SOCIAL IMPACT ASSESSMENT

CAMDEN GREEN HYDROGEN AND AMMONIA FACILITY

MPUMALANGA PROVINCE

JUNE 2022

Prepared for

WSP

by

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EXECUTIVE SUMMARY

INTRODUCTION AND LOCATION

WSP was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed Camden Green Hydrogen and Ammonia Facility located approximately 12 km south of the town of Ermelo in the Msukaligwa Municipality in the Mpumalanga Province. Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process.

SUMMARY OF KEY FINDINGS

The key findings of the study are summarised under the following sections:

- Fit with policy and planning.
- Construction phase impacts.
- Operational phase impacts.
- Cumulative impacts.
- Decommissioning phase impacts.
- No-development option.

The construction and operational phase impacts are similar for each alternative location for the proposed Green Hydrogen and Ammonia facility. The significance ratings therefore apply to each option.

FIT WITH POLICY AND PLANNING

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The development of renewable energy is also supported by the MMSDF. In this regard the SDF acknowledges the importance of the mining sector and notes that it will need to be accommodated over the short to medium term. However, of relevance to the proposed development the SDF refers to green industries and indicates that the existing site of the Camden Power Station and surrounds should be made available for new industrial development in the long term, to manage the long-term impact of the Power Station being decommissioned.

Given the link between green hydrogen energy and the renewable energy, the proposed green hydrogen and ammonia facility is supported by key policy and planning documents.

CONSTRUCTION PHASE

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

The construction phase will extend over a period of approximately 18 months and create in the region of 150-250 employment opportunities. Members from the local communities in Ermelo and the MM would qualify for the majority of low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The total wage bill will be in the region of R 30 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in Ermelo and the MM. The capital expenditure associated with the construction phase will be approximately R 4.75-6 billion (2022 Rand value). This will create opportunities for local companies and the regional and local economy. Due to the presence of the mining and energy sector, there are likely to suitably qualified companies in Ermelo that can provide the required services and products. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

The findings of the SIA indicate that the significance of the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts associated with the proposed construction phase can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 1 summarises the significance of the impacts associated with the construction phase.

Table 1: Summary of social impacts during construction phase

Impact	**Significance No Mitigation/Enhancement**	**Significance With Mitigation/Enhancement**
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative)	Low (Negative)
Influx of job seekers	Low (Negative)	Low (Negative)

Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)
Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

OPERATION PHASE

The following key social issues are of relevance to the operational phase:

Potential positive impacts
- Establishment of infrastructure to improve energy security and support renewable energy and green economy sector.
- Creation of employment, skills development, and business opportunities.
- Benefits for local landowners.

Potential negative impacts
- Visual impacts and associated impacts on sense of place.
- Noise impacts.
- Health and safety impacts associated with incidents and accidents.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. The significance of the impacts associated with the operational phase are summarised in Table 2.

Table 2: Summary of social impacts during operational phase

Impact	**Significance No Mitigation/Enhancement**	**Significance With Mitigation/Enhancement**
Establishment of infrastructure to produce green hydrogen and ammonia	Medium (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Medium (Positive)	Medium (Positive)
Benefits for landowners	Low (Positive)	Medium (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Medium (Negative)
Noise impacts	Low (Negative)	Low (Negative)
Health and safety impacts	Medium (Negative)	Low (Negative)

CUMULATIVE IMPACTS

Cumulative impact on sense of place
The establishment of the proposed green nitrogen and ammonia facility together with the proposed Camden wind and solar facilities will create the potential for combined and sequential visibility impacts. However, the impact on the areas sense of place should be viewed within the context of the impact of the Camden Power Station and associated transmission lines on areas sense of place. The areas sense of place has also been impacted by large-sale coal mining operations. The potential visual impact on the areas sense place is therefore likely to be limited. In addition, none of the affected landowners interviewed raised concerns about potential visual impacts associated with the proposed project. The potential cumulative impact on the areas sense of place is therefore likely to be limited.

Cumulative impact on local services and accommodation
The potential cumulative impact on local services and accommodation will depend on the timing construction phases for the different renewable energy projects in the area. With effective planning the significance of the potential impact was rated as **Low Negative**.

Cumulative impact on local economy
The significance of this impact with enhancement was rated as **Moderate Positive**.

NO-DEVELOPMENT OPTION

The No-Development option would represent a lost opportunity for South Africa to improve energy security and support the development of renewable energy. The green ammonia component will also create the opportunity to reduce the carbon footprint of the chemical sector. The No-Development option is not supported by the findings of the SIA.

COMMENT ON ALTERNATIVES

The social impacts and associated significance ratings are similar for each of the site alternatives for the Green Hydrogen and Ammonia facility (Alternative 1 and 2). In terms of potential impacts, the impacts on Welgelegen 322/1 are unavoidable given its location relative to Eskom Camden substation. However, minimizing the impacts on 322/2 would reduce the potential cumulative impacts and land fragmentation. As such, Plant Alternative 2 located on 322/1 adjacent to Collector Substation Alternative 1 is the preferred option. However, it should be noted that both alternative options are regarded as feasible and suitable from a social impact perspective.

CONCLUSION AND RECOMMENDATIONS

Conclusion
The findings of the SIA indicate that the proposed Camden Green Hydrogen and Ammonia Facility will create a number of social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The development will reduce the carbon footprint associated with production of hydrogen and ammonia and create potential comparative advantages for South Africa in the emerging green hydrogen sector.

This will support the transmission of South Africa's fossil fuel-based economy towards renewable energy.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The Camden Green Hydrogen and Ammonia Facility is therefore supported by the findings of the SIA. Alternative 2 located on 322/1 adjacent to Collector Substation Alternative 1 is the preferred option. However, it should be noted that both alternative options are regarded as feasible and suitable from a social impact perspective.

Recommendations

- The loss of high-quality agricultural land should be avoided and or minimised by careful planning of the final layout of the proposed WEF facilities, where possible.
- Affected landowners should be notified about the timing of construction related activities in advance of the commencement of the construction phase.
- The mitigation measures contained in the Acoustic, Major Hazardous Installation Assessment and Visual Impact Assessments should be implemented.

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CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Section 1.5, Annexure A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 1.6, Annexure B
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1, Section 1.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 1.2, Section 3,
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Interviews in 2021 (Annexure A)
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 1.2, Annexure B
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4, Section 5,
(g) an identification of any areas to be avoided, including buffers;	Section 4
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Refer to Visual Impact Assessment (VIA)
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.4,
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 4, Section 5
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4, Section 5
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	Section 5.3
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	Annexure A, lists key stakeholders interviewed
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Annexure A, lists key stakeholders interviewed
(q) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will	Comply with the Assessment Protocols that were

apply.	published on 20 March 2020, in Government Gazette 43110, GN 320. This specifically includes Part A, which provides the Site Sensitivity Verification Requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed. As at September 2020, there are no sensitivity layers on the Screening Tool for Socio-economic-features. Part A has therefore not been compiled for this assessment.

ACRONYMS

BESS	Battery Energy Storage System
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DM	District Municipality
GSDM	Gert Sibande District Municipality
HD	Historically Disadvantaged
EIA	Environmental Impact Assessment
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolts
LED	Local Economic Development
LM	Local Municipality
MM	Msukaligwa Municipality
MW	Megawatt
SDF	Spatial Development Framework
SEF	Solar Energy Facility
SIA	Social Impact Assessment
WEF	Wind Energy Facility

SECTION 1: INTRODUCTION

1.1 INTRODUCTION

WSP was appointed to manage the Environmental Impact Assessment (EIA) process for the proposed Camden Green Hydrogen and Ammonia Facility located approximately 12 km south of the town of Ermelo in the Msukaligwa Municipality in the Mpumalanga Province (Figure 1.1).

Tony Barbour Environmental Consulting was appointed to undertake a specialist Social Impact Assessment (SIA) as part of an EIA process.

