Impact Assessment (EIA) is globally the most recognised- and used instrument for identifying and evaluating the possible impacts of proposed developments on the environment. This EIA process gathers information that is used to compile Environmental Impact Reports (EIRs), which are used to inform decision making. The ultimate goal of an EIA is to achieve sustainable development by balancing the competing social, economic and environmental needs of the pillars of sustainable development. Therefore, the quality of EIRs produced through the EIA process plays a critical role in achieving sustainable development. In the context of this study, the O.R. Tambo region of the Eastern Cape province is faced with the problem of inadequate infrastructure due to apartheid government planning processes. In addressing this problem, through infrastructure development, it is important to recognise that the O.R. Tambo region is endowed with high biodiversity value areas such as the Maputoland-Pondoland Albany hotspot, Pondoland center of endemism and the Wild Coast which need to be protected, and therefore EIA is the relevant tool for that. However, there is no evidence suggesting that EIA reports produced in this region were ever subjected to quality review studies. It is for this reason that the main aim of this study is to review the quality of EIA reports conducted in the O.R. Tambo region of the Eastern Cape province.

Subsequently, in responding to the aim, this study identified three Research Objectives which were to: (1) review the quality of sampled EIA reports using an adapted Lee and Colley review package, (2) identify and analyse areas of strengths and weakness in the EIA reports, and (3) investigate whether the EIA reports meet the minimum legal requirements. To fulfil these research objectives, a qualitative research approach, specifically a descriptive research design, was used as the research methodology. Document analysis and an adapted South African Lee and Colley review package were applied to a randomly selected sample of 21 EIA reports conducted for infrastructure projects (namely sewerage and bulk water infrastructure, low cost housing development, electrification, access roads and bridges, telecommunication and commercial mixed-use developments).

The results indicated that the quality of EIA reports conducted in the O.R. Tambo region for infrastructure development projects was satisfactory (A-C). The results further demonstrated that Review Areas 1 and 4 were the best performing review areas, while Review Areas 2 and 3 were the weakest performing review areas. The results further revealed that the reviewed EIA reports demonstrated more areas of strengths than weaknesses. During the review exercise it was also observed that the reports met the minimum legal requirements. The study concluded that the quality of EIA reports in the O.R. Tambo region was satisfactory (A-C), however recommended that further research be conducted to determine the causes of weak performances in Review

Areas 2 and 3, and sub-categories such as 1.1.5 (i.e. describing the nature and quantity of raw materials need), 1.2.3 (i.e. estimated duration of different phases), and 1.3.3 (i.e. methods of obtaining the quantity of residual waste). The study further recommends that in future practices, EAPs and officials should be better capacitated and the quick implementation of the Registration Authority regulations is encouraged.

Keywords: Environmental Impact Assessment (EIA), EIA reports, Report Quality, Lee and Colley review package, Environmental Impact Statements (EIS), O.R. Tambo Region, Eastern Cape.

ABBREVIATIONS AND ACRONYMS

ACRONYMS AND ABBREVIATIONS	FULL EXPLANATION
BA	Basic Assessment
BAR	Basic Assessment Report
BIA	Biodiversity Impact Assessment
CA	Competent Authority
CFR	Cape Floristic Region
CMP	Coastal Management Program
DEAT	Department of Environmental Affairs and Tourism
DEDEAT	Department of Economic Development, Environment and Tourism
DFFE	Department of Fisheries, Forestry and Environment
EAP	Environmental Assessment Practitioner
EC	European Commission
ECA	Environment Conservation Act No. 73 of 1989
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMPr	Environmental Management Program
EPA	Environmental Protection Act, 1986 of India
EU	European Union
FEPA	Federal Environmental Protection Agency
FNSAS–REC	Faculty of Natural and Agriculture Sciences – Research Ethics Committee
GDP	Gross Domestic Product
GNR	General Notice Regulations
I&APs	Interested and Affected Parties

IAIA	International Association for Impact Assessment
LMs	Local Municipalities
MPA	Maputo Pondoland-Albany
NEMA	National Environmental Management Act No. 107 of 1998
NEMWA	National Environmental Management Waste Act No. 59 of 2008
NEPA	National Environmental Policy Act of 1969
NWU	North-West University
ORTDM	O.R. Tambo District Municipality
QD	Qualitative Descriptive
S&EIR	Scoping and Environmental Impact Report
SEMAs	Specific Environmental Management Acts
UK	United Kingdom
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
US	United States
WCED	World Commission on Environment and Development

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CHAPTER 1 INTRODUCTION

1.1 Introduction and background of the study

The sustainable development agenda is recognised across the globe and has been the subject of political discussions since the publication of the Brundtland report of the World Conference on Environment and Development (WCED) in 1987. The sustainable development concept was further popularised by the 1992 United Nations Conference on Environment and Development (UNCED) which was held in Rio de Janeiro, Brazil (Morrison-Saunders & Retief, 2012:34). These conferences culminated in the famous and most cited definition of the concept 'sustainable development' stating that it is "*development that meets the need of the present without compromising the ability of the future generation to meet their own needs"* (UN, 1987:15). This definition of sustainable development must always be contextualised with the understanding that sustainability is made up of three components: environmental, social and economic (Duran *et al*., 2015:806). Therefore, for a development to be sustainable these three components must be balanced.

Although it is important to realise that there is a pressing need for continuous socio-economic development, it is also equally important to ensure that environmental protection takes place during development (Duran *et al.,* 2015:808). In pursuit of this socio-economic development, the O.R. Tambo region recorded 41.4 billion in Gross Domestic Product (GDP) in 2018 making this region the third highest contributor to the provincial GDP by 11%. While infrastructure is an important part that enables economic growth, the O.R. Tambo region is still facing infrastructure backlog of 61% for formal piped water, 81% for sanitation, 13% for electricity and poor road infrastructure among others (ORTDM, 2020:28). These figures are indicative of the need for infrastructure development to improve the socio-economic conditions of the region.

Environmental protection has become a major concern for many nations around the world (Tchakounteu, 2021:1). This is because, after many countries have attained independence, their development patterns have been marked with rapid population growth, urbanisation, and expansion of agricultural- and industrial activities (Kidane-Mariam, 2003:313). This has led to environmental and social challenges such as deteriorating environmental quality, global warming, depleted and overburdened ecosystems, unemployment, HIV infections, inequality and poverty accompanied by a lack of access to basic needs and services. These environmental and social challenges threaten the attainment of environmental protection and sustainable development (DEAT, 2006; Duran *et al*., 2015:808, Lawrence, 2007:24; UN, 1987). Additionally, different nations' pursuits of economic growth caused significant environmental degradation that

threatened the attainment of sustainable development (Campion & Essel, 2013:37). Campion and Essel (2013:37) further mentioned that the cause of environmental degradation and threat to attainment of sustainable development was because many national development efforts and international investments were inconsiderate of the potential negative environmental impacts for decades. To manage these socio-environmental challenges, an appropriate environmental management tool is needed. In responding to that need, Environmental Impact Assessment (EIA) presents itself as the most appropriate tool. The appropriateness of EIA in this context is attributed to its ability to balance socio-economic- and environmental needs as a way of attaining the sustainable development agenda (Cashmore *et al*., 2004; Glasson *et al*., 2012:8; Morrison-Saunders & Retief, 2012:34; Roos *et al*., 2020; Singh *et al*., 2016:147). The management of these developmental challenges is therefore done through the EIA process, by identifying and mitigating potential negative impacts of proposed developments, while also enhancing positive ones (Roos *et al*., 2020:1, Singh *et al*., 2016:147).

EIA is a systematic process of examining the consequences of the potential developments on the environment before it commences (Glasson *et al*., 2005:3). It is a tool for identifying and evaluating the possible degradation in the environment as a result of planned development, and therefore assisting in achieving informed decision making and environmental management (Glasson *et al*., 2005; IAIA, 1999; Sadler, 1996; Wood, 2003; Sandham *et al*., 2008a:155). In the context of this study, EIA is therefore understood to be an important process that culminates in an EIA report known in South Africa as i.e. Basic Assessment Report (BAR) or Scoping and Environmental Impact Report (S&EIR), that guides decision making.

EIA became the major pre-requisite tool for project planning and implementation in many countries since its introduction in the United States (US) in the 1970s (Campion & Essel, 2013:37; Mounir, 2015:89). The concept of EIA was later adapted as a legal requirement by many countries around the world for projects with a potentially detrimental impact on the environment (Campion & Essel, 2013:37; Tchakounteu, 2021:1). Developing countries like Algeria, Burkina Faso, Gabon, Gambia, Mauritius, Nigeria, Senegal, Togo, Zambia, Egypt, Ghana, South Africa, Senegal, Côte d'Ivoire, and Togo have all included EIA requirements in their environmental legislation since the 1980s (Bekhechi & Mercier, 2002:13).

As indicated above, EIA endeavours to achieve the goal of sustainable development (Glasson *et al*., 2012:8; Morrison-Saunders & Retief, 2012:34; Roos *et al*., 2020; Singh *et al*., 2016:147), therefore the following two steps need to be adhered to:

- The first step for EIA to deliver on the sustainable development mandate is to assess socio-economic and biophysical aspects of the environment as an integral part of the EIA process.
- Secondly, the sustainability concept must be integrated both at a conceptual and at a regulatory level of EIA (Lawrence, 1997:23).

Morgan (2012:6) argues that 191 out of 193 European Union (EU) countries have legislative prescripts that refer to the application of EIA to projects with a potential negative impact on the environment. Among those countries, Canada and South Africa are examples of the countries that have integrated the sustainable development mandate into their EIA legislation as a way of delivering the sustainable development mandate (Lawrence, 1997:33; Morrison-Saunders & Retief, 2012:34). The integration of sustainable development in EIA legislation is an indication of the commitment of different countries to achieve the sustainable development goal of EIA (Glasson *et al*., 2012:8; Morrison-Saunders & Retief, 2012:34; Singh *et al*., 2016:147). This commitment to achieving sustainable development is also evident in the purposes of EIA as discussed in the following section.

1.1.1 Purpose of Environmental Impact Assessment (EIA)

The main purpose of EIA practice is to inform decision-making while also culminating in the protection of the environment, wellbeing of society and attainment of sustainable development (IAIA, 1999). Glasson *et al*. (2012:7) further classify and discuss the purpose of EIA into four categories, namely:

- the description of EIA as a tool to aid in decision making;
- the formulation of project designs and actions;
- stakeholder consultation and participation; and
- achieving sustainable development.

In the first of the four categories, *aiding in decision making*, the EIA process culminates in an Environmental Impact Statement (EIS), referred to in South Africa as an Environmental Impact Report (EIR) (DEAT, 2004:5). It is through the information encapsulated in this report that authorities systematically examine the potential environmental implications of the proposed project before making a decision. EIA is usually wider in scope and less quantitative, which helps in clarifying negative-, positive- and potential trade-offs that could be made. The information that

the decision is made on must have been subject to public scrutiny and debate to ensure that the interests of both the public, the developer and the environment are balanced (Glasson *et al*., 2012:7).

The second category, *formulation of project designs and actions,* refers to the ability of the EIA process to recommend suitable designs, alternatives and activities for the proposed project (Glasson *et al*., 2012:7). Although developers see EIA as a costly and time-consuming stumbling block that they have to undergo before commencing with a project, in the real sense, early consideration of EIA has the potential to suggest beneficial and environmentally friendly alternatives (Glasson *et al*., 2012:7). These alternatives include alterations to the location, design, technology and processes of the project such that it minimises potential negative environmental impacts. Experienced developers utilise EIA as an opportunity for negotiating environmental gains and clean technologies, which may reduce potential negative impacts and pollution. Environmentally friendly designs also serve as the positive branding of the development to entice customers who are conscious about the contemporary sustainability requirements of the world (Glasson *et al*., 2012:7)

Consultation and participation of stakeholders and interested and affected parties (I&APs) (category 3) throughout any development is key. This is because development can have a severe impact on the environment, which eventually affects various groups of people in the society who depend on the environment for their survival. In this instance, EIA becomes a functional instrument for consultation of communities, I&APs and stakeholders who are potentially affected by the proposed project. These consultations ensure that communities are well informed and involved from planning to post-implementation of the development (Glasson *et al*., 2012:7).

Lastly, in *achieving sustainable developmen*t (category 4), the interaction of economic and social aspects with the natural environment and the subsequent impacts as results of human actions to the biophysical environment, need to be managed better (Glasson *et al*., 2012:7). Harmful developments are inherent and even if they may be closed down, their residual impacts may still be experienced by future generations. It then becomes important to mitigate and manage the potential impacts of the development from the planning stages by applying EIA (Glasson *et al*., 2012:7).

Similar to South African EIA legislation, the United States' EIA legislation espouses the sustainable development mandate and environmental degradation preventative approach starting from its preamble (Glasson *et al*., 2012:7; Morrison-Saunders & Retief, 2012:34; NEPA, 1969). This sustainable development-infused EIA legislation affirms the fundamental statements by

various authors that EIA is a tool to deliver the sustainable development mandate (Cashmore *et al*., 2004; Glasson *et al*., 2012:8; Morrison-Saunders & Retief, 2012:2; Roos *et al*., 2020).

This section categorised and presented four purposes of conducting EIA, and one of them is the attainment of sustainable development. The following section discusses the benefits of conducting EIA with a focus on the nested-egg model of sustainable development.

1.1.2 Benefits of EIA: The nested-egg model

The benefits of EIA are categorised using different models in different contexts. Morrison-Saunders (2015:111) classify EIA benefits using a management model approach. This model classifies the benefits of EIA into:

- "*operational benefits;*
- *managerial benefits;*
- *strategic benefits; and*
- *organisational benefits*".

Bond *et al*. (2014:47), on the other hand, used Garner and O'Riordan's 1982 classification of the legislation content model, which is based on expectations and advantages of adopting the EU EIA directives. This model however classifies benefits as follows:

- "*consistency and fairness;*
- *early-warning as it relates to financial savings;*
- *environment and development; and*
- *public involvement*".

Although these two models are valuable and constitute some sustainability aspects, their general aim is not to achieve sustainable development as compared to the nested-egg model.

The nested-egg model is a systems-based sustainable development model that advocates the recognition of the interdependencies between economic-, socio-political- and ecosystem components (systems) of the environment (see Figure 1 below). These three components of the environment are embedded within each other, while they are simultaneously integrated through legislation-based governance systems (DEAT, 2008:15; Roos *et al*., 2020:2). This description of the nested-egg model resonates well with the ultimate mandate of EIA, which is to achieve sustainable development, because the model endeavours to strike a balance between the social-

economic- and biophysical components of the environment. This is therefore an important model for EIA, as it enables the holistic achievement of EIA benefits across all the sustainable development components.

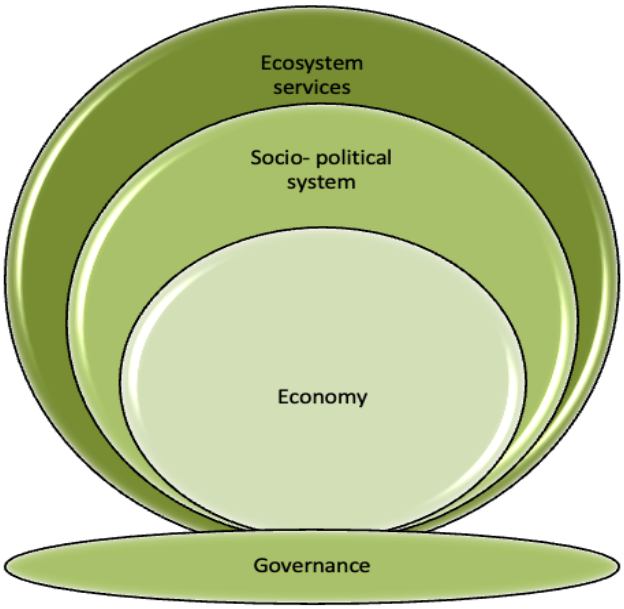

Figure 1: Illustration of the nested-egg model towards sustainable development (adapted from DEAT, 2008).

As demonstrated in Figure 1 above, the nested-egg model of sustainable development is characterised by the interdependency and integration between the three sustainable development pillars (social, economic and environmental). This integration and interdependency is achieved through a strong governance system that serves as the anchor that brings these three pillars together (DEAT, 2008; Roos *et al*., 2020:2). The integration concept in this sustainable development context is divided into two components: horizontal- and vertical integration (Kim, 2007:9). Horizontal integration demonstrated in Figure 2 below refers to initially understanding the links among causes of environmental degradation. This understanding propels a departure from a fragmented approach to a more holistic system, which recognises that biophysical and socio-economic problems are somewhere directly and indirectly interconnected and therefore their integration is critical in achieving sustainable development.

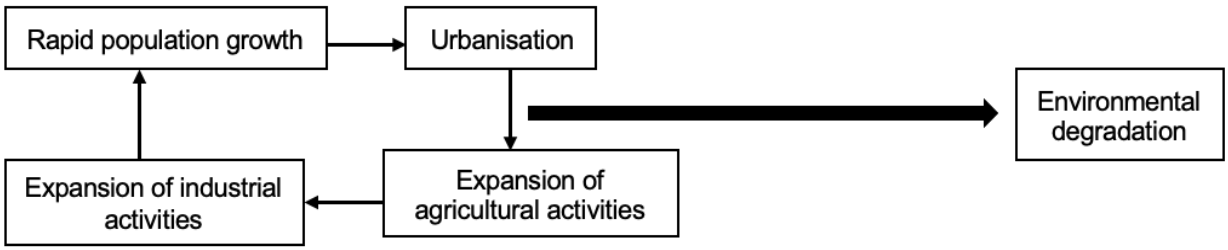

Figure 2: Illustrating horizontal integration concept of sustainable development (adapted from Kim, 2007:9).

Vertical integration illustrated in Figure 3 below is about understanding that all species living on earth are interdependent (Kim, 2007:9). These species are also dependent on ecological integrity to support their lives. Therefore, the perpetual existence of all forms of life on earth is dependent on ecological integrity and all services provided by the ecosystem (Kim, 2007:9).

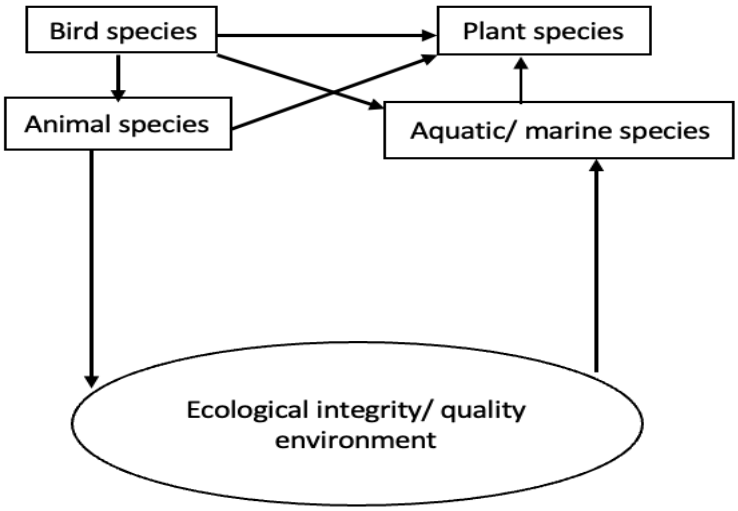

Figure 3: Vertical integration concept of sustainable development (adapted from Kim, 2007:9).

In all, the nested-egg model is about realising that all economic development initiatives and social interactions must be carried within the capacity of the biophysical component of the environment (Roos *et al*., 2020:2). Oosterhuis (2007:11) and Roos *et al. (*2020:2) used this sustainable development-driven nested-egg model approach to classify the benefits of EIA into the following four categories (see Figure 1 above):

- *Ecosystem*: EIA benefits related to the ecosystem include instilling the spirit of environmental protection and conservation. EIA also encourages developments that are anti-destructive to ecosystem services. Most importantly it helps to harmonise

development and environmental requirements by mitigating negative environmental impacts, thereby contributing towards sustainable development.

- *Socio-political*: EIA enables the empowerment of both political- and marginalised groups of the society. This enhances a certain level of project acceptance and ownership, thereby reducing the chances of conflicts in the receiving communities.
- *Economic*: EIA serves as a vehicle to deliver job opportunities to local communities. It also helps in avoiding unnecessary costs by confirming both designs and technologies to be used. By applying EIA, civil-, criminal- and wasteful expenditure costs can be avoided through compliance to EIA laws, and thorough analysis of the potential costs and benefits of the proposal.
- *Governance*: The EIA process provides access to information so that I&APs, the public in general and stakeholders can make informed inputs that guide better decision making. It also provides a platform for communication and engagement between different government authorities to monitor compliance with various environmental authorisation conditions and permits.

Although it is beneficial to conduct an EIA (Cilliers *et al*., 2020; Morrison-Saunders *et al*., 2015), it does not always deliver on its mandates of effective decision making (Mounir, 2015; Rocha *et al*., 2019) and attainment of the sustainable development agenda (Mounir, 2015; Onuora *et al*., 2017), and is still considered time-consuming (Kidd *et al*., 2018:1267; Tchakounteu, 2021:1). This therefore has a possible bearing on the quality of the produced EIA report. This section presented benefits derived from conducting an EIA, and concluded by briefly highlighting the challenges pertaining to EIA that still persist despite the benefits brought by the practice of EIA. The following section states the problem and the motivation for conducting research in the area of EIA report quality review.

1.2 Problem statement and rationale for the study

The legislative framework for EIA in South Africa prescribes the process to be followed when undertaking the EIA process. The primary duty given by the EIA regulations to the developer is the appointment of an independent Environmental Assessment Practitioner (EAP) to compile and submit an EIA report to the Competent Authority (CA) for decision-making purposes (South Africa, 2014a). The report, when submitted, must have been subjected to scrutiny through a comprehensive and transparent public participation process (Badr *et al*., 2011:99; DEAT, 1996; Sandham *et al*., 2008a:156). The produced EIA report is used by the CA as the basis to decide whether to grant authorisation or reject the application (Alberts *et al*., 2020:209; Mounir, 2005;

Sandham *et al*., 2008a:156). In ensuring that EIA reports are credible and fit for purpose, EIA regulations of 2014 (GNR 982) and its Appendix 3 further present the process and contents of the EIA report that the EAP must adhere to during compilation.

Alberts *et al*. (2020:209) and Bond *et al*. (2016:12) suggest that there is an assumption that a good quality report increases the chances of achieving positive decisions. Quality review processes serve as a "*Check and Balance*" tool for the quality of EIA reports, which is critical in achieving practical EIA systems (UNEP, 2002:349). Although most results of the EIA quality studies conducted showed satisfactory results, there are still areas of weaknesses (Singh *et al*., 2020; Sandham *et al*., 2020). It is for this particular reason that the quality of EIA reports has been a subject of research across the globe, including in South Africa (Barker & Jones, 2013; Bond *et al*., 2018; Jalava *et al*., 2010; Kamijo & Huang, 2016; Mounir, 2015; Sandham *et al*., 2008a; Sandham *et al*., 2020:2; Thorpe, 2014; Wylie *et al*., 2018).

Quality review for environment statements has been conducted in the United Kingdom (UK) from the year 1988 to the mid-1990s. Since then the EIA quality review exercise extended to many regions of the world. As a result, various EIA quality review studies have been conducted internationally in European-, Asian- and African countries. The results for developing countries were not very different from those of developed countries, as the difference in satisfactory levels was only five percent between these two nations (Anifowose *et al*., 2016; Badr *et al.*, 2011; Barimah, 2014; Canelas *et al*., 2005; Kamijo & Huang, 2020; Lee *et al*., 1991). Asian countries were the only exception that showed poor results, with satisfactory levels of performance as low as half the performance of the European nations (Aung *et al*., 2018; Kamijo & Huang, 2020:2557). Studies on the quality of EIA reports were also conducted in South Africa for different sectors (Hallatt *et al*., 2015; Mbhele, 2009; Sandham *et al*., 2008a; Sandham *et al*., 2008b; Sandham *et al*., 2013b; Sandham *et al*., 2020; Swanepoel *et al*., 2019; Wylie *et al*., 2018) and provinces (Kruger & Chapman, 2012; Sandham & Pretorius, 2008; Sandham *et al*., 2005). These studies shared similar areas of weaknesses and strengths when concluding their findings. The reports also reflected a standard that is below best practice, despite complying with the minimum legal requirements (Kidd *et al*., 2018:1270; Kruger & Chapman, 2005:55; Sandham & Pretorius, 2008:235).

This research seeks to review the quality of EIA reports for infrastructure development projects implemented in the O.R. Tambo region of the Eastern Cape Province. This region is faced with the problem of inadequate infrastructure, due to the apartheid government planning process, that needs to be addressed in order to enable economic development and improved social welfare (IDP, 2016). While there is a need to address this infrastructure backlog, it is equally important to recognise the region's special biophysical status and potential impacts of project development.

The O.R. Tambo region is characterised by being part of the Maputoland Pondoland Albany hotspot, host of the Pondoland center of endemism and being bordered by a 53 kilometre stretch of the wild coast (Nel, 2003:96; Shackleton *et al*., 2013:2). These features make the region a desirable place for environmental protection as Hallatt *et al*. (2015:2) suggests that consideration of the biodiversity during developments within the biodiversity hotspots or areas with high biodiversity value is critical. Additionally, the Maputoland-Pondoland-Albany Biodiversity hotspot holds an international status of concern, therefore its consideration during development proposals is also of critical importance (Swanepoel, 2016:8). Therefore, infrastructure development projects (namely water and sanitation, access roads and bridges, commercial developments, low cost housing development, electrification and telecommunication) that seek to address the apartheid government planning challenges need to balance sustainable development and environmental protection.

