

A critical analysis of the quality of EIA reports for middle to high income residential developments: Case studies from South Africa

LA Botha



orcid.org/0000-0002-6709-2259

Dissertation accepted in partial fulfilment of the requirements for the degree *Master of Environmental Management* at the North-West University

Supervisor: Prof FP Retief

Graduation May 2022

26392518

PREFACE AND ACKNOWLEDGMENTS

I would like to thank Prof F. Retief for his support and guidance through this project during unprecedented times. I would also like to thank my family and friends who stood by my side and motivated me to give it my best. Lastly, I want to thank my colleagues for their insight and experience. This research would not have been possible without any of these people.

ABSTRACT

Assessing and managing the environmental impacts of housing development is an international challenge. In South Africa, depending on the size and nature of mixed-use residential developments, such developments may be subject to an Environmental Impact Assessment (EIA) process. The number of large mixed use residential developments on the peripheries of cities are on the increase. However, limited research exists on the quality of the EIA reports for these developments submitted to the competent authority for decision-making. This research made use of an adapted version of the Lee and Colley review package to assess the quality of the EIA reports of eight mixed-use residential developments that were subject to a full scoping and EIA process. These developments were identified across South Africa. The main conclusions are that while most reports perform satisfactorily, none of the reviewed reports were complete in terms of best practice. Best practice was predominantly applied only when it formed part of the legal requirements. The main strengths of the reports are the use of visual aids like maps, descriptions of the baseline environments, and the execution and recording of the public participation process. The main weaknesses of the reports relate to descriptions of the various methodologies used at various stages, the provision of references and data sources, and the investigation of cumulative impacts. The results mostly correspond to results of EIA report quality research in other sectors in South Africa.

Keywords:

Environmental Impact Assessment (EIA); Environmental Impact Assessment Report (EIAR), mixed-use developments; housing; report quality review; South Africa

ABBREVIATIONS AND ACRONYMS

DEA	Department of Environmental Affairs
DHS	Department of Human Settlements
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EMPr	Environmental Management Programme
I&APs	Interested and Affected Parties
NEMA	National Environmental Management Act, 107 of 1998
NEM:WA	National Environmental Management: Waste Act, 59 of 2008
NEM:AQA	National Environmental Management: Air Quality Act, 39 of 2004

TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION	1
1.1 Background	1
1.2 Problem statement and rationale for the study	3
1.3 Research question and objectives	3
1.4 Scope of the research	3
1.5 Assumptions and limitations	4
1.6 Structure and outline of the dissertation	4
CHAPTER 2 - LITERATURE REVIEW	5
2.1 Introduction	5
2.2 Environmental Impact Assessments	5
2.2.1 Environmental Impact Assessment process in South Africa.....	6
2.2.2 EIA process for housing.....	7
2.2.3 Quality of Environmental Impact Assessments	8
2.3 Impacts of housing and residential developments.....	9
2.4 Quality review methodology	10
2.4.1 Quality review packages.....	11
2.4.2 Degree of legal compliance	11
2.5 Chapter summary	12
CHAPTER 3 – METHODOLOGY	13

3.1	EIAR quality review	13
3.1.1	Required modifications	14
3.2	Selection criteria for EIARs.....	19
3.2.1	Summary of selected EIARs	19
3.3	Data analysis.....	21
3.4	Methodological assumptions and limitations.....	21
CHAPTER 4 - RESULTS AND DISCUSSION.....		23
4.1	Single case analysis.....	23
4.1.1	Case 1	23
4.1.2	Case 2.....	23
4.1.3	Case 3.....	24
4.1.4	Case 4.....	24
4.1.5	Case 5.....	25
4.1.6	Case 6.....	25
4.1.7	Case 7.....	26
4.1.8	Case 8.....	26
4.2	Overall EIA quality	26
4.3	Results of Review Area 1	27
4.3.1	Description of the development	28
4.3.2	Site description	29
4.3.3	Waste	30
4.3.4	Description of baseline conditions.....	31

4.4	Results of Review Area 2	31
4.4.1	Definition of impacts	32
4.4.2	Identification of impacts	33
4.4.3	Scoping	34
4.4.4	Assessment of impact magnitude and significance	35
4.5	Results of Review Area 3	35
4.5.1	Alternatives.....	36
4.5.2	Assessment of impact magnitude and significance.....	37
4.6	Results of Review Area 4	38
4.6.1	Layout	38
4.6.2	Presentation	39
4.6.3	Emphasis.....	40
4.6.4	Non-technical summary	41
4.7	Discussion of results	41
4.8	Chapter summary	46
CHAPTER 5 - CONCLUSIONS AND RECOMMENDATIONS		47
5.1	Introduction	47
5.2	Conclusions.....	47
5.3	Recommendations and areas of future research	49
BIBLIOGRAPHY.....		51

LIST OF TABLES

Table 3-1: List of quality assessment grades (Source: Lee et al., 1999) 13

Table 3-2: Review criteria applied 14

Table 3-3: Cross-case analysis of selected cases 20

Table 4-1 Worst performing Review Categories and Sub-categories..... 41

LIST OF FIGURES

Figure 4-1: Overall quality scores of the EIARs reviewed.	27
Figure 4-2: Scores for Review Categories in Review Area 1	28
Figure 4-3: Results for Review Category 1.1	28
Figure 4-4: Results for Review Category 1.2	29
Figure 4-5: Results for Review Category 1.3	30
Figure 4-6: Results for Review Category 1.4	31
Figure 4-7: Scores for Review Categories in Review Area 2	32
Figure 4-8: Results for Review Category 2.1	33
Figure 4-9: Results for Review Category 2.2	33
Figure 4-10: Results for Review Category 2.3	34
Figure 4-11: Results for Review Category 2.4	35
Figure 4-12: Scores for Review Categories in Review Area 3.....	36
Figure 4-13: Results for Review Category 3.1	36
Figure 4-14: Results for Review Category 3.2	37
Figure 4-15: Scores for Review Categories in Review Area 4.....	38
Figure 4-16: Results for Review Category 4.1	39
Figure 4-17: Results for Review Category 4.2	40
Figure 4-18: Results for Review Category 4.3	40
Figure 4-19: Results for Review Category 4.4	41

CHAPTER 1 – INTRODUCTION

This chapter introduces the research. It starts by explaining the background to the research (section 1.1) and the problem statement (section 1.2). This is followed by defining the research question and objectives (section 1.3) and scope (section 1.4). The assumptions and limitations to the research is also explained (section 1.5). The chapter concludes by providing an explanation of the structure of the dissertation.

1.1 Background

Addressing the demand for housing in urban areas remains a persistent challenge in most countries around the world (Siqueira-Gay and Sanchez, 2018; United Nations Human Settlement Programme (UN-Habitat), 2020). In response to the rapidly growing populations in developing countries, several and successive housing policies have emphasised the need for quality housing (Babalola et al, 2019). According to UN-Habitat's World Cities Report of 2020, over 50% of the world's population has been living in cities since 2010. As of 2020, the number is approximately 4.379 billion people, or 56.2% of the population (UN-Habitat, 2020).

Housing does more than just provide the occupant with a place to live. Studies by Aliu and Adebayo (2010), Gou *et al.* (2013), Temitope and Maria (2016) and Fakunle *et al.* (2018) show how the quality of housing impacts not only the wellbeing of the residents, but also their behaviours, and that a link exists between low quality housing and substandard mental and physical health. Some have observed that the quality of housing is the most significant factor impacting the overall quality of life in the context of low-income public housing in Hong Kong (Therriault *et al.*, 2010; Gou *et al.*, 2018). In some contexts, owning a house or a residence comes with a feeling of fulfilment and prestige, and it allows people to display their culture, norms, personality and way of life (Ibem and Aduwo, 2013b; Olutayo, 2007). It is also considered a good economic investment with high returns (Turunen et al. 2010; literally every financial adviser ever).

In South Africa, housing has been identified as one of the elements contributing to a decent standard of living (Department of the Presidency, 2012). While the government has provided housing under the Reconstruction and Development Plan, developing middle to high income housing has mainly been the responsibility of the private sector. As a result, many planned and recently built middle to high income residential developments are located on urban peripheries, and have resulted in land-use changes and increased urban sprawl in the affected areas (Goebel, 2007). Recently, property developers have been very active in developing the urban

peripheries with so-called “residential estates”. These residential estates come in all shapes and sizes, but there are some common characteristics. Typically, residential estates are walled off, access controlled, and they feature several amenities, such as restaurants, gyms, and communal green spaces which may include small parks and playgrounds. The housing consists of several housing units. The design of the units varies, but each unit contains several flats, often ranging in terms of floor size and number of bedrooms. The number of residential units contained within each residential estate differs wildly. For example, Balwin Properties have completed construction of 19 developments in South Africa since 2010, with another 21 under construction as of 2020 (Balwin, 2020a). These developments usually have at least 500 units housing at least one person, and several have over 2000 units (Balwin, 2020b). Other property developers follow similar trends.

The Environmental Impact Assessment (EIA) process aims to inform decision making associated with the authorisation of listed activities (Kidd et al. 2018). The EIA process results in an Environmental Impact Assessment Report (EIAR), which should be objective and should bring to light all of the positive and negative impacts of a project, the probability and extent of the impacts, and possible mitigation measures (Thomas, 1998). While the process itself may vary in terms of procedures and practices employed, EIA systems have been adopted by over 100 countries (Sadler, 1996).

In order to make sure the EIA system functions correctly, the quality of EIARs should be continuously assessed (Sadler, 1996, Sandham *et al.*, 2008; Glasson *et al.*, 2012; Sandham *et al.* 2013b). The quality of EIARs has been the subject of numerous studies both locally and internationally, and has included several economic sectors (see for example Ceronio, 2018; Boshoff, 2013; Sandham *et al.*, 2008a; Sandham *et al.*, 2008b; Sandham *et al.*, 2008c; Sandham *et al.*, 2010; Sandham *et al.*, 2013; Sandham *et al.*, 2020; Kamijo and Huang, 2020). Some of the weaknesses identified by previous research include inaccurate descriptions of the receiving environment, impact identification (especially cumulative impacts), and inadequate consideration of alternatives (Boshoff, 2013; Sandham *et al.*, 2013). Some researchers, like Swanepoel *et al.* (2019) have extended this review to specialist studies, suggesting a need for reconsidering the role of specialist studies in the EIA process.

In South Africa, broad legal protection of the environment is provided in Section 24 of the Constitution. The National Environmental Management Act 108 of 1998 (NEMA) provides further mechanisms for environmental protection through, for example, the principles of NEMA and the requirement of an Environmental Authorisation (EA) for listed activities. In order to obtain an EA, the relevant activities must first be subjected to an EIA process as contemplated

in the EIA regulations of 2014 and must be approved by the competent authority. Middle to high income residential developments on urban peripheries could trigger several listed activities, and would therefore be subject to an EIA process.

1.2 Problem statement and rationale for the study

As a decision-aiding instrument, poor quality EIARs can potentially result in decisions being made based on incomplete or inaccurate information (Boshoff, 2013). Previous studies have identified weaknesses in the reports reviewed, for example inaccurate descriptions of the receiving environment, impact identification, and the consideration of project alternatives (Sandham *et al.*, 2013). However, there seems to be scant reflection on the quality of EIAs specifically for the residential development sector in South Africa. Given the significance of housing provision as a key government policy response contained in the National Development Plan of 2012, it is critical to gain a better understanding of the decision making that informs housing development through EIA.

1.3 Research question and objectives

In view of the problem statement, the research will answer the following main research question: What is the quality of EIA reports for middle to high income mixed-use residential developments in South Africa?

In order to answer the research question, the following research objectives are addressed:

1. Evaluating the quality of EIARs submitted dealing specifically with mixed-use residential development projects across South Africa;
2. Determining their strengths and weaknesses; and
3. Provide recommendations for improving EIAR quality for mixed-use residential developments under the South African EIA Regulations of 2014 (as amended).

1.4 Scope of the research

This research focused on residential developments aimed at middle to high income occupants that required a full scoping and EIA process in support of an Environmental Authorisation (EA). These reports had to be submitted in terms of the South African EIA Regulations of 2014 (as amended). Geographically, the research considered projects across South Africa. The reports were selected according to a set of criteria, the details of which will be discussed in the methodology chapter.

1.5 Assumptions and limitations

Due to the nature of the study, the research only focused on the quality of EIARs and not the effectiveness or implementation success of the EIARs. This research also focused on EIARs submitted in support of an EA, and ignored any other licenses or permits required for operation (e.g. waste management licenses and water use licenses). Furthermore, due to the specificity of the projects reviewed, one cannot necessarily generalise the results achieved into other types of projects in South Africa.

1.6 Structure and outline of the dissertation

This dissertation is divided into five chapters. Chapter 1 provides an introduction and background to the research. This chapter presents an introduction to the research question and objectives, as well as outlining the methodology used for the review of the EIARs. The scope and limitations of the research is also discussed in this chapter.

Chapter 2 discusses literature relevant to the research. This chapter starts with a broad introduction of EIARs and previous research conducted on the quality of EIARs, progressively narrowing the focus to the South African context and the impact of the housing sector on the environment. Chapter 3 discusses the methodology used. This chapter provides a detailed description of the review package used as well as justifying why it was chosen. Furthermore, this chapter includes the factors included in the adaptation of the package to fulfil the research criteria, as well as where data was sourced and how it was analysed.

Chapter 4 presents the research findings. The findings are tabulated and discussed. Chapter 5 provides the conclusion and recommendations of this study.

CHAPTER 2 - LITERATURE REVIEW

2.1 Introduction

This research aims to address the research question by determining the quality of EIARs for middle to high income residential developments. This chapter is divided into three sections. The first section of the literature review deals with literature on the EIA process and EIAR quality, both internationally and locally. The second section considers residential developments and their environmental impacts. The third section briefly discusses methodologies related to the assessment of EIAR quality.

2.2 Environmental Impact Assessments

Environmental Impact Assessments (EIAs) come in a variety of forms. Morrison-Saunders *et al.* (2014) identified 46 different specialist type impact assessments from literature and conference discussions. Its most well-known form is that of the project level EIA, which is also the form of EIA this study considers. Internationally it is understood that the EIA aims to predict and evaluate the positive and negative impacts of a project or action which is capable of causing significant damage to the surrounding environment (Owens *et al.*, 2004; Wood, 2002). One of the major underpinnings of EIA and EIA theory is the assumption that more information and an improved understanding of science will lead to better and more informed decision-making (Kidd *et al.*, 2018). While this so-called “information processing model” perception is being criticised and challenged by views which make provision for politics and power in decision-making, it is still the dominant understanding of the role of EIAs (Kidd *et al.*, 2018).