Figure 1.1: Location of Camden Green Hydrogen and Ammonia Facility site options (purple outline areas)

1.2 TERMS OF REFERENCE AND APPROACH

The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (DEADP, 2007). The key activities undertaken as part of the SIA process as embodied in the guidelines included:

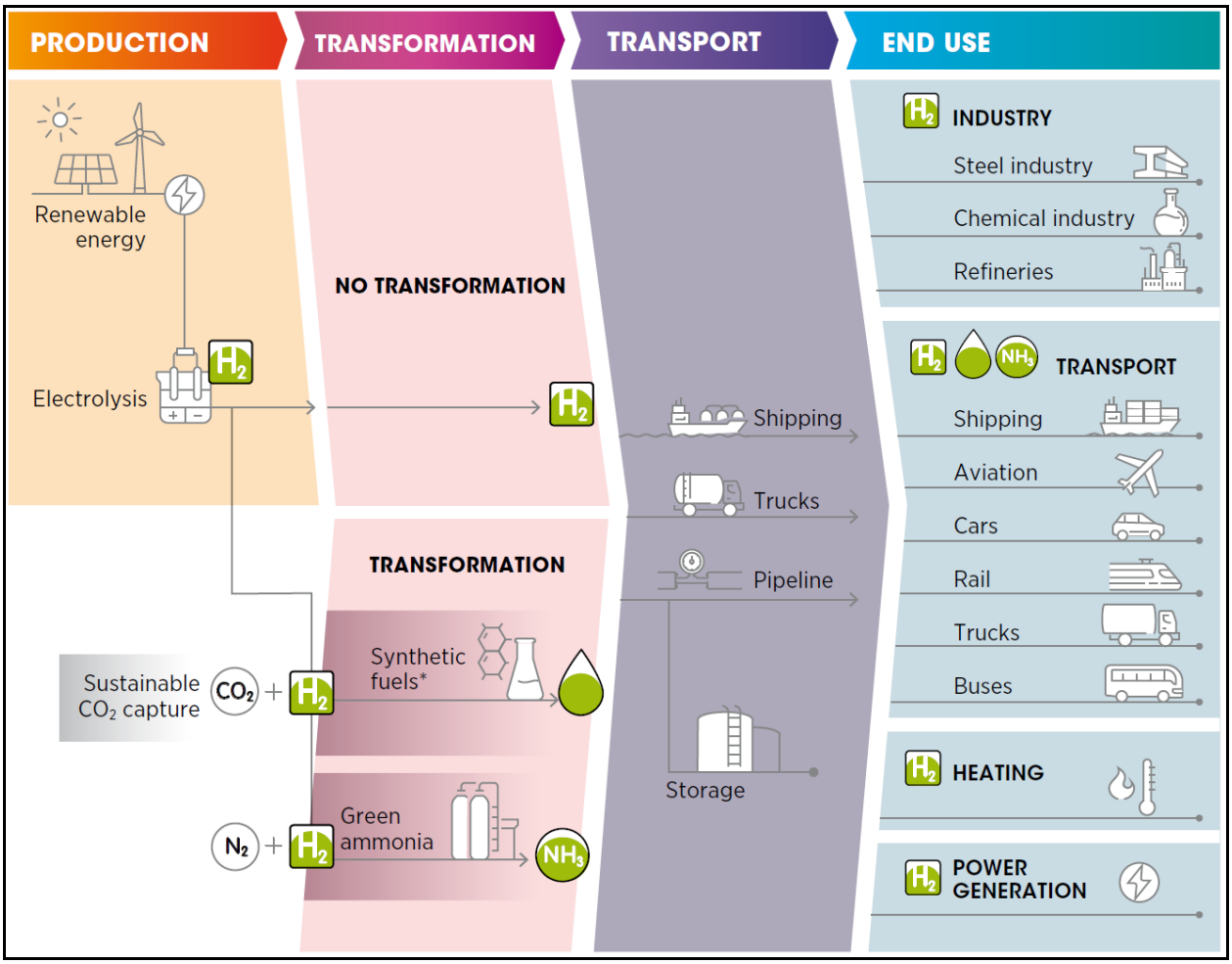
- Describing and obtaining an understanding of the proposed intervention (type, scale, and location), and the community, land uses and activities that may be affected by the proposed project.

- Collecting baseline data on the current social and economic environment.
- Review of key policy and planning documents that have a bearing on the project.
- Site visit and interviews with key stakeholders.
- Identifying the key potential social issues associated with the proposed project.
- Assessing and assessing the significance of social impacts associated with the proposed project.
- Identification of enhancement and mitigation measures aimed at maximizing opportunities and avoiding and or reducing negative impacts.

1.3 OVERVIEW OF GREEN HYDROGEN AND AMMONIA

Green hydrogen is produced when renewable energy is used to derive hydrogen from a clean source. This most commonly involves the electrolysis of water-sending an electric current through the water to separate molecules. Commercially, hydrogen is used as a fuel for transport in hydrogen fuel cells. Alternatively, hydrogen is used for welding and in the production of other chemicals such as methanol and hydrochloric acid and also has other commercial uses. It is also a primary input to the production of ammonia. Ammonia in turn is primarily used in the production of ammonium nitrate (fertiliser) and is also used as refrigerant gas and the manufacture of plastics, explosives, textiles, pesticides, and other chemicals. Ammonia can also be used as a stable 'carrier' of hydrogen, allowing hydrogen to be readily stored and transported. Research has shown that green hydrogen offers the greatest potential to decarbonize difficult-to-abate sectors like steel, cement, and heavy-duty transport.

The International Renewable Energy Agency (IRENA) notes that green hydrogen can provide a link between growing and sustainable renewable electricity generation and the hard-to-electrify sectors (IRENA, 2018). Hydrogen in general is a suitable energy carrier for applications remote from electricity grids or that require a high energy density, and it can serve as a feedstock for chemical reactions to produce a range of synthetic fuels and feedstocks. The key challenge facing green hydrogen barriers is cost (IRENA, Green Hydrogen, a Guide to Policy Making (2020). Figure 1.2 illustrates the green hydrogen process.



Source: IRENA

Figure 1.2: Green hydrogen production, conversion and end uses across the energy system

1.4 PROJECT DESCRIPTION

Camden Green Energy RF (Pty) Ltd, a special purpose vehicle ("SPV"), has been established for the sole purpose of developing, owning, and operating a green hydrogen and ammonia facility (the facility). Figure 1.3 illustrates a green hydrogen facility developed by Enertrag in Germany in 2011 which produces 94 tons of hydrogen per annum. Figure 1.4 illustrates the processes that will be associated with the proposed facility located near the Camden power station.

The footprint of the proposed Camden facility will be ~ 25 ha. Two alternative site options, Alternative 1 and 2 have been identified. Alternative 1 is located on Farm 322/2 Welgelegen. Alternative 2 is located on Farm 322/1 Welgelegen. The affected land parcels associated with each alternative are listed in Table 1.1. The different components that make up the green hydrogen and ammonia facility and associated footprint are listed in Table 1.2.

Figure 1.3: Enertrag Hybridkraftwerk Green Hydrogen Facility in Germany

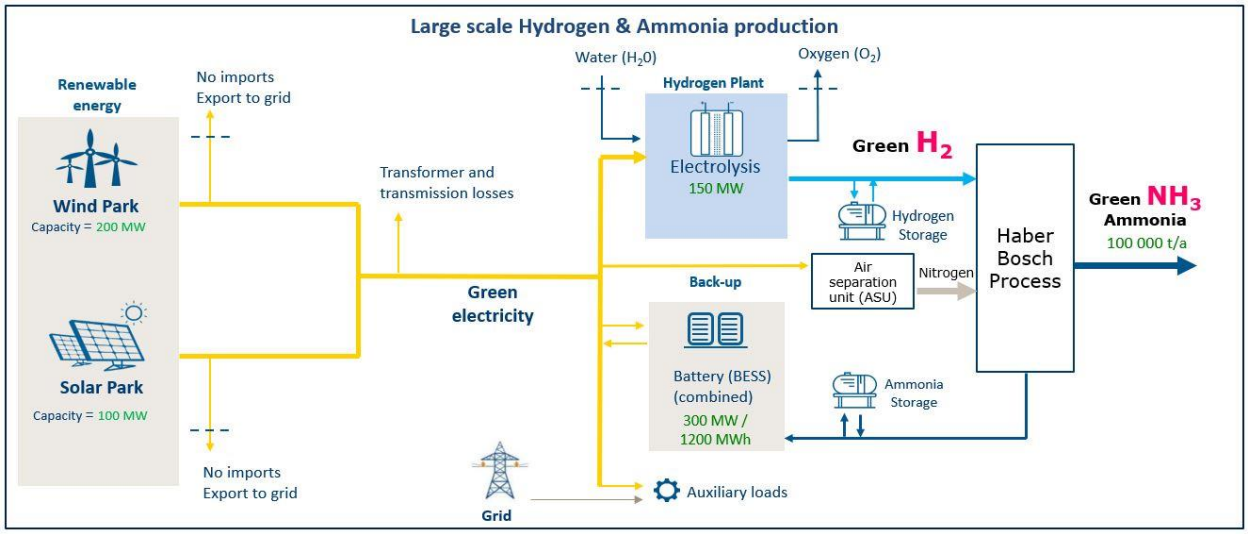


Figure 1.4: Simplified green hydrogen and ammonia production life cycle example

Table 1.1: Location of options for green hydrogen and ammonia facility

Parent Farm	Farm No	Portion No
Alternative 1		
Welgelegen	322	2
Alternative 2		
Welgelegen	322	1

Table 1.2: Components of green hydrogen and ammonia facility

No.	Component	Footprint (Ha)	Maximum Capacity (tpa)
1	Water Reservoir	2	800
2	Water Treatment Unit	1.5	192,000
3	Electrolyser Unit	1	20,000
4	Air Separation Unit	0.5	110,000
5	Ammonia Processing Unit	2	100,000
6	Liquid Air Storage System (LAES)	1	405,000
7	Liquid Ammonia Storage Tank	1.5	175,000
8	Hydrogen and Oxygen Storage Tank Farm	12	90,000
9	Ancillary infrastructure	3	n/a
	Total Footprint	**25**	

A summary of the storage requirements for the development are provided below.