EIA then becomes an appropriate balance-striking tool between advancing infrastructure development, socio-economic welfare and environmental protection (Glasson *et al*., 2012:8; Morrison-Saunders & Retief, 2012:2). It is for this reason that the EIA process must culminate in good quality EIA reports which will enable proper- and informed decision making (Alberts *et al*., 2020:209; Bond *et al*., 2016:12). Despite all the research that has been conducted in South Africa on the quality of EIA reports, there is still no evidence in the literature suggesting that similar research has ever been conducted in the O.R. Tambo region of the Eastern Cape Province. This research study is not only for closing the research gap identified above, but also to understand the quality of EIA reports that were used when deciding on issuing environmental authorisations for infrastructure development projects in the region (Alberts *et al*., 2020:209; Bond *et al*., 2016:12). This will be fulfilled by responding to the research question on what the quality of EIA reports conducted in the O.R. Tambo region of the Eastern Cape Province is.

1.3 Research aim and objectives

The main aim of this study is to review the quality of Environmental Impact Assessment Reports (EIRs) conducted in the O.R. Tambo region of the Eastern Cape Province.

The research objectives that guided this study in reaching its aim include:

- To review the quality of sampled EIA reports using an adapted Lee and Colley review package.
- To identify and analyse areas of strengths and weakness in the EIA reports.
- To investigate whether the EIA reports meet the minimum legal requirements.

1.4 Scope of the research

This research will be conducted by reviewing a sample of 21 EIA reports (n=21) for infrastructure development projects that have been conducted in the O.R. Tambo region of the Eastern Cape Province, namely: access roads and bridges, water and sanitation, housing, mixed-use developments, electrification and telecommunication. There are 23 (n=23 EIA reports) that were initially sampled and these reports were made up of 19 (n=19) BARs, and four (n=4) S&EIRs. However, during the data collection process only 21 (n=21) EIA reports were available in the end. Both these EIA reports (BAR and S&EIR) are the products of the EIA process, with the BAR described as the shorter version conducted for small scale activities that can be easily managed (Botha, 2017:19; Broughton, 2011:6; Steenkamp, 2010:12), while the S&EIR process is more comprehensive and conducted for high risk- and larger scale activities (Broughton, 2011:6; Jikijela, 2013:24; Steenkamp, 2010:15). The following section provides a brief overview of the research methodology that was applied in this research.

1.5 Overview of the research methodology

This section only provides a brief overview of the research methodology that was applied in this study. A detailed discussion on the methodology is found later in Chapter 3 of this dissertation. The methodology of this research started by reviewing the existing literature relevant to the topic. The literature for this study was reviewed and presented in Chapter 2 and was mostly in the form of credible peer-reviewed and published journal articles, books, dissertations, legislation, guidelines and government strategic documents. In aiming to answer the research question in reviewing the quality of EIA reports, the empirical investigation of this research study followed a qualitative research approach which involved the collection, analysis, and interpretation of data that is not easily reduced to numbers (Anderson, 2010:1). Document analysis was used as a research method in this study. This is a systematic procedure for reviewing or evaluating documents to obtain meaning out of the document (Bowen, 2009:27). These documents, in the form of EIA reports, were sampled from the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) using a purposive sampling strategy. The Lee and Colley review package (Lee & Colley, 1992; Lee *et al*., 1999), which is described as a pragmatic tool that is used to review and assess the quality of EIA reports, was used to review the sampled EIA report documents. The data generated from the application of the Lee and Colley review package from each EIA report was populated into a collation sheet (Annexure B). The data in the collation sheet was then analysed using simple statistics to produce graphs (Figures 6-8) and tables (Tables 5-10) for easy consumption and comprehension as presented later in Chapter 4.

1.6 Structure and outline of the dissertation

This section presents the structure of the dissertation which will be in line with the North-West University (NWU) master's research template as provided. The contents of each chapter are briefly described below:

Chapter 1: Introduction

This chapter presented the research background, problem statement, aims and objectives, research orientation and research outline. The study commenced by briefly discussing the EIA concept and its contribution to sustainable development. The chapter further discussed the purpose and benefits of undergoing the EIA process, and also highlighted the main aim of doing this research and the objectives followed to fulfil the research question. This chapter included a brief discussion on the scope of the study by highlighting the sample size and the type of EIA reports (BARs and S&EIR) that will be included in the sample. It concluded by briefly discussing the research methodology that will be followed to achieve the research objectives.

Chapter 2: Literature review

Chapter 2 discusses various literature on EIA and the quality of EIA reports. This starts with discussions on the origin and development of EIA, followed by a discussion on the legal mandate for EIA in South Africa, procedural steps, best practices and effectiveness. The second part of this chapter presents the EIA quality review. This section starts by discussing EIA reports on which the quality reviews are conducted using the Lee and Colley review package. This is followed by discussions on the origin and development of the Lee and Colley review package, its application and the results of its application from an international- to South African context.

Chapter 3: Research Methodology

This chapter presents the research methodology that was used to fulfil the objectives of the study. Discussions in this chapter start by presenting how the literature was sourced and presented. This is followed by a discussion of the research approach, methodology, data gathering and tool of analysis, which is the Lee and Colley review package. The chapter further discusses how the generated data will be analysed and presented, and concludes by highlighting the assumptions and limitations of the methodology and ethical considerations of the study.

Chapter 4: Results and Discussion

Chapter 4 presents the quality of EIA reports (n=21) sampled in the O.R. Tambo region of the Eastern Cape province. The presentation starts by indicating overall quality results followed by results at the review area, category and sub-category levels. From these results, areas of strengths and weaknesses are identified and presented. This chapter concludes by discussing the results and findings of the study.

Chapter 5: Conclusion and Recommendations

From the results presented in Chapter 4, the concluding chapter presents the conclusion and recommendations of the study. Chapter 5 starts by presenting the background followed by findings for each objective of the study by highlighting and linking the literature review with the findings. This is followed by the presentation of the recommendations on the findings of the study. This chapter ends with a concluding statement that highlights the overall finding and recommendations of the study.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

The previous chapter presented a discussion on Environmental Impact Assessment (EIA) and how it contributes to sustainable development. Chapter One further identified and stated the problem that this research aims to address. The research aims and objectives for responding to the research question and problem statement were also presented in the preceding chapter. Chapter Two contributes towards responding to Research Objective 1, which is concerned with the quality of EIA reports in the O.R. Tambo region of the Eastern Cape Province, and commences by firstly discussing the origin and development of EIA over the years across all regions of the world. EIA practice is further discussed within the context of South Africa as informed by the legislative mandate for EIA in the country. This chapter also discusses EIA best practice that should be applied to achieve effective EIA practices, followed by a discussion on the quality of EIA reports, by firstly looking at the history of the EIA quality review practice and then continuing to explore how it has developed and proliferated from developed- to developing nations. Through this discussion, areas of strengths, weaknesses, similarities and gaps within the EIA report quality literature will also be included.

2.2 The global origin and historical development of Environmental Impact Assessment (EIA)

The practice of EIA originated in the US during the early 1970s through the development and enactment of the National Environmental Policy Act (NEPA) (Mounir, 2015:89). This act was developed to respond to the growing pollution and environmental degradation which were experienced as many projects were implemented without consideration of their potentially negative impact to the environment (Mounir, 2015:89). Urbanisation in Western countries was one other major causes of environmental degradation and habitat loss (Ogola, 2007:1). EIA then became a recognised procedure for identifying and evaluating the potential impacts of proposed developments to assist in decision-making (Mounir, 2015:89; Sowman *et al*., 1995:45). The main aim of the NEPA is delivered through its Section 120, which mandates federal government agencies to prepare Environmental Impact Statements (EISs) for integration to planning and decision making for all federal development actions (Mounir, 2015:89; NEPA, 1987). Ever since the enactment of the NEPA, the US is regarded as the first country to develop and undertake EIA as a tool for environmental protection. This stance from the US on EIA was further solidified by the resolutions of the United Nations Conference on the Environment in Stockholm in 1972 and

its subsequent conventions, which formalised the practice of EIA (Ogola, 2007:1). As a result, during the mid-1990s all developed countries were fully implementing EIA already, as opposed to most of the developing countries that were still in the process of adopting and enacting the EIA practice legislation (Lee, 1995:78; Ogola, 2007:2). The 1992 World Conference on Environment and Development (WCED) echoed the same sentiments raised by the 1972 Stockholm Convention, which depicts the relationship between environmental degradation, economic development and the needed environmental protection (Gaharwar *et al*., 2016:741; UN, 1987:53). Therefore, EIA is an appropriate tool that must be used for harmonising economic development and environmental protection (Geharwa *et al*., 2016:743).

Since the implementation of the NEPA during the 1970s in the US of America, the EIA concept proliferated across the globe (Lee, 1995:77; Mounir, 2015:89). This proliferation started in the Oceanian countries in the mid-70s, Asian countries in the mid-80s, followed by European countries in the late-80s. African countries followed in the footsteps of the developed nations with Algeria pioneering the EIA legislation in 1983, followed by Tunisia, and South Africa in the late-80s, while the rest of the African countries started legislating EIA after the 1990s (Barker & Wood, 1999:387; El-Fadl & El-Fadel, 2004:559; Lee, 1995:77; Mounir, 2015:89; Panigrahi *et al.,* 2011:25). This section presented an overarching view of the origin and development of EIA practice globally. The following section will now provide a detailed discussion of the development of EIA practice in each region of the globe (Europe, Oceania, Asia and Africa), including in South Africa.

2.2.1 The international development of EIA

Internationally, the EU member states emulated the US by introducing EIA in 1988, just after the adoption of the Directive 85/337EEC by the EU in 1985 (Barker & Wood, 1999:387; Lee, 1995:77). The EU EIA legislative framework in the form of directives established and categorised activities with potential negative impacts on the environment into two listings — the directive firstly mandates that all projects listed in list one should undergo the EIA process, and, secondly, the subjectivity to EIA for projects in list two is determined by triggering the threshold set by EU member states (Barker & Wood, 1999:388). The content of the Environmental Impact Statement (EIS) (referred to as EIA report (EIAR) in South Africa) is determined by the directive of the EU. Requirements for the report before submission to the authorities include that the report must have been subjected to public review and that the information must be rational so that it enables decision-making to take place (Barker & Wood, 1999:388; Lyhne, 2015:240).

Similar to the European countries, the Oceania region followed in the footsteps of the US in introducing EIA through the enactment of its environmental protection policies in 1974. Both Australia and New Zealand introduced EIA in 1974 through the development of the Environmental Protection Act and the Environmental Protection and Enhancement Procedures Act dealing with the impact of projects and proposals, respectively (Lee, 1995:81).

In Asian countries, the need for environmental protection was realised in the mid-1980s as motivation from the study that was conducted by the United Nations Educational, Scientific and Cultural Organisation (UNESCO), aiming at establishing the feasibility of the "*man and biosphere reserve*" concept (Annandale, 2001:182). This realisation led to the development of the Environmental Protection Act (EPA) in 1986 (Panigrahi *et al*., 2011:25; Valappil *et al*., 1994:77). Possible climate change impacts, as a result of the topographic position of the Maldives, were highlighted in the study conducted by UNESCO in the late 1980s. This possibility led to the establishment of the EIA system in the Maldives. Eventually, in 1993 the Environmental Protection and Preservation Act of the Maldives (Law No. 4/93) was developed. This Act became the main act for implementing environmental protection, EIA, and waste disposal activities (Annandale, 2001:183). Similarly, in 1994 EIA in India became mandatory for all projects listed as having the potential to pose detrimental impacts on the environment. This EIA system was implemented through the enactment of what is termed the Environmental Notification of 1994. The Notification also detailed the process of EIA which highlighted the preparation of an informed report, public participation, informed decision making, and post-decision monitoring (Panigrahi *et al.*, 2011:25).

This section provided a discussion on the development of EIA internationally with a focus on European-, Oceanian- and Asian countries. African countries later emulated the international countries by starting the development of their own EIA legislation in 1983 (El-Fadl & El-Fadel, 2004:559). The following section presents the development of EIA in African countries.

2.2.2 The development of EIA in African countries

Initially, developing nations viewed EIA as an anti-developmental bureaucratic stumbling block to development (Agola, 2007:1). However, over time EIA practices continued to spread from developed- to developing nations. El-Fadl and El-Fadel (2004:559) argue that Algeria was the first country in Africa to introduce EIA legislation in 1983, followed by Tunisia in 1988 and South Africa in 1989, while some countries like Ghana, Nigeria and Egypt developed their EIA legislation after 1990.

Ghana realised the importance of protecting the environment in the early 1990s. This realisation came on the backdrop of mining activities that were polluting and destroying the environment, while also depleting natural resources. A policy framework to harmonise the economic-, social- and environmental interests in an attempt to achieve sustainable development was adapted. Subsequently, this framework resulted in the enactment of Act 490 by the Environmental Protection Agency (EPA) in 1994. It is through this act that the EPA is empowered to conduct EIA and grant permits for all activities that have a potentially detrimental impact on the environment, including mining activities. In 1999, Regulations L1-1652 were promulgated for easy implementation of Act 490 with a clear indication of types- and thresholds of projects that should undergo the EIA process (Fatawa & Allan, 2014:16; Guang *et al*., 2020:9716; Tuokuu *et al.,* 2018:437).

The dawn of EIA in Egypt came in 1994 through the enactment of the Environmental Protection Law No. 4 of 1994. After this enactment, the promulgation of many detailed executive regulations for the implementation of EIA were made in 1995. Ten years later (in 2005) amendments were made in both the law and the regulations, which were again followed by another amendment four years later in 2009 (Ahmad & Wood, 2002:217; Badr *et al*., 2011:280). Although the EIA practice was introduced five years later in Egypt than in South Africa, the Egyptian EIA system shares some similarities with the South African EIA system. This is evident in the fact that Egypt in its EIA regulations has three listings referred to as categories. Category A has a listing of projects with minor potential impacts, Category B is a category which constitutes projects with substantial environmental impacts, while Category C lists projects with significant potential impacts to the environment and that require full EIAs to be carried out (Badr *et al*., 2011:280). Ahmad and Wood (2002:218) add some similarities, which include the provision of thresholds for activities, appealing the decision of the CA, time limits, development and implementation of the Environmental Management Program (EMPr).

The environmental protection agenda in Nigeria has been in practice since 1969 however, the environmental legislation was reactive and biased to the pollution impacts of the petroleum industry (Ogunba, 2004:647). Ogunba (2004:647) further mentions that the commitment towards environmental protection in Nigeria continued to show itself by being part of the Stockholm conference both in 1972 and 1982. However, in 1991, the Federal Environmental Protection Agency (FEPA), realised the ineffectiveness of existing environmental legislation. This led to the establishment of a mandatory EIA system in 1991. FEPA established guidelines for implementation of EIA in 1992 and these guidelines were further updated in 1999 (Ogunba, 2004:647). While the evidence in the literature presented above shows that both Ghana, Egypt and Nigeria developed their EIA legislation in the early 1990s, South Africa is one of the few

countries in Africa that developed their EIA legislation before 1990. The following section provides a discussion on how the development of EIA in South Africa unfolded.

2.2.3 Development of EIA in South Africa

Environmental Impact Assessment (EIA) was initially conducted voluntarily in South Africa under the Integrated Environmental Management procedure (Duthie, 2001:215; Kidd *et al*., 2018:1215; Hamann *et al*., 2000; Sebetlele, 2018:5; Sowman *et al*., 1995:46). Under the voluntary regime, the EIA process was criticised for being manipulated to favour the developers, being poorly managed by consultants, inconsistently adjudicated to please the investors, and as a result the process enjoyed little trust from the public (Ridl & Couzens, 2010:82).

In responding to this criticism, EIA became mandatory from September 1997 under Sections 21, 22 and 26 of the Environment Conservation Act. 73 of 1989 (ECA), which was read together with promulgated regulations of ECA - R1182, R1183 and R1184 (Kidd *et al*., 2018:1215; South Africa, 1989; Sandham *et al.,* 2008a:156). During their implementation, the ECA promulgated EIA regulations still faced criticism. The criticism this time was on the lack of procedural clarity, inconsistent application of the law, inflexibility, being costly and time-consuming, lacking guidance in the public participation process and for triggering too many activities (Crookes & De Wit, 2002; Duthie, 2001; Ridl & Couzens, 2010:86; Retief & Chabalala, 2009:56).

However, the advent of democracy in 1994 in South Africa brought forth a new dawn in the context of environmental management. This is because the start of democracy culminated among other things in the development of the Constitution of the Republic in 1996. Chapter 2 of the country's Constitution contains the Bill of Rights and among these rights includes the environmental rights encapsulated in Section 24 of the Constitution. This environmental right states that, *"everyone has a right; (a) To an environment that is not harmful to their health or well-being; and (b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"* (South Africa, 1996:9). In responding to this environmental right, particularly Section 24(b), the National Environmental Management Act. 107 of 1998 (NEMA) was enacted in 1998 (Ridl & Couzens, 2010:84).

After the NEMA had come into effect, as a way of addressing criticism made on mandatory ECA EIA regulations earlier, the ECA promulgated EIA regulations were completely repealed by the new EIA regulations in 2006 (GNR 386 and GNR 387) and promulgated in terms of Section 24 of the NEMA, which is the main national overarching framework act currently in the country (Kidd *et al*., 2018:1216; Sebetlele, 2018:6). The newly promulgated NEMA EIA regulations embraced and incorporated principles enshrined in Section 2 of the NEMA, commonly known as the NEMA principles (Ridl & Couzens, 2010:80).

To make EIA practice better, the NEMA EIA regulations were refined and amended in 2010, 2014 and in 2017 respectively, in an attempt to make EIA practice more effective and efficient. These exercises culminated in the current regulations, which are the EIA regulations (GNR 982), and EIA regulations: Listing Notices 1 to 3 (GNR 983; GNR 984; GNR 985). The EIA regulations present listing notices for screening (South Africa, 2014b; 2014; 2014d) and also the overall procedure for undertaking the EIA process, including refinement of timeframes and public participation processes requirements (Kidd *et al*., 2018:1222, South Africa, 2014a). Additionally, the 2006 and 2010 EIA regulations were accompanied by the introduction of implementation guidelines series, which were absent for the 2014 regulations (Kidd *et al*., 2018:1217).

EIA sectoral expansion manifested in 2009 and 2014 through the introduction of sectoral regulations for waste and air quality respectively, adding to the already existing listings (Kidd *et al.,* 2018:1217), although Sandham *et al*. (2013a:161) argue that there is no proof that constant tweaking and refinement of the EIA regulations has yielded improvement in the performance of EIA. These amendments and refinements reflect a positive attitude towards trying to continually develop and improve EIA practice in South Africa into what was envisioned by then Minister of Environmental Affairs and Tourism, Marthinus van Schalkwyk as a quicker, simpler and better practice that culminates in sustainable development (Kidd *et al*., 2018:1275). This section provided a detailed discussion on the development of EIA legislation in South Africa. The following section will further present the legislative mandate given by specific EIA regulations to guide the EIA process in South Africa.

2.3 EIA legislative framework in South Africa

Following from the previous section, this section will now focus on the EIA legislative mandate given by the NEMA promulgated EIA regulations of 2014 and its amendments. Under the current NEMA legal requirements, EIA regulations (GNR 982) stipulate that the applicant must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental

assessment process and submit the subsequent report to the Competent Authority (CA) for decision making (South Africa, 2014a:13). During the EIA process, EAPs are guided by GNR 982 to 985. The 2014 NEMA EIA regulations (GNR 982) serve as the main guide for undertaking the complete EIA process. These regulations commence in Chapter 1 by highlighting their purpose and interpretation. Chapter 2 of the NEMA makes provision for timeframes in all aspects of EIAs under these regulations, whereas Chapter 3 provides for general duties of different role players in the EIA process, such as the duties of the CA, EAPs, specialists and applicants. Chapter 4 of these EIA regulations makes provision for the application of the environmental authorisation process for Basic Assessment Reports (BARs) and Scoping and Environmental Impact Reports (S&EIRs). This chapter further provides guidance on the content and issuing of environmental authorisations. Furthermore, Chapter 5 talks on post-authorisation processes such as amendments, suspension, compliance and auditing of the environmental authorisation, while the final chapter (Chapter 6) provides guidance on conducting the public participation process (South Africa, 2014a).

EIA regulations provide for a two-pronged approach process with one folder requiring a Basic Assessment (BA), and another one requiring a S&EIR process (Murombo, 2008:12). This two-pronged approach is informed by the EIA regulations: Listing Notices 1 and 3 of 2014 (GNR 983 & 985), which constitute a list of activities with potential minor negative impacts to the environment when triggered, and therefore requires a BA to be undertaken (South Africa, 2014a). EIA regulations: Listing Notice 2 (GNR 984) on the other hand constitutes a list of activities with significant potential negative impacts on the environment which requires a S&EIR to be compiled. The content and process of compiling both a BAR and S&EIR are conducted as per the requirements of GNR 982 (South Africa, 2014b; 2014c; 2014d).

Additional to the national overarching framework act (NEMA), there are Specific Environmental Management Acts (SEMAs) that are relevant to the EIA process. These SEMAs include the National Environmental Management: Air Quality Act, 39 of 2004; the National Environmental Management: Waste Act, 59 of 2008 (NEM:WA); the National Forests Act, 84 of 1998; the Mineral and Petroleum Resources Development Act, 49 of 2008; the National Water Act, 36 of 1998; and the National Environmental Management: Biodiversity Act, 10 of 2004. SEMAs such as the National Environmental Management: Waste Act, 59 of 2008 and the National Environmental Management: Air Quality Act, 39 of 2004 are read together with EIA regulations, which make provision for conducting EIA for activities listed to their respective listing and categories (Kidd *et al.*, 2018:1218; South Africa, 2008; South Africa, 2004). For example, activities listed under Category A of the NEM:WA require a BA, and activities in Category B require a S&EIR under the EIA carried out in terms of Section 24 of the NEMA (South Africa, 2008; Sebetlele, 2018:6).

Although the immediate output of complying and implementing the above requirements is to produce credible EIA reports (BAR or S&EIR) upon which the decision to grant or refuse environmental authorisation must be based (DEAT, 2004:5), the common long term goal of these diverse EIA legislative requirements is to achieve environmental protection and sustainable development. It is therefore imperative to adhere to all procedural requirements and the subsequent post-authorisation conditions of the EIA process. This is because complying to all these legal requirements and authorisation conditions has a potential to deliver a development that balances the competing environmental-, social- and economic needs. This section discussed the legislative requirements guiding the EIA process in South Africa. The following section discusses steps that need to be followed when implementing the above legislative requirements during the EIA process.

2.4 Environmental Impact Assessment procedural steps in South Africa

Environmental Impact Assessment (EIA) is a systematic process of identifying, predicting, evaluating and mitigating the potential impacts of the proposed project (Glasson *et al*., 1999:3). The EIA process takes a step-by-step approach when studying the potential impacts of proposed development projects. Procedural steps for undertaking EIA are applied globally, including in South Africa (Glasson *et al*., 1999:3; IAIA, 1999; Mubanga & Kwarteng, 2020:6). However, it is important to understand that these procedural steps are integrated into the EIA process mandated by the EIA regulations in South Africa. These regulations inform the two-way type of EIA, which is a S&EIR and BAR process through Listing Notices 1 and 3 of 2014 (GNR 983 & 985) (South Africa, 2014b; 2014d). The difference between these processes (BAR and S&EIR) is that the BAR is intended for projects with small scale activities which are not complex, with familiar and easily controllable impacts and is usually completed within a shorter period than S&EIR. The S&EIR process is undertaken for high scale activities and sensitive and complex projects with potentially significant and adverse impacts over a longer period as illustrated in Table 1 below (Botha, 2017:19; Broughton, 2011:6; Jikijela, 2013:24; Steenkamp, 2010:12; South Africa, 2014c).

Table 1: Comparison between the Basic Assessment Report (BAR) process and the Scoping and Environmental Impact Report (S&EIR) process (Adapted from South Africa, 2014a).

BASIC ASSESSMENT REPORT PROCESS (BAR)	SCOPING AND ENVIRONMENTAL IMPACT REPORT PROCESS (S&EIR)
Shorter timeframe (197+50 days)	Longer timeframe (300+50 days)
Small scale activities	High scale activities

Known impacts	Significant impacts
Easily manageable impacts	Sensitive projects
Less complex projects	Complex projects

A list of procedural steps for undertaking EIA globally, including in South Africa, are discussed next and illustrated in Figure 4 below as applied in both the BAR and S&EIR processes. The scoping step is only applicable in the S&EIR process, while the public participation step is conducted twice in the S&EIR process as compared to once in the BAR process (see Figure 4) (Glasson *et al.,* 1999:3; IAIA, 1999; Mubanga & Kwarteng, 2020:6):

- *Screening:* The screening stage is an initial stage of the EIA process to determine whether the proposed project requires an EIA or not and what level of assessment is required. Within the South African context, the applicability of EIA is determined by using EIA regulations where triggering activities listed in GNR 983 and GNR 985 will require a BAR and activities in GNR 984 will require a S&EIR (Glasson *et al.,* 1999:3; IAIA, 1999; Mubanga & Kwarteng, 2020:6).
- *Scoping*: The scoping phase identifies the key issues and significant impacts and alternatives that are likely to be important for further investigation at an early stage of the S&EIR process. Scoping is crucial as it helps to identify and determine the potential impact areas of focus in order to achieve efficiency. Scoping is only applicable to projects triggering activities listed in GNR 984 commonly referred to as Listing Notice 2. The scoping report needs to be subjected to public scrutiny for 30 days before being considered by the CA. The scoping report can either be accepted or refused by the CA within 43 days of submission (Glasson *et al.,* 1999:3; IAIA, 1999; Mubanga & Kwarteng, 2020:6).
- *Description of the environmental baseline*: This stage provides for a clear description of the present and future parameters of the environment even in the absence of development, while also taking into account the potential changes in the environment as a result of natural and human events. These usually consider both social and economic activities in the area of study (Glasson *et al.,* 1999:3; IAIA, 1999).
- *Project description*: This stage involves the clarification of the purpose, characteristics, stages, location and processes of the proposed project.
- *Evaluation/Analysis of impacts*: Assesses the significance of the predicted environmental, social, economic and other project-related impacts. This allows the ranking of significance and prioritises impacts based on their significance (Glasson *et al.,* 1999:3; IAIA, 1999).