EIAs as a process has its origin in the United States of America with the National Environmental Policy Act of 1969. This act required that natural and social sciences and environmental design arts be integrated and used to produce a report containing details of the impacts of a proposed project, which should be used for planning and decision-making purposes (Morgan, 1998; Wood, 1995). Soon after, countries including Australia, Israel and European countries (after the European Directive on EIA in 1985) also made provision for an EIA system (Glasson *et al.*, 2012; Morgan 2012; Zubair *et al.*, 2011). Although the legal and regulatory framework within which these EIA systems function can differ substantially between countries, the outcome is generally the same; an EIAR or an Environmental Impact Statement (EIS) of sufficient quality to aid the decision-making of the relevant competent authority (Pope *et al.*, 2013; Glasson *et al.*, 2012; Jay *et al.*, 2007).

In South Africa, the EIA process has been implemented since the 1970s, although it was only a voluntary tool applied outside of a regulatory framework (Kidd *et al.*, 2018). Provision for an environmental policy was made in the Environmental Conservation Act 73 of 1989. However, the first EIA regulations were only promulgated in 1997 (Kidd *et al.*, 2018). Since then, the regulations have been amended and refined in 2006, 2010, and 2014. The amendments can be grouped into refinement of the screening criteria, EIA process (including timeframes), and requirements in terms of public participation (Kidd *et al.*, 2018). Furthermore, the regulations have been expanded to apply to listed activities in terms of both the National Environmental Management: Waste Act 57 of 2008 (NEM: WA) and the National Environmental Management: Air Quality Act 39 of 2004 (NEM: AQA).

2.2.1 Environmental Impact Assessment process in South Africa

The EIA process in South Africa is described in the EIA Regulations of 2014 (as amended in 2017), and allows for two routes. The first route is that of the Basic Assessment process, and the second is a full scoping and EIA process. The Basic Assessment process does not have a dedicated scoping phase, and as such has shorter timeframes and are for projects limited in size and impact. The full scoping and EIA process has a dedicated scoping phase and are applicable to larger projects, both in terms of production and physical size of the development. Deciding when to apply which process is determined by EIA Regulations Listing Notices 1, 2, 3 and 4 of 2014 (as amended). This research will only consider developments that have been subject to a full scoping and EIA process and will only consider the EIA reports of these developments.

The process starts as soon as the application for an environmental authorisation is submitted to the competent authority. From that date, the applicant has 44 days to submit a scoping report which has been subjected to a public participation process for at least 30 days. Furthermore, the scoping report must reflect and incorporate the comments received during the public participation process. The competent authority then has 43 days to decide whether to accept or reject the scoping report.

If the scoping report is accepted (with or without conditions), the applicant has 106 days to submit an EIA report which has been subjected to at least a 30-day public participation process, and must include all specialist reports and environmental management programmes (EMPrs). The competent authority then has 107 days to decide on whether or not to grant environmental authorisation. If significant changes to the project has taken place or if new information has been discovered since the acceptance of the scoping report, which was not included in the

reports during the initial public participation period, the applicant can apply for a 50-day extension to the 106-day timeline, but the revised reports will have to be subjected to its own 30-day public participation process.

2.2.2 EIA process for housing

To determine if an EIA process is required, South Africa makes use of a list-based screening mechanism. This mechanism takes the form of three lists of activities, with each list triggering a different EIA process. This list-based approach has been critiqued for its indiscriminate nature and lack of discretion, and while subsequent refining of the listing notices did reduce the number of applications, the number of applications remain high (Retief *et al.*, 2011). Furthermore, an overall decrease in EIAR quality was observed by Sandham *et al.* (2031a) when comparing the 1997 EIA regulations with its successor regulations in 2006.

The developments considered in this research all trigger a number of listed activities. For example:

Listing Notice 1 Activity 28:

- “Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 1 April 1998 and:
 - Where such development will occur within an urban area, where the total land to be developed is more than 5 hectares; or
 - Will occur outside an urban area where the total land area to be developed is bigger than 1 hectare.
- Excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.”

Listing Notice 2 Activity 15:

- “The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for -
 - The undertaking of a linear activity; or

- Maintenance purposes undertaken in accordance with a maintenance management plan.”

Source: EIA Regulations Listing Notices 1 and 2 of 2014 (as amended).

Depending on the details of the development, like the sensitive environmental features surrounding the site, the internal road structure, utility access, service delivery access, and other design factors, additional activities may be triggered. The additional activities can result in additional requirements for specialist studies in terms of Listing Notices 3 and 4, but could also include activities that require additional licenses under different laws, like a waste management license in terms of NEM:WA or a water use license in terms of the Water Use Act 36 of 1998.

2.2.3 Quality of Environmental Impact Assessments

The EIA process involves multiple stakeholders and sectors with various standards and requirements that define what “good quality” is (Bond *et al.*, 2017). What is considered “good quality” has also changed over the years. When reviewing papers submitted for the South African chapter of the International Association for Impact Assessment (IAIA), Retief (2010) found that debates have moved away from quality and application of environmental assessments to effectiveness and the value environmental assessments add to a project. Furthermore, changes in our society introduce new challenges that require adaptation. In terms of global EIA practice, some have suggested that less emphasis should be placed on predicting singular outcomes and rather devote more attention to system adaptability and improved resilience that is flexible to change (Retief *et al.*, 2016).

The quality of a report does influence the decisions of decision makers, but research by Bond *et al* (2018) suggests that a relationship exists between EIA quality and EIA effectiveness. This further emphasises the need for more EIA quality reviews. The study of EIA quality has been done extensively in a wide variety of sectors, both locally and internationally (see for example Ceronio, 2018; Mbhele, 2009; Kruger, 2012; Sandham *et al.*, 2013; Peterson, 2010). The results of such studies have been mixed, but most have concluded that the EIAR quality is satisfactory with room for improvement. Some of the common weaknesses identified include identification and discussion of alternatives, weak site descriptions, little consideration for cumulative impacts, and non-specific mitigation measures that are vague and easy not to implement (Ceronio, 2018; Mbhele, 2009; Kruger, 2012; Sandham *et al.*, 2013; Peterson, 2010). The lack of consideration of alternatives is especially applicable to residential developments (Mbhele, 2009).

Despite all the studies conducted on EIA quality, determining EIAR quality remains largely an academic pursuit, at least in South Africa. While the EIA Regulations of 2014 specifically require an EIAR of “sufficient” quality, there is no formal requirement for external quality checks to be conducted on reports before submission. There is also no proof that decision-makers make use of review packages to assess the report quality before considering it (Sandham *et al.*, 2013). Furthermore, interpretation of the requirements often differs between regions and results in inconsistent application of the requirements. From the perspective of the consultant compiling the EIAR, the regulations are a requirement to be met, and the quality that is aimed for would be of such a standard that would generally be accepted by the competent authority (Kågström, 2016). Best practice would thus only be implemented if it was reflected in regulatory requirements.

2.3 Impacts of housing and residential developments

The impacts of residential developments can be split into three phases: construction, use, and end-of-life phases. The weight of each phase in terms of environmental impact varies greatly between individual countries and the construction method used. For example, life cycle assessments on housing stock in Europe has showed that the environmental impact of the construction phase is lower compared to the use phase (Lavagna *et al.*, 2018; Nemry *et al.*, 2010), while research in Mexico indicates an opposite trend (Gámez-García, 2019). It should be pointed out that Lavagna *et al.*, (2018) and Nemry *et al.*, (2010) also considered refurbishment of existing building stock in Europe, which has less demand for construction than new developments. Furthermore, a life cycle assessment by Piroozfar *et al.* in 2019 on Palestinian housing showed that houses using contemporary housing material and construction techniques have a higher environmental impact than that of traditional construction materials and techniques.

While there is no consensus on the environmental aspects related to construction, some aspects are mentioned by several authors. These include dust generation and hazardous emissions, soil contamination, waste and sewage generation, noise, destruction of local fauna and habitat loss, the use of natural resources and raw materials (including water and energy), and increased surface runoff due to the impermeable surfaces of roads and buildings (Al-Shihri, 2016; Gangoellis *et al.*, 2009; Siqueira-Gay and Sánchez, 2019). Some of these impacts can be mitigated in the design phase, like adjusting the layout to avoid sensitive features, while the remaining impacts would be managed by the approved EMP.

During the use phase, most of the impacts of residential developments are related to the consumption of the occupants, while building and infrastructure maintenance play a reduced role. Energy, water, and resource consumption as well as the generation of sewage and waste, and emissions from commuting by the occupants are some of the largest impacts associated with this phase (Balaban, 2012; Siqueira-Gay and Sánchez, 2019). Some developments make use of solar geysers or photovoltaic arrays on rooftops to reduce energy consumption. While some developments make provision for the required infrastructure during the design phase, these measures can still be effectively implemented retroactively. The developments also contribute to urban sprawl and increases pressure on and/or demand for public services such as schools and hospitals (Balaban, 2012; Siqueira-Gay and Sánchez, 2019).

End-of-life can refer to two separate reference frames: maintenance and the life cycle of the project. In terms of maintenance, end-of-life refers to the burden of components that have to be replaced during the use phase, including replacement of windows, geysers, and broken infrastructure, as well as reapplication of paint and other finishes (Layagna *et al.*, 2018). At a project level, it refers to the end-of-life phase, during which the development is demolished (Layagna *et al.*, 2018). It includes activities such as transportation of the waste material for recycling or disposal (as applicable) and the energy and emission demand for dismantling of the buildings and treatment of the waste (Layagna *et al.*, 2018). In both cases, the impacts of the end-of-life phase are influenced by the reusability/recyclability of the materials being disposed of. The choice of building material is structurally dependent on many factors and cannot be changed once the building is constructed. It must therefore be addressed during the design phase, while some flexibility exists with regards to the material of replacement components which can be sourced as and when required.

There is no consensus regarding the impacts of housing in all of the phases of a residential development and the impacts are dependent on several factors. Some impacts, like those associated with the consumption of the residents, are mostly out of the developer's control and depend on the habits of the residents themselves. Other impacts can potentially be addressed in the design phase, while some may only come to light during the EIA process itself. This further emphasises the need for quality EIAs.

2.4 Quality review methodology

This section will briefly discuss methodologies related to the study of EIAR quality.

2.4.1 Quality review packages

While there are several ways to determine the quality of an EIAR, the most popular method internationally has been the use of a quality review package (Sandham and Pretorius, 2008). Their effective use has been widespread since the development and use of the Lee and Colley Review Package (Thorpe, 2014; Sandham *et al.*, 2013; Zubair *et al.*, 2011; Pinho *et al.*, 2007). The Lee and Colley Review Package specifically has been widely used and adapted; however, several review packages have been developed, including the European Commission Guidelines and the Oxford-Brookes Review Package. These review packages are usually made up of review categories or questions (sometimes both), to which a score is assigned based on the completeness of the answer the report provides (Thorpe, 2014; Peterson, 2010; Talime, 2010). The scoring systems vary between review packages, but ultimately the scores will be used to determine the strengths and weaknesses of the EIAR and, by extension, its overall quality.

2.4.2 Degree of legal compliance

As mentioned before, while the EIA process has been adopted in the majority of nations, the exact process and requirements differ between countries. It is therefore important to identify the minimum legal requirements of the relevant country, and the subsequent degree of legal compliance of the EIAR (Thorpe, 2014, Coşkun and Turker, 2011). These requirements are thus the bare essentials required for a report to be accepted for decision-making purposes, and everything beyond such requirements would be considered “best practice” or “supplementary”. As such, unless it is specifically required by the relevant legal requirements, the use of this method as a measure of quality does not allow for assessing best practice. Therefore, identifying the legal requirements is usually the first step in using the Lee and Colley Review Package (Lee *et al.*, 1999). This method was applied by Kruger and Chapman in 2005, using the EIA regulations and guidelines published by the government as the basis of their quality review. They found that in the Free State EIA reports did not conform well to the EIA regulations and guidelines.

Review packages are the most widely used methods to assess EIAR quality in an academic sense. However, some would argue that the degree of legal compliance is often the most practically applied method, since the consultants drafting EIARs view the legal requirements as the minimum standard of quality. They do not necessarily consider best practice (Kågström, 2016).

2.5 Chapter summary

The EIA process has a long history, both internationally and locally. However, the EIARs produced by the EIA process varies in quality quite significantly between sectors and legal systems. While many of the studies on EIAR quality concludes that reports are of satisfactory quality, they also point out that best practice is not a major consideration or indicator of quality for the consultants drafting the reports. Furthermore, there is little evidence that the competent authorities reviewing these reports make use of quality review packages to assure the quality of the reports being reviewed. Therefore, determining EIAR quality remains largely an academic pursuit.

The impacts of housing and residential developments can largely be categorised in three phases: construction, use, and end-of-life phases. While several overlapping and shared impacts can be identified from the literature, there is no consensus regarding the impacts of each of these phases. In many cases the details regarding the development and the receiving environment can play a role in terms of the extent and risk of a given impact, including the layout of the development and the building material used. In addition, the local climate also plays a role in resource consumption, both in terms of design and the resource use of the occupants.

CHAPTER 3 – METHODOLOGY

Chapter 3 describes the methodologies used to answer the research and achieve the research objectives. Section 3.2 deals with the research design, the review package, the required adaptations for the context of this research, and how quality will be assessed. Section 3.3 provides and justifies the selection criteria for the reviewed EIARs and a cross case analysis of the selected EIARs. Section 3.4 discusses how the primary data will be analysed and interpreted.

3.1 EIAR quality review

Quality of EIAR reports for this research was reviewed using a modified version of the Lee and Colley Review Package (from here on referred to as “the Package”). The Package was chosen because it can be effectively applied in various countries provided it is adequately modified, and it has seen widespread use both locally and internationally (Lee *et al.*, 1999; Sandham *et al.*, 2008; Mbhele, 2009; Sandham *et al.*, 2010; Sandham *et al.*, 2013b; Hallatt *et al.*, 2015; Ceronio, 2018; Sandham *et al.*, 2020).

In summary, the Package aims to evaluate how well certain tasks were completed, and subsequently assigns a quality and completeness grade ranging from A to F. Grades A to C are considered satisfactory, and A specifically represents superior quality. Grades D to F are considered non-satisfactory, with F specifically indicating poorly executed tasks and/or tasks that were not attempted. Further details regarding the meaning of each grade are provided in Table 3.1 below.