Hydrogen
Compressed hydrogen can be stored at ambient temperature and will be stored in vertical or horizontal storage bullets (tanks). Up to 800 tons of hydrogen will be stored at the facility in up to 20 horizontal pressure bullets (tanks). Each bullet will have a diameter of up to 4m and a length of up to 15m (Figure 1.5). The footprint, together with the storage tanks for oxygen will be ~ 12 ha.

Figure 1.5: Horizontal compressed hydrogen storage tank

Nitrogen
Green nitrogen will be stored (7-14 days) as a liquid with in large cylindrical cryogenic[1] storage tanks with a combined volume of approximately 4 100 tons of nitrogen. Each tank will have a diameter of up to 14m and a height of up to 15m with a capacity of up to 2 032 tons.

Ammonia
Green ammonia will be stored as anhydrous liquid ammonia within large cylindrical cryogenic storage tanks (similar to tanks for storage of Liquid Natural Gas (LNG)) with a combined volume of 3 750 tons of ammonia. It is proposed that the facility will house up to three cylindrical cryogenic storage tanks. Each tank will have a diameter of up to 14m and a height of up to 15m with a capacity of up to 1 250 tons each (Figure 1.6).

Figure 1.6: Cryogenic ammonia storage tanks

Oxygen
Oxygen will be stored in vertical or horizontal storage bullets and stored under high-pressures. It is proposed that the facility will house up to 16 vertical cryogenic storage bullets for the storage of oxygen. Each bullet will have a diameter of up to 4m and a length of up to 15m (Figure 1.7). The footprint, together with the storage tanks for nitrogen will be ~ 12 ha.

[1] Designed to storage materials at very low temperatures

Figure 1.7: Vertical cryogenic storage tanks

1.5 ASSUMPTIONS AND LIMITATIONS

1.5.1 Assumptions

Technical suitability
It is assumed that the development site represents a technically suitable site for the establishment of the proposed development.

Strategic importance of the project
The strategic importance of promoting renewable and other forms of energy is supported by the national and provincial energy policies.

Fit with planning and policy requirements
Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard, a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines

contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported.

1.5.2 Limitations

Demographic data
Some of the provincial documents do not contain data from the 2011 Census and or 2016 Household Community Survey. However, where required the relevant 2011 and 2016 data has been provided.

1.6 SPECIALIST DETAILS

Tony Barbour, the lead author of this report, is an independent specialist with 28 years' experience in the field of environmental management. In terms of SIA experience Tony Barbour has undertaken in the region of 260 SIAs and is the author of the Guidelines for Social Impact Assessments for EIA's adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) in the Western Cape in 2007. Annexure C contains a copy of Tony Barbour's CV.

Schalk van der Merwe, the co-author of this report, has an MPhil in Environmental Management from the University of Cape Town and has worked closely with Tony Barbour over the last twenty years.

1.7 DECLARATION OF INDEPENDENCE

This confirms that Tony Barbour and Schalk van der Merwe, the specialist consultants responsible for undertaking the study and preparing the SIA Report, are independent and do not have any vested or financial interests in the proposed power line being either approved or rejected. Annexure D contains a signed declaration of independence.

1.8 REPORT STUCTURE

The report is divided into five sections, namely:

- Section 1: Introduction.
- Section 2: Policy and planning context.
- Section 3: Overview of study area.
- Section 4: Identification and assessment of key issues.
- Section 5: Summary of key findings.

SECTION 2: POLICY AND PLANNING ENVIRONMENT

2.1 INTRODUCTION

Legislation and policy embody and reflect key societal norms, values, and developmental goals. The legislative and policy context therefore plays an important role in identifying, assessing, and evaluating the significance of potential social impacts associated with any given proposed development. An assessment of the "policy and planning fit[2]" of the proposed development therefore constitutes a key aspect of the Social Impact Assessment (SIA). In this regard, assessment of "planning fit" conforms to international best practice for conducting SIAs.

Section 2 provides an overview of the policy and planning environment affecting the proposed project. For the purposes of meeting the objectives of the SIA the following policy and planning documents were reviewed:

- The National Energy Act (2008).
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- The White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2010-2030).
- The National Development Plan (2011).
- New Growth Framework.
- National Infrastructure Plan.
- Mpumalanga Spatial Development Framework (2019).
- Msukaligwa Municipality Integrated Development Plan (2019-2020).
- Msukaligwa Spatial Development Framework (2019)
-

Given the link between green hydrogen energy and the renewable energy, the section provides an overview of energy, including renewable energy, related policies

2.2 NATIONAL POLICY ENVIRONMENT

2.2.1 National Energy Act (Act No 34 of 2008)

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources, including solar and wind:

"To ensure that diverse energy resources are available, in sustainable quantities, and at affordable prices, to the South African economy, in support of economic growth and poverty alleviation, taking into account environmental management requirements (…); to provide for (…) increased generation and consumption of renewable energies.."(Preamble).

[2] Planning fit" can simply be described as the extent to which any relevant development satisfies the core criteria of appropriateness, need, and desirability, as defined or circumscribed by the relevant applicable legislation and policy documents at a given time.

2.2.2 White Paper on the Energy Policy of the Republic of South Africa

Investment in renewable energy initiatives, such as the proposed SEF, is supported by the White Paper on Energy Policy for South Africa (December 1998). In this regard, the document notes:

"Government policy is based on an understanding that renewables are energy sources in their own right, are not limited to small-scale and remote applications, and have significant medium and long-term commercial potential".

"Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future".

The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly ***solar*** and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential, and compared to investments in other energy supply options.
- Addressing constraints on the development of the renewable industry.

The White Paper also acknowledges that South Africa has neglected the development and implementation of renewable energy applications, despite the fact that the country's renewable energy resource base is extensive, and many appropriate applications exist.

The White Paper also notes that renewable energy applications have specific characteristics that need to be considered. Advantages include:

- Minimal environmental impacts in operation in comparison with traditional supply technologies.
- Generally lower running costs, and high labour intensities.

Disadvantages include:

- Higher capital costs in some cases.
- Lower energy densities.
- Lower levels of availability, depending on specific conditions, especially with sun and wind-based systems.

2.2.3 White Paper on Renewable Energy

The White Paper on Renewable Energy (November 2003) (further referred to as the White Paper) supplements the *White Paper on Energy Policy*, which recognizes that the medium and long-term potential of renewable energy is significant. This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

The White Paper notes that while South Africa is well endowed with renewable energy resources that have the potential to become sustainable alternatives to fossil fuels, these have thus far remained largely untapped. As signatory to the Kyoto Protocol[3], Government is determined to make good the country's commitment to reducing greenhouse gas emissions. To this purpose, Government has committed itself to the development of a framework in which a national renewable energy framework can be established and operate.

South Africa is also a signatory of the Copenhagen Accord, a document that delegates at the 15th session of the Conference of Parties (COP 15) to the United Nations Framework Convention on Climate Change agreed to "take note of" at the final plenary on 18 December 2009. The accord endorses the continuation of the Kyoto Protocol and confirms that climate change is one of the greatest challenges facing the world. In terms of the accord South Africa committed itself to a reduction target of 34% compared to business as usual. In this regard, the IRP 2010 aims to allocate 43% of new energy generation facilities in South Africa to renewables.

Apart from the reduction of greenhouse gas emissions, the promotion of renewable energy sources is aimed at ensuring energy security through the diversification of supply (in this regard, also refer to the objectives of the National Energy Act).

Government's long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer in future years a sustainable, fully non-subsidised alternative to fossil fuels.

2.2.4 Integrated Energy Plan (2016)

The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives were identified, namely:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.

[3] The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), aimed at fighting global warming. The UNFCCC is an international environmental treaty with the goal of achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". The Protocol was initially adopted on 11 December 1997 in Kyoto, Japan and entered into force on 16 February 2005. As of November 2009, 187 states have signed and ratified the protocol (Wikipedia).

- **Objective 6: Diversify supply sources and primary sources of energy.**
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also consider the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others.

Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives.

As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios:

- The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term.
- The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy.
- The Resource Constrained Scenario in which global energy commodity prices (i.e., coal, crude oil, and natural gas) are high due to limited supply.
- The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met.

The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources.

2.2.5 National Development Plan

The National Development Plan (NDP) contains a plan aimed at eliminating poverty and reducing inequality by 2030. The NDP identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy.

2.2.6 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard, the framework identifies investments in five key areas namely: energy, transport, communication, water, and housing.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard, clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

2.2.7 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. The plan also supports the integration of African economies. In terms of the plan, Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing, and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools, and dams will contribute to improved economic growth.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 strategic integrated projects (SIPS). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically-focussed SIPs.
- Three spatial SIPs.
- Three energy SIPs.
- Three social infrastructure SIPs.
- Two knowledge SIPs.
- One regional integration SIP.
- One water and sanitation SIP.