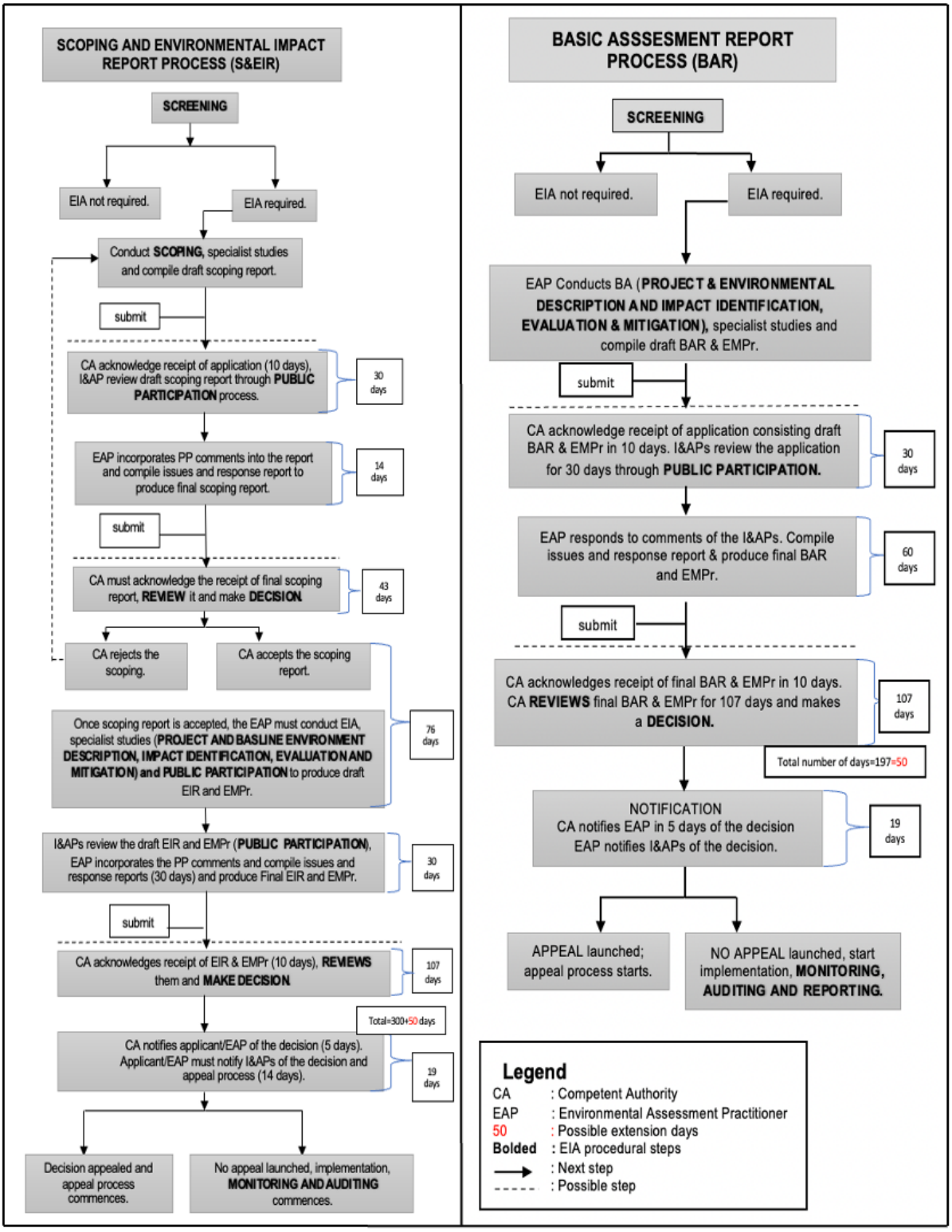

Figure 4: Illustration of the EIA process in South Africa (BAR and S&EIR) (adapted from South Africa, 2014a; Duthie, 2012:217).

- *Identification of mitigation measures:* Provides for the establishment and introduction of measures to avoid, minimise, remedy or offset any predicted adverse impacts and

incorporation of the measures in the environmental management plan, system and program (Glasson *et al.,* 1999:3; IAIA, 1999).

- *Public participation and consultation*: Public participation is a critical and integral part of the EIA process across all the stages. It ensures that all interested and affected parties (I&APs) and stakeholders participate and contribute towards the decision-making about the proposal (Glasson *et al.,* 1999:3; IAIA, 1999). Public participation for the S&EIR process is conducted during the scoping phase and compilation of the draft EIR and Environmental Management Programme (EMPr) stage (see Figure 4).
- *Presentation of EIA report*: The information gathered during the EIA study is clearly documented in a non-technical and easy to read format, as a bad presentation may negate the whole report. The report must reflect all key issues such as potential significant impacts, mitigation measures, alternatives and the views of the I&APs. In the South African context, the EIA report needs to be submitted to the CA within 106 days of acceptance of the scoping report according to Regulation 23. The report needs to also encapsulate the specialists reports as outlined in Appendix 6 and in the EMPr (Regulations 19 and 23 and Appendix 4) (Glasson *et al.,* 1999:3; IAIA, 1999; Mubanga & Kwarteng, 2020:6).
- *EIA report review*: Review by the CA helps in determining whether the information in the report is adequate and sound to inform decisions. The reviewers also check whether the legal procedural steps were followed or not (Glasson *et al.,* 1999:3; IAIA, 1999).
- *Decision making*: This is the stage where the CA uses the information submitted in the report to decide whether to grant or refuse the environmental authorisation. The decision to grant or refuse environmental authorisation should be made within 107 days of receipt of the report (Glasson *et al.,* 1999:3; IAIA, 1999; Mubanga & Kwarteng, 2020:6).
- *Post-decision making and monitoring*: This stage involves recording outcomes associated with development impacts, compliance to terms and conditions of environmental authorisation and assessing relevance and effectiveness of mitigation measures (Glasson *et al.,* 1999:3; IAIA, 1999).
- *Auditing*: This stage involves comparing actual impacts against the predicted impacts. It provides a vital step in the EIA learning process. The developer must submit an environmental audit report to the relevant CA for the period during which environmental authorisation and the EMPr remain valid (Regulations 34) (Glasson *et al.,* 1999:3; IAIA, 1999; Mubanga & Kwarteng, 2020:6).

For EIA practice to achieve its objectives in an efficient and cost-effective manner, the EIA legislative requirements and procedural steps mentioned above need to be adhered to throughout the EIA process. As a result of such adherence, a credible and informative EIA report will likely

be produced to enable effective decision-making (Badr *et al*., 2011:156; DEAT, 2004:5). Therefore, Sadler's (1996) interpretation of the requirements of effectiveness, which are about achieving required results under efficient and compliant processes as discussed in Section 2.6 below, would possibly be met. Additionally, the EIA best practice principles are also important for achieving effectiveness in EIA, therefore these principles need to be encapsulated and applied as well for effective EIA practice. The following section therefore presents a detailed discussion of the EIA best practice principles.

2.5 EIA best practice principles

Following the discussion on the EIA procedural steps in the previous section, this section presents EIA best practice principles applied across the EIA procedural steps during the EIA process. Despite the fact that EIA has been both substantially and theoretically developed and practiced for decades, there are still concerns that it is not meeting its objectives (Joseph *et al*., 2015:238). In responding to this concern the International Association for Impact Assessment (IAIA) (IAIA, 1999) developed a set of best practices principles to improve environmental assessment practice (Joseph *et al*., 2015:238). These best practice principles were developed with the understanding that EIA is a complex, interdependent system, that, for it to function effectively, all the best practice principles must be implemented fully (Joseph *et al*., 2015:250). For EIA to meet its objectives, the following IAIA (1999) principles should be embraced and encapsulated across the stages of EIA such that the practice is:

- *Purposive*: EIA should inform decision-making that culminates in sustainable development through socio-economic and environmental protection.
- *Systematic*: The EIA process should follow a structured step-by-step way of identification, minimisation, management and offsetting of all associated environmental management impacts.
- *Rigorous*: The EIA process should use relevant and best available techniques, methods and science during the investigation of the issues.
- *Practical*: The output of the EIA process should contain mitigation and management measures that are realistic, implementable and responsive to the predicted impacts.
- *Relevant*: The EIA process should provide information that is sufficient and informative enough to enable decision making.
- *Cost-effective*: The EIA process should efficiently utilise the available information to deliver on its objectives within reasonable time and money.

- *Efficient*: The objectives should be met within minimum time and financial cost to the stakeholders.
- *Focused*: The EIA process should be scoped to give priority to adverse environmental effects and key issues for consideration in decision making.
- *Adaptive*: The process should be flexible to accommodate and incorporate changes and amendments in issues, impacts, lessons and management measures without digressing from its procedural and substantive requirements.
- *Participative*: The EIA process should promote the participation of I&APs, stakeholders and the general public in decision making on issues affecting the environment they live in.
- *Transparent*: The EIA process should provide public access to information that is clearly and objectively written and communicated while acknowledging areas of limitations, weaknesses and strengths.
- *Interdisciplinary*: The EIA process should incorporate information from the relevant experts, technicians and traditional knowledge holders about the bio-physical and socio-economic aspects of the area being studied.
- *Credible*: The EIA process should be conducted in a manner that upholds professionalism, rigor, fairness, objectivity, impartiality and balance, and is subject to independent checks and verification.
- *Integrated*: The EIA process should recognise that social-, economic- and biophysical aspects of the environment are interrelated and associated impacts should be addressed with that understanding (IAIA, 1999).

When all these principles are incorporated throughout the stages of EIA, it is possible that the EIA process can produce credible reports because of its systematic, focused, efficient, participative, transparent and practical nature. Therefore, these principles are key ingredients of an effective EIA process, which is the process that enables effective decision making (Sandham & Pretorius, 2008). The following section will discuss EIA effectiveness in detail, while also displaying the relevance of the above EIA best practice principles in achieving effectiveness.

2.6 EIA effectiveness

Following the previous section's discussion of the EIA best practice principles, which are key ingredients of an effective EIA process, this section now discusses EIA effectiveness in detail. An effective EIA is described by Sadler (1996) and Sandham *et al.* (2013a) as the EIA process at which the objectives of the study are achieved under efficient, fair, cost-effective and procedurally

compliant procedures. This description is corroborated by Sandham and Pretorius (2008) when suggesting that EIA effectiveness refers to the extent to which EIA as a tool assists in achieving sound decision making pertaining to environmental issues. EIA effectiveness has been a subject of interest in the research community (Baker & McLelland, 2003; Bina, 2008; Rozema *et al*., 2015; Sadler, 1996) from the early days of EIA practice (Pope *et al*., 2018:34). This has been motivated by the interest in thoroughly understanding the processes, progress and quality of the EIA process (Ross *et al*., 2006). Sadler (1996:39) commissioned a study on the effectiveness of EIA in 1996 and discovered three dimensions of effectiveness in EIA practice. Sadler's findings on EIA effectiveness are often cited in various studies (Baker & McLelland, 2003; Bina, 2008; Bond *et al*., 2013b; Bond & Morrison-Saunders, 2018; Bond *et al*., 2018:6; Pope *et al*., 2018:3) when making discussions around EIA effectiveness. These dimensions of EIA effectiveness are described below:

- *Procedural effectiveness*: This is about whether the EIA process conforms to the established provisions and principles (procedures, steps and legal and best practice requirements).
- *Substantive effectiveness*: Assesses whether EIA practice achieves the objectives it is intended for, such as supporting well-informed decision making, environmental protection and sustainable development.
- *Transactive effectiveness*: Understanding whether the EIA process produces its objectives and outcomes efficiently and effectively in terms of time, money and other resource costs (Sadler, 1996:39).

Baker and McLelland (2003), Gallardo and Bond (2011), including Loomis and Dziedzic (2018), have added *normative effectiveness* as the fourth dimension of EIA effectiveness evaluation. In these studies normative effectiveness is described as assessing whether the EIA process achieves the policy goals and targets informing the EIA process.

Although there are four dimensions to evaluate the effectiveness of EIA as highlighted above, historically the effectiveness assessments have been biased towards- and focused mainly on procedural effectiveness. This means the focus has been on the extent to which the EIA process has complied with legal requirements and international best practice principles (Cashmore *et al*., 2004; Lyhne, 2015:240; Sadler, 1996; Kabir & Momtaz, 2013). Although substantive effectiveness has also been used in some instances, it has not been popularly used as compared to procedural effectiveness (Arts *et al*., 2012; Cashmore *et al*., 2004).

Sadler (1996) in his study concludes that the effectiveness of the EIA system can be based on being able to deliver efficiency in predicting and managing the impacts, effectiveness in decision

making, good quality EIA reports and monitoring and post-decision auditing function. This suggestion has been supported by various other authors in their studies (Anifowose *et al*., 2016; Arts *et al*., 2016; Sandham *et al*., 2020; Singh *et al*., 2020). One of the factors for an effective EIA system, the quality of EIA reports, is of critical importance in EIA quality review studies as it plays a major role in determining the outcomes of the decision making for the EIA process (Bond *et al.,* 2018; DEAT, 2004:5; Mounir, 2015:89; Sandham *et al*., 2020:2). As a result, the quality of EIA reports has been a subject of research internationally and in South Africa (Barker & Jones 2013; Bond *et al*., 2018; Jalava *et al*., 2010; Sandham *et al*., 2008a). Of these four effectiveness dimensions of EIA described above, procedural effectiveness emerges as the most relevant dimension to EIA report quality. This is because EIA effectiveness under this dimension is evaluated using the quality of the Environmental Impact Statements (EIS) as a criterion among others. The reason for using EIS is that they are argued to represent the reflection of EIA performance in practice. The Lee and Colley review package is used as a tool to determine the quality of EISs and the subsequent results are used as the measure of EIA effectiveness (Loomis & Dziedzic, 2018:31). Therefore, it is apparent that the quality of EIA reports is an important indicator for an effective EIA system. The following section begins the discussion of the quality of EIA reports by giving a detailed description of the EIA report and its relevance to EIA quality review studies.

2.7 EIA report quality review

This section presents a discussion on the quality of EIA reports by firstly describing the relevance of EIA reports on which the quality review is conducted. This is followed by the discussion of the Lee and Colley review package (Lee & Colley, 1992; Lee *et al*., 1999), which is a tool used to review the quality of the EIA reports. The discussion of the review package starts from its origin, development and application. The discussion of the application of the review package starts internationally (Europe, Oceania, and Asia), moves to regionally (Ghana, Egypt and Nigeria), and ends Nationally (South Africa).

2.7.1 Relevance of EIA report

The Environmental Impact Assessment report (S&EIR or BAR) is the output document of the EIA process and constitutes information used by the CA for decision-making regarding the project proposal (Badr *et al*., 2011:156; DEAT, 2004:5; DEAT, 1998; Sandham *et al*., 2008a; Sandham *et al*., 2020:2). Wood (2015) suggests that the EIA report is at the heart of the EIA process,

therefore the information encapsulated in it must be relevant and informative. The importance of clearly written and understandable reports is again emphasised by the UNEP (2002:331) when stating that EIR as a communication instrument should be well organised and written in plain language for non-experts to understand, but also to appropriate technical standards. To ensure that the report is fit for purpose, the information in the report must be substantial, accurate, objective and credible (Kabir & Montaz, 2012; Duarte & Sánchez, 2020; Tchakounteu, 2021:20). To produce this clearly written report, Canter (2006) suggests that EIR preparation should not just be done anyhow, but should rather follow a specific logical process. He further adds that this logical process usually translates into three distinct EIR preparation phases, namely: an

- initial report planning phase;
- a detailed report planning phase; and
- the writing phase at the end.

The structure and the contents of the report need to be shown in the initial report planning phase, extensively highlighted in the detailed report planning phase, and then be fully articulated and discussed in the report writing phase.

Mills and Walter (1987), and Canter (1996) list five important principles that should underpin the compilation of the EIA report to ensure that the required standard for enabling decision-making is met. The first principle implies that the compiler of the report must always assume that the readers of the EIR are intelligent, but uninformed persons. Secondly, once the purpose of the report is decided upon, the compiler must ensure that every word, sentence and paragraph in the report accurately contributes to the identified purpose. The third principle insists that simple, concrete and familiar language be used during the preparation of the EIA report. The fourth principle says that it is always important to tell the readers what you are going to tell them before you tell them, then you tell them, and then you tell them that you have told them. The fifth and the last principle states that the report must be made such that it is visually attractive.

Therefore, it is important to develop the EIA report in line with these principles so that it is understandable to the EIA audiences for easy decision-making. It is also key in mitigating, managing and monitoring the impacts of the project as it provides a departure point for preparing environmental management plans and programs (DEAT, 2004:16). Because of the importance of the EIA report, research interest has emerged worldwide in reviewing the quality of EIA reports of various studies that have been conducted (Badr *et al*., 2011; Barker & Jones, 2013; Bond *et al*., 2018; Canelas *et al*., 2005; Jalava *et al*., 2010; Lee *et al*., 1999; Sandham *et al*., 2008a; Sandham *et al*., 2020:2). The UNEP (2002:349) stresses the importance of quality review processes as this

exercise helps in determining and understanding the quality of EIA reports in a particular scenario. The quality review exercise in many studies (Anifowose *et al.* 2016; Badr *et al*., 2011; Barimah, 2014; Canelas *et al*., 2005; Hallatt *et al*., 2015; Mbhele, 2009; Sandham *et al*., 2005; Sandham *et al*., 2008a; Sandham *et al*., 2008b; Sandham & Pretorius, 2008; Sandham *et al*., 2013b & Swanepoel *et al*., 2019) has been conducted using the Lee and Colley review package as the main review instrument (Lee & Colley, 1992; Lee *et al*., 1999). The following section presents the origin, development and application of the Lee and Colley review package.

2.7.2 The origin and development of Lee and Colley review package

The Lee and Colley review package is described as a pragmatic tool that is used to review and assess the quality of EIA reports globally (Lee & Colley, 1992; Lee *et al*., 1999). This package was originally developed by Colley in the United Kingdom (UK) in 1989 as a tool designed for determining the quality of Environmental Impact Statements (EISs) that had been compiled in response to the requirements of the UK's planning regulations. The EISs were compiled in response to the mandate of the EC Directive 85/337 developed according to the aforementioned regulations. The Lee and Colley review package was initially published in 1990 as Occasional Paper 24 and later revised in 1992 as the second edition of Occasional Paper 24, respectively. Since then, the review package has been an instrumental tool over the years to review the quality of EIA reports internationally (Lee *et al*., 1999:1).

In its classical form, the Lee and Colley review package is structured in a hierarchical format made up of multiple level criteria consisting of four-level hierarchies arranged from the high level of four review areas, seventeen categories and fifty five sub-categories, thereby amounting to seventy six assessment tasks (Sandham *et al*., 2010:143). Each performance task under different review areas starting from sub-categories, is assigned a nominal score ranging from A to F, with A being relevant tasks well performed, no important tasks left incomplete, to F being very unsatisfactory (Lee, 1999; Sandham *et al*., 2010:143; Sandham *et al*., 2008a; Sandham *et al*., 2020). A detailed discussion and explanation of the structure of the review package will be given later in Chapter 3, however, the following section discusses the international, regional and South African application of the Lee and Colley review package.

2.7.3 The international application of the Lee and Colley review package for EIA reports

Researchers from different countries have predominantly applied the Lee and Colley review package as a tool for determining the quality of EIA reports (Badr *et al*., 2011; Canelas *et al*., 2005; Lee *et al*., 1999:1). Canelas *et al*. (2005) and Lee *et al*. (1991) researched the quality of EIA reports respectively in Spain and Portugal and eight European nations (namely Belgium, Denmark, Germany, Greece, Ireland, Portugal, Spain and the UK). The results produced by both studies were almost similar, presenting about an average of 70% of the number of EIA reports with satisfactory quality.

In the studies conducted in Europe, Lee and Brown (1992) in the 1988/89 sample found that two-thirds of the reports were of unsatisfactory quality (D, E & F). Wood and Jones (1991), in different samples of the same period, got similar unsatisfactory results. After one year, in the 1990/91 sample of EU countries, the proportion of unsatisfactory results fell. The European Commission (EC, 1996) in the 1990/91 sample, detected a similar decrease in the number of reports with an unsatisfactory rating. The EC (1996) also found that the number of EIA reports that were satisfactory in all EU countries from 1990–1996 improved from 50% to 70% (Lee *et al*., 1999:12; Barker & Woods, 1999:390; Canelas *et al.*, 2005:221). The best-performed review area is the description of the development, the local environment and baseline conditions at 75%, and communication of results at 80%.

In Asia, 160 EIA reports produced between 2001–2016 from Japan cooperation projects were sampled for research by Kamijo and Huang (2020:2557) using the Lee and Colley review package. The results showed that only 38% of the reports were of a satisfactory standard. The best performed review areas were the description of the development and the baseline environment at 60%, and considered as of satisfactory nature. Aung *et al*. (2018) and Tchakounteu (2021:27) suggest that in the reports sampled between 2010–2017 only 33% of the reports were found to be of a satisfactory standard (A & B), while 27% were described to be on borderline to the poor (C & D). The description of the development and the baseline environment were also areas rated as satisfactory. In Bangladesh and Cambodia EIA reports were sampled between 1994–2008 and 2007–2011. The results showed that Bangladesh had 66% of reports described as satisfactory, while it was 69% in Cambodia. Description of the development and the baseline environment were the areas that again performed well.

2.7.4 The application of Lee and Colley review package in African countries EIA reports

In Ghana, in a study conducted by Barimah (2014:143) on the quality of EIA reports, a total of 30 reports from between 2008 to 2014 were purposively sampled. Again, the Lee and Colley review package was used to assess the quality of the sampled reports. The results showed that 93% of the sampled reports were of satisfactory quality, with only 7% of unsatisfactory quality. The description of the development and the baseline conditions as well as the identification and evaluation of key impacts were presented to the best performed areas at 100% satisfactory quality. The worst performed areas were on the determination of the magnitude of impacts, estimation of quantities of raw materials and waste, and also the consideration of alternatives at a 50% satisfactory rate.

In a study conducted by Anifowose *et al.* (2016) in Nigeria, a sample of 19 reports produced between 1998–2008 from the oil industry were also reviewed using the Lee and Colley review package. The results showed that 52% of the EIA reports were scored as satisfactory, while 37% were unsatisfactory and 11% were recorded as being poorly performed reports. Project description and communication areas were indicated as well performed, while environmental impact prediction and decommissioning were noted as areas that needed intervention (Anifowose *et al*., 2016:578).

An Egyptian EIA quality review study conducted by Badr *et al*. (2011:281) showed that 69% of the sampled reports were satisfactory (A, B or C) — 35,5% of the reports showed good (A or B) results, while only 4,5% of the reports showed poor results (E or F). The description of the development and the baseline environment was the best-performed areas with 93% satisfactory performance. The prediction of impact magnitude was marked as the worst performed area at 15,5%. These results were obtained by applying the adapted Lee and Colley review package to the sample of 45 reports across different sectors such as industry, energy, tourism, agricultural infrastructure development and landfill.

2.7.5 The application of Lee and Colley review package in South African EIA reports

In South Africa, research on the quality of EIA reports has been conducted in different sectors namely, mining (Sandham *et al*., 2008b), explosives (Sandham *et al*., 2013b), biodiversity (Swanepoel *et al*., 2019; Hallatt *et al*., 2015), wetlands (Sandham *et al*., 2008a), tourism and protected areas (Wylie *et al*., 2018; Sandham *et al*., 2020), housing (Mbhele, 2009), and also in various provinces like the Limpopo- (Sandham *et al*., 2005), North-West- (Sandham & Pretorius, 2008), and the Free State provinces (Kruger & Chapman, 2012). This research study is interested

in the quality of EIA reports conducted for infrastructure development projects (namely sewerage and bulk water infrastructure, low cost housing development, electrification, access roads and bridges, telecommunications and commercial mixed-use developments) conducted in the O.R. Tambo region of the Eastern Cape Province. Previous EIA quality review studies conducted for infrastructure development are viewed to be relevant for contextualising this research. Therefore, the application of the Lee and Colley review package and the subsequent results of studies on infrastructure development and biodiversity hotspot areas are described below.

Research on the quality of EIA reports for housing developments conducted in the Nkangala District of the Mpumalanga province by Mbhele (2009:32) shows that the Lee and Colley review package was applied in 15 EIA reports (n=15). The EIA reports were compiled between 1998 and 2006 for low-cost housing developments and extensions and luxury holiday resorts. According to the results obtained, 73% of the sampled reports demonstrated a satisfactory quality. The description of the development and the environment and evaluation of key impacts were the areas that were best performed. The poorly performed areas were the identification of alternatives and mitigation measures. However, in general the quality of EIA reports in this study was found to be satisfactory.