Table 3-1: List of quality assessment grades (Source: Lee et al., 1999)

Grade	Explanation
A	Relevant tasks are well performed, no important tasks left incomplete.
B	Generally satisfactory and complete, only minor omissions and inadequacies.
C	Can be considered just satisfactory, despite omissions and inadequacies.
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies.
E	Not satisfactory, significant omissions or inadequacies.
F	Very unsatisfactory, important tasks poorly done or not attempted.
N	Not applicable. The review topic is not applicable or it is irrelevant in the context of

	this report.
--	--------------

These tasks are grouped into review sub-categories and form the base of the four-tier hierarchical structure of the Package. The review sub-categories are grouped into review categories, which are themselves grouped into review areas. Finally, the review areas are grouped together into the overall assessment, which will be the final score of the EIAR. So, in this hierarchical system, the score of the lowest level (review sub-categories) will inform the scores of the review categories, which will inform the score of the review areas, which will finally result in an overall assessment score.

3.1.1 Required modifications

In order to refine the methodology, the Package was modified to suit the South African regulatory environment, and more specifically considering best practice in the housing sector. In this regard, the only modifications made to the package were the tasks of the review sub-categories. The NEMA 2014 EIA Regulations and the National Housing Code (Department of Human Settlements (DHS), 2009) were analysed and requirements included into the review package. No changes were made to the review methodology. Table 3-2 is an example of the collation sheet used in this research.

Table 3-2: Review criteria applied

Criteria no.	Description	Score
1	DESCRIPTION OF THE DEVELOPMENT, THE LOCAL ENVIRONMENT AND THE BASELINE CONDITIONS +*	
1.1	Description of the development: The purpose(s) of the development should be described as should the physical characteristics, scale and design. The legislative and policy context must be established. Details around the proponent, the EAP and the property should be included.+*	
1.1.1	Identity of the applicant and the EAP preparing the report. Include the experience and CV of the EAP, as well as an undertaking under oath by the EAP that the information in the report is correct and complete.*+	
1.1.2	Identify the proposed location. Include the 21-digit Surveyor General number for each cadastral land parcel, the physical address and farm name, or the coordinates of the boundary of the property/ies.*	
1.1.3	Describe the policy and legislative context of the project. Include any legislation, policies, plans, municipal development planning frameworks etc. that are applicable and to be considered.*+	

1.1.4	Describe the project and its physical footprint. Include the design, size and scale of the project, as well as the nature and duration of the various phases of the project.*+	
1.1.5	Establish the needs and desirability of the project, including the needs and desirability of the project in terms of the preferred location.*+	
1.1.6	Describe the preferred site, activities, and technologies. Include design features, especially those for environmental planning and socio-economic management like pollution control, worker services, etc.*+	
1.1.7	Describe site specific design features for sustainable energy efficient housing as described in the National Housing Code: Technical and General Guidelines. These include but are not limited to orientation, energy efficient materials and technology, insulation and design considerations for flooring and windows.+	
1.1.8	Describe site specific design consideration features for sustainable water efficient housing as described in the National Housing Code: Technical and General Guidelines. These design features include but are not limited to design consideration like pipe size, use of grey water, and implementation of water saving devices.+	
1.1.9	Identify the resources required during different phases, as well as the sources and availability of required resources.+	
1.2	Site description: The on-site and surrounding land-uses should be described. Access to the site and means of transportation to the site during construction and operational phases should be described. An estimation of the amount of people on site during the various phases of the project should be provided. +*	
1.2.1	Describe the site. Include the location of the project on a map and the planned layout of any buildings or infrastructure. The use of maps and visual representation is encouraged.+*	
1.2.2	Descriptions and locations of land uses surrounding the project. Include the current and future use of the proposed location. *	
1.2.3	Establish the estimated number of workers, visitors and/or occupants on-site at the various phases of the project.+	
1.2.4	Identify site access and the means of transportation for required resources and workforce, including those of visitors.+*	
1.3	Wastes: The types and quantities of wastes which might be produced should be estimated, and the proposed disposal routes to the environment described.+*	
1.3.1	Identify the type and quantity of waste produced. Acknowledge uncertainties, assumptions and estimations, and indicate the range or confidence limits where possible.+*	
1.3.2	Identify the pathway of disposal for the waste produced and how the waste will be handled and/or removed from site.+*	
1.4	Environment description and baseline conditions: The area and location of the environment likely to be affected by the	

	development proposals should be described.+*	
1.4.1	Identify and indicate the receiving environment. Include the method used to identify sensitive receptors, relevant existing data used, the geographical area of investigation, extent of fieldwork done, and acknowledge assumptions and uncertainties.+*	
1.4.2	Identify the baseline socio-economic conditions of the receiving environment. Include key aspects and issues that will be investigated by the report.+	
2	IDENTIFICATION AND EVALUATION OF KEY IMPACTS +*	
2.1	Definition of impacts: Potential impacts of the development on the environment should be investigated and described. Impacts should be broadly defined to cover all potential effects on the environment and should be determined as the predicted deviation from the baseline state.+*	
2.1.1	Describe the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project.*+	
2.1.2	The description above should include the extent each effect will affect the natural, social and economic environments, and their interaction with each other.*+	
2.1.3	Appropriate emphasis should be placed on sensitive receptors and important components, seasonal variation and feedback loops.+	
2.2	Identification of impacts: Methods should be used which are capable of identifying all significant impacts.+*	
2.2.1	Identify the method and describe the process used for identifying impacts.+*	
2.2.2	Derive impacts from the deviation it causes from the baseline conditions.+	
2.2.3	Identify all possible impacts for each phase of the project.+*	
2.3	Scoping: Not all impacts should be studied in equal depth. Key impacts should be identified, taking into account the views of interested parties, and the main investigation centred on these.+*	
2.3.1	Describe the public participation process. Include details regarding how the I&APs were identified and notified of the project, what provisions were given for them to express their views, as well as any information documents regarding the project made available to the I&APs. These include but are not limited to public meetings, background information documents, notices and/or advertisements used to interact with I&APs.+*	
2.3.2	Record all comments received.*	
2.3.3	List issues identified by I&APs.*	
2.3.4	Describe the communication with I&APs at various stages of the process. Include proof of delivery of any notification regarding the availability of reports for review and deadline for receiving comments, as well as the method of	

	communication.*	
2.3.5	Indicate if any I&APs declined to take part in the public participation process, as well as their reason for doing so.+	
2.3.6	Identify any impacts or comments for further investigation.+*	
2.4	Assessment of impact magnitude and significance: The expected significance that the projected impacts will have for society should be estimated. The sources of quality standards, together with the rationale, assumptions and value judgements used in assessing significance, should be fully described.+*	
2.4.1	Describe the method used to determine the magnitude of impacts. Include the source of the data used and identify and acknowledge any gaps, shortcomings or assumptions made in both the data and method used.+*	
2.4.2	Describe the method of assessing significance and ranking of impacts. Include the source of the data and the relevant quality standards used, and identify and acknowledge any gaps, shortcomings or assumptions made in both the data and method used.+*	
2.4.3	Describe the significance of the impacts on the surrounding community/ies. Include the nature, significance, duration, probability of occurring, spatial extent, consequences and the reversibility of the impact, as well as any potentially irreplaceable losses and the degree to which the impact and risk can be avoided, managed or mitigated. Cumulative impacts should also be considered. Where possible, impacts should be recorded in measurable quantities and qualitative descriptions should be fully defined.+*	
2.4.4	Describe the significance of the impacts on the affected environment. Include the nature, significance, duration, probability of occurring, spatial extent, consequences and the reversibility of the impact, as well as any potentially irreplaceable losses and the degree to which the impact and risk can be avoided, managed or mitigated. Cumulative impacts should also be considered. Where possible, impacts should be recorded in measurable quantities and qualitative descriptions should be fully defined.+*	
3	ALTERNATIVES AND MITIGATION +*	
3.1	Alternatives: Feasible alternatives to the proposed project should have been considered. These should be outlined in the Statement, the environmental implications of each presented, and the motivation for the preferred alternative should be given, particularly where the preferred project is likely to have significant, adverse environmental impacts.+*	
3.1.1	Describe the method used to identify alternatives. Include assumptions and uncertainties.+*	
3.1.2	Describe the positives and negatives of each alternative. Each alternative should be investigated as if it were the preferred alternative.+*	
3.1.3	At least 2 alternatives should be investigated. Include appropriate justification for the lack of alternatives where fewer alternatives are considered.+	

3.1.4	Provide adequate motivation for the preferred alternative.+*	
3.2	Scope and effectiveness of mitigation measures: All significant adverse impacts should be considered for mitigation. Evidence should be presented to show that proposed mitigation measures will be effective when implemented.+*	
3.2.1	Describe the mitigation measures proposed. Include methods to determine the effectiveness of mitigation measures. Any unmitigated or residual impacts should be identified and the lack of mitigation should be justified.+*	
3.2.2	The mitigation measures proposed should conform to industry best practice* and should include modification of the project, compensation and pollution control.+	
3.2.3	Indicate the effectiveness of mitigation measures. Include any uncertainties and assumptions, as well as relevant data to justify the acceptance of such assumptions.+*	
3.2.4	Describe any monitoring procedures to be implemented to ensure compliance with and the effectiveness of the proposed mitigation measures. Include the frequency of monitoring events at the various phases.+	
4	COMMUNICATION OF RESULTS +*	
4.1	Layout: The layout of the Statement should enable the reader to find and assimilate data easily and quickly. External data sources should be acknowledged.+*	
4.1.1	There should be an introduction briefly describing the project, the aims of the environmental assessment and how those aims are to be achieved.*	
4.1.2	Information should be logically arranged in sections or chapters and the whereabouts of important data should be signalled in a table of contents or index.*	
4.1.3	Reference and acknowledge all data, conclusions and/or quality standards in the text, and provide a full reference as a footnote or in a reference list.+*	
4.2	Presentation: Care should be taken in the presentation of information to make sure that it is accessible to the non-specialist.+*	
4.2.1	Information should be presented so as to be comprehensible to the non-specialist. Tables, graphs and other devices should be used as appropriate. Unnecessarily technical or obscure language should be avoided.*	
4.2.2	Technical terms, acronyms and initials should be defined, either when first introduced into the text or in a glossary. Important data should be presented and discussed in the main text.*	
4.2.3	The Statement should be presented as an integrated whole. Summaries of data presented in separately bound appendices should be introduced in the main body of the text.	
4.3	Emphasis: Information should be presented without bias and receive the emphasis appropriate to its importance in the	

	context of the environmental impact statement.+*	
4.3.1	Prominence and emphasis should be given to potentially severe adverse impacts as well as to potentially substantial favourable environmental impacts. The Statement should avoid according space disproportionately to impacts which have been well investigated or are beneficial.+	
4.3.2	The Statement should be unbiased; it should not lobby for any particular point of view. Adverse impacts should not be disguised by euphemisms or platitudes.+*	
4.3.3	The Statement should include the key findings of the assessment, a map indicating the project, related infrastructure, surrounding land uses and sensitive receptors etc., as well as a summary of the positive and negative impacts, risks and alternatives of the project.*	
4.4	Non-technical summary: An adequate non-technical summary is included, outlining the main conclusion and how they were reached.+	
4.4.1	An adequate non-technical summary is included indicating the main findings of the report. Avoid technical terms, detailed explanation and data lists.+	
4.4.2	The summary should contain a brief description of the project and the environment, the main impacts along with their relevant mitigation measures, any residual impacts, and how and where the data was obtained.+	

3.2 Selection criteria for EIARs

The EIARs selected had to conform to a set of criteria in order to be in line with the purpose of this study. Firstly, the assessments had to be subject to the full scoping and EIA process. Secondly, the EIARs had to be compiled by a variety of consultants. Thirdly, the EIAR considered had to provide housing and services for middle to high income earners, i.e., occupants earning between R15 000 and R40 000 a month. Lastly, the EIARs were sourced from across the country from the consultants who compiled the reports. In this regard, eight EIARs were selected. This is in line with previously conducted quality assessments of EIARs in research. For example, Kruger (2012) evaluated the EIAR quality of twenty filling stations, Ceronio (2018) evaluated the EIAR quality of five hazardous waste landfills, and Sandham et al. (2010) evaluated the EIAR quality of six pest control projects.

3.2.1 Summary of selected EIARs

Table 3-3 provides a cross-case analysis of the selected reports for this research.

Table 3-3: Cross-case analysis of selected cases

Case ID	Province	Year of application	Project area	Activities applied for
Case 1	Gauteng	2020	92.5ha	Listing Notice 1, Activity 28(i); Listing Notice 2, Activity 15; Listing Notice 3, Activity 4; Listing Notice 3, Activity 12.
Case 2	Western Cape	2021	70.23ha	Listing Notice 1, Activity 12; Listing Notice 1, Activity 23; Listing Notice 1, Activity 27; Listing Notice 1, Activity 28; Listing Notice 2, Activity 15; Listing Notice 3, Activity 12.
Case 3	Free State	2018	49.11ha	Listing Notice 1, Activity 28; Listing Notice 2, Activity 15.
Case 4	Gauteng	2020	50.33ha	Listing Notice 1, Activity 12; Listing Notice 1, Activity 19; Listing Notice 1, Activity 27; Listing Notice 2, Activity 15; Listing Notice 3, Activity 12; Listing Notice 3, Activity 14.
Case 5	KwaZulu Natal	2016	480ha	Listing Notice 1, Activity 10; Listing Notice 1, Activity 11; Listing Notice 1, Activity 13; Listing Notice 1, Activity 14; Listing Notice 1, Activity 15; Listing Notice 1, Activity 17; Listing Notice 1, Activity 18; Listing Notice 1, Activity 19; Listing Notice 1, Activity 24; Listing Notice 1, Activity 30; Listing Notice 1, Activity 34; Listing Notice 1, Activity 48; Listing Notice 1, Activity 54; Listing Notice 1, Activity 56; Listing Notice 1, Activity 67; Listing Notice 2, Activity 4; Listing Notice 2, Activity 6 Listing Notice 2, Activity 9; Listing Notice 2, Activity 15; Listing Notice 2, Activity 27; Listing Notice 3, Activity 6; Listing Notice 3, Activity 12; Listing Notice 3, Activity 26.
Case 6	Free State	2015	20ha	Listing Notice 1, Activity 3; Listing Notice 1, Activity 4; Listing Notice 1, Activity 5; Listing Notice 1, Activity 9; Listing Notice 1, Activity 10; Listing Notice 1, Activity 12; Listing Notice 1, Activity 14; Listing Notice 1, Activity 19;

				Listing Notice 1, Activity 27; Listing Notice 2, Activity 6; Listing Notice 2, Activity 15; Listing Notice 2, Activity 28; Listing Notice 3, Activity 6; Listing Notice 3, Activity 14.
Case 7	Gauteng	2017	145ha	Listing Notice 1, Activity 9; Listing Notice 1, Activity 10; Listing Notice 1, Activity 11; Listing Notice 1, Activity 12; Listing Notice 1, Activity 19; Listing Notice 1, Activity 27; Listing Notice 1, Activity 28 Listing Notice 2, Activity 15; Listing Notice 3, Activity 12; Listing Notice 3, Activity 14.
Case 8	Gauteng	2019	279.44ha	Listing Notice 1, Activity 9; Listing Notice 1, Activity 10; Listing Notice 1, Activity 24; Listing Notice 2, Activity 15; Listing Notice 3, Activity 4; Listing Notice 3, Activity 12;

3.3 Data analysis

A collation sheet was used for data processing and analysis (see appendix). The collation sheet allowed the reviewer to capture the quality grade (A, B, C, D, E, F or N/A) of each review sub-category, review category, etc. and allows for any supplementary comments or score justifications to be captured as well. A complete collation sheet would thus highlight unsatisfactory qualities and shortcomings of the relevant EIAR. These scores are then presented on graphs and any trends and anomalies identified within reports, review areas etc. are discussed.