The three energy SIPS are SIP 8, 9 and 10.

SIP 8: Green energy in support of the South African economy

- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010).
- Support bio-fuel production facilities.

SIP 9: Electricity generation to support socio-economic development

- Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances.
- Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.

SIP 10: Electricity transmission and distribution for all

- Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.
- Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

2.3 PROVINCIAL AND LOCAL LEVEL POLICY AND PLANNING

2.3.1 Mpumalanga Spatial Development Framework (2019)

The spatial vision for Mpumalanga Province is "A sustainable, vibrant and inclusive economy, Mpumalanga". The SDF identifies a number of opportunities and challenges facing the province. The opportunities are linked to the province's natural resources, well developed economy, and established economies.

Natural Environment: The natural environment is diversified and is associated with the Highveld and the Lowveld areas in the province. Five major rivers systems in the flow through Mpumalanga and it is an important catchment area.

Connectivity and Infrastructure: The province is well connected in terms of infrastructure and is connected to Maputo and Richards Bay ports by both rail and road.

Economy: The province's rich biodiversity and scenic beauty support the tourism industry, while at the same time mining, specifically coal mining, plays a key role in the province's economy. The availability of high potential soil and diverse climatic condition also support a range of crops.

Urban settlements: The key urban centres are well established economic centres and offer the opportunity for further economic development by leveraging on the towns' economic bases.

In terms of challenges, climate change is identified as a key challenge. In this regard the activities in the province, specifically the generation of coal powered energy, account for 90% of South Africa's scheduled emissions. The province is also home to 50% of the most polluted towns in the country. The predicted impacts associated with climate change include decreased rainfall in the province and increase temperatures. This will increase the risk of natural disasters, including droughts, flooding and fires.

The SDF identifies five spatial objectives, namely:

Connectivity and corridor functionality: The aim is to ensure connectivity between nodes, secondary towns, marginalised areas, the surrounding area, and to green open space systems.

Sustainable concentration and agglomeration: The aim is to promote the creation of an agglomeration economy that will encourage people and economic activities to locate near one another in urban centres and industrial clusters.

Conservation and resource utilisation: The aim is to promote the maximisation, protection and maintenance of ecosystems, scarce natural resources, high-potential agricultural land, and integrated open space systems.

Liveability and sense of place: The aim is to create settlements that contribute to people's sense of personal and collective wellbeing and to their sense of satisfaction in being residents of a settlements.

Rural diversity and transformation: The aim is to create Urban-Rural anchors and choices for residents within the rural economy linked to access to markets, food security and security of land tenure.

Connectivity and corridor functionality, Sustainable concentration and agglomeration, and Conservation and resource utilisation are of specific relevance the proposed development.

Connectivity and corridor functionality
The strategic objectives (SOs) that are relevant the study area and the proposed development include:

- Strategic Objective 2: Development of the existing corridors and building new linkages to increase capacity and economic opportunities and ensure connectivity to the surrounding areas
- Strategic Objective 5: Decongestion of the coal haul roads and Improvement of Freight Network

In terms of SO 2, the spatial linkages identified for development and upgrading include the upgrade of N17, N17/N2 Corridor and the N12 and N11 corridor. The site is flanked by the N2 to the north east and N11 to the south west.

Sustainable concentration and agglomeration
Of specific relevance, Strategic Objective 4, Diversify Economy, focusses on the need to diversify the economy. The SDF notes that mining sector contributes 25% to Mpumalanga's GVA. In addition, there are a number of other sectors directly or indirectly dependent on mining such as manufacturing (specifically metal processing) and utilities (specifically power generation). The combined GVA of these three sectors makes up more than 40% of the provincial GVA.

However, the SDF recognises that mining is not a sustainable industry and resources are finite. There is therefore a need for a gradual shift from mining-oriented sectors to the sustainable economic sectors to maintain sustained growth of the provincial economy. Mpumalanga's Coal Mining and Coal Fired Power Plant region (located mainly in the Highveld area) will be come under increasing pressure due to environmental considerations. As a result, the region is likely to experience a decline in demand for coal and with it a decline in the associated employment it creates. There is therefore a need to diversify the regional economy and facilitate the gradual transition of economic activities in the region. The proposed development supports the objective of diversifying the provinces economy.

Conservation and resource utilisation
The strategic objectives (SOs) that are relevant the study area and the proposed development include:

- Strategic Objective 2: Ensure conservation of all water resources and catchment Areas.
- Strategic Objective 4: Promote a low carbon and climate resilient economy.
- Strategic Objective 6: To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment.

Strategic Objective 2: Ensure Conservation of all Water Resources and Catchment Areas

Achieving Strategic Objective 2, Ensure Conservation of all Water Resources and Catchment Areas is closely linked to diversifying the economy. The SDF notes that the provinces water resources are under pressure from high demand activities, including Eskom's power stations, mining, and industrial uses. The proposed development represents a low consumer of water.

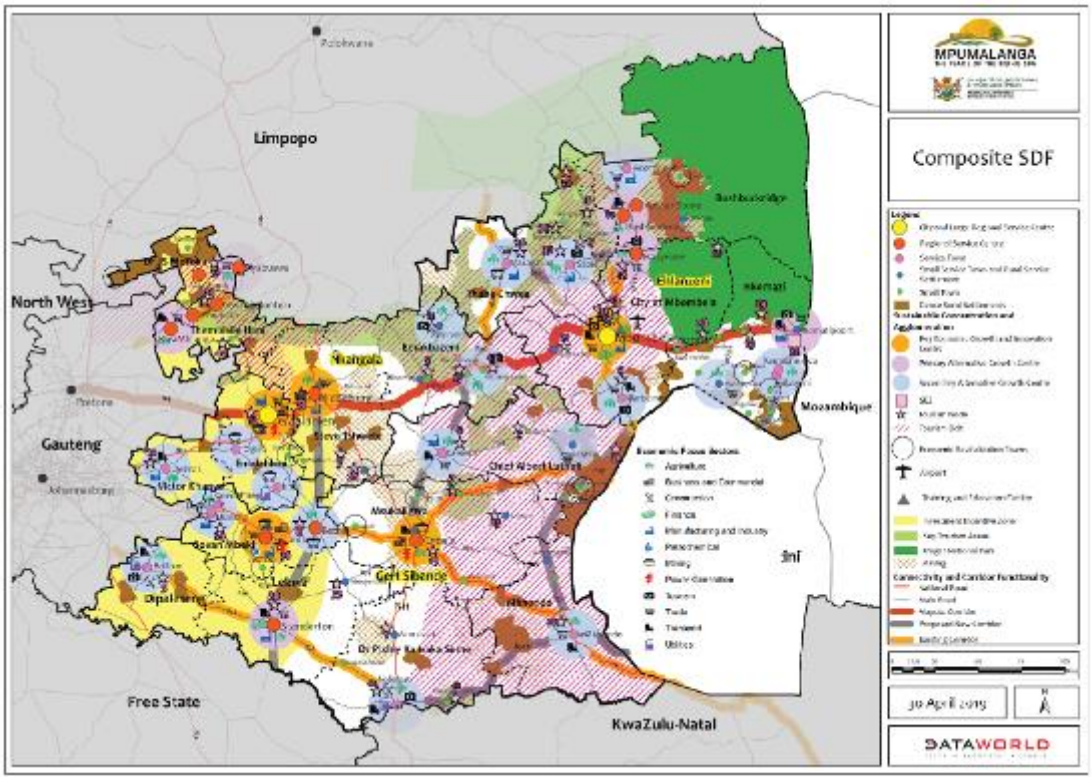
Strategic Objective 4: Promote a Low Carbon and Climate Resilient Economy

Mpumalanga is home to 12 of Eskom's 15 coal-fired power stations; petrochemical plants including Sasol's refinery in Secunda; metal smelters; coal and other mines; brick and stone works; fertiliser and chemical producers; explosives producers; and other smaller industrial operations, making the Highveld one of South Africa's industrial heartlands (CER, 2017). As a result, the air quality within the Mpumalanga Province, especially within the Highveld area, is the poorest in South Africa. The Highveld region accounts for approximately 90 % of South Africa's scheduled emissions of industrial dust, sulphur dioxide and nitrogen oxides (Wells et al. 1996, as cited in Josipovic et al. 2009). Achieving Strategic 4, Promote a low carbon and climate resilient economy, is closely linked to diversifying the economy. The proposed development supports the development of a low carbon, climate resistant economy.