Biodiversity Inputs Assessment for areas with high biodiversity statuses such as the Maputo-Pondoland Albany (MPA) and Cape Floristic Region (CFR) have been subjected to quality review in South Africa. Both studies in the CFR and MPA showed similar results with satisfactory quality in the MPA slightly higher at 81% (A–C), compared to 73% (A–C) of the CFR quality. These results were obtained using the adapted Lee and Colley review package to suit the Biodiversity Impact Assessment (BIA) (Swanepoel, 2016:43). Other similarities are on the weakness and strengths of the reviewed reports which are noticeable in the description of the project and baseline environment and public participation, respectively (Hallatt *et al*., 2015:11).

Sandham *et al*. (2020:3) conducted research that evaluated the quality of EIA reports in South African National Parks. The Lee and Colley review package was applied on a sample of 24 reports (n=24 that were obtained from 10 different National Parks. The reports were developed under three different EIA regimes (2001–2017) for tourism related infrastructure such as the construction of lodges, hotels, access roads, access gates, caravan camping sites, etc. The overall results of the study showed that 92% of the reports were graded as satisfactory (A–C) and 25% were graded as well performed (A). However, the majority of the reports (58%) were ‘generally satisfactory’ (B), and 8% were graded as ‘just satisfactory’ (C) despite omissions and inadequacies. The remaining 8% of the reports were graded as just unsatisfactory (D) because of omissions or inadequacies in the information. The best performed areas were review areas four (presentation and communication), and one (description of project and environment) with all

of the reports being satisfactory (A–C). The least performed review area was review area two (impact identification and evaluation), with 88% of the reports achieving a C or higher.

Sebetlele (2018:21) conducted a study on the quality of EIA reports in the transport sector. The study sampled EIA reports for transportation infrastructure projects which included reports for upgrading roads and construction of waiting and parking areas, upgrading of the existing gravel roads and single tracks to tarred roads. The results were generated by applying the Lee and Colley review package in 12 EIA reports (n=12) developed under the 2006, 2010 and 2014 EIA regimes. The results showed that the overall quality of the reports was satisfactory with a score ranging from (A–C) despite the omissions and/or inadequacies. The review areas that were well performed are review areas one and four which are the description of the environment and communication of results, respectively.

In a study conducted by Sandham and Pretorius (2008) in the North-West Province, the reports mostly for construction projects such as township establishment and extension, electrification, water and sanitation infrastructure development, hotel and accommodation establishments and filling stations were reviewed. The review was conducted through the application of the Lee and Colley review package to a sample of 38 EIA reports (n=38) produced between 1999–2001.

The EIA quality review studies were also conducted in different provinces (Free State, Limpopo and North-West) of South Africa. In a study conducted in the Limpopo province by Sandham and Siphugu (2005), 95 EIA reports (n=95) sampled from infrastructure projects for water and sanitation infrastructure, township establishment, and electrification were reviewed. The study conducted in the North-West Province by Sandham and Pretorius (2008) reviewed a sample of 28 EIA reports (n=28). These reports were developed for projects of infrastructure in the energy and electrification, water supply, sewerage and waste, land-use change and telecommunications sectors (Sandham & Pretorius, 2008:232). In another study conducted by Kruger and Chapman (2012) in the Free State Province, a sample of 51 EIA reports (n=51) developed between 1997–2002 for various sector projects were reviewed (Kruger & Chapman, 2005:52). The results of these studies presented similar conclusions. The results pointed to shortcomings in the areas of identification and analysis of potential impacts, the significance ranking and identification of sound alternatives and mitigation measures to address the impacts and the dominance of biophysical over economic information. Most importantly, the results also showed that, although the reports met the bare minimum requirements, the performance still fell below best practice level, despite changes and amendments made in EIA regulations (Kidd *et al*., 2018:1270; Kruger & Chapman, 2005:55; Sandham & Pretorius, 2008:235). This argument is supported by Kidd *et al*. (2018:126) and Lee *et al*. (1999:1) when maintaining that among four challenges facing the overall performance of EIA is the critical quality of EIA reports.

The overall observation in the quality of the EIA reports in the literature reviewed above starting from developed to developing nations is that the quality of EIA reports has been improving over time and with experience of EIA practice. Developed nations conducted EIA report quality reviews as early as the late 1980s and the satisfaction levels were low. Over time the quality of EIA reports improved as observed in the mid-90s. A similar trend is found in Asian countries where, EIA practice performance was as low as 38% in the early 2000s, but the performance doubled by about a decade later. Developing African nations including South Africa started practicing EIA itself in the late 1980s to the 1990s (El-Fadl & El-Fadel, 2004:559). The quality review exercise followed in the late 1990s and dominated in the 21st century (Post, 2000). The observation in the above literature is that the quality of the EIA reports has been improving with time when comparing studies that were conducted in the early days of EIA practice to those conducted during the 2014 EIA regime in South Africa. One other most interesting observation is that the description of the environment and communication of results have been the areas that were constantly performing great during the quality review exercises, while on the other hand the impact identification and evaluation, and identification of alternatives and impact management were the worst performing areas. Therefore, the literature suggests that the quality of EIA reports has been improving with time and experience in the EIA practice to what currently seems to be a plateau phase.

2.8 Conclusion

This chapter presented a wealth of literature about EIA report quality in trying to fulfil Research Objective 1. This chapter started by discussing the history of EIA from its origin and development from the international- to the South African context. The history was followed by a discussion on the EIA legislative framework, procedural steps and best practices that need to be followed to achieve an effective EIA system. EIA effectiveness was discussed as a concluding topic in this section, highlighting dimensions that need to be satisfied to achieve EIA effectiveness. EIA quality review was discussed starting with the EIA report which is at the heart of the EIA quality review process. This chapter also presented the history of the quality review process, starting from its origin, development and results. This was followed by the brief discussion of the key tool used in quality reviews which is the Lee and Colley review package. Its application and subsequent results were discussed from international to South African EIA reports. The next chapter (Chapter 3) seeks to discuss the research methodology that will be used to achieve Research Objectives 1 to 3 of the study.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter (Chapter 2) provided a detailed discussion of the relevant literature. The literature was reviewed and presented starting from the origin and development of Environmental Impact Assessment (EIA), EIA legislative framework, EIA process, quality of EIA reports and application of the Lee and Colley review package from an international level to South Africa. This was followed by the presentation of the results of different studies conducted on the quality of EIA reports starting from abroad to South Africa. The Lee and Colley review package is a well know review tool used for conducting EIA quality review studies, however in some instances it has been adapted to suit the legislative requirements of different countries and industries. Earlier, in Chapter 1 (sub-section 1.5), a brief overview of the research methodology was given. Chapter 3 will now aim to provide a detailed discussion on the relevant research methodology that will be used to satisfy the three research objectives of this study presented earlier in Chapter 1 (sub-section 1.3). This chapter starts by highlighting the literature review and its importance, and the research methods used in collecting the literature for this study. This will be followed by a discussion of the research approach and design, methodology, data gathering and tool of analysis which is the Lee and Colley review package. The chapter will also be discussing how the generated data will be analysed and presented, and concludes by highlighting the assumptions and limitations of the methodology and the ethical considerations of the study.

3.2 Literature review

This section describes the methodological process of conducting a literature review. The literature review exercise for this study was conducted first and presented in the previous chapter (Chapter 2). Literature review is a process of studying written arguments that support the research interest position by building a case from credible evidence obtained from previous research (Machi & McEvoy, 2016:28). Machi and McEvoy (2016:28) further mentioned that literature reviews provide the context and the background about the current knowledge of the topic being studied and lay out a logical case to defend the conclusions it draws. To discover the existing body of knowledge in the research topic, a literature search was conducted to determine the data to be included in the review. This was done by selecting the research data that provide the strongest argument and relevant evidence in responding to the research question. During the literature search, data was reviewed, selected and organised through skimming, scanning and mapping skills as recommended by Machi and McEvoy (2016:28). The search of the relevant literature was done

through various platforms. Publications in the form of journal articles and books were obtained from the NWU Library EBSCO Discovery Service (EDS). Other peer-reviewed journal articles were obtained from the Google Scholar search engine. Electronic copies of theses and dissertations were obtained through consultation with the NWU Institutional Repository called Boloka. Additionally, the Google search engine was consulted for documents and legislation published by the government and reports published by different organisations like the European Commission, International Association for Impact Assessment (IAIA), and the United Nations Environment Programme (UNEP). This literature search was conducted by using different, and combinations of, keywords pertinent to the research topic such as EIA, quality, reports, development, impact statements and review. This section presented the process that was followed when conducting the literature review in Chapter 2. The following section will provide a discussion on the research approach and design that was followed in this study.

3.3 Qualitative research approach and design

This section presents the qualitative research approach as an approach that will be followed in this study, and its relevance in this study manifests in the discussion below. The qualitative research approach involves the collection, analysis, and interpretation of data that is not easily reduced to numbers (Anderson, 2010:1; Creswell, 2018:41). Busetto *et al.* (2020:1) add that qualitative research is more concerned about the nature of phenomena (their quality, different manifestations, the context in which they appear and the perspectives from which they can be perceived). This research approach is chosen with the understanding that:

- there is no research approach that is appropriate to answer every research question, and
- that the chosen research approach must always be in alignment with the research objectives as suggested by Anderson (2010:1).

Additionally, Creswell (2018:57) and Morse (1991) argue that the qualitative research approach is for studying and understanding a particular phenomenon or concept in a particular sample or an area where little or no research of that kind was ever conducted in the past. Therefore, this research approach is perceived suitable for this study as it was chosen with the consideration of the research question (i.e. quality of EIA report as a phenomenon), objectives and problem statement (research gaps in the study area) as presented earlier in Chapter 1 of this study.

Additionally, qualitative research is characterised by being flexible, open and responsive to context and this is evident in the steps of data collection and analysis as they are not as rigid,

separate and consecutive as they can be in quantitative research (Busetto *et al*., 2020:2). Busetto *et al.* (2020:3) further suggest that the qualitative research approach can be conducted using different methods which include document analysis, interviews, observations and focus groups. Given these different methods applied in the qualitative research approach highlighted above, the philosophy underpinning a qualitative research approach implies that each choice of single or combined methods and designs used has to be based on the research question that needs to be answered (Busetto *et al*., 2020:2). Busetto *et al*. (2020:2) further suggest that a critical assessment of whether, or to what extent, the chosen method and design can accomplish the research objectives has to be made. Therefore, this study identifies the qualitative descriptive research design as an appropriate research design for accomplishing its objectives.

This study has followed the qualitative descriptive (QD) research design, which has a history of mostly being used in the nursing profession of the healthcare sector (Doyle *et al*., 2020:44). It is a research design that is used for studies that are descriptive in nature, where the researcher wants to understand *who* was involved, *wha*t was involved, and *where* did the event happen. It is useful for gaining insight into a phenomenon that is poorly understood (Kim *et al*., 2017:2; Lambert & Lambert, 2013:256; Sandelowski, 2000:339). When using qualitative descriptive design, data collection may include observations and examinations of documents. The purposive sampling technique is the most relevant technique when using a QD research design as it allows researchers to deeply explore common and unique features of the targeted sample. Data analysis in QD studies is done through a qualitative content analysis approach in which the data is summarised such that meaningful results are obtained (Sandelowski, 2000:338). In this study, the researcher wants to understand the quality (what) of EIA reports (phenomenon) conducted in the O.R. Tambo region of the Eastern Cape province (where) as developed by different Environmental Assessment Practitioners (EAPs). Also, the data sampling, collection and analysis techniques compatible with this QD research design as highlighted above, are the ones proposed by this study in sub-sections 3.3.1, 3.5 and 3.6. Therefore, the QD research design is the most relevant design to be used for responding to the research objectives of this study as presented in Chapter 1. This study focuses on the use of document analysis as one appropriate method and its suitability is discussed in the following sub-section.

3.3.1 Data collection method: Document analysis

The previous section presented the qualitative research approach and the qualitative descriptive research design as key ingredients to be followed in this study. Qualitative research uses various ways for data collection, and document analysis is one of them. Document analysis is a

systematic procedure for reviewing, analysing or evaluating different types of documents such as books, journal articles, videos, films and institutional reports in an attempt to obtain meaning out of the document and subsequently develop empirical knowledge (Bowen, 2009:27; Morgan, 2022:64). In fulfilling the objectives of this research as highlighted earlier in Chapter 1, document analysis will be used as a data collection method. It is an appropriate method, as this research will include going through and analysing various EIA report documents in a structured manner.

Additionally, to document analysis being appropriate to this research, Morgan (2022:66) and Bowen (2009:31) present beneficial advantages of using document analysis as a data collection method of the qualitative research approach. Firstly, it is *cost-effective*, as the data in the documents are already available for content and quality evaluation. The second advantage is being *efficient*, which means that it consumes less time to conduct document analysis as it requires less data selection than the actual field collection. The third advantage is the *availability,* and it implies that many documents are already available for public consumption, especially during the internet age. The fourth advantage is *obstructiveness,* which suggests that conducting a document analysis allows researchers to have access to data that would otherwise take enormous effort and time to collect or be obstructed by circumstances. The fifth and the most useful advantage is *stability*, which says that documents are always stable, therefore they do not change content depending on the reviewer and they always present the same and consistent data. Documents also provide *exactness* as the sixth advantage, which manifests through accurate details on sources of information, authors, dates and references and this is advantageous in the field of research. The seventh and last advantage is *coverage,* which states that documents can be available for a long time and cover information from as far back as possible.

In this research, a document analysis was conducted on a sample of twenty-three (n=23) EIA reports using the Lee and Colley quality review package as a data collection tool. Additionally, document analysis is discussed in this section as one of the data collection methods that was used in this study. The following section will present the Lee and Colley review package as a data collection tool.

3.3.2 Data collection tool: Lee and Colley review package

A brief discussion of the Lee and Colley review package was conducted earlier in Chapter 2. This section provides a detailed presentation of the Lee and Colley review package as the data collection tool that will be used in this study. The Lee and Colley review package is the review

package used to assess the quality of EIA reports and is probably the most utilised review package across the globe (Lee, 1992; Lee *et al.,* 1999). The quality review package has been used to review and evaluate the quality of EIA reports and documents such as scoping reports, Scoping and Environmental Impact Reports (S&EIRs), Basic Assessment Reports (BARs) and the specialist inputs from different industries (Badr *et al*., 2011; Barker & Jones 2013; Canelas *et al*., 2005; Cashmore *et al*., 2002; Lee *et al*., 1999; Sandham *et al*., 2008a, Sandham *et al*., 2013; Sandham *et al*., 2020:3). This package was originally designed in the UK with the particular intention of evaluating the UK EIA system (Lee *et al*., 1999). However, in certain instances, the package has been adapted to fit EIA legislation of a specific country or a certain industry (Glasson *et al*., 2012; Hallatt *et al*., 2015; Kamijo & Huang, 2016; Sandham *et al*., 2008a; Sandham *et al*., 2008b; Sandham *et al*., 2013b; Swanepoel *et al*., 2019). Sandham *et al*. (2013a) adapted the Lee and Colley review package to a generic South African version for application within the context of the EIA legal framework of the country. This study will adopt this South African legislation based generic review package.

The review package is structured in a hierarchical fashion which is made up of four-level steps as shown in Figure 5 below. These steps consist from the highest level, an overall report grade, review areas, categories and sub-categories. The EIA quality review exercise starts from the lowest level of sub-categories up to the highest level of the overall report quality. The review package in its hierarchy groups the review tasks into 63 sub-categories, 17 review categories, 4 review areas and, finally to 1 overall quality review area. The complete review package for details can be viewed in Annexure A.

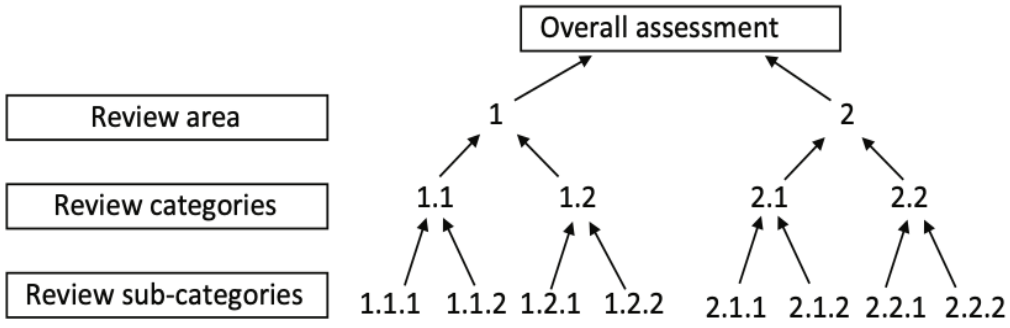

Figure 5: Hierarchical structure of the Lee and Colley review package (adapted from Lee and Colley, 1999:6; Sandham *et al*., 2020:4).

Lee and Colley (1999:18) describe four main review areas (see Table 2 below) of the Lee and Colley review package as follows: *Review Area 1* provides information about the description of

the plan, the affected environment and the baseline conditions; *Review Area 2* presents the information about the identification and evaluation of key impacts of the project. *Review Area 3* describes the alternatives, mitigation measures, monitoring and recommendations, while the last review area, which is *Review Area 4,* describe the manner in which the results of the study are communicated.

Table 2: Summary of the Lee and Colley review areas (adapted from Sandham *et al*., 2013).

Summary of the Lee and Colley review package	
Review area 1	**Review area 3**
1.1. Description of environment	3.1. Feasible alternatives should have been considered
1.2. Site description	3.2. Scope and effectiveness of mitigation measures
1.3. Waste	3.3. Commitment to mitigation
1.4. Environment description	
1.5. Baseline conditions	
Review area 2	**Review area 4**
2.1. Definition of impacts	4.1. Layout of statement
2.2. Identification of impacts	4.2. Presentation
2.3. Scoping	4.3. Emphasis
2.4. Prediction of impact magnitude	4.4. Non-technical summary
2.5. Assessment of impact significance	

The review exercise started from the sub-categories, where each performance task in the sub-category level was assigned a letter of the alphabet as a grade of its performance. Grades run from A–F, with A in green colour being the area that is well performed to F in red colour being the review task that is worst performed, as described in Table 3 below. Once the sub-categories are all allocated grades, the allocation moved up the hierarchy level to category level and eventually to the main review areas. The grades of the four review areas were used to determine the overall grade of the full EIA report (Lee *et al*., 1999:5; Sandham *et al*., 2008a:158; Sandham *et al*., 2008b:702; Sandham *et al*., 2020:2). Therefore, the performance in the sub-categories, categories and review areas served as the build-up exercise to the overall performance and the quality of the respective EIA reports as a whole.

Table 3: Lee and Colley review grading symbols and their explanations (Lee *et al*., 1996:6; Sebetlele, 2018:18).

Symbol	Explanation	Combined Grading
A	Generally well performed, no important tasks left incomplete.	Satisfactory A-C
B	Generally satisfactory and complete, only minor omissions and inadequacies. Can be considered just satisfactory, despite omissions and/or inadequacies.	
C	Can be considered just satisfactory, despite omissions and/or inadequacies.	
D	Parts are well attempted but must, as a whole be considered just unsatisfactory because of omissions or inadequacies.	Unsatisfactory D-F
E	Not satisfactory, significant omissions or inadequacies.	
F	Very unsatisfactory, important task(s) poorly done or not attempted.	
N/A	The Review topic is not applicable or it is irrelevant in the context of the environmental appraisal report.	

Subsequent results emanated from the application of the performance grades with different colour codes as reflected in Table 3 above were then recorded in a collation sheet (see Annexure B) where strengths, trends, weaknesses and comparisons could be made (Lee *et al*., 1999:15). Following the description of the application of the Lee and Colley review package above, the next section (Study orientation) provide context of the study area and the sample at which the Lee and Colley review package will be applied at.

3.3.3 Study orientation

This section presents the orientation of this study by describing the location, study sample and types of EIA reports to be reviewed. This research study was conducted in the O.R. Tambo region of the Eastern Cape province in South Africa. The research focuses on the quality review of 21 EIA reports made up of 19 BARs and 2 S&EIRs for infrastructure development projects. The O.R. Tambo region is located to the east of the Eastern Cape province, along the Indian Ocean coastline (see Figure 6). The O.R. Tambo region is one of the six district municipalities in this province. To the north, it is bordered by the Alfred Nzo District Municipality, to the north-west by the Joe Gqabi District Municipality, to the west by the Chris Hani District Municipality, and to the south-west by the Amathole District Municipality as shown in Figure 7 below. There are five local municipalities (LMs) under the O.R Tambo region, which include: Ingquza Hill, Port St Johns,

Nyandeni, Mhlontlo, and the King Sabata Dalindyebo LM. Four of these five LMs are bordered by a coastline of approximately 148 kilometres (ORTDM, 2016:17). Therefore, the sampled EIA reports for review were from within these LMs of the O.R. Tambo region.

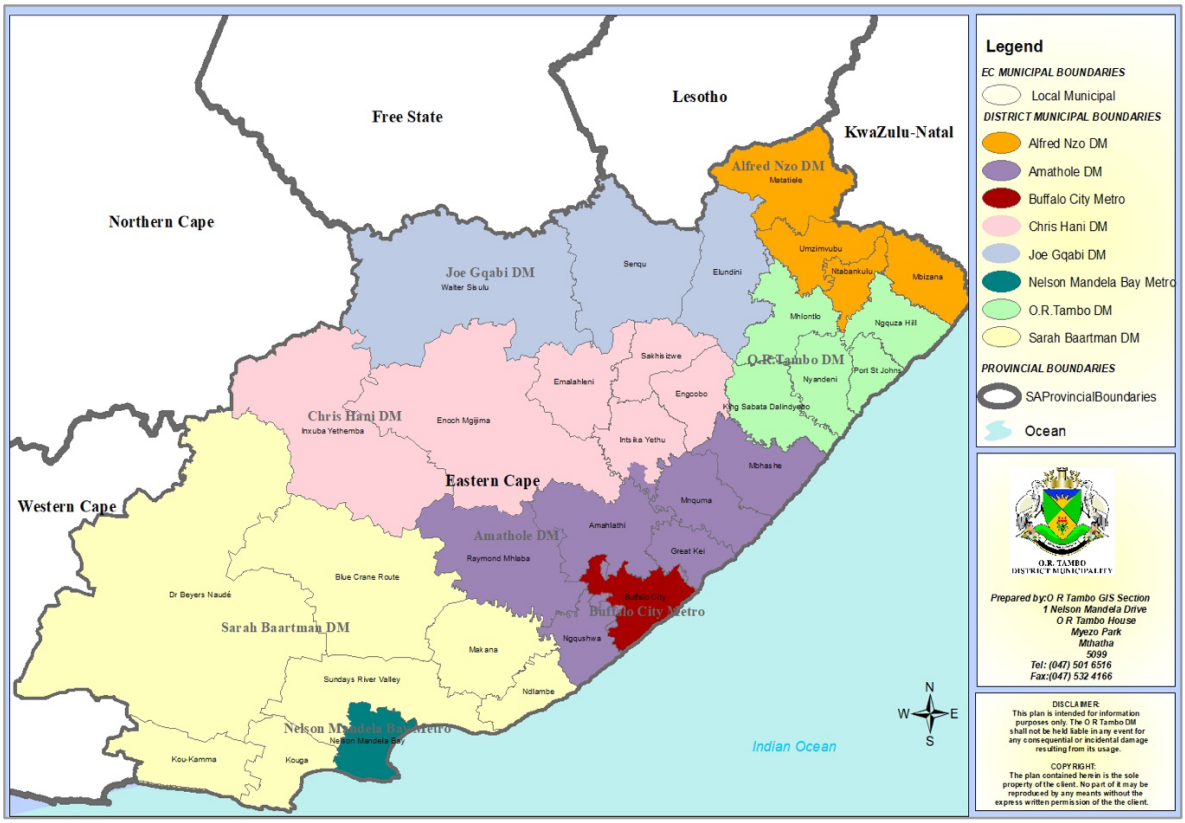

Figure 6: Map showing Eastern Cape province (ORTDM, 2020).

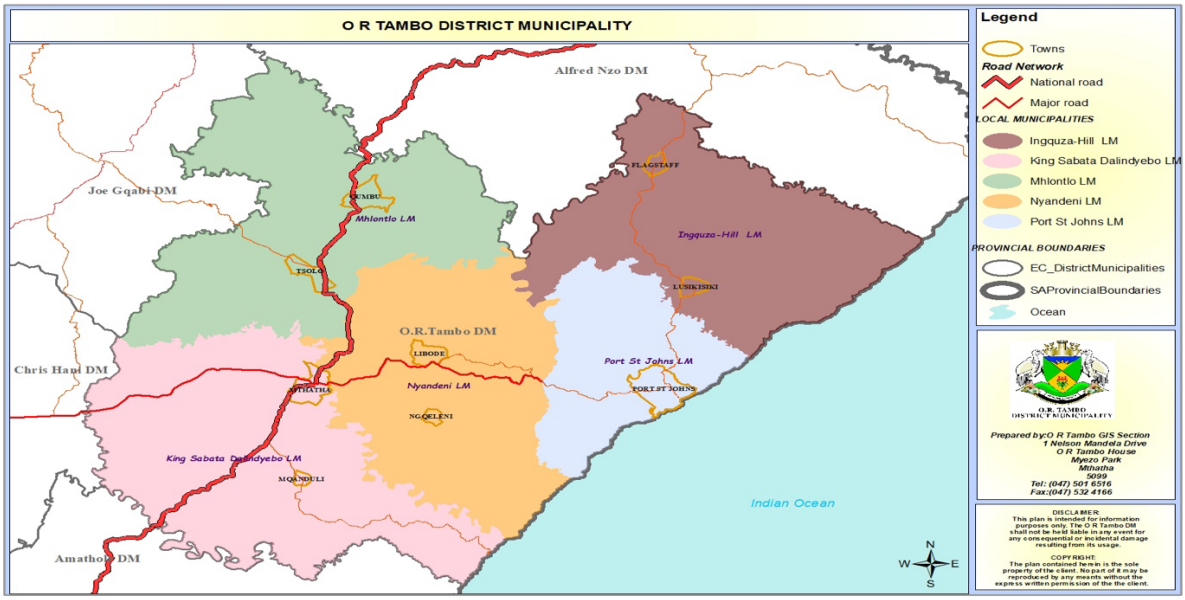

Figure 7: Map showing the position of O.R. Tambo region (ORTDM, 2020).