3.4 Methodological assumptions and limitations

This method does not evaluate the effectiveness of the EIARs studied, only the quality in terms of the legislative and best practice requirements. Furthermore, this research made use of one reviewer, where the methodology of the Lee and Colley review package require at least two reviewers. This was addressed by calibrating the review package using two reviewers before reviewing the EIARs for this research.

This research conforms to replication logic, which means that although the results may not necessarily be generalised for the housing industry as a whole, similar results can be expected for similar developments under similar conditions and contexts (Yin, 2017). The research

therefore generalises within context and not based on a representative sample. Since thousands of housing projects have been completed in South Africa since the introduction of EIA requirements, the latter would not be feasible within the time and resources allocated for this research.

CHAPTER 4 - RESULTS AND DISCUSSION

Chapter 4 presents and discusses the results of the quality reviews, and is divided into seven sections. In this chapter, Section 4.1 provides a brief analysis of each case's EIAR review. Section 4.2 discusses the overall quality the EIAs reviewed. Sections 4.3 to 4.6 discuss the results of review categories 1 to 4 in more detail. Section 4.7 provides a summary of the chapter and concluding remarks.

4.1 Single case analysis.

This section provides a summary of each of the cases reviewed for this research.

4.1.1 Case 1

The report is easy to navigate and the site, the activity, baseline environment, and the regulatory and legislative contexts are thoroughly discussed. Maps and visual representation are used appropriately. The project has been modified based on specialist input. The relevant methodologies are described. Several alternatives are identified, although these do not include alternative locations or activities.

The environmental statement only discusses the negative impacts of the no-go alternative and compares it to the positive impacts of the preferred alternative. Very little attention is given to the operational phase.

Generally, this report conforms to legislative requirements, but falls short of best practice.

4.1.2 Case 2

The report thoroughly describes the legal contexts and development frameworks and policies relevant to the project. The public participation process is well documented and the report also shows how certain comments were addressed in the final design of the project. The report is logically arranged and technical terms and acronyms are defined.

Not all the methods are adequately described, and not all the impacts are addressed. Very few alternatives were considered for this project. Water and energy efficiency were not considered

at any point. The assessment of magnitude and significance are solely qualitative, although they are well defined.

Generally, this report conforms to legislative requirements, but falls short of best practice.

4.1.3 Case 3

The report is logically arranged, although there is no navigation aid indicating where legal requirements are met. The various methods used are adequately described. The public participation process is well documented, although there is no distinction between comments received during the various phases of the EIA process. The layout of the project has been adjusted based on specialist input.

Not all the impacts are addressed, and while cumulative impacts were identified, none were investigated and addressed in the report. The environmental statement only discusses the negative impacts of the no-go alternative and the positive impacts of the preferred alternative. The needs and desirability of the project is poorly addressed. Not all of the technical terms used are defined, and very few acknowledgements and references are provided.

Despite certain shortcomings, this report complies with legal requirements, but rarely with best practice.

4.1.4 Case 4

The report gives special attention to sensitive receptors during impact identification and assessment. The relevant methodologies are well described, although no limitations or shortcomings are identified. The report investigates several alternatives. The mitigation measures proposed conform to best practice and effectiveness of mitigation was also investigated. The public participation process is well recorded.

There is no undertaking under oath included for the EAP or any of the specialists who conducted specialist studies for the project. No transport considerations were made for any point of the project. Waste is not an issue addressed in this report. While the public participation report is attached as an appendix, there exists no summary of it in the main report. Furthermore, no summary of issues raised by I&APs is included in the main report.

Despite some short comings, this report is compliant with legal requirements.

4.1.5 Case 5

Navigation in this report is aided by the table of content as well as a separate table indicating where legal requirements were met. The needs and desirability are strongly motivated for, and the legal and policy frameworks are thoroughly described. The impacts are described qualitatively and quantitatively. Special emphasis is placed on sensitive receptors, and aspects of the project have been modified based on specialist reports and locations of sensitive receptors. Several alternatives are considered, and where no alternative is considered, motivation is provided.

No undertaking under oath for the EAPS is included. Water efficiency is not addressed, and energy efficiency is discussed as an alternative technology. The method used for impact identification is not described. Furthermore, no assumptions and uncertainties are discussed for any of the methods. The main report does not contain a summary of the public participation report, and no list of comments and responses is included in the report. Monitoring programmes are required as part of the mitigation measures, but none is described.

The report complied with legal requirements, as well as several best practice requirements.

4.1.6 Case 6

The report describes the legal and policy frameworks well, and the needs and desirability of the project is adequately addressed. Several alternatives had been investigated and the public participation process is well documented. Maps and other visual presentations are used appropriately.

The report is not logically arranged, and the report headings are not necessarily representative of the content to follow. Few methods are described and no data sources, references, limitations or gaps in knowledge are identified. The description of the project is very limited. Waste and waste pathways are not considered at any phase of the project. No cumulative impacts are identified. The environmental statement compares only the positive impacts of the preferred alternative to the negative impacts of the no-go alternative. No undertaking under oath is included for the EAP or the specialists conducting the specialist studies for this report.

This report contains several significant omissions and is not considered compliant with legal requirements.

4.1.7 Case 7

A list of technical terms, abbreviations and acronyms is provided. Sensitive areas, along with the various levels of sensitivity, were identified and given appropriate attention. The identification discussion of impacts was very well done. The methods are summarised in the main report and expanded on in the relevant appendix. The public participation process is well documented and proof of all communication is provided. Several alternatives are identified, and adequate motivation is provided for aspects that had no alternative.

Waste and waste pathways are not addressed in this report. While several alternatives were identified, few of them were properly investigated, and only their negative impacts are presented. There is no indication of the effectiveness of the proposed mitigation measures. The policy and legislative contexts are well addressed; however, they are discussed in three separate sections, resulting in repetition and confusion for the reader.

The report is considered compliant with legal requirements, and also satisfies several best practice requirements.

4.1.8 Case 8

The report incorporates aspects of the relevant policy documents into the needs and desirability of the project. Several recommendations are made regarding energy efficiency, but these are discussed as “alternative technologies”. The baseline receiving environment is well defined and the use of maps and other visual aids are appropriately used. Provision was made for public transportation at all phases of the project. The public participation process is well documented, and a summary of the comments and responses is provided in the main report.

Site identification is limited to a farm name and a description of the local road network. Not all the references are cited in the report, and some of the sources are dated. Gaps and shortcomings of methods and data are not acknowledged. Not all of the methods used in the report are described. Cumulative impacts are identified, but were not investigated.

Generally, this report conformed to legislative requirements, but falls short of best practice.

4.2 Overall EIA quality

Figure 4.1 provides a summary of the overall scores assigned to the EIAs reviewed in this study. Of the eight EIAs reviewed, six scored a B (generally satisfactory and complete, only minor omissions and inadequacies), one scored a C (can be considered just satisfactory,

despite omissions and inadequacies), and one scored a D (parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies). From this it can be concluded that seven out of the eight EIARs reviewed were of high enough quality to be considered compliant with the legal requirements, and can provide the competent authority with enough information to make an informed decision. However, the lack of A scores assigned to the review areas, and the fact that no report received an A score for overall quality, is an indication that best practice is not always complied with.

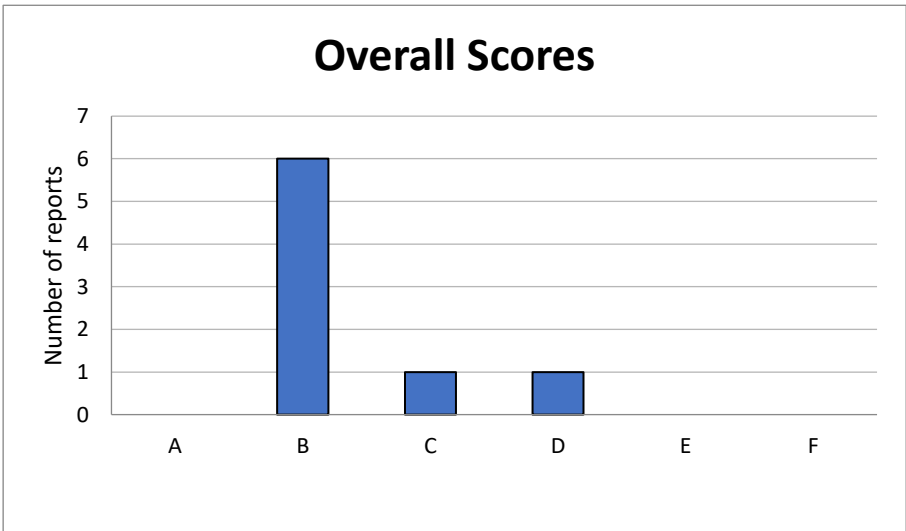


Figure 4-1: Overall quality scores of the EIARs reviewed.

4.3 Results of Review Area 1

Review Area 1 considers the proposed development, the local environment, waste, and the baseline environmental conditions. This review area is further broken down into the following review categories:

- 1.1 Description of the development;
- 1.2 Site description;
- 1.3 Waste; and
- 1.4 Description of the baseline conditions.

Four EIARs scored a B and four scored a C for Review Area 1. Figure 4.2 shows the score distribution for Review Area 1. The graph shows that while most of the reports covered the review categories adequately, three reports did not address Review Sub-category 1.3 sufficiently and significant omissions were identified. On the other hand, very few reports

completed all important tasks described in Review Area 1, and not one report received an A score for Review Area 1.

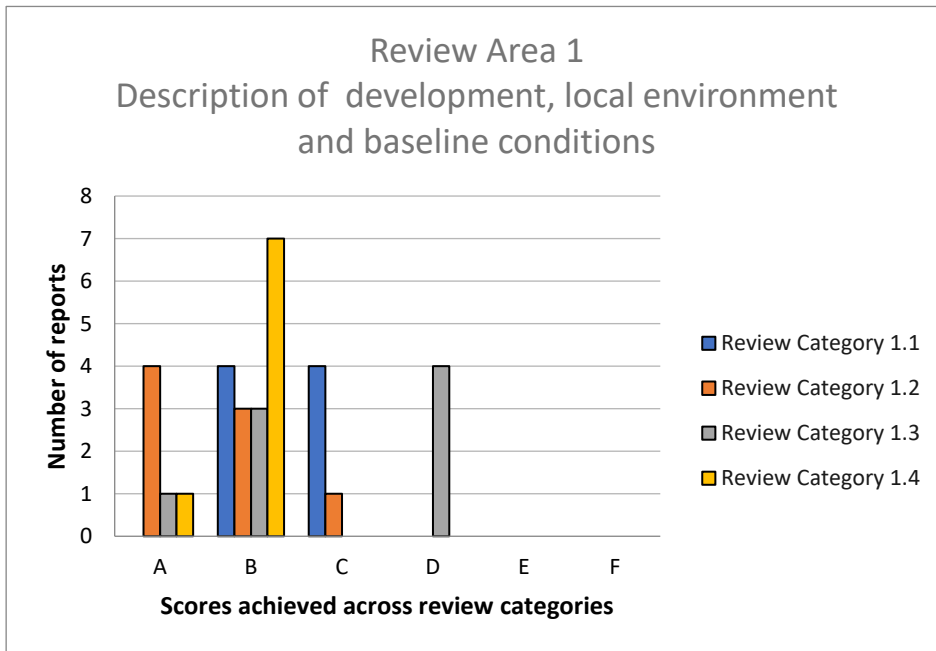


Figure 4-2: Scores for Review Categories in Review Area 1

4.3.1 Description of the development

Figure 4.3 shows the results for Review Category 1.1. In summary, Review Category 1.1 considers the purpose of the development, the nature of the activities of the development, the legislative and policy context and details regarding the EAP and the proponent.

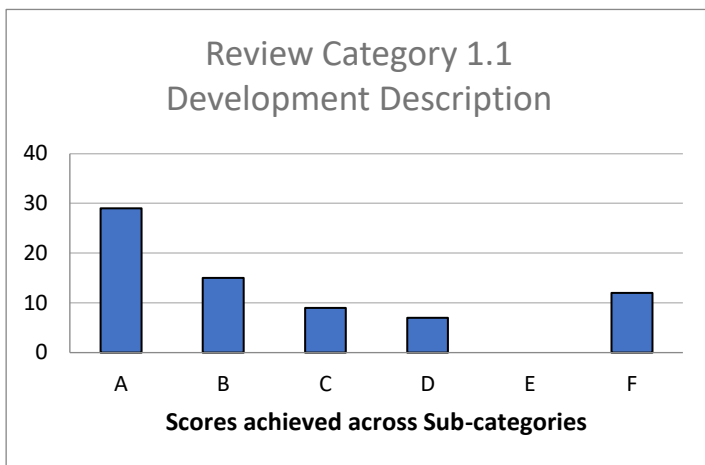


Figure 4-3: Results for Review Category 1.1

None of the EIARs scored an A in this review area. Four EIARs scored a B and four a C. As such, all the EIARs performed adequately in this review category. Most EIARs excelled when describing the activity, identifying and describing the proposed site and discussing the legislative and policy context of the project. However, in several instances the “undertaking under oath” was not supplied with the report. While in most cases all legal requirements were met, best practice was not readily complied with. Some EIARs, however, discussed legal and policy context in several different sections. This results in repeating information, creating confusion for the reader. The reader now has to navigate back and forth through the report to verify the extent to which it was covered. All but one EIAR failed to adequately address water and electricity efficiency requirements identified in the National Housing Code. Some EIARs omitted these points entirely. In the instances where these points were addressed, they were considered as alternatives and were not included in the intended design of the project. One EIAR acknowledged that energy efficiency considerations have not been made part of the project. Nonetheless, this report made several recommendations for the implementation of such technologies. However, this was again discussed as an alternative, and was not returned to in the Conclusions and Recommendations of the report. While the requirements of the National Housing Code are not legally required, such energy and water efficient planning it is considered best practice.