Strategic Objective 6: To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment

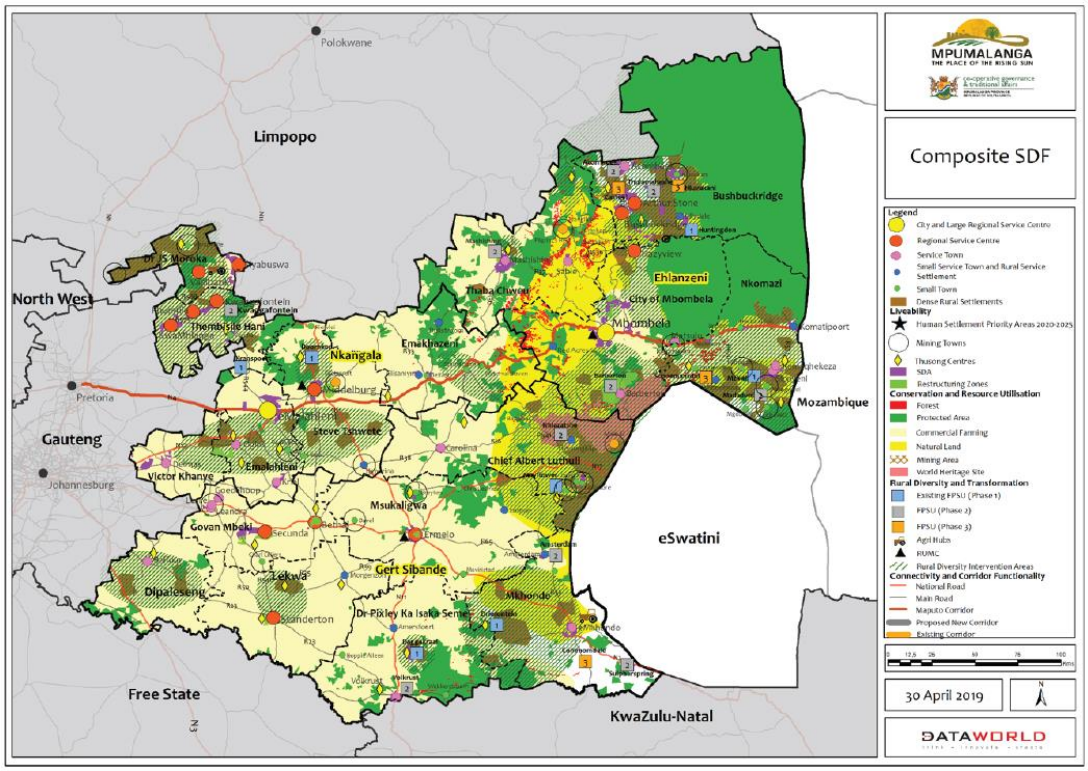
Mining contributes R 49.6 billion (approximately 25%) to the provincial economy. The key mining sector is coal, which represents 83% of South Africa's coal production. The mining sector, specifically coal mining, creates employment opportunities and supports the manufacturing and power generation sector. However, mining is also associated with many issues including water and soil contamination, air pollution and environmental degradation.

Achieving Strategic 6, To optimally utilise the mining potential without compromising the long-term sustainability of the natural environment is closely linked to diversifying and developing a low carbon climate resistant economy. The proposed development supports the objective of diversifying and developing a low carbon, climate resistant economy. In terms of the high-level composite spatial development framework, Ermelo is identified as a Regional Service Centre (red dot) and the development area located to the south east of the town falls within a mining area (brown hatched) (Figure 2.2). The economic sectors in the area include mining and power generation. The dominant land use in the area is commercial agriculture (yellow, Figure 2.3).



Source: Mpumalanga SDF

Figure 2.2: Mpumalanga Composite SDF-Economic Activities



Source: Mpumalanga SDF

Figure 2.3: Mpumalanga Composite SDF-Land Uses

2.3.2 Msukaligwa Integrated Development Plan

The Vision of Msukaligwa Municipality is to be "A Beacon of Service Excellence". The associated mission to meet the vision is:

- Enhancing community participation to steer development initiatives towards community needs.
- Advocating and stimulating local economy to promote economic growth and development.
- Improving good governance and measurable service delivery techniques.
- Enhancing effectiveness and efficiency in the utilization of available resources.
- Empowering our communities and the vulnerable groups in particular.
- Working in partnership with all its stakeholders.
- Continuously mobilizing resources to achieve high standards in service.

A SWOT analysis undertaken as part of the IDP process identified and number of opportunities and threats that are relevant to the development, namely.

Opportunities
- Power utility, government services, mining, tourism, agriculture, and forestry.
- National corridor developments (N2, N11 and N17).
- Strategic location of the municipality.

Threats
- Ageing infrastructure.
- High unemployment rate.
- Mines that are not rehabilitated.

Based on the outcome of the SWOT analysis a number of key focus areas were identified for attention over the 5-year IDP planning period of which the following are relevant.

- Unemployment and poor economic development.
- Insufficient access to basic services.
- Poor maintenance and upgrading of services infrastructure.
- Poor roads and storm water drainage system.

Besides Ermelo to the north west of the study area, the only other settlement located within relatively close proximity to the site is the rural settlement of Sheepmore, located to the east of the N2 and the study area.

The community engagement process undertaken as part of the IDP process indicated that a number of key issues in the rural areas that are relevant to the development. These include:

Basic services
A number of the rural areas in the MM that do not have access to basic services, including potable water, electricity, and toilets. Some of these challenges can be addressed through the SED initiatives associated with the development.

Skills development and job opportunities
There is a need to support skills development and create employment opportunities. The initiatives listed in the IDP include building of skills development centres or multipurpose centres, employing local contractors on projects implemented within municipality, creating

opportunities for skills transfers by contractors and the provision of bursaries and learnerships. The proposed development will create opportunities for skills development and employment.

Sports and recreation
There is a shortage of sports and recreation facilities and opportunities in many of the rural areas within the MM. The initiatives identified in the IDP to address this include the refurbishment of existing sports facilities, including the provision of ablution facilities, the construction of new sport facilities in remote areas and upgrading of security to prevent vandalism. Some of these challenges can be addressed through the SED initiatives associated with the development.

Section E of the IDP lists the developmental goals, objectives, strategies, and performance indicators. The strategic goals that are relevant to the development include:

- Sustainable and reliable delivery of basic services.
- Reduced unemployment and poverty.
- Social cohesion and spatial transformation.

The key priorities in terms of basic services with specific reference to rural areas includes the establishment of new and or up-grading of existing clinics, and the provision of mobile clinic services for more remote rural areas. The need for clinics outside Ermelo to operate 24 hours and seven days a week due to the absence of hospitals nearby was also raised as a key issue. reach the areas.

In terms of community facilities, the needs identified included, community halls and more Thusong Centres. Centres also need to be established for disabled members of the community.

The key priority in terms of unemployment and poverty is to support economic development and create employment opportunities.

The strategic objectives that are relevant to the development include:

- To provide sustainable and reliable services to communities.
- To coordinate efforts to address unemployment and poverty.

2.2.3 Msukaligwa Municipality Spatial Development Framework

The spatial vision for the MM is "*a diversified, vibrant rural economy that make optimal use of natural resources, supported by a well-connected network of sustainable rural service and economic nodes, where people have access to services and economic opportunity*".

The SDF is informed by a number of spatial objectives, namely:

- Provide a spatial structure that facilitates access to services for all communities.
- Protect strategic water sources and sensitive eco-systems.
- Provide space for the diversification of the local economy.
- Eliminate past spatial settlement patterns.

The provision of space of the diversification of the local economy is of specific relevance to the proposed development.

A SWOT analysis was undertaken as part of the preparation of the SDF. The key outcomes of the analysis are summarised below.

Strengths
- Rich natural resource base – minerals, high potential agricultural land, water resources, natural environment (lakes region).

Weakness
- Typical rural population distribution making it difficult to reach people with services.
- Remaining service backlogs (water, sanitation, refuse removal).
- Increasing poverty levels.
- Relatively low skills levels; declining functional literacy.

Opportunities
- National projects to enhance regional links may strengthen the locational advantage of Ermelo / Wesselton.
- Potential for tourism linked to natural assets.
- Potential for larger scale beneficiation supported by current nodal structure and transport links.
- Legislative investment by mines (social and labour plans) and the associated opportunity for service provision and socio-economic development[4].

Threats
- Declining coal reserves threatens mining economy and employment. Impact on mining sector also impacts on other related industries, such as manufacturing and transport.
- Global and national move away from carbon-based economy will lead to decline in mining, coal power generation economy and employment. This will also impact on mining related industries.
- Competing land uses – mining, agriculture, urban expansion, conservation
- Climate change – decreased rainfall and increased temperatures will have impact on agriculture, forestry, and settlements.
- Population growth exceeding expected and current economic growth.

The results of the SWOT analysis informed the identification of a set of priority issues centred around natural resource management and human development. The issues that are relevant to the proposed development include:

Strategic water source areas
Msukaligwa is part of a catchment area which is classified as strategic water source area at a national scale. The preservation and sustainable use of these water sources is becoming increasingly important in view of climate change. Decisions about the future development of the area should take cognisance of this issue, and not sacrifice long term water security in favour of meeting short term economic or development targets.