3.3.4 Data sampling

Data in the form of EIA reports for this study was obtained from the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT). The purposive sampling technique was used to select the sample from a list of projects that were authorised by the DEDEAT (see Annexure D). Purposive sampling is a sampling technique that is used to select study samples based on availability and pre-conceived characteristics of the intended sample (Palinkas *et al*., 2016:2). It is based on this definition that the purposive sampling technique is the most relevant and appropriate sampling method for this study as the researcher already had predetermined characteristics of the study sample. The characteristics that were considered when sampling were:

- that the reports must have been compiled and approved under the 2014 EIA regulations;
- must be for infrastructure development projects within the O.R Tambo region in the Eastern Cape province; and
- must have been developed by different Environmental Assessment Practitioners (EAPs).

The underpinning philosophy that was applied when developing criteria for sampling the reports to be studied is the one presented by Flick (2018) and Morgan (2022), which implied that, when selecting documents, the researcher must consider authenticity, credibility, representativeness and meaning and these were considered as well in this study (Morgan 2022:70). Anderson (2010) adds that the reliability and validity as two other important factors that need to be considered during data sampling. This consideration is important because examining the data for reliability and validity assesses both the objectivity and credibility of the research. This stance emanates from the description of the validity and reliability concept, which state that validity relates to the honesty and genuineness of the research data, while reliability relates to the reproducibility and stability of the data (Anderson, 2010:2). It is important to understand and apply these factors when sampling, as their accurate application produces credible results even if is repeated by different researchers (Anderson, 2010:2).

A total number of twenty-three (n = 23) EIA reports, made up of 19 BARs and 4 SEIRs (n = 19 BARs and n = 4 SEIRs), was initially sampled for this study. However, during the data collection process, it was discovered that only twenty-one (n = 21) EIA report documents were meeting the sampling criteria. The two (n = 2) additional EIRs were incomplete. Therefore, the actual sample size to be studied changed from twenty-three (n=23) to twenty-one (n=21) reports. These EIRs (n=19 BARs and n=2 SEIRs) were conducted between 2015 and 2021 in various sectors such as water supply and sanitation (n=6), access roads (n=5), bridges (n=3), commercial mixed-use developments (n=2), low-cost housing developments (n=2), electrification (n=2) and

telecommunication (n=1), were selected for the study and can be considered as the final sample size (n=21). A South African adapted Lee and Colley review package (Sandham, 2013b) was then applied to determine the quality of the sampled EIA reports. Table 4 below presents a detailed list and classification of the research sample.

Table 4: Classification of EIA reports sampled for the EIA quality review study (own contribution).

TYPE OF DEVELOPMENT		DEVELOPMENT YEAR		REPORT TYPE BAR/EIR	
TYPE OF INFRASTRUCTURE	NO	YEAR	NO	REPORT TYPE	NO
Sewerage and Bulk water infrastructure	6	2015	2	EIRs	2
Low cost housing development	2	2017	3	BARs	19
Electrification	2	2018	4		
Access roads and Bridge	8	2019	4		
Telecommunication	1	2020	5		
Commercial mixed use developments	2	2021	5		

3.3.5 Data analysis

Qualitative data analysis is a process of systematically bringing order, structure and meaning to the mass of collected data in order to extract meaning from it (Hilal & Alabri, 2013:181; Wong, 2008:14). Hilal and Alabri (2013:181) together with Wong (2008:14) further describes the process of qualitative data analysis as being predominantly more about categorising, pursuing the relationship between categories and themes and also identifying patterns and trends in order to increase the understanding of the phenomenon that is being studied, while also building a string of logical evidence. Because of the voluminous nature of data that the researcher needs to analyse to bring meaning, data analysis is known for being a hard and time-consuming exercise to embark on (Hilal & Alabri, 2013:181; Wong, 2008:14).

During data collection, which was through the application of the Lee and Colley review package described in sub-section 3.3.2. above, produced data in the form of alphabet letters (A-F) were recorded in the collation sheet (see Annexure B). This data represented the performance of EIA reports as follows: A=well performed, B=satisfactory, C=just satisfactory, D=just not satisfactory, E=not satisfactory and F being very unsatisfactory (Lee *et al*., 1999:6; Sandham & Pretorius, 2008) as shown in Table 3 of Chapter 3 above. This data were further grouped using the approach

that was previously used by researchers such as Sandham and Pretorius (2008), and Sandham *et al*., (2008b). This approach implies that assessment grades be grouped based on their performances. As a result, performance grades from A-C were grouped together as they reflect different levels of satisfactory performance. Performance grades D-F were also grouped together to indicate different levels of unsatisfactory performance. The area between performance grades D and C is regarded as a critical boundary as it separates tasks that are just satisfactory and just unsatisfactorily performed.

For easy analysis, from the collation sheet, the data was then populated into tables (see Chapter 4, Tables 6–10). Simple statistical analysis was applied to determine areas of satisfactory performance, unsatisfactory performance, strengths, weaknesses and the frequently occurring grades across the tables. During the analysis, EIA reports, review areas, categories and sub-categories that were assigned performance A-C were graded as satisfactory while those assigned performance grades D-F were graded as unsatisfactory. Also, areas that were assigned performance grades A-B were regarded as areas of strengths, while those assigned performance grades E-F were graded as weaknesses. The different review areas were then compared to determine the best performed review areas, categories and sub-categories. Following this analysis, the meaning could be derived from the data and the similarities and trends were then identified as well. This meaningful data brought the researcher closer to the ultimate goal of this process which was to get a clear understanding of the quality of EIA reports for the infrastructure development projects conducted in the O.R. Tambo region of the Eastern Cape province.

3.4 Ethical considerations

The application of ethical clearance was submitted before the commencement of this research to the Faculty of Natural and Agricultural Sciences Research Ethics Committee (FNAS-REC) of the NWU. The application followed the online assessment that was undertaken to equip the researcher about ethical conduct associated with conducting academic research. The FNAS-REC accepted and approved the study and the ethics clearance number NWU-01220-22-A9 was allocated to the study. The research was classified as “No ethical risk”, however general conditions to abide by during research were stipulated. These conditions included privacy and anonymity, such as not disclosing the names of the companies or EAPs and the specific names of projects for the EIA reports that will be reviewed as shown in Annexure C. Additionally, permission to have access to EIA files from the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) was granted with conditions such

as protection of names of I&APs and stakeholders that participated during the public consultation processes as shown in Annexure D.

3.5 Methodological assumptions and limitations

The methodological assumption for this study emanates from the document analysis, being known for its advantages of being efficient, cost-effective and the online availability of study documents (Bowen, 2009:31; Morgan, 2022:66). Therefore, the research is anticipated to produce credible results in a short space of time without any challenges in accessing data. It is also assumed that the use of the Lee and Colley review package (Lee, 1992; Lee *et al*., 1999) as an instrument of document analysis will ensure that credible and reliable results are produced. The assumption is based on the fact that this review package has been successfully used in many EIA quality review studies across the globe (Badr *et al*., 2011; Canelas *et al*., 2005; Lee *et al,* 1999; Sandham *et al*., 2008a: Sandham *et al*., 2013b) and its strengths and limitations are known. On the other side, it is understood that limitations are inherent in any methodology (Morgan, 2022:68). Possible methodological limitations of this study are:

- a biased collection of the study documents
- insufficient details in the reports about the subject matter and
- inability to retrieve the study documents as access to documents may be blocked deliberately (Yin, 1994:80).

For most accurate results, the Lee and Colley review method requires independent review, comparison and discussion of results by two reviewers to reach a reasonable consensus. In this study, there is only one reviewer and that may potentially limit the objectivity of the reviewer when deciding and allocating a performance grade to a particular review area. In trying to maximise objectivity and credible results, the researcher will take into consideration and disclose all the assumptions and limitations encountered when conducting the review of the EIA reports.

3.6 Chapter summary

This chapter presented the methodology used in achieving the research objectives. The discussion commenced by detailing how the literature was conducted and from which sources it was obtained. This discussion was followed by discussing the qualitative research approach and

-method as main strategies that were used in this research. This was then followed by the detailed description of the Lee and Colley review package as the pragmatic tool that will be used to review the quality of EIA reports. Data collection, and analysis methods were also discussed in this chapter. The chapter concluded by discussing the methodological assumptions and limitations, while also discussing the ethical considerations of the study. The next chapter (Chapter 4) will present the results obtained by applying the research methodology presented in this chapter.

CHAPTER 4 RESULTS AND DISCUSSION

4.1 Introduction

Chapter Four presents the results of the quality review exercise conducted on the twenty-one (n=21) Environmental Impact Reports (EIRs) produced in the O.R. Tambo region of the Eastern Cape province. These Environmental Impact Assessment (EIA) reports were compiled for various infrastructure projects such as access roads and bridges, water and sanitation, housing, mixed-use developments, electrification, and telecommunication projects. The results are analysed and discussed to achieve the objectives of this study, which are: (1) To review the quality of sampled EIA reports using an adapted Lee and Colley review package, (2) To identify and analyse areas of strengths and weakness in the EIA reports and (3) To investigate whether the EIA reports meet the minimum legal requirements.

The presentation and discussion of the results start by presenting the results for the overall report quality of the complete research sample (n=21), followed by the results for the report quality of the review areas and categories, respectively. After the results of all four Review Areas have been presented, areas of strengths and weaknesses are identified and presented. This is followed by a discussion of the overall results of the study, linking the results with the objectives and literature reviewed and discussed in Chapter 2. Because of the vast amount of information encapsulated at the sub-category level, not every sub-category is mentioned during the discussion, however sub-categories of special interest and those in question are referenced during discussions.

4.2 Overall report quality results

This section presents the results of the overall report quality reviewed based on the sample size of twenty-one (n=21) EIA reports of the infrastructure projects conducted in the O.R Tambo region of the Eastern Cape that was reviewed. The EIA report review results illustrated that the majority of the EIA reports (71%; n=15) were of satisfactory quality (A–C), while 29% (n=6) of the reports were found to be of an unsatisfactory quality (D–F) (see Figure 8 below).

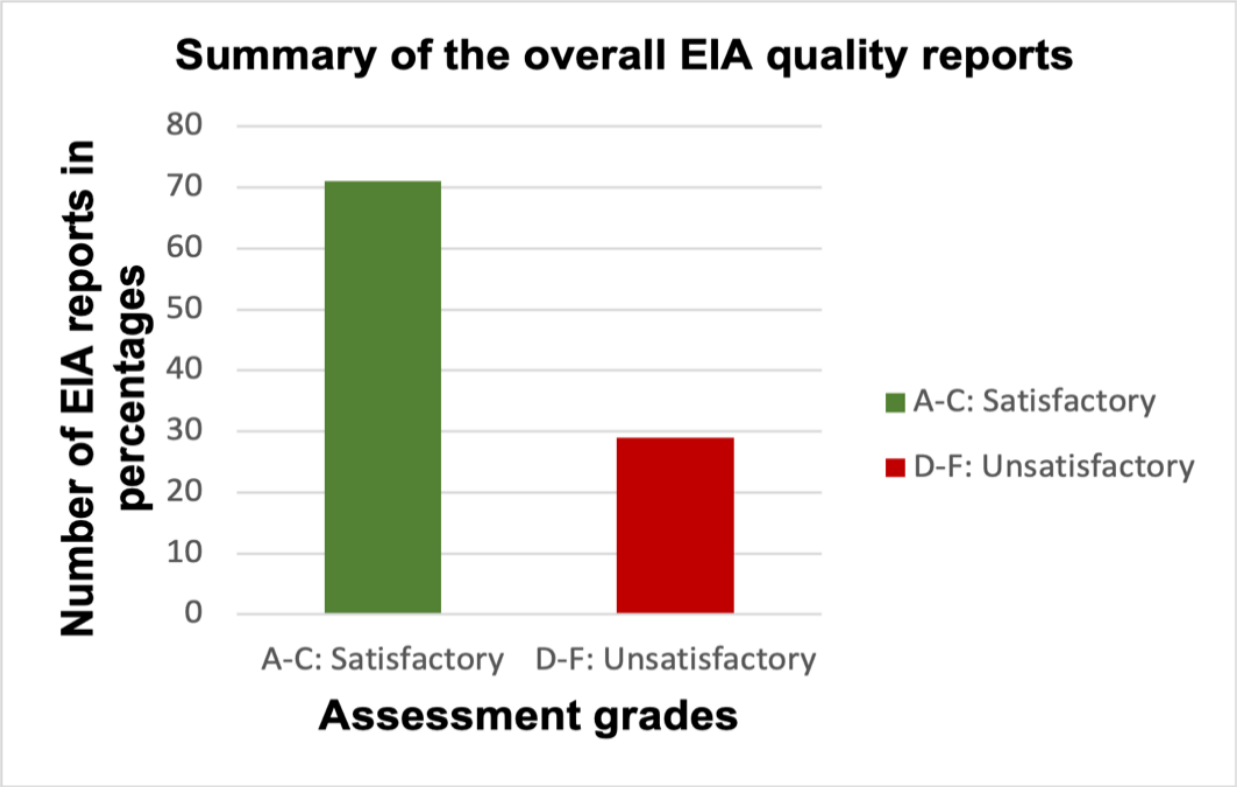

Figure 8: Graph showing summary of the overall quality of EIA reports.

Of the 71% (n=15) of the reviewed EIA reports with satisfactory quality (presented in Figure 8 above), four EIA reports (27%; n=4) were well performed (A), six EIA reports (40%; n=6) show that the quality is satisfactory (B), and five reports (33%; n=5) being just satisfactory (C) (Figure 9). When looking at the overall unsatisfactory results (D-F), which account for six reports (29%; n=6) of the overall sample, all six EIA reports (100%) were graded as just unsatisfactory (D). None of the reports were graded as either not satisfactory (E) or very unsatisfactory (F) (Figure 9).

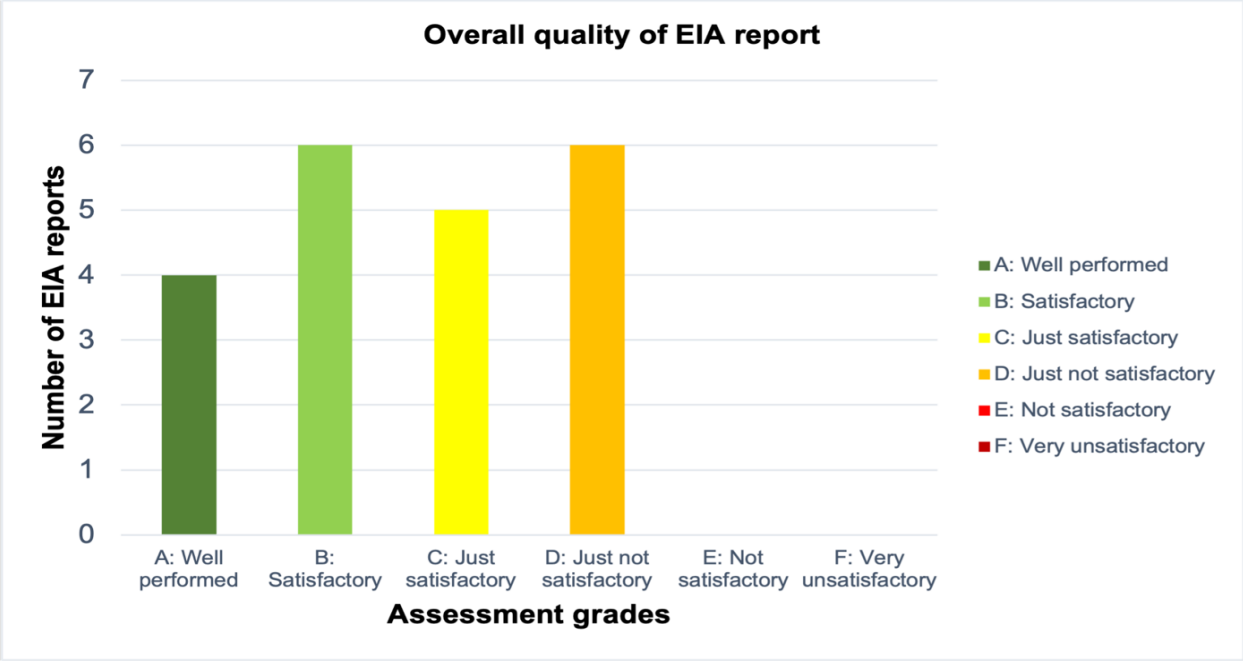

Figure 9: Details of the overall quality of EIA reports.

Overall, the best performed review area was Review Area 1 (i.e. Description of the development, local environment and baseline conditions), with 90% (n=19) of the reports graded in this area as satisfactory (A-C) (see Figure 10).

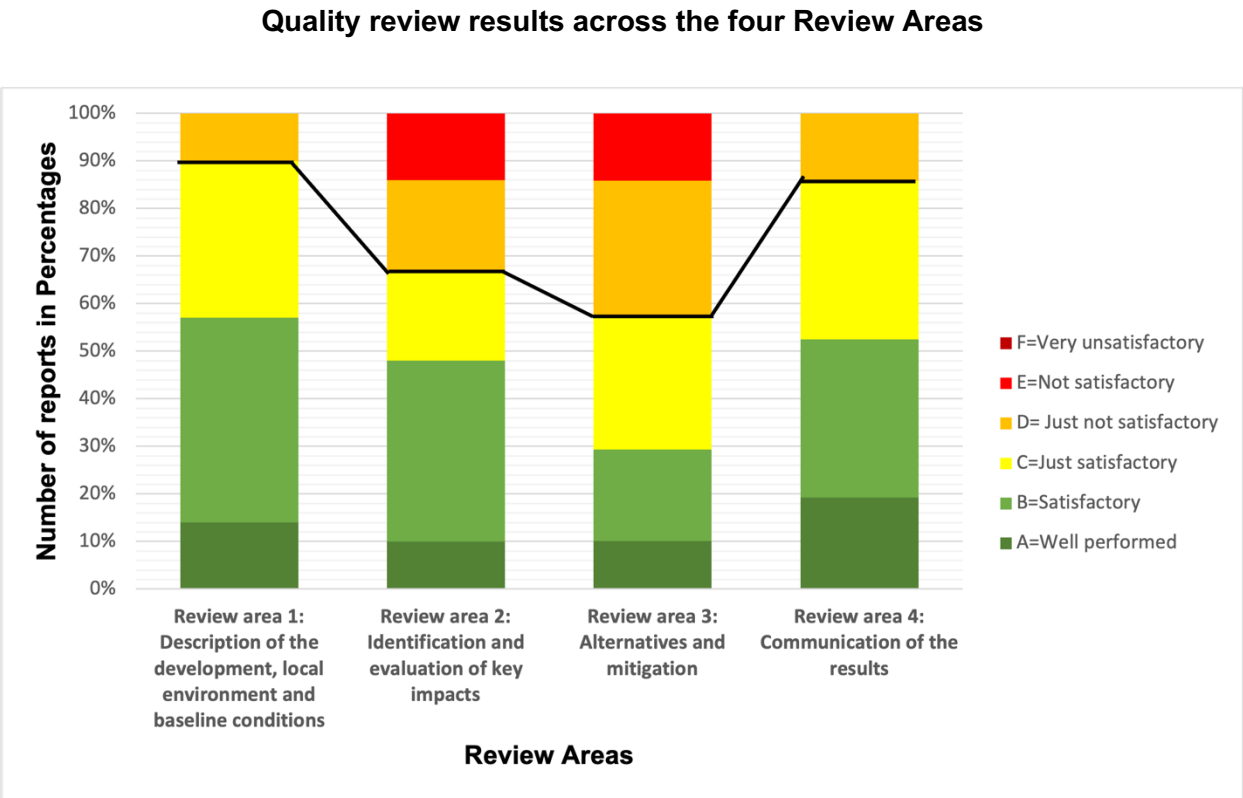

Figure 10: Quality review results of the four Review Areas.

The results illustrated in Table 5 below demonstrate the second-best performed review area as Review Area 4 (i.e. Communication of the results) with 86% (n=18) of the reports graded in this review area as satisfactory, while the lowest performed review area was demonstrated as Review Area 3 (Alternatives and mitigations) with only 57% (n=12) of the reports in this review area graded as satisfactory (see Figure 10 and Table 5).

Table 5: Quality review results of the four Review Areas and their categories.

	Number of reports (n)						**Percentage of reports (%)**			
Review Areas and categories	**A**	**B**	**C**	**D**	**E**	**F**	**A-C**	**D-F**	**A-B**	**E-F**
Review Area 1: Description of the development, local environment and baseline conditions	**3**	**9**	**7**	**2**	**0**	**0**	**90**	**10**	**57**	**0**
1.1. Description of development	5	7	7	1	0	1	90	10	57	5
1.2. Site description	1	7	9	2	2	0	81	19	38	10
1.3. Waste	1	7	8	3	1	1	76	24	38	10
1.4. Environment description	6	6	5	2	2	0	81	19	57	10
1.5. Baseline condition	8	5	3	4	1	0	76	24	62	5
Review Area 2: Identification and evaluation of key impacts	**2**	**8**	**4**	**4**	**3**	**0**	**67**	**33**	**48**	**14**
2.1. Definition of impacts	4	7	3	2	5	0	67	33	52	24
2.2. Identification of impacts	11	3	3	0	1	3	81	19	67	19
2.3. Scoping	5	9	2	4	1	0	76	24	67	5
2.4. Prediction of impact magnitude	2	5	6	2	0	6	62	38	33	28
2.5. Assessment of impact significance	0	6	6	3	1	5	57	43	28	28
Review Area 3: Alternatives and mitigations	**2**	**4**	**6**	**6**	**3**	**0**	**57**	**43**	**28**	**14**
3.1. Feasible alternatives should have been considered	1	3	4	3	2	8	38	62	19	48
3.2. Scope and effectiveness of mitigation measures	6	4	6	2	3	0	76	24	48	14
3.3. Commitment to mitigation	11	4	2	3	0	1	81	19	71	5
Review Area 4: Communication of the results	**4**	**7**	**7**	**3**	**0**	**0**	**86**	**14**	**52**	**0**
4.1. Layout of statement	2	6	12	1	0	0	95	5	0	0
4.2. Presentation	2	8	11	0	0	0	100	0	48	0
4.3. Emphasis	11	3	4	1	1	1	86	14	67	10
4.4. Non-technical summary	8	2	2	3	4	2	57	43	48	28

Following from the presentation of the overall quality of the EIA reports above, the next section will present the results of the four review areas, respectively.

4.3 The quality review results of the four review areas

This section presents the results for the quality review of each review area. The four review areas that are presented in this section include: (1) the description of the development, local environment and baseline conditions, (2) the identification and evaluation of key impacts, (3) alternatives and mitigations and (4) communication of the results. Each review area is presented with its categories and its sub-categories (see Tables 6-9).

4.3.1 Review Area 1: Description of the development, local environment and baseline conditions

This section illustrates the results obtained from assessing Review Area 1 that focused on the description of the development, local environment and the baseline conditions. The results demonstrating the performance of review areas are illustrated in Table 5, under Section 4.2 above. The results demonstrated that 90% (n=19) of the reports were satisfactory (A-C), making Review Area 1 the best performing review area. The best performance demonstrated in Review Area 1 can be attributed to the high satisfactory scores received by the categories under this review area. The results demonstrated in Table 6 below reveal that all the categories under Review Area 1 were graded as satisfactory (A-C), with the lowest satisfactory score of 76% (n=16). The results demonstrated in Table 6 below illustrate the best performed category under Review Area 1 as the *Description of the development* (Category 1.1), and received a satisfactory (A-C) grading of 90% (n=19), followed by *Site description* (Category 1.2) and *Environmental description* (Category 1.4), which both received satisfactory grading (A-C) of 81% (n=17). The worst performed categories were *Waste* (Category 1.3) and *Baseline conditions* (Category 1.5), as they both received a satisfactory grading (A-C) of 76% (n=16).

Most of the reports (90%) (n=19) were graded as satisfactory (A-C) for the description of the development (Category 1.1). Under Category 1.1, the design and the size of development (Sub-category 1.1.2) and identification of applicant (Sub-category 1.1.6) illustrated the best performance with 95% (n=20) of the reports graded as satisfactory for both sub-categories (Table 6). The worst performing sub-categories under this Category (1.1) were Sub-category 1.1.5, focusing on describing the nature and quantity of raw materials needed during different phases, followed by Sub-category 1.1.4, that described the nature of the production process intended to be employed in completed development and its expected rate of production. These sub-categories both received satisfactory grades of only 10% (n=2) and 14% (n=3), respectively (see Table 6 below).

Table 6: Showing results of the categories and sub-categories under Review Area 1.