4.3.2 Site description

Figure 4.4 shows the results of Review Category 1.2. In summary, Review Category 1.2 considers the site description, the current and future land uses of the site and surroundings, the amount of people on-site during various phases of the project, and access to the site.

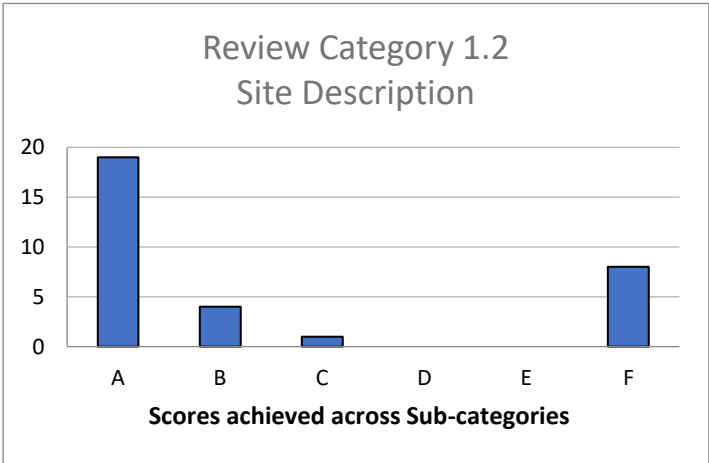


Figure 4-4: Results for Review Category 1.2

While the EIARs generally scored high in this review category, four reports scored an A. The biggest omission identified related to site access. Not all EIARs identified transport to and from the site, and little to no consideration was made for public transportation in these cases. In one case, a limited site description resulted in a C score for Review Sub-category 1.2.1 (describe the site). While it is not considered a legal requirement, no report addressed Review Sub-category 1.2.3 (estimated number of workers, visitors and/or occupants on site at the various phases).

4.3.3 Waste

Figure 4.5 shows the results of Review Category 1.3. In summary, Review Category 1.3 considers waste and the disposal thereof.

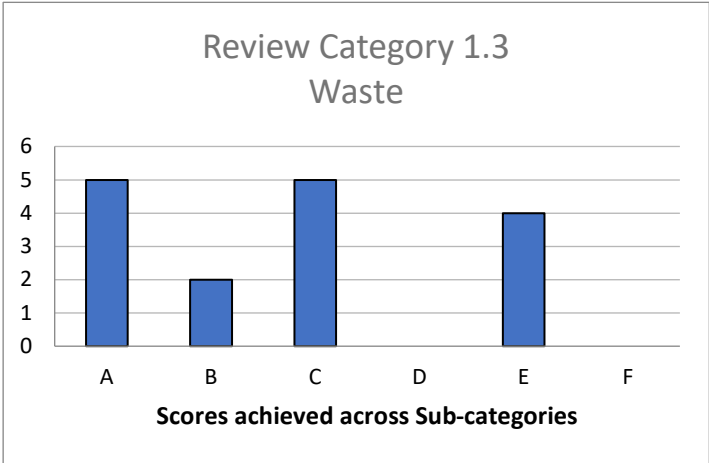


Figure 4-5: Results for Review Category 1.3

Only one EIAR scored an A, and four EIARs scored a D. A symptom across all but one was the lack of waste management considered during the operational phase. Thus, only the waste generated during the construction phase have been investigated. The four EIARs received low scores due to waste not being adequately addressed as an issue. These EIARs only identified the different wastes during the assessment of impacts and discussion of mitigation measures and offsets, while the waste pathways were only discussed in the EMP. An omission noted in all reports is the lack of acknowledgment of assumptions or uncertainties. This omission is not limited to just this review category.

4.3.4 Description of baseline conditions

Figure 4.6 shows the results of Review Category 1.4. In summary, Review Category 1.4 considers the baseline conditions of the receiving environment, and includes both the natural and the socio-economic environments.

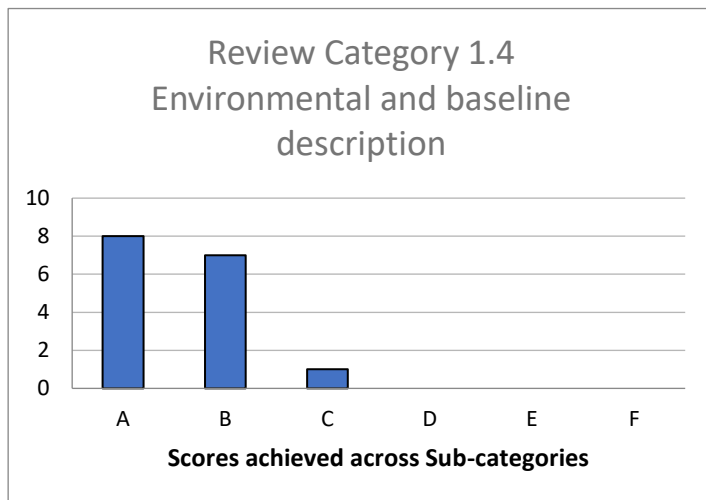


Figure 4-6: Results for Review Category 1.4

The EIARs generally performed well in this review category. However, the lack of data sources in most of the EIARs is of concern. As a result, only one EIAR scored an A while the rest all scored Bs. As part of the description of the baseline environment, specialist reports are referenced where appropriate. However, descriptions like rainfall data or the demographics of the surrounding area are often presented without a source, and the legitimacy of these descriptions cannot be verified.

4.4 Results of Review Area 2

Review Area 2 considers the identification and evaluation of the key impacts of the proposed development, and includes the public participation process. This review area is further broken down into the following review categories:

- 2.1 Definition of impacts;
- 2.2 Identification of impacts;
- 2.3 Scoping; and
- 2.4 Assessment of impact magnitude and significance.

Figure 4.7 shows the score distribution for Review Area 2. The graph shows that while most of the EIARs covered the review categories adequately enough for a B score, three EIARs did not

address Review Category 2.3 sufficiently and one report did not address Review Category 2.4 sufficiently. Overall, Review Area 2 was adequately addressed by all EIARs, with four EIARs scoring a B and four scoring a C.

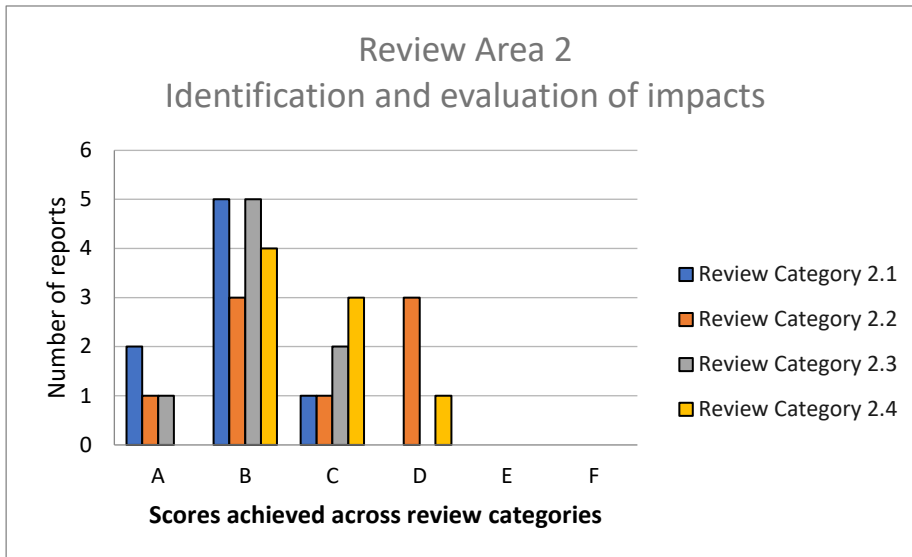


Figure 4-7: Scores for Review Categories in Review Area 2

4.4.1 Definition of impacts

Figure 4.8 shows the results of Review Category 2.1. In summary, Review Category 2.1 considers how impacts are defined, and requires a description of any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project. This description also has to indicate the extent of the effect of the project on the natural, social, and economic environments, as well as the interaction between these environments. Lastly, any important components, sensitive receptors and seasonal variations should be acknowledged and investigated.

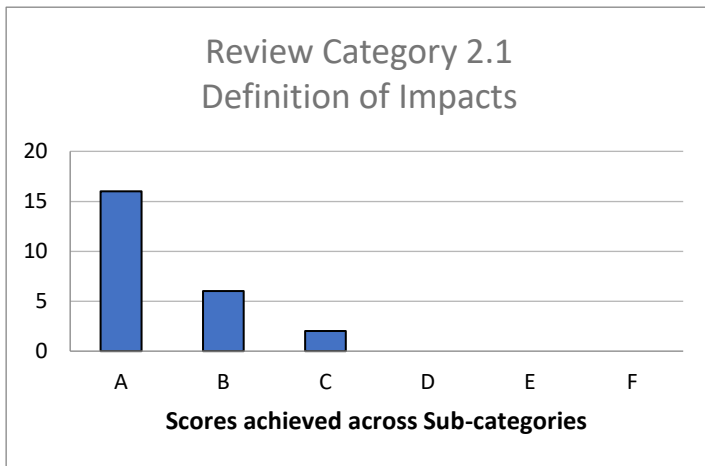


Figure 4-8: Results for Review Category 2.1

Overall, all the EIARs addressed this review category adequately, although only two EIARs scored an A. In most cases, the interaction between the different environments was not addressed, resulting in a B score. Seasonal variation and sensitive receptors (and in some cases, the lack thereof) were adequately identified.

4.4.2 Identification of impacts

Figure 4.9 shows the results of Review Category 2.2. In summary, Review Category 2.2 considers the methods used to identify impacts and requires that all the impacts be identified. One best practice method for identifying impacts is described in Review Sub-category 2.2.2 (derive impacts from the deviation the project causes from the baseline conditions).

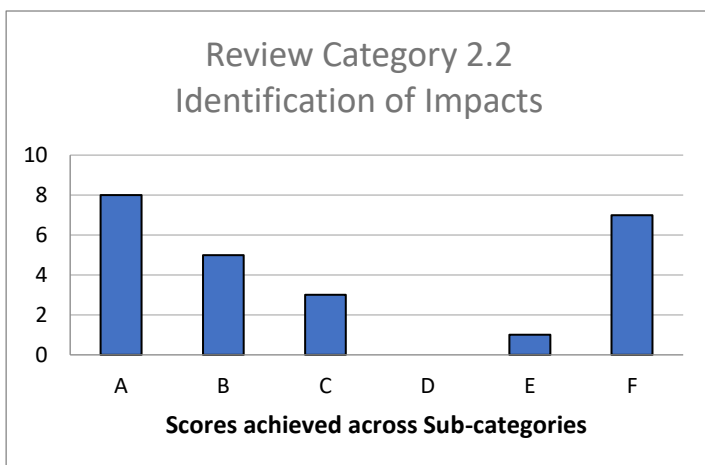


Figure 4-9: Results for Review Category 2.2

Three of the EIARs reviewed did not include a method for impact identification. Although it appears that, in these cases, the impacts were derived from specialist input and reports, this is

never confirmed. Furthermore, two reports did not include any issues raised by Interested and Affected Parties (I&APs) in the main report. Overall, five reports scored satisfactorily, and three reports scored a D.

4.4.3 Scoping

Figure 4.10 shows the results of Review Category 2.3. In summary, Review Category 2.3 considers the identification of key impacts to be investigated in the EIA and the public participation process.

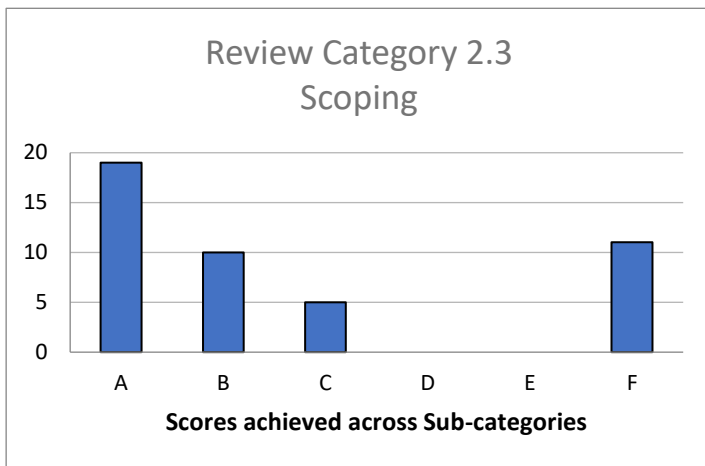


Figure 4-10: Results for Review Category 2.3

Although only one EIA received an A score, the overall scores were satisfactory. The EIAs generally included all of the correspondences with I&APs and a list of I&APs along with their comments. However, in some cases the list of I&APs and the comments and responses were only available in the public participation report, with no summary provided in the main report.

A common omission in this review category was a description of the method for identifying I&APs. Furthermore, while not all the issues and comments raised by I&APs required further investigation, the comments that did require further investigation (and that were further investigated) were not identified in four of the reports. Lastly, only one EIA provided notification in more than one language. While the use of multiple languages is not a legal requirement, the demographic information collected for the EIA can be used to identify at least one appropriate additional language to be used in notifying and communicating with I&APs. This reduces the barrier of entry for participating in the EIA process. Justification should be provided for the lack of consideration for additional languages.

4.4.4 Assessment of impact magnitude and significance

Figure 4.11 shows the results of Review Category 2.4. In summary, Review Category 2.4 considers the methods used to investigate the impacts, as well as a description of the impacts.