Conflicting land uses
Msukaligwa is richly endowed with natural resources including water, high potential land, minerals, and sensitive ecosystems that occur in attractive natural landscapes. However, these natural resources and the demand to exploit them spatially overlap and often conflict. The SDF highlights the need to address and manage potential land use conflicts.

[4] Opportunities associated with SLPs would also apply to Community Trusts associated with renewable energy projects.

Reliance on Carbon Economy
The area's economy is currently strongly dependent on coal mining. In addition to coal mining, the area also hosts the Camden Power Station. The SDF notes that the eventual decline of the mining sector and coal-based power generation, based on declining coal deposits and a move away from a carbon-based economy, is a long-term certainty for the area. Emphasis in spatial planning should be on the creation of opportunities to diversify the economy to lessen the impact of the decline.

The SDF highlights the risks posed by climate change, specifically given that large section of the economy is reliant on agriculture and forestry. The area is also the source area of some of the main strategic waterways of the country.

The SDF identifies a number of structuring elements that inform the spatial concept for the MM. These include urban development nodes, transportation corridors, mining areas and commercial agriculture and conservation areas.

The main town of Ermelo is designated as a Primary Node. The function of a Primary Node is to:

- Provide higher order services to the growing urban population, as well as the rural catchment area surrounding the node.
- Provide space for economic diversification and higher intensity economic development, with a focus on agriculture and related activities, mining, utilities, and ***power generation***, as well as transport and logistics. Support should also be provided too industrial and commercial uses, as well as business incubation centres and innovation centres, training facilities and educational institutes

Sheepmore, located to the east of the development area, is designated as Rural Node and has been identified as a site for the establishment of a Farmer Production Support Unit in terms of the Department of Rural Development and Land Reform's Agri-Park Programme. The economic focus on Sheepmoor is on forestry and agriculture (livestock, grains (maize and beans) and vegetables). Economic initiatives such as the establishment of grain silo, training in tree farming and provision of connecting infrastructure should be prioritised. The development of small agri-villages in consultation with Mondi/ Sappi is also identified as an initiative. The Socio-Economic Development (SED) spend linked to the proposed development could support for these initiatives

The N2 and N17 are identified as Primary Transportation Corridors, while the N11 is identified as a Secondary Corridor. The SDF notes that development of nodes along these corridors are proposed, in order to intensify development at specific points and achieve economies of scale.

The SDF highlights the key role and spatial extent of mining in the MM, including reference to the Camden coal-fired power station south of Ermelo. Over the longer term the rehabilitation of mining areas and a range of alternative peri-urban uses should be considered for the impacted areas in view of the decrease reliance on coal. Commercial Agriculture also represents a key economic activity in the MM. However, the SDF notes that climate change will pose a risk to the agricultural sector.

The structuring elements have been used to identify spatial focus areas. The areas of relevance to the development include:

- Agriculture and Forestry Focus Areas.

- Conservation and Tourism Focus Area.
- Mining and Peri-Urban Focus Areas.

Agriculture and Forestry Focus Areas

In terms of agricultural development, the SDF notes that the recommendations of the District Rural Development Plan for Gert Sibande District Municipality be implemented. The Plan identifies a number of rural intervention areas (RIAs). As indicated in Figure 2.4, the study area is not located in an RIA. The main land use is commercial farming.

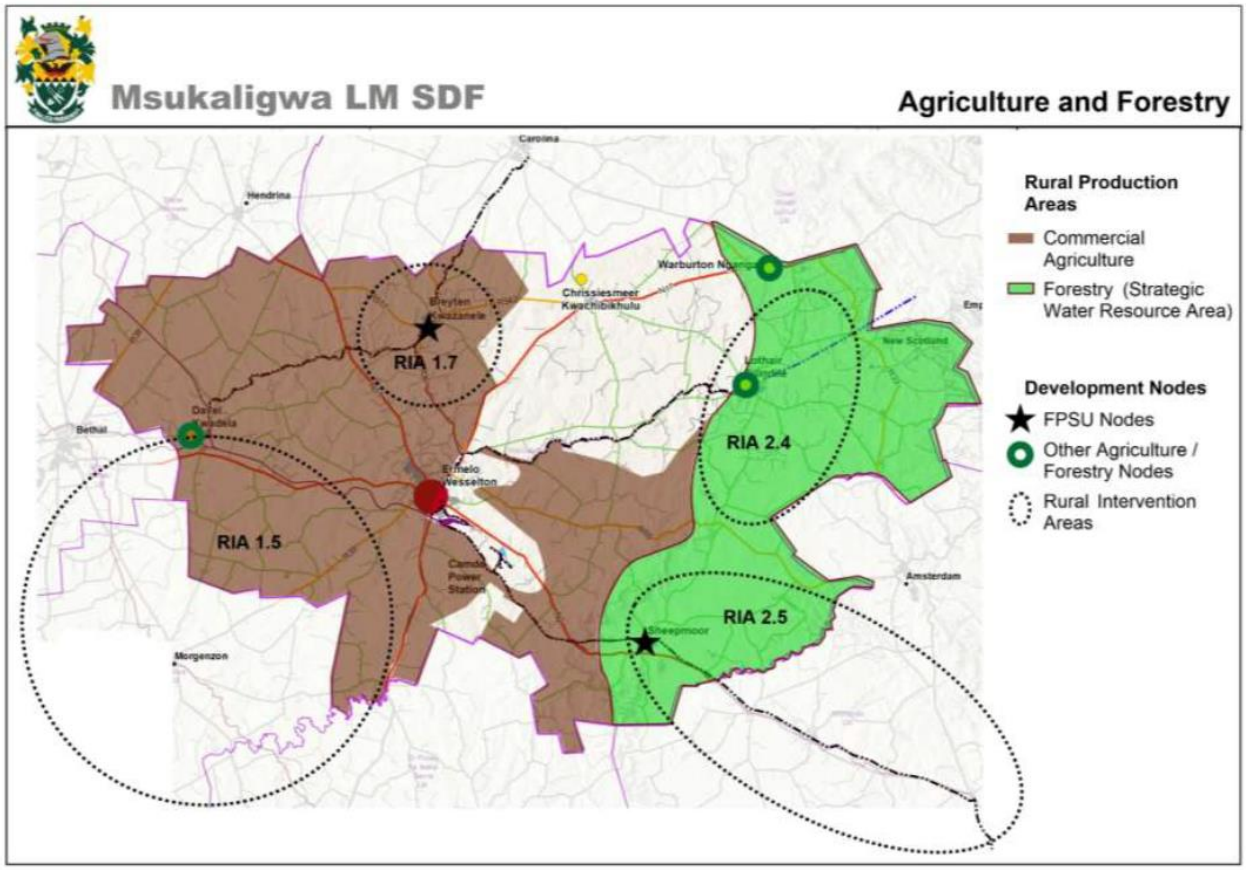


Figure 2.4: Msukaligwa SDF-Agriculture and Forestry

Conservation and Tourism Focus Areas

The SDF notes that the entire Msukaligwa area is environmentally sensitive, and all human activity should be conducted in such a way as to minimise impact. The key areas of significance identified include:

- The lakes region – this natural asset is not only an economic asset for tourism, but also an important ecosystem and an important mechanism to mitigate the impacts of climate change.
- Strategic water source areas and river headwaters – the area makes an important contribution to national water security, and also requires clean water for human development and economic activities such as agriculture.
- Protected areas – a number of small, protected areas exist outside the lake's region. There areas are not only important ecologically, but also from a tourism perspective.

The natural and cultural assets of Msukaligwa, notable the lakes region, has the potential to serve as a major attraction. In addition, the area's proximity to the large markets of Gauteng and good regional connectivity should be harnessed in attracting more local tourists. As indicated in Figure 2.5, the majority of the proposed development area is not located in a protected and or tourism area. There is however a protected area to the south of the development area. This will need to be assessed as part of the relevant specialist studies.