	Number of reports (n)						Percentages of reports (%)			
Categories and sub-categories	**A**	**B**	**C**	**D**	**E**	**F**	**A-C**	**D-F**	**A-B**	**E-F**
Category 1.1: Description of the development	**5**	**7**	**7**	**1**	**0**	**1**	**90**	**10**	**57**	**5**
1.1.1. Purpose and objectives of development	3	3	8	4	1	2	67	33	28	14
1.1.2. Design and size of development	12	2	6	1	0	0	95	5	67	0
1.1.3. Physical presence and appearance of completed development within receiving environment	5	3	3	4	3	3	52	48	38	28
1.1.4. Nature of production processes intended to be employed in completed development and expected rate of production	3	0	0	1	0	4 NA=13	14	24	14	19 NA=62
1.1.5. Nature and quantity of raw materials needed during different phases	1	0	1	1	1	17	10	90	5	86
1.1.6. Identification of applicant	18	2	0	0	0	1	95	5	95	5
1.1.7. Details of EAP to carry out environmental impact assessment	8	4	2	3	0	4	67	33	57	19
Category 1.2: Site description	**1**	**7**	**9**	**2**	**2**	**0**	**81**	**19**	**38**	**10**
1.2.1. Land area taken up by development site	19	1	0	0	0	1	95	5	95	5
1.2.2. Description of demarcation of Land use areas	17	3	1	0	0	0	100	0	95	0
1.2.3. Estimated duration of different phases	1	1	1	0	0	18	14	86	10	90
1.2.4. Estimated number of workers and/or visitors entering development site, access to site and likely means of transport	0	2	1	9	4	5	14	86	10	43
1.2.5. Means of transporting raw materials/products to and from site and approximate quantities involved	1	1	4	5	5	5	28	72	10	48
Category 1.3: Waste	**1**	**7**	**8**	**3**	**1**	**1**	**76**	**24**	**38**	**10**
1.3.1. Estimated types and quantities of wastes and rate of production	9	3	4	2	1	2	76	24	57	14
1.3.2. Proposed handling/treatment, disposal and disposal routes to the environment	11	6	2	1	1	0	90	10	81	5
1.3.3. Methods of obtaining quantity of residuals and wastes	1	0	0	1	1	18	5	95	5	90
Category 1.4: Environmental description	**6**	**6**	**5**	**2**	**2**	**0**	**81**	**19**	**57**	**10**
1.4.1. Indication of likely area to be affected by development	7	7	5	2	0	0	90	10	67	0
1.4.2. Greater area to accommodate potentially significant effects occurring away from immediate affected environment	4	6	5	1	3	2	72	28	48	24
Category 1.5: Baseline environment	**8**	**5**	**3**	**4**	**1**	**0**	**76**	**24**	**62**	**5**
1.5.1. Identification and description of important components of the affected environment	12	3	4	1	1	0	90	10	71	5
1.5.2. Existing data sources searched and utilized	11	3	4	1	1	1	86	14	67	10
1.5.3. Local land use plans, policies consulted and other data collected to determine baseline conditions	6	4	2	1	0	8	57	43	48	38

The second category under Review Area 1 is the site description (Category 1.2). The results for Review Area 1 presented in Table 6 above illustrate that 81% (n=17) of the reports received a satisfactory grading (A-C), making this the second-best performing category under Review Area 1. Under this category, there are five sub-categories which are: Land area taken up by development site (Sub-category 1.2.1), description of demarcation of land use areas (Sub-category 1.2.2), estimated duration of different phases (Sub-category 1.2.3), estimated number of workers and/or visitors entering development site, access to the site and likely means of transport (Sub-category 1.2.4) and means of transporting raw materials/products to- and from the site and approximate quantities involved (Sub-category 1.2.5). The results presented in Table 6 demonstrate that the best performing sub-category was the *description of demarcation of land use areas* (Sub-category 1.2.2.). This Sub-category received a satisfactory grading (A-C) of 100% (n=21). The second-best performed sub-category was Sub-category 1.2.1, describing the area taken up by the development, which received a satisfactory grading (A-C) of 95% (n=20). The worst performing sub-categories were Sub-category 1.2.3, i.e. describing estimation of duration of different phases, and Sub-category 1.2.4, i.e. describing an estimated number of workers and or visitors entering the development site and their likely means of transportation. Both these sub-categories received only 14% (n=3) in satisfactory grades.

In Category 1.3, describing waste generated and handled, 76% (n=16) of the reports were graded as satisfactory (A-C). There are three sub-categories under Category 1.3, which are: Estimated types and quantities of wastes and rate of production (Sub-category 1.3.1), proposed handling/treatment, disposal and disposal routes to the environment (Sub-category 1.3.2) and methods of obtaining the quantity of residuals and wastes (Sub-category 1.3.3). The best performing sub-category was Sub-category 1.3.2, i.e. describing the proposed handling or treatment, disposal and disposal routes to the environment. This sub-category received a satisfactory grading of 90% (n=19) (Table 6). This is followed by Sub-category 1.3.1 that focused on describing the estimated types and quantities of waste and rate of production. Sub-category 1.3.1 received a satisfactory grading (A-C) of 76% (n=16). The worst performed sub-category under this category was Sub-category 1.3.3, the description of methods of obtaining residuals and waste, receiving a satisfactory grading of only 5% (n=1).

Similar to Category 1.2 above, the fourth category (Category 1.4), referring to environmental description, also received a satisfactory grading (A-C) of 81% (n=17) as demonstrated in Table 6 above. This category has only two sub-categories which are: Indication of likely area to be affected by development (Sub-category 1.4.1) and referring to greater area to accommodate potentially significant effects occurring away from the immediate affected environment (Sub-category 1.4.2) (see Table 6). Sub-category 1.4.1 that reviewed the description of the indication

of the likely impacts to be affected by the development received a satisfactory grading (A-C) of 90% (n=19), while Sub-category 1.4.2 that focused on the description of the greater area to accommodate potential significant effects occurring away from the immediate affected environment, received a satisfactory grading (A-C) of 71% (n=15).

The results of the last category under Review Area 1 (Category 1.5), which describes the baseline environment, indicated that 76% (n=16) of the reports received a satisfactory grading (A-C). There are three sub-categories under this category that include the identification and description of important components of the affected environment (Sub-category 1.5.1), existing data sources searched and utilized (Sub-category 1.5.2) and local land use plans, policies consulted and other data collected to determine baseline conditions (Sub-category 1.5.3). The results of these three sub-categories are demonstrated in Table 6 above and the best performing sub-category under this last category was Sub-category 1.5.1, followed by Sub-category 1.5.2 describing existing data sources searched and utilised. These sub-categories received satisfactory gradings (A-C) of 90% (n=19) and 86% (n=18), respectively. The last and the worst performing sub-category was Sub-category 1.5.3, describing local land use plans, policies consulted and other data collected to determine baseline conditions. This sub-category received a satisfactory grading (A-C) of only 57% (n=12).

4.3.2 Review Area 2: Identification and evaluation of key impacts

This section presents the quality review results of Review Area 2, which is the identification and evaluation of key impacts. This review area is made up of five categories and 15 sub-categories. The categories under this review area are demonstrated in Table 7 below as: Definition of impacts (Category 2.1), Identification of impacts (Category 2.2), Scoping (Category 2.3), Prediction of impacts (Category 2.4) and Assessment of impact significance (Category 2.5). The results of Review Area 2 illustrated in Table 7 reveal that 67% (n=14) of the reports were graded as satisfactory (A-C) making this review area the third best performing review area when compared to other review areas. The results illustrated in Table 7 indicate that the best performed category under this review area was Category 2.2 that received a satisfactory score (A-C) of 81% (n=17) of the reports, followed by Category 2.3 and Category 2.5, which both received a satisfactory grading (A-C) from 76% (n=16) of the reports. Category 2.4 also received a satisfactory rating (A-C) from 62% (n=13) of the reports, making it the weakest performing category under Review Area 2.

Table 7: Showing quality review results of categories and sub-categories under Review Area 2.

	Number of reports (n)						Percentage of reports (%)			
Categories and sub-categories	**A**	**B**	**C**	**D**	**E**	**F**	**%A-C**	**%D-F**	**%A-B**	**%E-F**
Category 2.1 Definition of impacts	**4**	**7**	**3**	**2**	**5**	**0**	**67**	**33**	**52**	**24**
2.1.1. Description of all possible impacts of project on the environment	7	8	3	3	0	0	86	14	72	0
2.1.2. Identify and describe interaction of impacts	5	5	2	3	1	4	62	38	52	24
2.1.3. Impacts arising from non-standard operating conditions	3	3	4	1	1	9	48	52	28	48
2.1.4. Impacts arising from deviation from baseline conditions	5	8	3	2	1	2	76	24	62	14
category 2.2: Identification of impacts	**11**	**3**	**3**	**0**	**1**	**3**	**81**	**19**	**67**	**19**
2.2.1. Impact identification methodology	13	3	1	0	1	3	81	19	76	14
2.2.2. Description of impacts identification methods	11	3	1	2	1	3	72	28	67	19
Category 2.3 Scoping	**5**	**9**	**2**	**4**	**1**	**0**	**76**	**24**	**67**	**5**
2.3.1. Genuine attempt to contact general public and special interest groups to appraise them of project	14	2	3	2	0	0	90	10	76	0
2.3.2. Arrangements to collect opinions and concerns of I&APs	12	4	1	4	0	0	81	19	76	0
2.3.3. Key impacts identified	3	2	6	5	1	4	52	48	24	24
Category 2.4: Prediction of impact magnitude	**2**	**5**	**6**	**2**	**0**	**6**	**62**	**38**	**33**	**28**
2.4.1.. Identification and description of important components of the affected environment	5	6	1	1	2	6	57	43	52	38
2.4.2. Existing data sources searched and utilized	6	5	3	0	2	5	67	33	52	33
2.4.3. Express predictions of impact in measurable quantities with confidence limits	5	2	1	0	2	11	38	62	33	62
Category 2.5: Assessment of impact significance	**8**	**5**	**3**	**4**	**1**	**0**	**76**	**24**	**62**	**5**
2.5.1. Description of significance of impacts on affected community and society in general (mitigation?)	12	3	1	0	1	4	76	24	72	24
2.5.2. Significance of impacts in terms of national and international quality standards	0	3	4	1	0	13	33	67	14	62
2.5.3. Justification of proposed method of assessing significance	1	3	3	4	1	9	33	67	19	48

The quality review results demonstrated in Table 7 above also demonstrate the performance of EIA reports at a sub-category level. These results indicate that the best performed sub-category under Category 2.1 was the description of all possible impacts of the project on the environment (Sub-category 2.1.1) with a satisfactory grading (A-C) of 86% (n=18) from the reports. This is followed by Sub-category 2.1.4, which describes the impacts arising from deviation from baseline conditions. This sub-category received a satisfactory grading (A-C) of 76% (n=16). The worst performed sub-category under this category is Sub-category 2.1.3, describing impacts resulting

from non-standard operating conditions which received a satisfactory grading (A-C) of only 48% (n=10) of the reports.

Category 2.2, referring to the identification of impacts, received satisfactory ratings (A-C) from 81% (n=17) of the reports. There are only two sub-categories under this category, as displayed in Table 7 above. These sub-categories, which refer to the impact identification methodology (Sub-category 2.2.1) and the description of impacts identification methods (Sub-category 2.1.2) both received satisfactory ratings (A-C) of 81% (n=17) and 72% (n=15), respectively. The third category (Category 2.3), which describes the scoping process, received a satisfactory rating of 76% (n=16). The results demonstrated that the best performing sub-category under this category was Sub-category 2.3.1, followed by Sub-category 2.3.2. These sub-categories both received satisfactory gradings (A-C) of 90% (n=19), and 81% (n=17), respectively. The sub-category that demonstrated the weakest performance for this category was Sub-category 2.3.3, which received a satisfactory grading (A-C) of only 52% (n=11).

Category 2.4 was the weakest performing category under Review Area 2, as it received a satisfactory grading (A-C) of only 62% (n=12) of the reports. This category also consists of three sub-categories, which are the identification and description of important components of the affected environment (Sub-category 2.4.1), description of the existing data sources searched and utilized (Sub-category 2.4.2) and expression of predictions of impacts in measurable quantities with confidence limits (Sub-category 2.4.3). The lowest performance in this category, when compared with other categories under Review Area 2, can be attributed to the low satisfactory scores received at the sub-category level. Even the best performing sub-category (Sub-category 2.4.2) received a satisfactory grading of only 67% (n=14) of the reports. Sub-category 2.4.1 received a satisfactory grading (A-C) of 57% (n=12), while Sub-category 2.4.3 received a satisfactory grading (A-C) of only 38% (n=8), making this sub-category the worst performed sub-category under Category 2.4.

The last category that formed part of the second review area (Category 2.5), was the second-best performing category under Review Area 2 that received a satisfactory (A-C) score in 76% (n=16) of the reports, making it equal to Category 2.3. Table 7 above demonstrate three sub-categories that formed part of this category. The first sub-category refers to the description of significance of impacts on the affected community and society in general (Sub-category 2.5.1) and received satisfactory gradings (A-C) of 76% (n=16) of the reports. Sub-category 2.5.2, which describes the significance of impacts in terms of national and international quality standards, and Sub-category 2.5.3, which describes justification of the proposed method of assessing significance, both received satisfactory gradings (A-C) of 33% (n=8) from the reviewed reports.

4.3.3 Review Area 3: Alternatives and mitigation

This section presents the results for Review Area 3 (Alternatives and mitigation) by looking at the categories under this review area. The overall results presented earlier in Section 4.2. indicated that this review area was the weakest performing review area (see Table 5), receiving only a 57% (n=12) satisfactory grading (A-C) from the reviewed EIA reports. There are three categories under this review area which are: Consideration of feasible alternatives (Category 3.1), Scope and effectiveness of mitigation measures (Category 3.2) and Commitment to mitigation (Category 3.3). The best performing category under this review area was Category 3.3, followed by Category 3.2 that were both graded as satisfactory (A-C) in 81% (n=17) and 76% (n=16) of the reports respectively. Category 3.1 was the worst performing category, receiving only 38% (n=8) satisfactory ratings (A-C) (see Table 8 below).

Table 8: Showing quality review results of categories and sub-categories under Review Area 3.

	Number of reports (n)						Percentage of reports (%)			
Categories and sub-categories	**A**	**B**	**C**	**D**	**E**	**F**	**A-C**	**D-F**	**A-B**	**E-F**
Category 3.1.Feasible alternatives should have been considered	**1**	**3**	**4**	**3**	**2**	**8**	**38**	**62**	**19**	**48**
3.1.1. Consideration/description of alternative sites	4	2	2	0	1	10 (NA=2)	38	52	28	52
3.1.2. Consideration/description of alternative processes, designs and operating conditions	5	3	1	0	3	7 (NA=2)	42	48	38	48
3.1.3. For unexpectedly severe adverse impacts identified	1	0	1	0	1	18	10	90	5	90
3.1.4. Comparative assessment of all alternatives identified	1	1	3	3	2	11	24	76	10	62
Category 3.2. Scope and effectiveness of mitigation measures	**6**	**4**	**6**	**2**	**3**	**0**	**76**	**24**	**48**	**14**
3.2.1. Consider mitigation of all significant adverse impacts	12	4	3	2	0	0	90	10	76	0
3.2.2. Mitigation measures considered should include	0	6	4	5	4	2	48	52	28	28
3.2.3. Extent of effectiveness of mitigation when implemented	6	7	3	0	0	5	76	24	62	24
Category 3.3. Commitment to mitigation	**11**	**4**	**2**	**3**	**0**	**1**	**81**	**19**	**71**	**5**
3.3.1. Clear record of commitment of developer to mitigation measures	8	7	2	1	3	1	81	19	57	14
3.3.2. Monitoring arrangements should be proposed in draft EMP	11	4	1	3	1	1	76	24	57	10

Category 3.1 was the lowest performing category out of the four sub-categories, under Review Area 1, receiving a satisfactory score (A-C) of only 38% (n=8). None of the sub-categories have received a satisfactory score that is greater than 50% under Category 3.1. The best performing sub-category in this first category was Sub-category 3.1.2, which describes the consideration of

alternative processes, designs and operating conditions, which received a satisfactory grading of 43% (n=9), followed by Sub-category 3.1.1 (Consideration and description of alternative sites) which received a satisfactory grading (A-C) of only 43% (n=8). The lowest performing sub-category focused on the identification and description of unexpected severe impacts (Sub-category 3.1.3), which requires that there must be mitigation measures for offering pollution control and compensation. This sub-category received a satisfactory grading of 10% (n=2), making it the worst performing sub-category across all the review areas. The weak performance in this category might be attributed to the fact that sub-categories such as Sub-category 3.1.1 and Sub-category 3.1.2 had cases that were not applicable (N/A) in the reports being reviewed (see Table 8).

Category 3.2, describes the scope and effectiveness of mitigation measures and constitutes three sub-categories as illustrated in Table 8 above. This category is the second-best performing category that formed part of Review Area 3 (Table 8) with a satisfactory grade (A-C) of 76% (n=16). The results illustrated in Table 8 demonstrate that the first sub-category under Category 3.2. which is Sub-category 3.2.1 that refers to the mitigation of all significant adverse impacts, was the best performing sub-category. Sub-category 3.2.1 received a satisfactory score (A-C) of 90% (n=19). This is followed by Sub-category 3.2.3 that describes the extent of the effectiveness of the mitigation measures when implemented and received a satisfactory score of 76% (n=16). The lowest performing sub-category under this category was Sub-category 3.2.2, which states that mitigation measures should include pollution control and compensation as it received a satisfactory score of only 48% (n=10).

The results illustrated in Table 8 above further demonstrate that Category 3.3, which describes the commitment to mitigation, was the best performing category under Review Area 3 with 81% (n=17) of the reports describing it as satisfactory (A-C). Under this category, there are only two sub-categories which are a clear record of commitment of the developer to mitigation measures (Sub-category 3.3.1) and that monitoring arrangements should be proposed in the draft Environmental Management Program (EMPr) (Sub-category 3.3.2). Both these sub-categories received satisfactory scores of 81% (n=17) and 76% (n=16), respectively.

4.3.4 Review Area 4: Communication of the results

This section presents the quality review results of the last review area namely, Review Area 4. The overall results presented earlier in Table 5 of Section 4.2 above, demonstrated that this review area is the second-best performing review area in the presentation of the overall results.

This review area received satisfactory grades (A-C) of 86% (n=18). Review Area 4 is further made up of four categories which are: Layout of the statement (Category 4.1), Presentation (Category 4.2), Emphasis (Category 4.3), and Non-technical summary (Category 4.4).

Table 9: Showing quality review results of categories and sub-categories under Review Area 4.

	Number of reports (n)						Percentage of reports (%)			
Categories and sub-categories	**A**	**B**	**C**	**D**	**E**	**F**	**A-C**	**D-F**	**A-B**	**E-F**
Category 4.1. Layout of statement	**2**	**6**	**12**	**1**	**0**	**0**	**95**	**5**	**0**	**0**
4.1.1. Introduction and aims of the assessment	0	5	8	6	1	1	62	38	24	10
4.1.2. Arrangement of information	6	6	8	1	0	0	95	5	57	0
4.1.3. Chapter summaries	0	9	3	5	4	0	57	43	43	19
4.1.4. Reference of external sources	7	9	3	1	1	0	90	10	76	5
Category 4.2. Presentation	**2**	**8**	**11**	**0**	**0**	**0**	**100**	**0**	**48**	**0**
4.2.1. Presentation of Information	2	13	6	0	0	0	100	0	71	0
4.2.2. Technical terms, acronyms, initials defined	5	5	6	4	1	0	76	24	48	5
4.2.3. Statement presented as an integrated whole	6	5	3	4	2	1	67	33	52	14
Category 4.3. Emphasis	**11**	**3**	**4**	**1**	**1**	**1**	**86**	**14**	**67**	**10**
4.3.1. Prominence and emphasis to potentially severe impacts	10	4	3	0	3	1	81	19	67	19
4.3.2. Statement must be unbiased	13	4	1	0	0	3	86	14	67	19
4.3.3. Opinion as to whether the activity should/should not be authorized	11	2	3	1	1	0	76	24	62	14
Category 4.4. Non-technical summary	**8**	**2**	**2**	**3**	**4**	**2**	**57**	**43**	**48**	**28**
4.4.1. Data used to estimate magnitude of main impacts and gaps in data clearly indicated	6	4	1	1	6	3	52	48	48	42
4.4.2. Methods predicting impact magnitude clearly described	7	3	2	2	5	2	57	43	48	33

Category 4.1, which presents the layout of the statement, is illustrated in Table 9 above as the second-best performing category under Review Area 4. This is because it received a satisfactory grading (A-C) of 95% (n=20) of the reports. There are four sub-categories that formed part of this first category of Review Area 4. The best performing sub-category of the four was Sub-category 4.1.2, which focused on describing the arrangement of information, with 95% (n=20) of the reports graded as satisfactory (A-C) for this sub-category. The second-best performing sub-category (Sub-Category 4.1.4), which is referring to referencing external sources, received a satisfactory rate of 90% (n=19). The worst performed sub-category was Sub-category 4.1.3, describing chapter summaries, and it only received a satisfactory grading (A-C) of 57% (n=12) from the reviewed reports.

Category 4.2, which refers to the presentation, demonstrated that 100% (n=21) of the reports were graded as satisfactory for this category, making it the best performed category of Review Area 4. There are three sub-categories under Category 4.2 which are describing the presentation

of the information (4.2.1), reference to the definition of technical terms, acronyms and initials (4.2.2) and presentation of the statement (4.2.3). The results demonstrated in Table 9 illustrated that Sub-category 4.2.1, describing the presentation of the information, was the best performing sub-category. This is because this sub-category received a satisfactory grading (A-C) in all the sampled reports (100%; n=21). The second-best performing sub-category (4.2.2), which refers to the definition of technical terms, acronyms and initials, received satisfactory scores (A-C) of 76% (n=16) from the reviewed reports, while the sub-category implying that the statement must be presented as an integrated whole (4.2.3), received only a 67% (n=14) satisfactory score (A-C), making it the worst performing sub-category under Category 4.2.

Category 4.3 represents the results of the emphasis, as demonstrated in Table 9, and received a satisfactory grading (A-C) of 86% (n=18) of the reports. Under this category there are three sub-categories, and the best performing sub-category was Sub-category 4.3.2 that implied that statements must be unbiased, receiving satisfactory grades (A-C) of 86% (n=18). The second-best performing sub-category was Sub-category 4.3.1, which describes prominence and emphasis on potentially severe impacts, followed by Sub-category 4.3.3 describing the opinion as to whether the activity should or should not be authorised. These sub-categories received satisfactory gradings (A-C) of 81% (n=17) and 76% (n=16), respectively.

The last category reviewed under Review Area 4 was the presentation of the non-technical summary (Category 4.4) and it was the worst performing category of Review Area 4 with only 57% (n=12) of the reports receiving satisfactory grades for this category. There are two sub-categories under Category 4.4 of this review area. The best performing sub-category was Sub-category 4.4.2, describing methods of predicting impact magnitude that received a satisfactory grading (A-C) of 57% (n=12) from the reviewed reports. The last and the weakest performing sub-category of Category 4.4, was Sub-category 4.4.1, indicating the data used to estimate the magnitude of main impacts and gaps. This sub-category came just below the best performing sub-category with five grades, receiving only a 52% (n=11) in satisfactory grades (A-C).

4.4 Areas of strengths and weaknesses on EIA reports reviewed

This section seeks to address Research Objective 2, as presented earlier in Chapter 1, Sub-section 1.3. The response to the objective is done through the presentation of the areas of strengths and weaknesses observed when grading the performance of EIA reports using the Lee and Colley review package. Areas of strengths and weaknesses were determined by calculating

the percentages of A and B (very satisfactory performance), and E and F (very unsatisfactory performance) grades across all the review areas, categories and sub-categories.

Table 10: Showing areas of strengths and weaknesses across the four Review Areas of the Lee and Colley review package.

Strengths	**%A-B**	**Weaknesses**	**%E-F**
1.1.6. Identification of applicant	95	1.1.5. Nature and quantity of raw materials needed during different phases	86
1.2.1. Land area taken up by development site	95	1.2.3. Estimated duration of different phases	90
1.2.2. Description of demarcation of Land use areas	95	1.3.3. Methods of obtaining quantity of residuals and wastes	90
2.2.1. Impact identification methodology	76	3.1.3. For unexpectedly severe adverse impacts identified	90
2.3.1. Genuine attempt to contact general public and special interest groups to appraise them of project	76		
2.3.2. Arrangements to collect opinions and concerns of I&APs	76		
3.2.1 Consider mitigation of all significant adverse impacts	76		
4.1.4 Reference of external sources	76		

The categories and sub-categories that received very satisfactory grades (A-B) from 75% and above of the reports, were categorised as areas of strengths, while those categories and sub-categories received very unsatisfactory grades (E-F) from 75% of the reports were then categorised as areas of weaknesses (see Table 10 above). In other previous quality review studies conducted in South Africa (Mbhele, 2009; Sandham & Pretorius, 2008; Sandham *et al.*, 2008b; Sandham *et al.*, 2013a; Sandham *et al.*, 2013b; Van Heerden, 2010), areas that received 50% and more of A and B grades, and E and F grades, were regarded as strengths and weaknesses, respectively. This study has also used a similar method of determining strengths and weaknesses despite the different thresholds used, which is 75% in the context of this study.

The results obtained from reviewing the sample of EIA reports of infrastructure projects in the O.R. Tambo region of the Eastern Cape province demonstrated that there were more strengths than weaknesses across different categories and sub-categories. The results as illustrated in Table 10 above indicate that Review Areas 1 and 2 had more strengths, with each Review Area

featuring three sub-categories classified as strengths. This is followed by Review Areas 3 and 4, demonstrating one sub-category each classified as a strength. The results demonstrated in Table 10 also reveal that Review Area 1 demonstrated more weaknesses than any other area, with three sub-categories classified as weaknesses. There was only one sub-category under Review Area 3 that was classified as a weakness. Review Areas 2 and 4 did not demonstrate any areas of weakness.