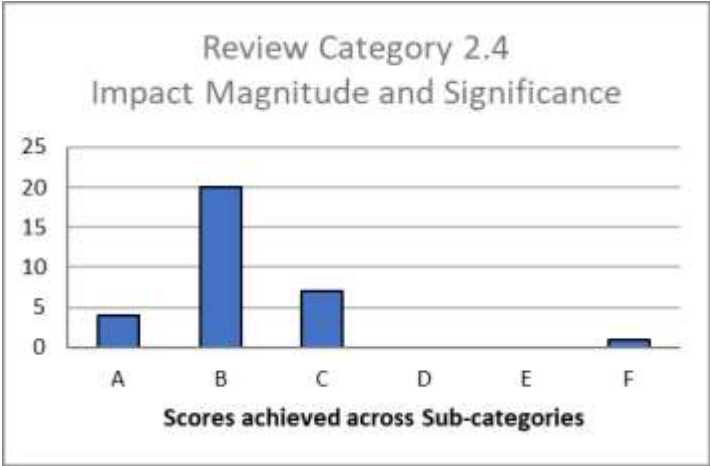


Figure 4-11: Results for Review Category 2.4

All but one EIAR achieved satisfactory scores for this review category. However, no EIAR scored an A. All EIARs described the method used to assess magnitude and significance, though no data sources, assumptions or gaps in knowledge (as noted in Review Category 1.3) were acknowledged in any EIAR. While all reports identified cumulative impacts, four of the EIARs did not investigate any cumulative impacts. One EIAR only provided a qualitative description of the impacts. While this is not considered best practice, the qualitative descriptions were well defined. One EIAR that did not receive a satisfactory score for this review category discussed the impacts in two different sections of the report, providing a solely qualitative description in one section and a solely quantitative description in a separate section. This is not best practice and makes it difficult for the reader to obtain a full understanding of the impacts. The EIAR that did not receive a satisfactory score identified significant impacts relating to the socio-economic environment, but none of these impacts (or any other socio-economic impacts, for that matter) were investigated.

4.5 Results of Review Area 3

Review Area 3 considers alternatives and the proposed mitigation measures, and is broken down into two review categories. Figure 4.12 shows this Review Area’s score distribution. The graph shows that two EIARs did not sufficiently address Review Category 3.1.

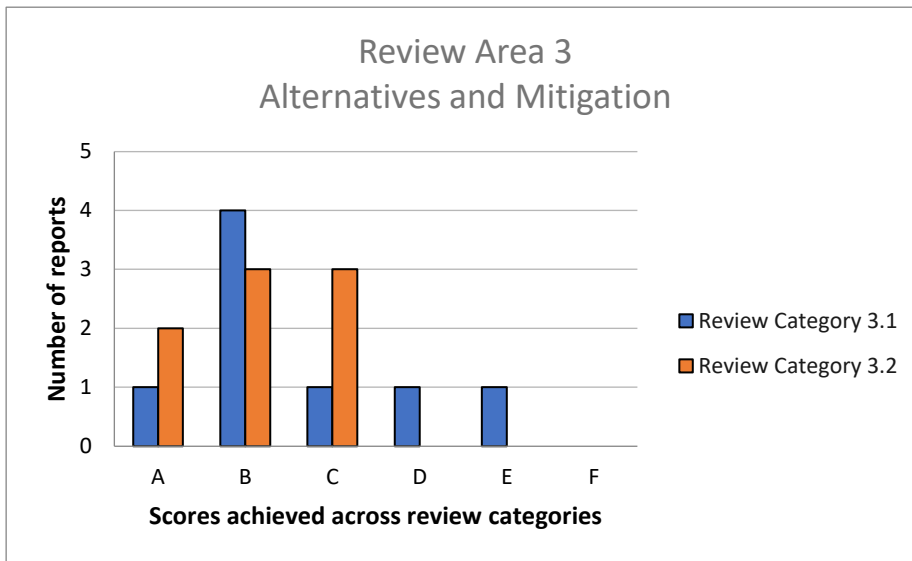


Figure 4-12: Scores for Review Categories in Review Area 3

4.5.1 Alternatives

Figure 4.13 shows the results of Review Category 3.1. In summary, Review Category 3.1 considers the method used to identify alternatives, as well as the investigation of said alternatives as part of the EIAR. An important point to note is that the 2014 EIA Regulations requires that these alternatives be investigated as thoroughly as the preferred alternative. Furthermore, where no alternatives are identified, adequate justification should be provided.

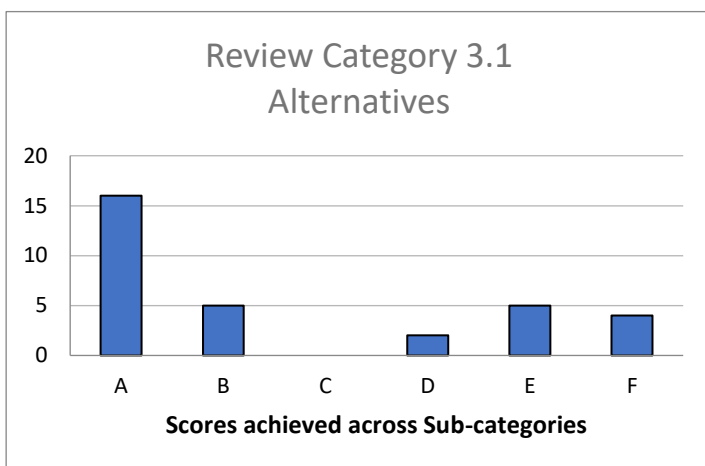


Figure 4-13: Results for Review Category 3.1

Two of the EIARs did not score satisfactorily (one scored a D and another an E), while the rest performed adequately. No A scores were achieved. Three of the EIARs failed to provide a method used to identify alternatives, and five EIARs only investigated the negative impacts of the alternatives. One EIAR only identified the no-go alternative with no justification for the lack of alternatives. All but one EIAR excelled at providing motivation for the preferred alternative. The remaining EIAR's motivation for the preferred alternative was limited to the layout, and no other alternatives were discussed.

4.5.2 Assessment of impact magnitude and significance

Figure 4.14 shows the results of Review Category 3.2. In summary, Review Category 3.2 considers the proposed mitigation measures, how effective the mitigation measures are and how their effectiveness was determined. It also considers any required monitoring procedures at the various phases of the project.

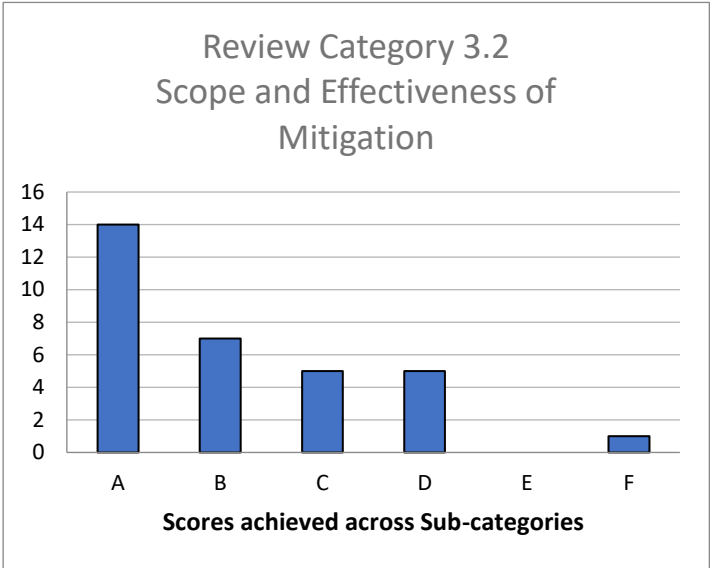


Figure 4-14: Results for Review Category 3.2

All the EIARs performed adequately in this review category. Two reports achieved an A score. The effectiveness of the mitigation measures was, in all cases, determined by assessing the impacts before and after mitigation, and then comparing the results of the impact assessments. Almost all EIARs required monitoring procedures during the various phases of the project. However, none provided any further information about the monitoring procedures that were required.

4.6 Results of Review Area 4

Review Area 4 considers the communication of results. This includes layout and navigation of the EIAR, making the EIAR accessible to a non-specialist, providing all the relevant information and an unbiased Environmental Impact Statement. It also provides a non-technical/executive summary. This review area is further broken down into the following review categories:

- 4.1 Layout;
- 4.2 Presentation;
- 4.3 Emphasis; and
- 4.4 Non-technical summary.

Figure 4.15 shows the score distribution for Review Area 4. The graph shows that while most of the EIARs covered the review categories adequately enough for a B score, two of the EIARs did not address Review Category 4.3 sufficiently, and three EIARs did not address Review Category 4.4 sufficiently. Overall, one EIAR scored an unsatisfactory score for this review area, and no EIAR scored an A.

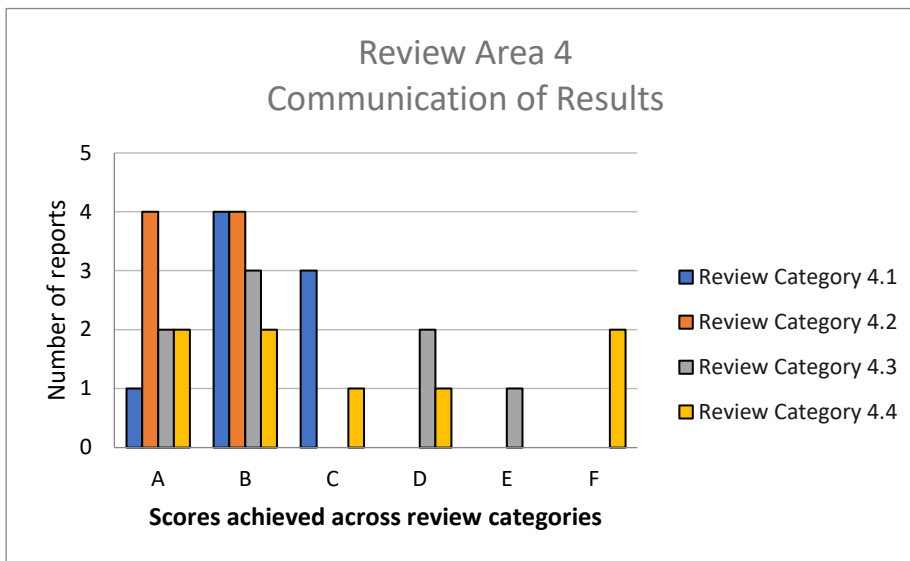


Figure 4-15: Scores for Review Categories in Review Area 4

4.6.1 Layout

Figure 4.16 shows the results of Review Category 4.1. In summary, Review Category 4.1 considers the layout of the report, how information is arranged, and where that information was sourced.

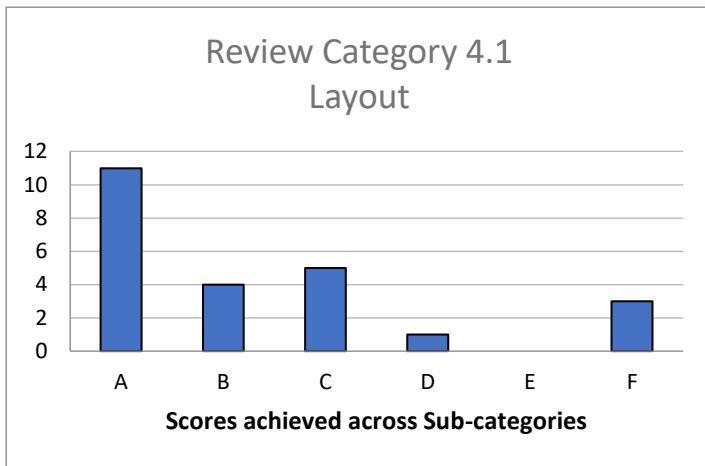


Figure 4-16: Results for Review Category 4.1

The review sub-categories were generally well addressed. All reports provided a brief description of the project and the aims of the EIA process and all but one EIAR was easy to navigate. In most cases a table were provided indicating where legal requirements were met. However, only one EIAR provided proper citation of the data sources used. Some EIARs referred to specialist reports, but references relating to data such as rainfall and climate were generally omitted. Three EIARs provided a reference list, of which two were incomplete and included dated references. One EIAR, however, was not logically arranged and information was hidden under obscure headings. This made information difficult to find. Overall, one report scored an A, four a B and three a C.

4.6.2 Presentation

Figure 4.17 shows the results of Review Category 4.2. In summary, Review Category 4.2 considers presentation of the information, and making sure that the information is presented in such a way that a non-specialist can understand it.

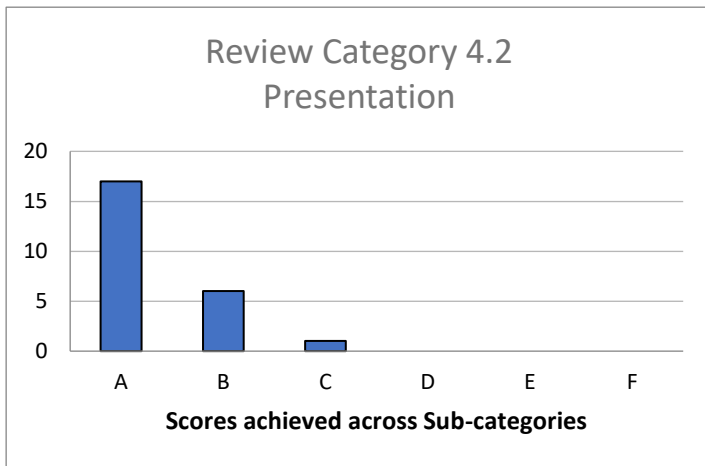


Figure 4-17: Results for Review Category 4.2

All EAIRs excelled at this section. All EIARs provided a list of abbreviations and acronyms, and some also included a glossary. All technical terms that could not be avoided were defined in text when used for the first time and the use of obscure terms and language was largely avoided. However, three reports omitted summaries of some external reports, more specifically, the public participation report. Overall, four EIARs scored an A and four scored a B.

4.6.3 Emphasis

Figure 4.18 shows the results of Review Category 4.3. In summary, Review Category 4.3 considers the objectivity of the Environmental Impact Statement, ensuring that emphasis is appropriately distributed across both positive and negative impacts of the proposed project and the potential alternatives.