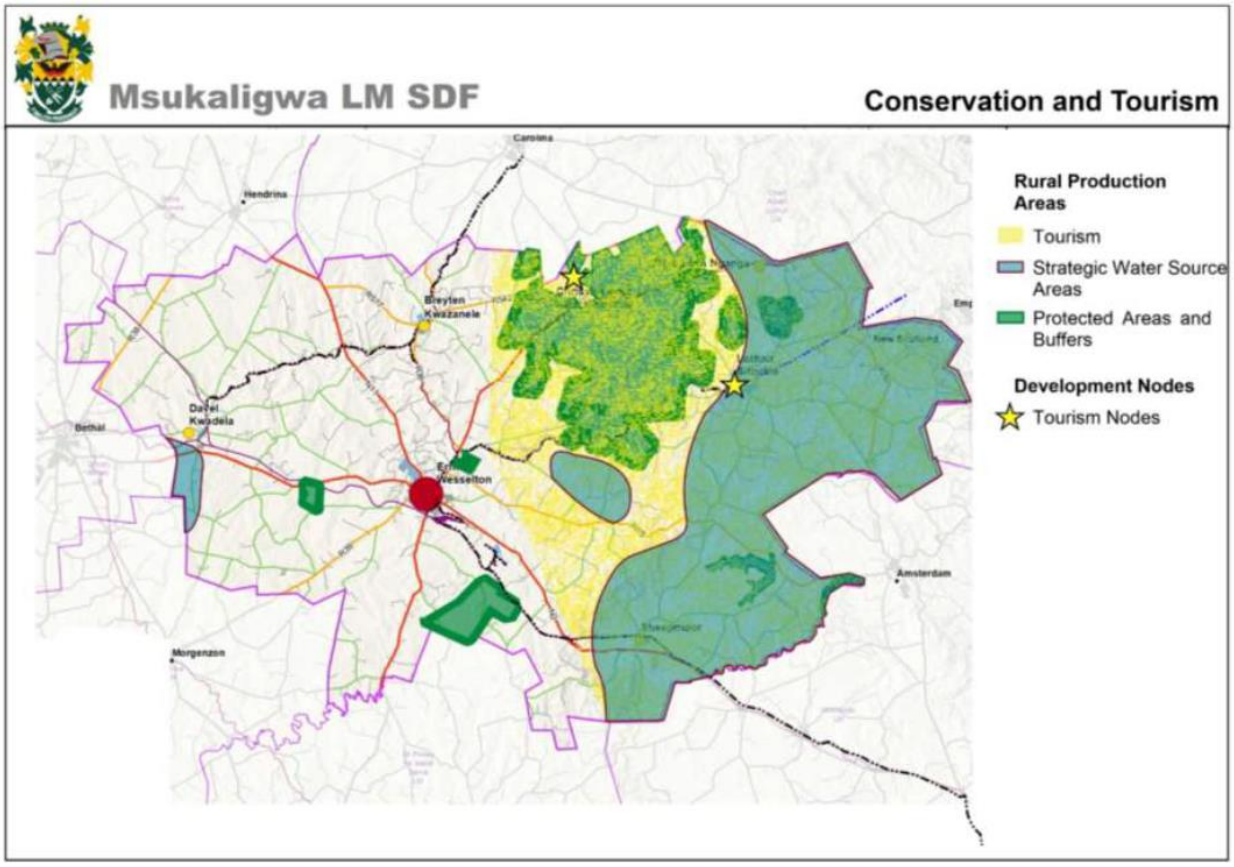


Figure 2.5: Msukaligwa SDF-Conservation and Tourism

Mining Areas

The SDF acknowledges the importance of the mining sector and notes that it will need to be accommodated over the short to medium term. However, of relevance to the proposed development the SDF refers to green industries and indicates that the existing site of the Camden Power Station and surrounds should be made available for new industrial development in the long term, to manage the long-term impact of the Power Station being decommissioned. The existing road and rail infrastructure render the area in the vicinity of the Power Station and the site itself highly accessible creating an opportunity for redevelopment with alternative uses requiring extensive space and good connectivity. The SDF also notes that the mining belt area holds other potential that should be harnessed with a long-term view of diversifying the local economy to soften the long-term impact of eventual decline in mining. As indicated in Figure 2.6, the development area is located in an area where current mining activities take place (brown areas). The composite spatial development framework for the MM is informed by the various structuring elements. The spatial layout is reflected in Figure 2.7. As indicated in Figure 2.7, the majority of the

development area falls within a commercial agriculture area. There is also a protected area located to the south of the development area.

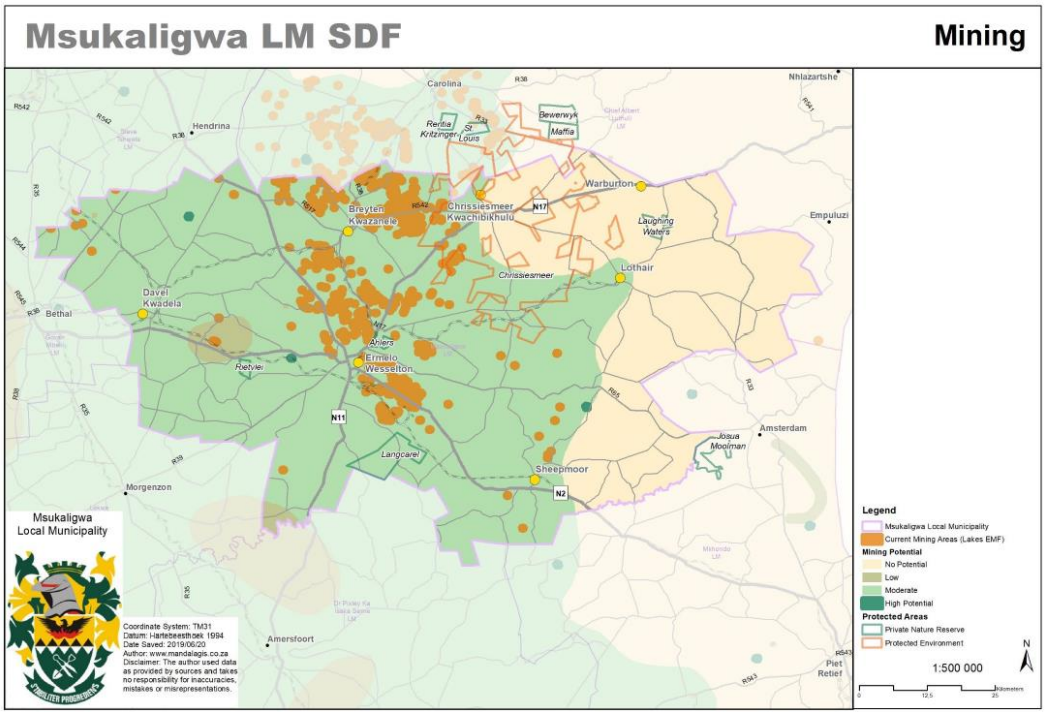


Figure 2.6: Msukaligwa SDF-Mining

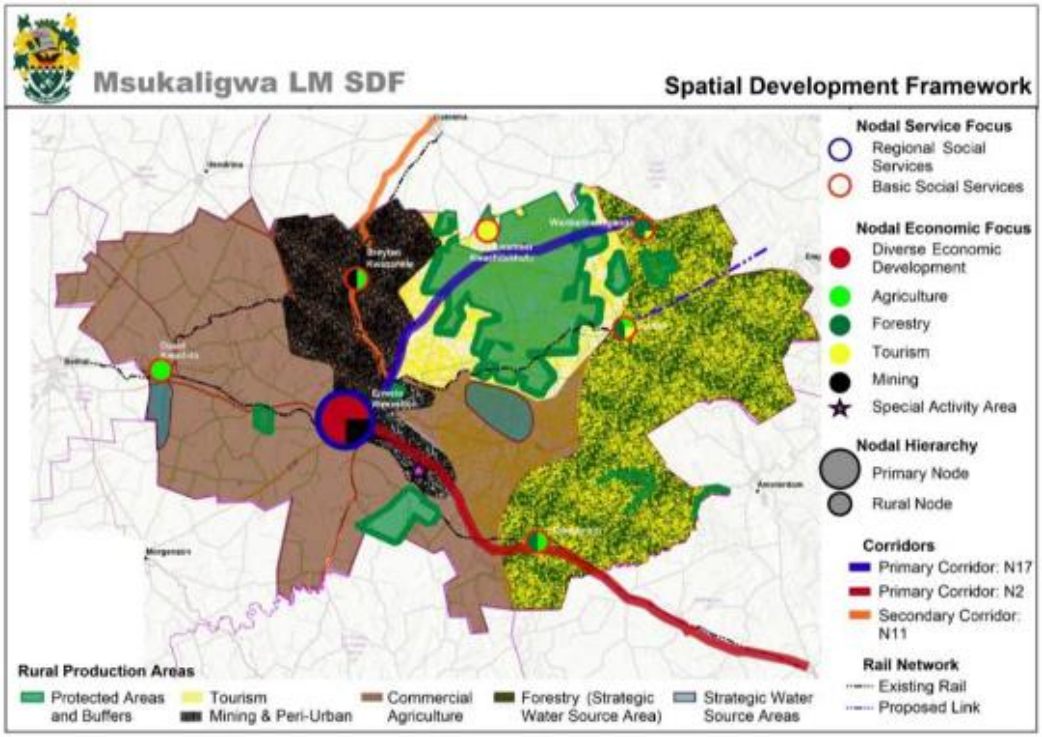


Figure 2.7: Msukaligwa SDF-Composite Spatial Development Framework

SECTION 3: OVERVIEW OF STUDY AREA

3.1 INTRODUCTION

Section 3 provides a baseline description of the study area with regard to:

- The administrative context.
- Provincial context.
- Overview of district and local municipalities.
- Site and the surrounding land uses.