The majority of the reports (95%; n=20) highlighted sub-categories such as (1.1.6) identification of the applicant, (1.2.1) land area taken by the development site, and (1.2.2) description of demarcation of land use areas, as areas of strengths (A and B). Additionally, 76% (n=16) of the reports highlighted sub-categories of (2.2.1) impact identification methodology, (2.3.1) genuine attempts to contact the general public and special interest groups to appraise them of project, (2.3.2) arrangements to collect opinions and concerns of Interested and Affected Parties (I&APs), (3.2.1) consideration of mitigation of all significant adverse impacts and (4.1.4) referencing of external sources as areas of strength as well (A and B).

Sub-categories such as the (1.2.3) estimated duration of different phases, (1.3.3) methods of obtaining the quantity of residuals and wastes, and for unexpectedly severe adverse impacts identified were all highlighted as areas of weakness (E and F) in 76% (n=16) of EIA reports. Sub-category (1.1.5) describing the nature and quantity of raw materials needed during different phases was also highlighted as an area of weakness (E and F) in 86% (n=18) of the reports.

Given the results demonstrated in Table 10 above, the quality review exercise revealed more strengths than weaknesses in overall, culminating in the justification of the overall quality review results presented in Section 4.2 above, indicating that the quality of EIA reports was satisfactory. However, areas of strengths and weaknesses have different levels of importance in influencing the quality of EIA reports and subsequently the decision making, therefore the below discussion will include the seriousness of the strengths and weaknesses.

4.5 Discussion of results

This section presents the discussion of the results of this study. The discussion of the results starts at the overall review area level, to review areas. The discussion further extends to the strengths and weaknesses observed. During the discussion of results, a comparison is made to other quality review results previously conducted internationally, regionally and nationally. This section concludes by highlighting whether the reviewed reports met the minimum legal requirements.

4.5.1 Discussion of the overall quality results

The findings on the quality review of the EIA reports for this study conducted in the O.R. Tambo region of the Eastern Cape province indicated that the overall quality of the EIA reports was satisfactory (A-C). The findings revealed that 71% of the EIA reports were of satisfactory quality (A-C). Within this satisfactory performance of 71% (n=15), the majority (40%; n=6) of the reports were graded as satisfactory (B). The remaining 29% (n=6) of the overall quality review results were graded as unsatisfactory (D-F). However, when looking at the details of the unsatisfactory results of 29% (n=6), all six reports were graded as being of just unsatisfactory quality (D). These just unsatisfactory performance reports (n=6) still provide meaningful information for decision making as most parts of the reports were well attempted despite having some omissions or inadequacies. Looking at these findings, an assumption can be made that the decision to issue environmental authorisations for the infrastructure projects in the O.R. Tambo region of the Eastern Cape province was made based on reasonable sound and enough information (EIA reports), although there were some omissions and inadequacies.

The satisfactory quality review findings highlighted in the paragraph above are not new in the discipline of EIA quality review exercises. Various studies conducted both internationally (Barker & Woods:1999; Canelas *et al*., 2005; Lee *et al*., 1999), regionally (Anifowose *et al.* 2016; Badr *et al*., 2011; Barimah, 2014:143) and nationally (Hallatt *et al*., 2015; Kruger & Chapman, 2005; Mbhele, 2009; Sandham *et al*., 2005; Sandham & Pretorius, 2008; Sandham *et al*., 2008a; Sandham *et al*., 2008b; Sandham *et al*., 2013b; Sandham *et al*., 2020; Swanepoel *et al*., 2019; Wylie *et al*., 2018) also concluded that the overall quality of EIA reports was satisfactory.

Findings of the international quality review studies conducted in eight European nations, as presented in the literature review (Chapter 2) in section 2.7.3, concluded that an average of 70% of the EIA reports were graded as satisfactory. These findings are very similar to those of this research, where 71% of the reports were graded as satisfactory. Additionally, the quality review results of the studies conducted in regional countries such as Ghana, Nigeria and Egypt demonstrated that the quality of the EIA reports was satisfactory (Anifowose *et al.,* 2016; Badr *et al*., 2011; Barimah, 2014:143). The findings of the study conducted by Barimah (2014) in Ghana illustrated that 93% of the reports were graded as satisfactory, while the results of the study conducted by Anifowose *et al. (*2016) in Nigeria indicated that only 52% of the reports were graded as satisfactory. The results of the study conducted by Badr *et al*. (2011) in Egypt were the closest results to those of this study, with 69% of the reports graded as satisfactory compared to 71% of satisfactory levels of this study as demonstrated earlier in Figure 6 above.

Similarly, the results of the quality review studies conducted in South Africa, as presented in the literature review, also demonstrated satisfactory results (Hallatt *et al*., 2015; Kruger & Chapman, 2005; Mbhele, 2009; Sandham *et al*., 2005; Sandham & Pretorius, 2008; Sandham *et al*., 2008a; Sandham *et al*., 2008b; Sandham *et al*., 2013b; Sandham *et al*., 2020; Sebetlele, 2018; Swanepoel *et al*., 2019; Wylie *et al*., 2018). In a study conducted by Mbhele (2009) on the housing sector in the Nkangala District of the Mpumalanga province, the results demonstrated that 73% of the reports were graded as satisfactory. Hallatt *et al*. (2015) and Swanepoel (2016) conducted their quality review studies on the biodiversity sector and the results indicated that the quality of EIA reports was satisfactory, receiving satisfactory grades of 73% and 81%, respectively. The results of the quality review study conducted by Sandham *et al*. (2020), on EIA reports in the South African National Parks, illustrated that the reports received satisfactory grades on 92% of the reports, while Sebetlele's study (2018) conducted in the transport sector demonstrated satisfactory results as well, although with no percentage grading. Quality review studies were also conducted in different provinces, such as the Free state, Limpopo and North-West provinces (Kruger & Chapman, 2005; Sandham & Siphugu, 2005; Sandham & Pretorius, 2008), and all these results presented similar results of satisfactory quality with shortcomings mainly in Review Areas 2 and 3 (Kidd *et al*., 2018:1270).

The discussion above indicated that the quality of EIA reports was satisfactory and these results were found to be similar to the results of the studies conducted in European nations, Africa and South Africa in particular. This satisfactory performance can be attributed to two reasons, which are that all these countries mentioned above (eight European nations, Nigeria, Ghana, Egypt and South Africa) have (1) EIA legislation, and (2) the experience to implement it. These reasons are evident in the literature presented earlier in Chapter 2 (Section 2.2), which indicated that the EIA practice originated in the United States (US) through the enactment of the National Environmental Policy Act (NEPA) in the early 70s (Mounir, 2015:89). The stance on EIA practice was followed by European nations through the development and implementation of EIA legislation known as the Directive 85/337EEC in 1988 (Barker & Wood, 1999:387; Lee, 1995:77). EIA practice further trickled down to African countries when they developed their EIA legislation from the 80s to the mid 90s. Algeria led the development and implementation of EIA legislation in Africa in 1983, followed by Tunisia in 1988, South Africa in 1989 and Ghana, Nigeria and Egypt from the early to the mid 90s (El-Fadl & El-Fadel, 2004:559). These developments resulted in a safe assumption that all the reviewed EIA reports were developed in compliance with the EIA legislation and implementation guidelines, and that this has led to a more uniform and standard way of developing EIA reports. Hence, the quality of the produced reports was satisfactory in 71% (n=15) of the reports. Furthermore, as the EIA legislation, through its regulations, gives guidance on the process and contents of the reports, it is assumed that it makes it easy for Environmental

Assessment Practitioners (EAPs) to develop reports that include all the required information to influence the quality. Lastly, since all the reports were all developed after 2014, it is safe to argue that reports reflect body of practitioners.

4.5.2 Review Areas results discussion

When looking at the quality review results at a review area level, the best performing review area is demonstrated in Table 6 as Review Area 1, receiving satisfactory grades (A-C) for 90% (n=19) of the reports. The best performance of Review Area 1 is evident in other quality review studies previously conducted globally. These include the results of the studies conducted in eight European nations by Lee *et al*. (1999), Barker and Woods (1999), and Canelas *et al.* (2005). These similar best performance results of Review Area 1 trickled to African and South African studies as well. This is evident in the studies conducted by Barimah (2014) in Ghana and Badr *et al*. (2011) in Egypt, where Review Area 1 was graded as the best performing area on 100% and 93% of the reports respectively. The results of the South African quality review studies also revealed Review Area 1 as the best performing review area (Kruger & Chapman, 2005; Mbhele, 2009; Sandham *et al*., 2020; Sandham & Siphugu, 2005; Sandham & Pretorius, 2008; Sebetlele, 2018).

Similar to Review Area 1, Review Area 4 is illustrated in Table 9 above as the second-best performing Review Area after Review Area 1, with 86% (n=18) of the reports receiving satisfactory grades (A-C). The best performance results presented in Section 4.3.4 above are not unfamiliar. These results were also observed in other quality review studies reviewed during the literature review process presented in Chapter 2 (Section 2.7.3). Quality review studies conducted in eight European nations by Lee *et al*. (1999), Barker and Woods (1999) and Canelas *et al.* (2005) revealed that an average of 80% of the reports received satisfactory grades for Review Area 4, while Anifowose *et al*. (2016) in a quality review study conducted in Nigeria revealed the communication of the results as the second best performing review area, without indicating the grading percentage. The South African quality review studies conducted by Kruger and Chapman (2005), Sandham and Siphugu (2005), Sandham and Pretorius (2008), Sandham *et al*. (2020) and Sebetlele (2018) also revealed Review Area 4 as the best performing review area after Review Area 1.

The impressive performance in Review Area 4 can be attributed to how well the communication- and presentation of the results were conducted across the EIA reports. The following categories and sub-categories were well described and performed and the conclusion can be made from these results that they were the main contributors to the best performance achieved in this review area. These include Category 4.1 describing the layout of the statement that received a

satisfactory score of 95%, Category 4.2 describing presentation at 100%, Category 4.3 describing emphasis at 86%, and sub-categories, such as 4.1.2, referring to the arrangement of information at 95%, 4.1.4 referring to referencing of external sources at 90%, 4.2.1 and 4.3.2 which describes the nature of the impact statement weather is biased or not at 86% satisfactory scores.

The best performance for Review Area 1 and Review Area 4 demonstrated in Table 6 can be attributed to the guidance given by the EIA legislation on the processes and contents of the EIA reports. The fact that Review Areas 1 and 4 present information that is descriptive, compared to analytical information presented in Review Areas 2 and 3, also makes it easy to present information. This is because the EIA report development process is structured such that it describes the baseline environment, activity and the site and general surrounding environment in which the proposed development will take place. Specialist studies developed as part of the EIA report also provide much needed information to describe the environment and baseline conditions, making it easy for Review Area 1 to be well described. Regarding Review Area 4, EIA regulations give a clear guidance on the contents of the EIA report and how the information must be presented. Guidelines for implementation of EIA regulations provide advice on how the EIA report should be developed and its contents. Therefore, a conclusion can be made that EIA regulations played an important role in the satisfactory quality review results and the best performance achieved in Review Areas 1 and 4.

By contrast, the results of this study, as illustrated in Table 7 and Table 8 above, demonstrated that Review Areas 2 and 3 were slightly weaker than Review Areas 1 and 4. This low performance can be linked to the low performance that was observed in the sub-categories level. Sub-categories such as 3.1.3, 3.1.4 and 3.1.1 received satisfactory grades (A-C) that are as low as 10% (n=2), 24% (n=5) and 38% (n=8) respectively. Despite the low satisfactory score, Review Areas 2 and 3 also demonstrated some strengths in sub-categories such as 2.3.1 (n=90%), 2.1.1 (n=86%), 3.2.1 (n=90%) and 3.3.1 (n=81%). The low performance demonstrated in Review Areas 2 and 3 can be attributed to the fact that both these review areas are the analytical areas, as compared to Review Areas 1 and 4, which are more descriptive. Furthermore, analysing information might not be every EAP's strength, and this might have led to low performance in these review areas. Although the EIA regulations provided guidance on the process and contents of the EIA reports, these two review areas did not perform as well as Review Areas 1 and 4. This weaker performance in the analytical areas (Review Areas 2 and 3) might be attributed to the absence of implementation guidelines for the NEMA 2014 EIA regulations, as amended.

4.5.3 Discussion of the areas of strengths and weaknesses

Research Objective 2, presented earlier in Chapter 1 (sub-section 1.3), seeks to identify and analyse areas of strengths and weaknesses in the EIA reports reviewed. Although the results of this quality review study revealed that the performance of the EIA reports was satisfactory, Table 10 demonstrated that the reports also showed some areas of strengths and weaknesses in different sub-categories.

In addressing the second objective of this study, the results identified the following areas of strengths and weaknesses:

The strengths were found in sub-category 1.1.6, i.e. describing the identification of applicants, as this area was graded by 95% (n=20) of the reports as very satisfactory (A-B). Sub-category 1.2.2 that described the demarcation of land use areas was also graded by 95% (n=20) of the report as very satisfactory (A-B). Sub-category 2.2.1 presenting the impact identification methodology, sub-category 2.3.1 describing the genuine attempt to contact the general public and special interest groups to appraise them of projects, sub-category 2.3.2 describing the arrangements to collect opinions and concerns of Interested and Affected Parties (I&APs), and sub-category 3.2.1 describing the consideration of the mitigation of all significant adverse impacts were all graded as very satisfactory (A-B grades) in 76% (n=21) of the reports. Sandham *et al*. (2020) in their study identified strengths similar to these strengths identified in this study as presented above.

The results of this study also presented some weaknesses which, were found in sub-category 1.1.5 that described the nature and quantity of raw materials needed during different phases, and sub-category 1.3.3 describing methods of obtaining the quantities of residuals and wastes. These sub-categories were graded as very unsatisfactory (E-F), in 86% and 90% of the cases respectively. Sandham *et al*. (2020) also identified two similar weaknesses to those in sub-categories 1.1.5 and 1.3.3. Sub-category 1.2.3 describing the duration of different phases, and sub-category 3.1.3 describing unexpectedly severe adverse impacts identified, were both graded as very unsatisfactory (E-F) in 90% (n=19) of the reports.

Mbhele's (2009) study also shared some similar findings that are related to strengths and weaknesses. The sub-categories with similar strengths were 3.2.1, 2.2.1, and 1.2.2, while the sub-categories with similar weaknesses were 3.1.3 and 1.2.3. Sandham *et al*. (2008a) and Sandham *et al.* (2013b) shared some strengths and weaknesses. These areas of similarities for strengths were found in sub-categories 3.2.1, 2.3.2, and 4.1.1 and the weaknesses were found in sub-categories such as 1.3.3, 3.1.3 and 1.2.3.

The results of this study in Table 10 demonstrated eight strengths, with three of them found under Review Area 1. This can be attributed to the fact that the sub-categories that demonstrated these strengths were more descriptive of basic information that is usually captured in this EIA report. For instance, sub-category 1.1.6 describing the identification of applicants, sub-category 1.2.2 describing the demarcation of land use areas, and sub-category 1.2.1 describing the land area taken up by development sites, contain the basic necessary information that is required by the Competent Authority (CA) to be supplied even during the application. This information was central to the conceptualisation of the application, as it tells the authority who is developing, where the development is going to be located and what the size of the development will be.

The strengths identified under Review Area 2 were also demonstrated in sub-categories that were indicative of the methods or procedures to be followed when identifying impacts rather than the actual process of identifying impacts. Therefore, it was easy to just indicate the method of identifying impact, arrangements to collect opinions and showing that the attempt was made to contact the public. Although Review Area 2 is analytical, these three sub-categories hosting strengths seem to be just descriptive of the process and methods rather than being analytical. This can be regarded as the reason Review Area 2 demonstrated numerous areas of strengths, although it was the weakest performing review area when compared to others.

Review Areas 3 and 4 demonstrated one area of strength each and these were found in sub-categories that were also not analytical which are Sub-category 3.2.1, i.e. considering mitigation of all significant adverse impacts, and sub-category 4.1.4 that refers to the referencing of external sources. Mitigation of significant impacts is an integral part of the main objective of the EIA exercise and there is no way a credible report would not include this information. Additionally, referencing sources is a critical element of writing a credible and a verifiable document, therefore referencing could not easily be omitted in the EIA reports. These can be regarded as the reasons why sub-categories 3.2.1 and 4.1.4 were regarded as strengths.

Table 10 also demonstrated areas of weaknesses identified in the EIA reports and three of these weaknesses were identified in sub-categories 1.1.5, 1.2.3 and 1.3.3 under Review Area 1. These sub-categories describe more engineering related aspects, such as the nature and quantity of raw materials that will be needed during different phases of the project, the duration of different phases of the project and methods of obtaining quantities of residual waste. Therefore, these weaknesses can be attributed to inadequate information provided by the engineers, developers or the applicant to the Environmental Assessment Practitioner (EAP). Also, one sub-category under Review Area 3 demonstrated an area of weakness which deals with the identification of unexpected severe adverse impacts (sub-category 3.1.3). This weakness can be attributed to the

fact that impacts in the EIA reports were identified holistically, with no specific focus on possible unexpectedly severe adverse impacts.

Although this study in Table 10 revealed strengths and weaknesses across different sub-categories under different review areas, there were more strengths than weaknesses. The areas with a high number of strengths were Review Areas 1 and 2 with each review area demonstrating three strengths. For Review Area 2, this means that, despite being a worse performed review area when compared to other review areas (Table 6), there were still some sub-categories that were performed well. Similar to Review Area 1, this area hosted more weaknesses than any other Review Area (Table 10). However, it was illustrated in Table 5 as the best performed review area when compared to others. Therefore, a conclusion from this observation can be such that demonstrating few weaknesses or strengths at the sub-categories level does not always influence the performance of the main review area.

4.5.4 Legislative compliance of EIA reports

Research Objective 3 of this study presented in Chapter 1 (Section 1.3) was to investigate whether the EIA reports meet the minimum legal requirements. Firstly, during the literature review conducted in Chapter 2 earlier, it was discovered that the Lee and Colley review package (see Annexure A) used to review the quality of EIA reports was adapted to embrace the South African EIA legislation context. It was also discovered during the EIA reports review exercise that the reports were developed according to the requirements for EIA regulations, as the contents of the reports were always aligned with the requirements of the EIA regulations. The procedural processes such as scoping, public participation and notification of Interested and Affected Parties (I&APs) were also followed as described in the EIA legislation. It can therefore be concluded that the EIA reports were developed in such a way that they meet the minimum EIA legal requirements as enshrined in the EIA regulations promulgated and amended in terms of the National Environmental Management Act 107 of 1998 (NEMA).

4.6 Conclusion

The Lee and Colley review package was applied to review 21 EIA reports compiled for infrastructure projects conducted in the O.R. Tambo District of the Eastern Cape province. This application was done as a way of trying to respond to the study objectives set out in Chapter 1, Section 3 of this study. The objectives were:

- To review the quality of sampled EIA reports using an adapted Lee and Colley review package.
- To identify and analyse areas of strengths and weakness in the EIA reports.
- To investigate whether the EIA reports meet the minimum legal requirements.

In addressing these objectives, the overall results of the study revealed that the quality of EIA reports was satisfactory (A-C) with a satisfactory grading of 71% (n=15). The study results further revealed that the reports had strengths and weaknesses. Areas of strengths were identified to be more than areas of weaknesses, with Review Areas 1 and 2 demonstrating more strengths. The study also indicated that during the preparation of the EIA reports, minimum legal requirements stipulated in the EIA regulations were adhered to. From these results, a conclusion can be drawn that although there were areas with omissions and inadequacies, the findings of this study demonstrated that the quality of EIA reports conducted in the O.R. Tambo region of the Eastern Cape province for infrastructure projects was satisfactory, and therefore decisions made were based on adequate, credible and sound information.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter starts by highlighting the objectives of the study as presented in Chapter 1. Earlier in Chapter 1, sub-section 3, this study identified three research objectives:

- To review the quality of sampled EIA reports using an adapted Lee and Colley review package (Research Objective 1).
- To identify and analyse areas of strengths and weakness in the EIA reports (Research Objective 2).
- To investigate whether the EIA reports meet the minimum legal requirements (Research Objective 3).

To fulfil these research objectives, the Lee and Colley review package was applied to a sample of 21 EIA reports and the subsequent results on how each objective was fulfilled were presented earlier in Chapter 4. From the results presented in Chapter 4, this Chapter presents a summary of the findings, conclusion and recommendations.

5.2 Research findings

The summary of these findings is presented for each research objective followed by the recommendations. This section ends by presenting a concluding statement indicating the final findings of this research.

5.2.1 Research Objective 1

Research Objective 1 of the study aimed to review the quality of sampled EIA reports using an adapted Lee and Colley review package. To realise the study objectives above, the Lee and Colley review package was applied to the sample of twenty-one (n=21) EIA reports for infrastructure projects conducted in the O.R. Tambo region of the Eastern Cape province. The results obtained after the application of the Lee and Colley review package revealed that the quality of the EIA reports was satisfactory (A-C) with 71% (n=15) of the EIA reports receiving satisfactory grades (A-C). Only 29% (n=6) of the reports were graded as unsatisfactory (D-F). Out of the satisfactory scores of 71% (A-C), 27% (n= 4) of the reports were graded as well performed (A), 40% (n=6) as satisfactory (B) and 33% (n=5) were just satisfactory (C) as discussed earlier

in Chapter 4. The findings further revealed that the remaining 29% (n=6) of the overall results representing unsatisfactory results were all (100%) graded as just unsatisfactory (D). The findings also identified Review Areas 1 and 4 (descriptive areas) as the best performing review areas as they received satisfactory grading from 90% (n=19) and 86% of the reports. Review Areas 2 and 3 (analytical areas) received satisfactory grading from 67% and 57% of the reports respectively, and therefore were the weakest performing review areas. In all, deducing from the presentation of the findings above, it is apparent that Research Objective 1 was achieved, as the findings revealed that the quality of EIA reports for infrastructure projects conducted in the O.R. Tambo region of the Eastern Cape province was satisfactory.

5.2.2 Research Objective 2

The second research objective (Research Objective 2) aimed to identify and analyse areas of strengths and weaknesses within the EIA reports that were reviewed. In addressing this objective, Table 10 in Chapter 4 illustrated a list of identified strengths and weaknesses. A total of eight strengths and four weaknesses were identified at the sub-category level across the review areas. Review Areas 1 and 2 demonstrated three strengths each, while Review Areas 3 and 4 shared one strength each as shown earlier in Table 10 of Chapter 4. Surprisingly, Review Area 1 demonstrated three areas of weakness, although it is the best performing review area of the study, while Review Area 2 demonstrated only one weakness. The findings also revealed that there were no weaknesses identified in Review Areas 3 and 4.

5.2.3 Research Objective 3

Research Objective 3 aimed to investigate whether the EIA reports meet the minimum legal requirements. It was discovered during the EIA reports review exercise that the reports were developed according to the requirements of EIA regulations, as the contents and procedures for compiling the EIA reports were always aligned with the requirements of the EIA regulations. The Lee and Colley review package that was used to review the quality of EIA reports was adapted such that it was aligned with the contents of South African EIA legislation. Therefore, it can be concluded that the reports on their own meet the minimum legal requirements.

5.3 Recommendations

In response to the findings as presented for each research objective above, this section presents the recommendations of this study. These recommendations are divided into possible future research areas and practices.

5.3.1 Future research areas

This study recommends that further studies be undertaken to investigate the cause of low performance in Review Areas 2 and 3 (analytical areas). This is because low performance in Review Areas 2 and 3 has been consistently noticed in the findings of other quality review studies conducted previously. The existing literature presented in Chapter 2 and the findings of this study presented in Chapter 4, revealed that Review Areas 1 and 4 have consistently been graded as the best performing review areas, while Review Areas 2 and 3 have often been graded as the weakest performing review areas. This study further recommends that future studies be conducted to determine the reasons for consistent demonstration of the weakest performance in sub-categories such as 1.1.5 (describing the nature and quantity of raw materials needed during different phases), 1.2.3 (estimated duration of different phases), and 1.3.3 (methods of obtaining the quantity of residuals and wastes). These weaknesses were observed in other quality review studies conducted for the housing industry in the Nkangala District of the Mpumalanga province, projects with the potential of affecting wetlands in South Africa and projects within the explosive industry in South Africa.

5.3.2 Future practices

The Government needs to develop and publish guidelines on the implementation of the 2014 EIA regulations as amended. This is because the literature on the development of the EIA presented earlier in Chapter 2, indicated that there were no guidelines published for the implementation of the 2014 EIA regulations and its subsequent amendments. The absence of implementation guidelines for the NEMA 2014 EIA regulations might also have contributed to the low performance of the analytical areas (Review Areas 2 and 3). A study conducted by Sandham *et al*. (2013a) indicated, however, that regulatory refinement does not necessarily guarantee improved EIA practice and the quality of EIA reports, but that the training of officials can bring the required solution. It is therefore recommended that Competent Authorities need to capacitate the practitioners on how to effectively deal with Review Areas 2 and 3 when compiling the EIA reports

for practitioners to improve the quality of EIA reports. This should be done at national level, as this weak performance trend in Review Areas 2 and 3 has been observed in other quality review studies conducted in other provinces such as Gauteng, North-West and Limpopo. The Competent Authorities also need to capacitate their internal reviewers (officials) and decision makers on the contents of high quality EIA reports, so that decisions can be made based on quality information. Furthermore, for EAPs to respond accurately on engineering related aspects such as the nature and quantity of raw materials that will be needed during different phases of the project, duration of different phases of the project and methods of obtaining quantities of residual waste, they need to constantly consult and be appraised of these aspects by the engineers/applicant or developers. Lastly, the Government through the Department of Fisheries Forestry and Environment (DFFE) needs to speed up the implementation of the Section 24H regulations of the NEMA dealing with the selection of the Registration Authority for EAPs.