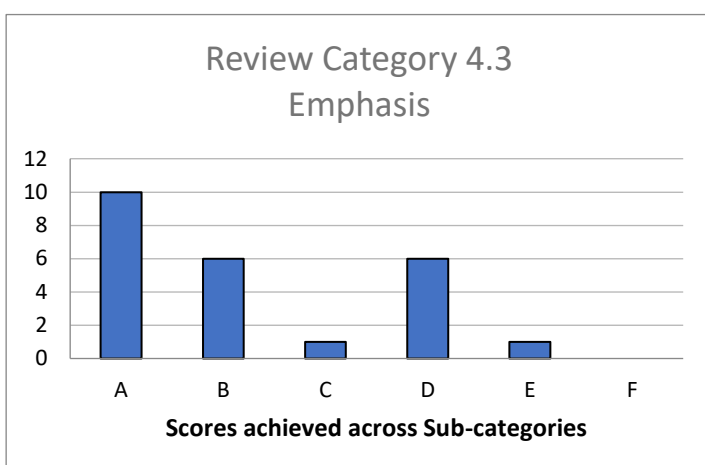


Figure 4-18: Results for Review Category 4.3

Five of the EIARs were given an acceptable score, and two received an A score. However, three of the EIARs presented certain information in a biased way. In these cases, only the positive impacts of the preferred alternative were compared to only the negative impacts of the alternatives considered.

4.6.4 Non-technical summary

Figure 4.19 shows the results of Review Category 4.4. In summary, Review Category 4.4 considers the non-technical or executive summary of the report. Two EIARs did not provide a summary. Two EIARs provided summaries that contained information that was not included in the main report. One EIAR provided a summary that was too detailed, as this summary was sixty pages long.

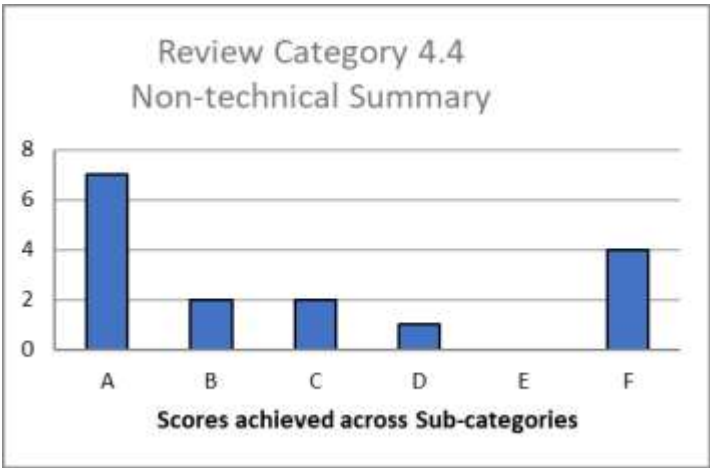


Figure 4-19: Results for Review Category 4.4

4.7 Discussion of results

Table 4.1 below summarises the worst performing review sub-categories for all the EIARs reviewed. From the table it can be seen that of the fourteen worst performing review sub-categories, nine were best practice requirements. Considering this with the low number of A scores assigned to review categories and review areas, it suggests that best practice is a secondary consideration for the consultants that drafted these EIARs.

Table 4-1 Worst performing Review Categories and Sub-categories

Review category/Sub-category	Legal requirement	Best practice	No. EIARs with unsatisfactory scores
1.1.7 Describe site specific design features for sustainable energy efficient	No	Yes	5

housing as described in the National Housing Code: Technical and General Guidelines.			
1.1.8 Describe site specific design consideration features for sustainable water efficient housing as described in the National Housing Code: Technical and General Guidelines.	No	Yes	8
1.1.9 Identify the resources required during different phases, as well as the sources and availability of required resources.	No	Yes	4
1.2.3 Establish the estimated number of workers, visitors and/or occupants on-site at the various phases of the project.	No	Yes	8
1.3.1 Identify the type and quantity of waste produced. Acknowledge uncertainties, assumptions and estimations, and indicate the range or confidence limits where possible.	Yes	Yes	4
2.2.1 Identify the method and describe the process used for identifying impacts.	Yes	Yes	3
2.2.2 Derive impacts from the deviation it causes from the baseline conditions.	No	Yes	4
2.3.5 Indicate if any I&APs declined to take part in the public participation process, as well as their reason for doing so.	No	Yes	7
2.3.6 Identify any impacts or comments for further investigation.	Yes	Yes	4
3.1.1 Describe the method used to identify alternatives. Include assumptions and uncertainties.	Yes	Yes	4
3.1.2 Describe the positives and negatives of each alternative. Each alternative should be investigated as if it were the preferred alternative.	Yes	Yes	5
3.2.4 Describe any monitoring procedures to be implemented to ensure compliance with and the effectiveness of the proposed mitigation measures. Include the frequency of monitoring events at the various phases.	No	Yes	6
4.1.3 Reference and acknowledge all data, conclusions and/or quality standards in the text, and provide a full reference as a footnote or in a reference list.	Yes	Yes	3
4.4.1 An adequate non-technical summary is included indicating the main findings of the report. Avoid technical terms, detailed explanation and data lists.	No	Yes	3

Review Sub-categories 1.1.7 and 1.1.8 consider the design features included relating to sustainable and efficient energy and water usage and are best practice requirements. Two of the EIARs identified some energy efficient design features for the project, but only as alternatives of sorts. No report considered any water or energy efficiency design features as part of the preferred design of the project. One EIAR did identify that energy efficiency has not been considered for the design of the project and makes several recommendations. However, these recommendations were made and discussed in the alternatives section of the EIAR, and were not included in the conclusions and recommendations. Considering the nature of water and energy supply in South Africa, it would make sense to include such interventions in the preferred design of communal infrastructure. While the buildings are at this point not necessarily designed yet, and some projects allow the buyer to design their own homes, energy and water efficient requirements or recommendations for the future buildings and homes can be established during the planning phase. One report summarised the attitude of consultants toward including such design features as part of the project. The consultants assumed that the local city bylaws will force people into designing such efficient housing.

Review sub-category 1.1.9 considers the required resources and their sources at various stages of the project, and is considered a best practice requirement. The estimated electricity, water, and sewage capacity required during the operational phase were identified in three EIARs, but no EIAR considered the resource requirements during the construction phase. Furthermore, one EIAR identified that the municipal water supply is not sufficient to satisfy the need of the project, and that there is no alternative water source. This is considered a fatal flaw in the project and in spite of the acknowledgements of such water shortages, there was no mention of any water efficient design features as described in Sub-category 1.1.8.

Review Sub-category 1.2.3 is concerned with the amount of people on site at the various stages of the project and is a best practice requirement. No report provided an estimation of workers, occupants or visitors for any of the project phases. This omission is curious, because these projects are concerned with providing housing for people. Since the layout for the EIARs already divided the sites into their plots, an estimation for the potential number of people on site during the operational phase should have been derived already. Furthermore, the reports that did identify the required electricity, water, and sewage needs for their respective developments had to base such a calculation on the estimated number of users on site. This disclosure has not been made in any EIAR.

Review Sub-category 1.3.1 requires that the types and quantities of waste produced during the various phases of the project be identified, and is both a legal and best practice requirement.

The four EIARs that scored unsatisfactorily in this sub-category also scored unsatisfactorily in Review Category 1.3. These EIARs all failed to discuss or investigate waste as an issue despite identifying NEM:WA as applicable legislation to the project. In some cases, waste is addressed in more detail in the EMPr than in the EIAR and identified the waste pathways (Review Sub-category 1.3.2).

Review Sub-category 2.2.1 requires a description of the method used to identify impacts, and is a legal requirement. Review Sub-category 2.2.2 prescribes a method used to identify impacts to be used in conjunction with any other methods. Review Sub-category 2.2.2 is a best practice requirement, which is to derive impacts from the deviation it causes from the baseline conditions. Four EIARs did not sufficiently discuss their impact identification method, and three EIARs did not address this sub-category at all. While there is evidence to suggest that the impacts were derived from the specialist reports, this is never confirmed in the report. Since different methodologies may arrive to different conclusions, it is important to disclose the method and its assumptions and shortcomings. The three EIARs that scored A's for this sub-category used multiple methods, each compensating for the weakness of another. This provides more confidence that all the impacts were in fact identified. If the method/s are not provided, then it can't be known if all the impacts were identified or not.

Review Sub-category 2.3.5 requires that any I&AP who declined to take part in the public participation process to be identified, as well as their reason for doing so. It is a best practice requirement. While it is the right of the I&AP to raise any concerns about the project and be consulted and engaged during the public participation process, the I&AP is not obligated to do so. In some cases, the nature of the project is of no concern to the I&AP and they do not want to be involved. In other cases, the I&AP may be boycotting the process in protest of the project. Including details such as these may provide a competent authority with more context, as well as provide some indemnity for a public participation process that yielded little public participation. This sub-category was only partially addressed in one EIAR, which acknowledged the lack of feedback from I&APs despite the communication efforts made by the consultancy.

Review Sub-category 2.3.6 requires a list of issues and concerns raised by I&APs that merited further investigation, and is both a legal and best practice requirement. This is a method that can be used to help satisfy Review Sub category 2.2.1. Four EIARs failed to provide such a list, three of which also failed to satisfy Review Sub category 2.2.1.

Review Category 3.1.1 requires a description of the method used to identify alternatives, and is both a legal and best practice requirement. Similar to Review Category 2.2.1, it is important to

know the method used to identify alternatives to confirm that all reasonable alternatives were considered. The four EIARs that failed this review category failed to provide a method.

Review Category 3.1.2 requires that the positive and negative impacts of each alternative be investigated, and that each alternative should be investigated as though it were the preferred alternative. This sub-category is both a legal and best practice requirement. Since the competent authority is not obligated to approve the preferred alternative, it is important for the positive and negative impacts of the alternatives to be made clear. Five EIARs only discussed the negative impacts of the alternatives, and compared it with only the positives of the preferred alternative. This immediately creates bias for the preferred alternative, as not all the alternatives are equally described.

Review Sub-category 3.2.4 requires a description of the monitoring procedures during the various phases of the project, and is a best practice requirement. Only one EIAR adequately defined the monitoring procedures for the construction and operational phases. The remaining EIARs only identified the need for such monitoring procedures, but failed to provide any detail.

Review Sub-category 4.1.3 requires that references be provided and data sets acknowledged, and are both a legal and best practice requirement. While most EIARs referenced the relevant specialist reports where relevant, very few provided references to external data sources. Climate data and maps consulted were seldom acknowledged. Only two EIARs provided a reference list. Data sources have varying levels of confidence with regards to the accuracy of the data, and as such not knowing where the data was sourced, raises issues of the legitimacy of the data provided.

Review Sub-category 4.4.1 requires a summary that includes the main findings of the EIAR and should be simplified to be understood by a non-specialist. This is a best practice requirement. Two EIARs failed to attempt this section. One EIAR included an executive summary in excess of 60 pages, and contained information that was not included in the main report. This “summary” was also considered too technical since few definitions were provided in the summary.

Lastly, one common issue in the reviewed EIARs was the limited use of multiple languages. The Public Participation Guidelines does not really define what is considered “a language I&APs will understand”. However, it is considered best practice to use multiple languages for notification and communication with I&APs in a country with eleven official languages. Only one EIAR provided notification in one additional language, while the rest limited language use to English only. The use of multiple languages removes barriers of entry for individuals to engage in the public participation process and results in a more thorough process. This is because not all

I&APs can necessarily express themselves adequately in English as a second, or even a third language.

4.8 Chapter summary

Chapter 4 considered the results of the quality reviews of the EAIRs. The results of each review area and review category were discussed. The review sub-categories that performed the worst were identified. The results showed that all but one of the reviewed EIARs were of acceptable quality, although no EAIR scored an overall A (relevant tasks well performed, no important tasks left incomplete). Similarly, no EIAR scored an A for a review area. Common omissions include methodologies, water and energy efficient design features, references, assumptions and knowledge gaps, and undertakings under oath for the EAP. The lack of A scores is an indication that EIARs are first and foremost concerned with legal compliance, and will forgo best practice for simplification as long as it is not a legal requirement.

CHAPTER 5 - CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This research asked the question: what is the quality of EIA reports for middle to high income mixed-use residential developments in South Africa? In order to answer this question, the research had to evaluate the quality of the EIARs for middle to high income mixed use residential developments, determine the strengths and weaknesses of the reports, and make recommendations to improve EIAR quality. This chapter presents the conclusion and recommendations.

5.2 Conclusions

The overall score of the EIARs reviewed were on average a B (generally satisfactory and complete, only minor omissions and inadequacies), and no EIAR scored an A. Considering that most EIARs were of satisfactory quality in terms of legal compliance, the lack of A scores assigned to the overall quality and review areas seems to support Kågström's (2016) observations, i.e., consultants generally do not conform to EIAR best practice unless best practice is a legal requirement. This is further supported by nine of the fourteen worst performing review sub-categories being solely best practice requirements.

The general strengths of the EIARs were:

- Use of maps and visual aids to contextualise data.

The maps used in the reports were of good quality. It assisted in contextualising the projects and the environment around them. The maps made use of appropriate filters to emphasise the information they were conveying.

- Baseline descriptions of the receiving environment.

While some reports described the receiving environment more thoroughly than others, all of the reports discussed it adequately. Some reports used specialist studies to inform this section of the report while others used other appropriate references.

- Stakeholder engagement and the public participation process.

All the reports conducted a public participation process that complies with the Public Participation Guidelines. While comments and responses and certain details regarding the process were not included in all the reports, the public participation document submitted with each EIAR as an appendix contained all communications and proofs of the process.

- Discussion and investigation of impacts and mitigation measures.

Most reports devoted a lot of time to the investigation of impacts, and some describe them using both qualitative and quantitative methods. The qualitative descriptions and/or quantitative scores used were generally well defined. Most reports also discussed the methods used to reach the final score or description.

- The EAIRs were understandable by non-specialist. Definitions were provided where technical terms could not be avoided.

All reports provided a list of definitions, abbreviations and acronyms. In most cases reports avoided technical and obscure terms where possible. They were understandable by non-specialists and were generally logically arranged.

The general weaknesses of the EIARs were:

- Description of methodologies.

Few reports discussed all the methods used in the reports, and most omitted at least one.

- Provision of data sources and references.

This was generally omitted from the reports.

- Acknowledgement of shortcomings and assumptions.

This was generally omitted from the reports.

- Addressing sustainable water and energy usage at various phases of the project.