5.4 Concluding statement

This research concludes that the quality of EIA reports conducted in the O.R. Tambo region of the Eastern Cape province was satisfactory for infrastructure projects. All three of the objectives that were set with the aim of understanding the quality of EIA reports in Chapter 1, sub-section 3, which were to review the quality of sampled EIA reports using an adapted Lee and Colley review package, to identify and analyse areas of strengths and weakness in the EIA reports and to investigate whether the EIA reports meet the minimum legal requirements, were fulfilled. These objectives were successfully responded to in Chapter 4, by revealing the quality of EIA reports, areas of strengths and weaknesses, and whether the minimum legal requirements were met during the preparation of EIA reports. Due to areas of strengths and weaknesses, omissions and inadequacies observed, this study further recommended that studies be undertaken to investigate areas of weaknesses and future practices by EAPs, Competent Authorities and Government on implementing measures that will ensure the improvement of the quality of EIA reports in South Africa as a whole.

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ANNEXURE A: LEE AND COLLEY REVIEW PACKAGE CHECKLIST SHEET

REVIEW AREA 1 DESCRIPTION OF THE DEVELOPMENT, LOCAL ENVIRONMENT AND BASELINE CONDITIONS								
1.1 DESCRIPTION OF THE DEVELOPMENT		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
1.1.1	Purpose and objectives of development							
1.1.2	Design and size of development							
1.1.3	Physical presence and appearance of completed development within receiving environment							
1.1.4	Nature of production processes intended to be employed in completed development and expected rate of production							
1.1.5	Nature and quantity of raw materials needed during different phases							
1.1.6	Identification of applicant							
1.1.7	Details of EAP to carry out environmental impact assessment							
GRADE – REVIEW AREA 1.1								
1.2 SITE DESCRIPTION: On site land requirements of development and duration of each land use		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
1.2.1	Land area taken up by development site							
1.2.2	Description of demarcation of Land use areas							
1.2.3	Estimated duration of different phases							
1.2.4	Estimated number of workers and/or visitors entering development site, access to site and likely means of transport							
1.2.5	Means of transporting raw materials/products to and from site and approximate quantities involved							
PRELIMINARY GRADE – REVIEW AREA 1.2								
1.3 WASTES: Estimated types and quantities of wastes which might be produced and proposed disposal routes to the environment described		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
1.3.1	Estimated types and quantities of wastes and rate of production							
1.3.2	Proposed handling/treatment, disposal and disposal routes to the environment							
1.3.3	Methods of obtaining quantity of residuals and wastes							
PRELIMINARY GRADE – REVIEW AREA 1.3								
1.4 ENVIRONMENT DESCRIPTION: Area and location likely to be affected by development proposal		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
1.4.1	Indication of likely area to be affected by development							
1.4.2	Greater area to accommodate potentially significant effects occurring away from immediate affected environment							
PRELIMINARY GRADE – REVIEW AREA 1.4								

1.5 BASELINE CONDITIONS: Description of effected environment as it is currently and as it could be expected to develop if project were not to proceed.		A	B	C	D	E	F	N/A
1.5.1	Identification and description of important components of the affected environment							
1.5.2	Existing data sources searched and utilized							
1.5.3	Local land use plans, policies consulted and other data collected to determine baseline conditions							
PRELIMINARY GRADE – REVIEW AREA 1.5								

SUMMARY OF PRELIMINARY GRADES – REVIEW AREA 1		A	B	C	D	E	F	N/A
1.1	**Description of environment**							
1.2	**Site description**							
1.3	**Waste**							
1.4	**Environment description**							
1.5	**Baseline condition**							
FINAL GRADE REVIEW AREA 1								

REVIEW AREA 2 IDENTIFICATION AND EVALUATION OF KEY IMPACTS								
2.1 DEFINITION OF IMPACTS: Potential impacts of development on the environment		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
2.1.1	Description of all possible impacts of project on the environment							
2.1.2	Identify and describe interaction of impacts							
2.1.3	Impacts arising from non-standard operating conditions							
2.1.4	Impacts arising from deviation from baseline conditions							
GRADE – REVIEW AREA 2.1								
2.2 IDENTIFICATION OF IMPACTS: Methods used for identification of all significant impacts		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
2.2.1	Impact identification methodology							
2.2.2	Description of impacts identification methods							
GRADE – REVIEW AREA 2.2								
2.3 SCOPING: Key impacts should be identified, and main investigation cantered on these.		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
2.3.1	Genuine attempt to contact general public and special interest groups to appraise them of project							
2.3.2	Arrangements to collect opinions and concerns of I&APs							
2.3.3	Key impacts identified							
GRADE – REVIEW AREA 2.3								
2.4 PREDICTION OF IMPACT MAGNITUDE: Likely impacts should be described in exact terms where possible		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
2.4.1	Data used to estimate magnitude of main impacts and gaps in data clearly indicated							
2.4.2	Methods predicting impact magnitude clearly described							
2.4.3	Express predictions of impact in measurable quantities with confidence limits							

GRADE – REVIEW AREA 2.4								
2.5 ASSESSMENT OF IMPACT SIGNIFICANCE: Estimation of expected significance of impacts for society		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
2.5.1	Description of significance of impacts on affected community and society in general (mitigation?)							
2.5.2	Significance of impacts in terms of national and international quality standards							
2.5.3	Justification of proposed method of assessing significance							
GRADE – REVIEW AREA 2.5								
SUMMARY OF PRELIMINARY GRADES – REVIEW AREA 2		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
2.1	Definition of impacts							
2.2	Identification of impacts							
2.3	Scoping							
2.4	Prediction of impact magnitude							
2.5	Assessment of impact significance							
FINAL GRADE REVIEW AREA 2								

REVIEW AREA 3 ALTERNATIVES AND MITIGATION								
3.1 ALTERNATIVES: Feasible alternatives should be considered		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
3.1.1	Consideration/description of alternative sites							
3.1.2	Consideration/description of alternative processes, designs and operating conditions							
3.1.3	For unexpectedly severe adverse impacts identified							
3.1.4	Comparative assessment of all alternatives identified							
GRADE – REVIEW AREA 3.1								
3.2 SCOPE AND EFFECTIVENESS OF MITIGATION MEASURES: All significant adverse impacts should be considered for mitigation.		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
3.2.1	Consider mitigation of all significant adverse impacts							
3.2.2	Mitigation measures considered should include							
3.2.3	Extent of effectiveness of mitigation when implemented							
GRADE – REVIEW AREA 3.2								
3.3 COMMITMENT TO MITIGATION		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
3.3.1	Clear record of commitment of developer to mitigation measures							
3.3.2	Monitoring arrangements should be proposed in draft EMP							
GRADE – REVIEW AREA 3.3								
SUMMARY OF PRELIMINARY GRADES – REVIEW AREA 3		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
3.1	Feasible alternatives should have been considered							
3.2	Scope and effectiveness of mitigation measures							
3.3	Commitment to mitigation							
FINAL GRADE REVIEW AREA 3								

	REVIEW AREA 4 COMMUNICATION OF RESULTS							
4.1 LAYOUT OF THE REPORT		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
4.1.1	Introduction and aims of the assessment							
4.1.2	Arrangement of information							

4.1.3	Chapter summaries							
4.1.4	Reference of external sources							
PRELIMINARY GRADE – REVIEW AREA 4.1								
4.2 PRESENTATION: Information should be accessible to the non-specialist		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
4.2.1	Presentation of Information							
4.2.2	Technical terms, acronyms, initials defined							
4.2.3	Statement presented as an integrated whole							
PRELIMINARY GRADE – REVIEW AREA 4.2								
4.3 EMPHASIS: Information should be represented without bias		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
4.3.1	Prominence and emphasis to potentially severe impacts							
4.3.2	Statement must be unbiased							
4.3.3	Opinion as to whether the activity should/should not be authorized							
PRELIMINARY GRADE – REVIEW AREA 4.3								
4.4 NON-TECHNICAL SUMMARY: Clearly written non-technical summary of main findings		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
4.4.1	Non-technical summary of main findings and conclusions							
4.4.2	Summary must cover all main issues							
PRELIMINARY GRADE – REVIEW AREA 4.4								
SUMMARY OF PRELIMINARY GRADES – REVIEW AREA 4		**A**	**B**	**C**	**D**	**E**	**F**	**N/A**
4.1	Layout of statement							
4.2	Presentation							
4.3	Emphasis							
4.4	Non-technical summary							
FINAL GRADE REVIEW AREA 4								

ANNEXURE B: COLLATION SHEET

	Report Description	Report 1	Report 2	Report 3	Report 4	Report 5	Report 6	Report 7	Report 8	Report 9	Report 10	Report 11	Report 12	Report 13	Report 14	Report 15	Report 16	Report 17	Report 18	Report 19	Report 20	Report 21
OVERALL REPORT GRADE		B	B	C	D	B	D	A	C	D	C	B	C	A	D	D	C	B	D	B	A	A
1	**DESCRIPTION OF THE DEVELOPMENT, LOCAL ENVIRONMENT AND BASELINE CONDITIONS**	B	A	C	D	B	C	B	B	D	C	B	B	A	B	C	C	B	C	C	A	B
1.1	**DESCRIPTION OF THE DEVELOPMENT**	C	A	B	F	A	C	B	B	D	C	B	B	A	C	C	B	A	B	C	A	C
1.1.1	Purpose and objectives of development	A	A	A	E	C	C	C	C	F	F	C	C	B	B	D	D	C	D	C	B	D
1.1.2.	Design and size of development	C	A	C	D	A	A	A	C	B	A	C	A	A	C	A	A	A	A	B	A	C
1.1.3	Physical presence and appearance of completed development within receiving environment	F	F	F	E	A	E	A	C	D	A	C	A	A	D	D	C	B	B	E	B	D
1.1.4	Nature of production processes intended to be employed in completed development and expected rate of production	N/A	N/A	N/A	N/A	A	F	N/A	N/A	F	N/A	F	N/A	N/A	N/A	N/A	N/A	A	D	F	N/A	A
1.1.5	Nature and quantity of raw materials needed during different phases	F	F	F	F	F	F	F	F	F	F	C	F	A	F	D	F	F	F	F	F	E
1.1.6	Identification of applicant	A	A	A	F	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A
1.1.7	Details of EAP to carry out environmental impact assessment	B	A	A	F	F	A	A	B	B	C	A	D	B	A	D	C	F	A	D	A	F
1.2	**SITE DESCRIPTION: On site land requirements of development and duration of each land use**	C	B	B	E	C	E	C	C	D	C	B	C	A	C	C	D	B	B	C	B	B
1.2.1	Land area taken up by development site	A	A	A	F	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B
1.2.2	Description of demarcation of Land use areas	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	C	A
1.2.3	Estimated duration of different phases	F	A	F	F	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F	B	F
1.2.4	Estimated number of workers and/or visitors entering development site, access to site and likely means of transport	F	F	F	D	D	F	D	D	E	E	C	D	D	D	E	E	F	D	D	B	B
1.2.5	Means of transporting raw materials/products to and from site and approximate quantities involved	F	F	C	F	E	F	E	D	E	E	B	D	A	E	D	D	D	C	F	C	C
1.3	**WASTES: Estimated types and quantities of wastes which might be produced and proposed disposal routes to the environment described**	B	B	C	D	D	C	B	B	C	E	C	C	C	B	C	C	B	A	D	F	B
1.3.1	Estimated types and quantities of wastes and rate of production	A	B	D	E	D	A	A	A	A	F	C	C	B	A	B	C	A	A	C	F	A
1.3.2	Proposed handling/treatment, disposal and disposal routes to the environment	A	A	A	B	A	A	A	A	C	D	B	A	A	A	B	B	A	B	C	E	B
1.3.3	Methods of obtaining quantity of residuals and wastes	F	F	F	F	F	F	F	F	E	F	F	F	F	F	F	F	F	A	F	F	D
1.4	**ENVIRONMENT DESCRIPTION: Area and location likely to be affected by development proposal**	A	A	E	C	A	C	A	B	E	B	B	B	A	C	B	D	C	D	C	A	B
1.4.1	Indication of likely area to be affected by development	A	A	B	B	A	A	A	B	D	B	B	B	A	C	B	D	C	C	C	A	C
1.4.2	Greater area to accommodate potentially significant effects occurring away from immediate affected environment	B	A	F	E	A	F	B	B	E	C	B	C	A	C	B	D	C	E	C	A	B
1.5	**BASELINE CONDITIONS: Description of effected environment as it is currently and as it could be expected to develop if project were not to proceed.**	A	B	D	D	B	B	A	A	D	D	B	C	A	A	C	E	A	C	B	A	A
1.5.1	Identification and description of important components of the affected environment	A	A	E	C	A	A	A	A	C	C	A	B	A	A	C	D	A	B	B	A	A
1.5.2	Existing data sources searched and utilized	A	A	E	C	C	A	A	A	C	D	C	A	A	A	B	F	A	B	A	B	A
1.5.3	Local land use plans, policies consulted and other data collected to determine baseline conditions	A	F	A	F	A	F	A	B	F	F	B	F	A	B	C	F	D	F	C	A	B
2	**IDENTIFICATION AND EVALUATION OF KEY IMPACTS**	B	B	D	D	B	E	B	C	D	C	A	C	B	C	E	E	B	D	B	B	A
2.1.	**DEFINITION OF IMPACTS: Potential impacts of development on the environment**	A	B	E	E	B	E	C	D	E	B	A	B	A	D	C	C	B	E	A	B	B
2.1.1	Description of all possible impacts of project on the environment	A	A	B	A	B	D	B	B	D	B	A	A	A	D	C	B	B	C	B	C	A
2.1.2	Identify and describe interaction of impacts	B	F	E	F	A	F	D	D	F	A	A	B	B	B	C	C	B	D	A	A	B
2.1.3	Impacts arising from non-standard operating conditions	A	F	F	F	B	F	F	F	F	B	C	F	A	C	E	D	B	F	A	C	C
2.1.4	Impacts arising from deviation from baseline conditions	A	F	F	B	B	D	B	B	E	B	A	B	A	D	C	C	B	C	B	A	A
2.2	**IDENTIFICATION OF IMPACTS: Methods used for identification of all significant impacts**	A	A	F	B	A	E	A	A	C	C	A	C	A	B	F	F	A	B	A	A	A
2.2.1	Impact identification methodology	A	A	F	A	A	E	A	A	B	C	A	A	A	B	F	F	A	B	A	A	A

2.2.2	Description of impacts identification methods	A	A	F	B	A	E	A	A	C	D	A	D	A	B	F	F	A	B	A	A	A
2.3	**SCOPING: Key impacts should be identified, and main investigation cantered on these.**	B	A	C	B	A	E	A	B	D	D	B	B	B	C	B	D	B	D	B	A	A
2.3.1	Genuine attempt to contact general public and special interest groups to appraise them of project	A	A	A	A	A	D	A	A	D	C	A	A	A	B	B	C	A	C	A	A	A
2.3.2	Arrangements to collect opinions and concerns of I&APs	A	A	A	A	A	D	A	B	D	D	A	B	A	B	A	C	A	D	B	A	A
2.3.3	Key impacts identified	D	A	C	C	B	F	A	B	F	F	C	D	D	D	D	E	C	F	C	C	A
2.4	**PREDICTION OF IMPACT MAGNITUDE: Likely impacts should be described in exact terms where possible**	C	C	C	D	C	F	B	B	D	F	A	F	B	F	F	F	C	C	B	B	A
2.4.1	Data used to estimate magnitude of main impacts and gaps in data clearly indicated	B	A	B	D	A	F	B	C	F	F	A	F	A	E	F	F	E	B	B	A	B
2.4.2	Methods predicting impact magnitude clearly described	A	C	E	C	A	F	B	A	C	E	A	F	A	F	F	F	B	B	B	B	A
2.4.3	Express predictions of impact in measurable quantities with confidence limits	E	F	B	B	F	F	A	A	E	F	A	F	F	F	F	F	F	F	A	C	A
2.5	**ASSESSMENT OF IMPACT SIGNIFICANCE: Estimation of expected significance of impacts for society**	F	B	C	C	C	F	C	B	F	D	B	D	B	C	F	E	B	F	C	D	B
2.5.1	Description of significance of impacts on affected community and society in general (mitigation?)	F	A	A	A	B	F	A	A	E	B	A	A	A	B	F	C	A	F	A	A	A
2.5.2	Significance of impacts in terms of national and international quality standards	F	C	C	D	C	F	B	B	F	C	F	F	F	F	F	F	B	F	F	F	F
2.5.3	Justification of proposed method of assessing significance	F	A	F	C	D	D	F	D	F	F	C	E	B	D	F	F	C	F	B	F	B
3	**ALTERNATIVES AND MITIGATION**	C	D	D	D	B	D	A	D	E	C	B	C	B	E	E	C	B	D	C	C	A
3.1	**ALTERNATIVES: Feasible alternatives should be considered**	D	F	F	E	B	F	B	F	F	F	C	E	F	D	F	C	C	C	B	D	A
3.1.1	Consideration/description of alternative sites	F	F	N/A	C	A	N	A	F	F	F	F	E	F	B	F	F	F	B	A	C	A
3.1.2	Consideration/description of alternative processes, designs and operating conditions	B	E	N/A	E	A	N/A	A	F	F	F	A	E	F	F	F	B	A	C	B	F	A
3.1.3	For unexpectedly severe adverse impacts identified	F	F	F	F	C	F	F	F	F	F	F	E	F	F	F	F	F	F	F	F	A
3.1.4	Comparative assessment of all alternatives identified	F	F	F	F	C	F	C	F	F	F	D	E	F	F	F	D	C	E	B	D	A
3.2	**SCOPE AND EFFECTIVENESS OF MITIGATION MEASURES: All significant adverse impacts should be considered for mitigation.**	B	B	C	C	C	E	A	C	C	C	A	A	A	D	E	D	B	E	B	A	A
3.2.1	Consider mitigation of all significant adverse impacts	A	A	B	B	A	D	A	A	C	B	A	A	A	B	D	C	A	C	A	A	A
3.2.2	Mitigation measures considered should include	E	C	D	E	C	F	B	E	E	D	B	C	B	D	D	D	B	F	C	B	B
3.2.3	Extent of effectiveness of mitigation when implemented	B	B	C	B	C	F	A	C	B	B	A	A	A	F	F	F	B	F	B	A	A
3.3	**COMMITMENT TO MITIGATION**	A	A	A	B	A	B	A	D	D	A	B	A	A	F	D	C	B	C	A	A	A
3.3.1	Clear record of commitment of developer to mitigation measures	A	A	A	B	A	B	A	E	D	A	B	B	B	F	E	C	A	C	B	A	B
3.3.2	Monitoring arrangements should be proposed in draft EMP	A	A	A	A	A	B	A	D	E	B	B	A	A	F	D	B	C	D	A	A	A
4	**COMMUNICATION OF RESULTS**	B	B	C	C	B	C	A	D	B	C	C	C	A	D	D	B	A	C	B	A	B
4.1	**LAYOUT OF THE REPORT**	B	B	C	C	B	C	B	C	C	D	C	C	A	C	C	C	B	C	A	B	C
4.1.1	Introduction and aims of the assessment	B	B	E	D	C	D	C	C	C	F	C	C	B	B	D	D	C	D	C	B	D
4.1.2	Arrangement of information	B	B	C	B	A	C	B	B	C	D	C	C	A	C	A	B	A	C	A	A	C
4.1.3	Chapter summaries	E	B	E	D	B	D	B	C	B	E	E	D	B	D	D	B	C	C	B	B	B
4.1.4	Reference of external sources	A	A	B	B	B	B	A	B	C	D	C	C	A	B	B	E	A	B	A	B	A
4.2	**PRESENTATION: Information should be accessible to the non-specialist**	C	B	C	B	B	C	A	C	C	C	C	C	B	C	C	B	B	C	B	A	B
4.2.1	Presentation of Information	B	B	C	B	B	C	A	B	B	C	C	C	B	C	B	B	B	B	B	A	B
4.2.2	Technical terms, acronyms, initials defined	E	A	C	A	B	C	B	C	C	C	D	D	B	A	A	D	B	C	D	A	B
4.2.3	Statement presented as an integrated whole	D	C	D	C	A	D	A	E	D	B	B	B	A	F	E	B	A	C	A	B	A
4.3	**EMPHASIS: Information should be represented without bias**	A	C	A	C	A	B	A	D	B	A	B	A	A	F	E	C	A	C	A	A	A
4.3.1	Prominence and emphasis to potentially severe impacts	A	C	A	B	A	B	A	C	E	A	B	B	A	F	E	C	A	E	A	A	A
4.3.2	Statement must be unbiased	B	A	A	A	A	B	A	F	B	A	A	A	A	F	F	B	A	C	A	A	A
4.3.3	Opinion as to whether the activity should/should not be authorized	A	F	A	F	C	C	B	D	A	A	A	A	A	F	E	C	A	B	A	A	A
4.4	**NON-TECHNICAL SUMMARY: Clearly written non-technical summary of main findings**	A	A	D	D	B	E	A	E	B	A	C	E	C	F	F	A	A	E	D	A	A
4.4.1	Non-technical summary of main findings and conclusions	A	A	E	E	B	F	A	E	B	B	D	E	C	F	F	A	A	E	E	B	A
4.4.2	Summary must cover all main issues	A	A	D	E	B	E	A	E	B	B	C	E	C	F	F	A	A	E	D	A	A

ANNEXURE C: ETHICS APPROVAL LETTER

NORTH-WEST UNIVERSITY
NOORDWES-UNIVERSITEIT
YUNIBESITI YA BOKONE-BOPHIRIMA

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Tel: 018 299-1111/2222
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Senate Committee for Research Ethics
Tel: 018 299-4849
Email: nkosinathi.machine@nwu.ac.za

ETHICS APPROVAL LETTER OF STUDY

Based on the review by the **Faculty of Natural and Agricultural Sciences Ethics Committee (FNASREC)**, the Committee hereby clears your study as no ethical risk. This implies that the FNASREC grants permission that, provided the general conditions specified below are met, the study may be initiated, using the ethics number below.

Study title: Reviewing the quality of EIA reports conducted in the O.R. Tambo region of the Eastern Cape Province
Study Leader/Supervisor: Dr L Kruger
Student: N Lugetye

Ethics number: NWU-01220-22-A9

Institution | Study Number | Year | Status

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application type: Single **Risk Category:** No Risk

Commencement date: 25/02/2022
Expiry date: 25/05/2023

General conditions:
The following general terms and conditions apply:

- *The commencement date indicates the date when the study may be started.*
- *In the interest of ethical responsibility, the NWU-SCRE and FNASREC reserves the right to:*
  - *request access to any information or data at any time during the course or after completion of the study;*
  - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*
  - *withdraw or postpone approval if:*
    - *any unethical principles or practices of the study are revealed or suspected;*
    - *it becomes apparent that any relevant information was withheld from the FNASREC or that information has been false or misrepresented;*
    - *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
    - *new institutional rules, national legislation or international conventions deem it necessary.*
- *FNASREC can be contacted for further information or any report templates via Roelof.Burger@nwu.ac.za 018 299 4269*

The FNASREC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the FNASREC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely,

Prof Roelof Burger
Chairperson Faculty of Natural and Agricultural Sciences Ethics Committee (FNASREC)

File reference: 9.1.5.4.2

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ANNEXURE D: LETTER GRANTING ACCESS TO EIA REPORTS (STUDY SAMPLE)

Loyiso Nondlebe
047 531 1191
066 489 4097
Loyiso.Nondlebe@dedea.gov.za
Ref: Request for Access to EIA

Province of the EASTERN CAPE
ECONOMIC DEVELOPMENT, ENVIRONMENTAL AFFAIRS & TOURISM

Date: 09 November 2021

Dear Mr. Nangamso Lugetye

RE: REQUEST TO ACCESS ENVIRONMENTAL IMPACT ASSESSMENT REPORTS FOR THE PURPOSES OF CONDUCTING ACADEMIC RESEARCH

1. The pursuit for academic research and scientific advancement is supported and appreciated by the Department (DEDEAT), in principle.
2. The Protection of Personal Information Act (Act 4 of 2013) [POPI Act] was assented to on the 19th of November 2013 and commenced on the 1st of July 2020 for the protection of personal information.
3. EIA (Environmental Impact Assessment) reports contains personal information as the registration of I&APs (Interested & Affected Parties) as well their comments, are required by regulation 42 of the National Environmental Management Act EIA Regulations, 2014 (GN R. 326 of 7 April 2017) to form part of EIA reports.
4. Your request to access EIA reports is noted and accepted insofar as it does not contravene the provisions of the POPI Act.
5. Consent from the EAP (Environmental Assessment Practitioner), applicant and each I&AP would be required to allow you to access such information. However, only the contact details of the EAP can be shared based on the fact that they were made public during advertisement as required by the aforementioned Regulations.
6. Henceforth, some parts of the report pertaining to the Public Participation Process will be redacted or excluded altogether in the EIA reports accessible to you.
7. You may contact the Assistant Manager: Environmental Quality Management in the O.R. Tambo region, Mr. Qondile Paliso on Qondile.Paliso@dedea.gov.za to arrange access to the requested files.

.....
Mr. Loyiso Nondlebe
Regional Manger: Environmental Affairs, O.R. Tambo