Energy efficiency was discussed in several reports, but only as some sort of alternative and never part of the preferred design/alternative. Water efficiency was not addressed in any of the reports.

- Only using only English to notify and communicate with I&APs.
- Identifying issues raised by stakeholders for further investigation.

A number of EIARs identified stakeholder issues for further investigation, however, only one report acknowledged this.

- Investigation of cumulative impacts.

Most of the reports did identify cumulative impacts. However, the investigation of cumulative impacts was very limited in the reviewed reports and was not discussed outside of impact identification.

- Only the negative impacts of alternatives were discussed.

In the environmental statement, several reports compared only the positive impacts of the preferred alternative with the negative impacts of the alternatives. This is not a fair comparison and introduces bias.

- Description of monitoring procedures was omitted.

Description of monitoring activities is limited to the EMP, and the description is very limited. There is no commitment to any defined monitoring programme.

The results seem to conform to similar EIAR quality studies. Previous studies in EIAR quality in other sectors specifically identified alternatives and cumulative impacts as weaknesses. However, all other weaknesses have been identified in other quality review studies (Kruger, 2012; Mbehle, 2009; Sandham *et al.*, 2008; Sandham *et al.*, 2013). Similarly, the strengths identified in the reviewed EIARs support the findings of previous studies. The only exceptions are energy and water efficient housing, which is unique to this sector, and the discussion of mitigation measures, which seems to have mixed results in the literature.

5.3 Recommendations and areas of future research

From the results of this study, it can firstly be recommended in order to improve the legal compliance of future EIARs for middle to high income mixed-use residential developments, the methodologies and data sets used should be described more clearly. Secondly, more attention should be given to adequately investigate alternatives and define monitoring procedures. Lastly, water and energy efficiency should not be considered as alternatives of sorts. More must be done to include such design features in the preferred design.

Due to the scope of this study, no consideration was made for projects that required basic assessments. Possible future research could consider the quality of basic assessments for similar developments. These developments are more numerous, and the results can be compared to the results of this study to possibly identify trends in the environmental assessment of residential developments.

BIBLIOGRAPHY

Aliu, I.R. and Adebayo, A., 2010. Evaluating the influence of housing quality on urban residents' wellbeing: the case of Lagos Nigeria. *International Journal of Academic Research*, 2(6).

Al-Shihri, F.S., 2016. Impacts of large-scale residential projects on urban sustainability in Dammam Metropolitan Area, Saudi Arabia. *Habitat International*, 56, pp.201-211.

Babalola, O.D., Ibem, E.O., Olotuah, A.O., Opoko, A.P., Adewale, B.A. and Fulani, O.A., 2020. Housing quality and its predictors in public residential estates in Lagos, Nigeria. *Environment, Development and Sustainability*, 22(5), pp.3973-4005.

Balaban, O., 2012. The negative effects of construction boom on urban planning and environment in Turkey: Unraveling the role of the public sector. *Habitat International*, 36(1), pp.26-35.

Balwin Properties. 2020a. *Developments*. <https://balwin.co.za/developments/> Date of access 17 February 2021.

Balwin Properties. 2020b. *Sales map*. <https://www.salesmap.co.za/balwin-launch/#/search> Date of Access 17 February 2021.

Bond, A., Fischer, T.B. and Fothergill, J., 2017. Progressing quality control in environmental impact assessment beyond legislative compliance: An evaluation of the IEMA EIA Quality Mark certification scheme. *Environmental Impact Assessment Review*, 63, pp.160-171.

Bond, A., Retief, F., Cave, B., Fundingsland-Tetlow, M., Duinker, P. N., Verheem R. and Brown, A. L., 2018. A contribution to the conceptualisation of quality in impact assessment. *Environmental Impact Assessment Review*, vol 68, pp49-58.

Boshoff, D.A. 2013. *An assessment of Environmental Impact Assessment Reports quality pertaining to renewable energy projects in South Africa*. Johannesburg: University of Johannesburg (Dissertation - MSc).

Ceronio, W.A.F. 2018. *A critical evaluation of EIA quality in the hazardous waste management sector: a case study of EIA reports in the Gauteng province of South Africa*. Johannesburg: University of Johannesburg (Mini-dissertation - M.Sc).

Coşkun, A.A. and Turker, O., 2011. Analysis of environmental impact assessment (EIA) system in Turkey. *Environmental monitoring and assessment*, 175(1), pp.213-226.

Department of the Presidency (South Africa). 2012. *National Development Plan 2030: Our future - make it work*. <https://www.gov.za/issues/national-development-plan-2030> Date of access: 1 February 2021

Fakunle, A., Ogundare, J., Olayinka-Alli, L., Aridegbe, M., Bello, T., Elujulo, O., Olugbile, O. and Saliu, I., 2018. Housing quality and risk factors associated with respiratory health conditions in Nigeria. *Housing*, 19, p.20.

Gámez-García, D.C., Saldaña-Márquez, H., Gómez-Soberón, J.M., Arredondo-Rea, S.P., Gómez-Soberón, M.C. and Corral-Higuera, R., 2019. Environmental challenges in the residential sector: Life cycle assessment of Mexican social housing. *Energies*, 12(14), p.2837.

Gangoells, M., Casals, M., Gasso, S., Forcada, N., Roca, X. and Fuertes, A., 2009. A methodology for predicting the severity of environmental impacts related to the construction process of residential buildings. *Building and Environment*, 44(3), pp.558-571.

Glasson, J., Therivel, R. and Chadwick, A. 2012. *Introduction to Environmental Impact Assessment* (4th Edition). New York: Routledge Taylor and Frances Group.

Gou, Z., Prasad, D. and Lau, S.S.Y., 2013. Are green buildings more satisfactory and comfortable?. *Habitat International*, 39, pp.156-161.

Gou, Z., Xie, X., Lu, Y. and Khoshbakht, M., 2018. Quality of Life (QoL) survey in Hong Kong: Understanding the importance of housing environment and needs of residents from different housing sectors. *International journal of environmental research and public health*, 15(2), p.219.

Goebel, A., 2007. Sustainable urban development? Low-cost housing challenges in South Africa. *Habitat International*, 31(3-4), pp.291-302.

Ibem, E.O. and Aduwo, B.E., 2013. Urban housing and social development in Nigeria: issues and prospects. *Developing Countries, Political, Economic and Social Issues*, Hauppauge: Nova Publishers, pp.69-96.

Jay, S., Jones, C., Slinn, P. & Wood, C. (2007). Environmental impact assessment: Retrospect and prospect. *Environmental Impact Assessment Review*, 27 (1); 287-300.

Kågström, M., 2016. Between 'best' and 'good enough': how consultants guide quality in environmental assessment. *Environmental Impact Assessment Review*, 60, pp.169-175.

Kidd, M., Retief, F. & Alberts, R. 2018. Integrated Environmental Assessment and Management *In: King, N., Strydom, H. & Retief, F. (eds.) Environmental Management in South Africa*. Cape Town: Juta.

Kruger, E. and Chapman, O.A., 2005. Quality aspects of environmental impact assessment reports in the Free State Province, South Africa. *South African geographical journal*, 87(1), pp.52-57.

Kruger, R. 2012. *A critical analysis of the quality of EIA reports for filling stations in South Africa*. Potchefstroom: North West University (Mini-dissertation - M. Env. Man).

Lavagna, M., Baldassarri, C., Campioli, A., Giorgi, S., Dalla Valle, A., Castellani, V. and Sala, S., 2018. Benchmarks for environmental impact of housing in Europe: Definition of archetypes and LCA of the residential building stock. *Building and Environment*, 145, pp.260-275.

- Mbhele, P.M. 2009. *The quality of EIA reports for housing developments in the Nkangala district of the Mpumalanga province, South Africa*. Potchefstroom: North West University. (Mini-dissertation - M. Env. Man).
- Morgan, R.K. 1998. *Environmental Impact Assessment: a methodological perspective*. Dordrecht: Kluwer Academic.
- Morgan, R.K. 2012. Environmental Impact Assessment: the state of the art. *Impact Assessment and Project Appraisal*, 30(1): 5-14.
- Morrison-Saunders, A., Pope, J., Gunn, J.A., Bond, A. and Retief, F., 2014. Strengthening impact assessment: a call for integration and focus. *Impact Assessment and Project Appraisal*, 32(1), pp.2-8.
- Nemry, F., Uihlein, A., Colodel, C.M., Wetzels, C., Braune, A., Wittstock, B., Hasan, I., Kreißig, J., Gallon, N., Niemeier, S. and Frech, Y., 2010. Options to reduce the environmental impacts of residential buildings in the European Union—Potential and costs. *Energy and Buildings*, 42(7), pp.976-984.
- Olutayo, A. O. (2007). Sociology of housing. In T. Agbola, L. Egunjobi, & C. O. Olatubara (Eds.), *Housing development and management: A book of readings in urban and regional planning* (pp. 151–172). Ibadan: University of Ibadan
- Owens, S., Rayner, T. and Bina, O., 2004. New agendas for appraisal: reflections on theory, practice, and research. *Environment and Planning A*, 36(11), pp.1943-1959.
- Peterson, K., 2010. Quality of environmental impact statements and variability of scrutiny by reviewers. *Environmental Impact Assessment Review*, 30(3), pp.169-176.
- Piroozfar, P., Pomponi, F. and El-Alem, F., 2019. Life cycle environmental impact assessment of contemporary and traditional housing in Palestine. *Energy and Buildings*, 202, p.109333.
- Pope, J., Bond, A., Morrison-Saunders, A. & Retief, F. 2013. Advancing the theory and practice of impact assessment: Setting the research agenda. *Environmental Impact Assessment Review*, 41 (1): 1-9.
- Retief, F., 2010. The evolution of environmental assessment debates – critical perspectives from South Africa. *Journal of Environmental Assessment Policy and Management*, vol 12(4), pp 1-23.
- Retief, F., Welman, C. and Sandham, L. A., 2011. Performance of Environmental Impact Assessment (EIA) screening in South Africa: a comparative analysis between the 1997 and 2006 EIA regimes. *South African Geographical Journal*, vol 93(2), pp 1-18.
- Retief, F., Bond, A., Pope, J., Morrison-Saunders, A. and King, N., 2016. Global megatrends and their implications for Environmental Assessment (EA) practice. *Environmental Impact Assessment Review*, vol 61, pp52-60.

- Sadler, B., 1996. *Environmental Assessment in a Changing World. Evaluating practice to improve performance-final report*. Ottawa: Canadian Environmental Assessment Agency.
- Sandham, L.A., Hoffmann, A.R. and Retief, F.P., 2008a. Reflections on the quality of mining EIA reports in South Africa. *Journal of the Southern African Institute of Mining and Metallurgy*, 108(11), pp.701-706.
- Sandham, L.A. and Pretorius, H.M., 2008b. A review of EIA report quality in the North West province of South Africa. *Environmental Impact Assessment Review*, 28(4-5), pp.229-240.
- Sandham, L., Moloto, M. and Retief, F., 2008c. 'The quality of environmental impact assessment reports for projects with the potential of affecting wetlands' *Water SA*, vol 34(2), pp 155-162.
- Sandham, L., Carrol, T and Retief, F., 2010. 'The contribution of Environmental Impact Assessment (EIA) to decision making for biological pest control in South Africa – the case of *Lantana camara*', *Biological Control*, vol 55, pp 141-149.
- Sandham, L.A., Van der Vyver, F. and Retief, F.P., 2013a. The performance of environmental impact assessment in the explosives manufacturing industry in South Africa. *Journal of Environmental Assessment Policy and Management*, 15(03), p.1350013.
- Sandham, L., Van Heerden, A., Jones, C., Retief, F., and Morrison-Saunders, A., 2013b. Does Enhanced Regulation Improve EIA report Quality? Lessons from South Africa. *Environmental Impact Assessment Review*, vol 38, pp 155-162
- Sandham L.A., Huysamen C., Retief F.P., Pope J., Morrison-Saunders A., Bond A.J. and Alberts R.C., 2020. Evaluating Environmental Impact Assessment (EIA) report quality in South African national parks. *Koedoe – Protected Area Science and Management*, 62(1), 62(1), pp. 1-9, a1631.
- Siqueira-Gay, J. and Sánchez, L.E., 2019. Mainstreaming environmental issues into housing plans: The approach of strategic environmental assessment. *Environmental Impact Assessment Review*, 77, pp.145-153.
- Swanepoel, F., Retief, F., Bond, A., Pope, J., Morrison-Saunders, A., Hauptfleisch, M. and Fundingsland, M., 2019. Explanations for the quality of biodiversity inputs to Environmental Impact Assessments (EIA) in areas with high biodiversity value. *Journal of Environmental Assessment, Policy and Management*, vol 21(2), DOI: 10.1142/S1464333219500091.
- Talime, L.A. 2010. *A Critical review of the quality of Environmental Impact Assessment reports in Lesotho*. Bloemfontein: University of the Free State (Dissertation - MSc).
- Temitope, B.E. and Maria, O., 2016. Effects of housing quality and overcrowding on psychological wellbeing of residents in Lagos State, Nigeria. *Journal Of Humanities And Social Science (IOSR)*, 21(11), pp.14-22.
- Thériault, L., Leclerc, A., Wisniewski, A.E., Chouinard, O. and Martin, G., 2010. "Not Just an Apartment Building": Residents' Quality of Life in a Social Housing Co-operative. *Canadian journal of nonprofit and social economy research*, 1(1).

Thomas, I., 1998. *Environmental impact assessment in Australia*. Sydney: Federation Press.

Thorpe, B.K. 2014. *Evaluating the quality of EIA Scoping reports associated with hazardous waste management activities in South Africa*. Johannesburg: University of Johannesburg (Dissertation - MSc).

Turunen, M., Paanala, A., Villman, J., Nevalainen, A. and Haverinen-Shaughnessy, U., 2010. Evaluating housing quality, health and safety using an Internet-based data collection and response system: a cross-sectional study. *Environmental health*, 9(1), pp.1-14.

Wood, C. 1995. *Environmental Impact Assessment: a comparative review*. Harlow: Longman.

Wood, C., 2002. *Environmental impact assessment: a comparative review*. Harlow: Longman.

Yin, R.K. 2017. *Case study research and applications: Design and Methods*. 6th ed. Los Angeles, LA: SAGE Publications inc.

Zubair, S., Bowen, D. and Elwin, J. 2011. Not quite paradise: Inadequacies of environmental impact assessment in the Maldives. *Tourism management*, 32(1): 225-234