3.2 ADMINISTRATIVE CONTEXT

The study area is located within the Msukaligwa Municipality (MM) within the Mpumalanga Province. The MM is one of the seven Local Municipalities that make up the Gert Sibande District Municipality (Figure 3.1). The town of Ermelo is the administrative seat of the MM.

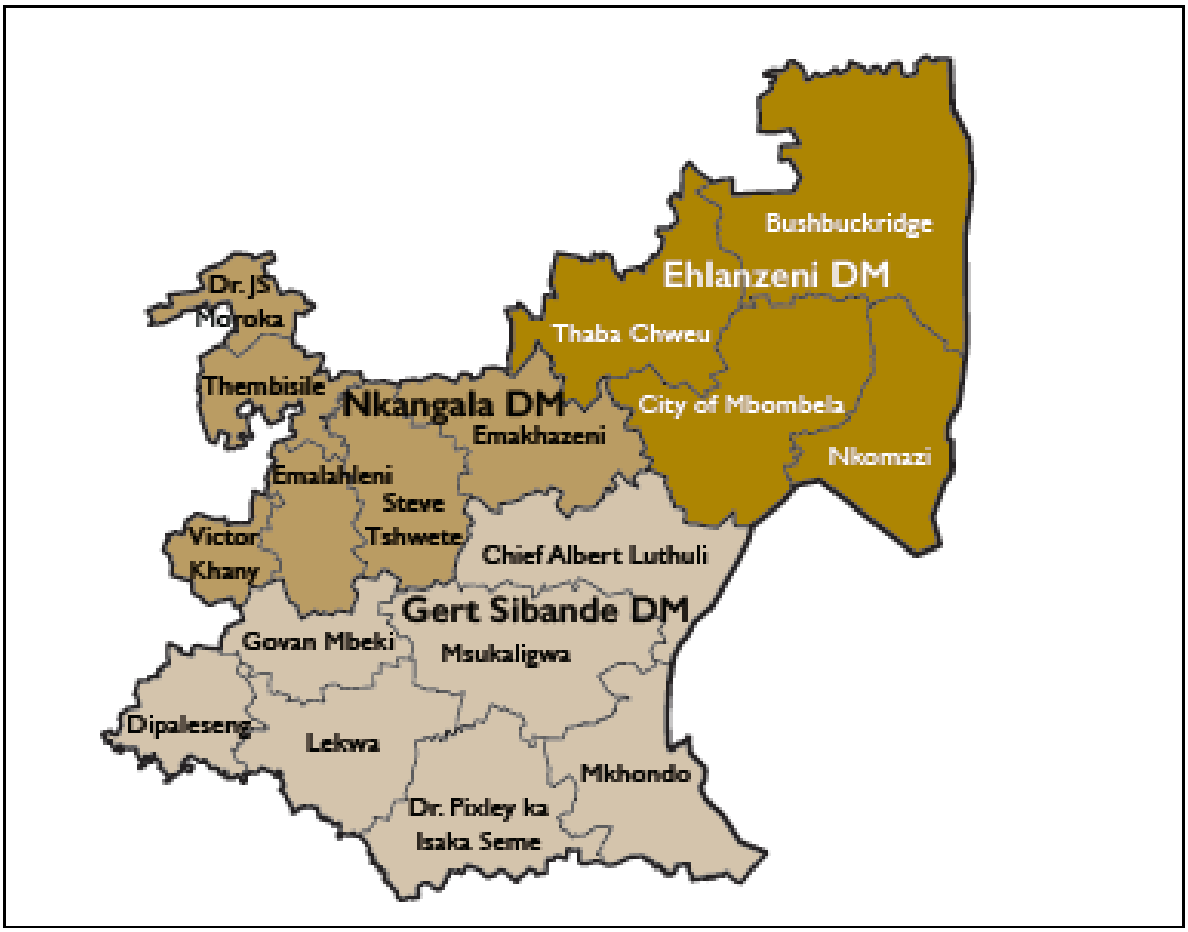


Figure 3.1: Location of Msukaligwa Municipality within the Gert Sibande District Municipality and Mpumalanga Province.

3.3 DEMOGRAPHIC OVERVIEW

Population

The population of the MM in 2016 was 164 608 (Community Household Survey 2016). Of this total, 35.4% were under the age of 18, 60.4% were between 18 and 64, and the remaining 4.1% were 65 and older. The MM therefore had a high percentage of the population that fall within the economically active group of 18-65. The figures are higher than the figures for the GSDM and Mpumalanga (57.7% and 56.6% respectively). This is likely to be due to the employment opportunities associated with the mining and manufacturing activities in the MM.

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates to reduced revenue for local authorities to meet the growing demand for services. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e., they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the MM, the GSDM and Mpumalanga in 2016 were 65.4%, 73.5% and 77% respectively. The high dependency ratios reflect the limited employment and economic opportunities in the area and the province as a whole. As indicated above, a high dependency ratio also places pressure on local authorities in terms of service delivery.

In terms of race groups, Black Africans made up 91.6% of the population on the MM, followed by Whites, 6.9% and Asian or Indians, 0.9%, and Coloureds, 0.6%. This figures for the GSDM are similar. The main first language spoken in the MM was isizulu, 79.1%, followed by Siswati, 7.3% and Afrikaans, 6.2%.

Households and house types

The total number of households in the MM in 2016 was 51 090, which constituted approximately 20% of the total number of households in the GSDM. Of these 66.2% were formal houses, 9.1% flats in backyards, 6.6% traditional dwellings, and 9.4% shacks or informal dwellings. The figures for the GSDM were 67.2%, 4.6%, 6.7% and 13.4% respectively. The majority of dwellings in the MM are therefore formal structures. A relatively large percentage of the properties in the MM (43.3%), while 5.9% were owned and in the process of being paid off. 22.1% of the households rented their properties, while 10.6% occupied their properties rent free. The rent-free figure is likely to be associated with farm workers. The relatively high number of properties that are owned and or in the process of being paid off reflects a relatively stable and established community.

In terms of household heads, approximately 38.9% of the households in the MM and 39.1% of the households in the GSDM were headed by women. These figures similar to the provincial figure of 39.71%. The high percentage of households headed by women reflects the likelihood that the men have left the area in search of employment opportunities in Gauteng. Women headed households tend to be more vulnerable.

Household income
Based on the data from the 2011 Census, 12.6% of the population of the MM had no formal income, 4.1% earned less than R 4 800, 7.1% earned between R 5 000 and R 10 000 per annum, 17.7% between R 10 000 and R 20 000 per annum and 20.9% between R 20 000 and 40 000 per annum (2016). The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 62.4% of the households in the MM and 65.2% in the GSDM live close to or below the poverty line. The low-income levels reflect the rural nature of the local economy and the limited formal employment opportunities outside in the urban areas. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the MM. This in turn impacts on the ability of the MM to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the MM and GSDM that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

Employment
The official unemployment rate in the MM in 2016 was 15.6%, while 42.6% were employed, and 36.4% were regarded as not economically active. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in both the ULM and Ward 3. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education
In terms of education levels, the percentage of the population over 20 years of age in the MM and GSDM with no schooling was 10.6% (2016), compared to 10.8% and 11.3% for the GSDM and Mpumalanga Cape Province. The percentage of the population over the age of 20 with matric was 34.12%, compared to 34.3% and 36.1% for the GSDM and Mpumalanga. The education levels for the MM are therefore similar to the DM and Provincial figures.

3.4 MUNICIPAL SERVICES

Electricity
Based on 2016 survey, 87% of households in the MM had access to electricity, compared to 90% for the GSDM and 93% for Mpumalanga.

Access to water
Based on the 2016 survey information, 81.7% of households in the MM were supplied by a service provider, while 5.8% relied on their own service or natural sources (4%). The reliance on own services or natural sources reflects the rural nature of large parts the MM.

Sanitation
72.3% of the households in the MM had access to flush toilets (2016), while 18.8% relied on pit toilets and 3.2% had no access to formal sanitation. The high percentage of

households that rely on pit toilets is linked to the relatively high percentage (9.4%) of households that live in shacks.

Refuse collection
Only 59.4% of the households in the MM had access to regular refuse removal service, while 16.5% disposed of their waste at their own dump and 7.1% had not access to facilities. The low percentage of households that have access to regular refuse removal services is linked to the relatively high percentage (9.4%) of households that live in shacks. The relatively higher percentage that dispose of their waste at their own dump reflects the rural nature of the area and the difficulty of providing municipal services to areas located at a distance from the main towns in the area.

3.5 HEALTH, EDUCATION AND COMMUNITY FACILITIES

Health Services
The MM IDP indicates that there is 1 government and 1 private hospital in the MM, 10 primary health care clinics, and 4 mobile clinics (Table 3.1).

Table 3.1: Health services in Msukaligwa Municipality

Facilities	Number
Private Hospitals	1
Primary Health Care Clinics	10
Mobile Clinics	4
Government hospitals	1
Infectious Hospital (TB)	1
Dentists	4
Gynaecologist	1
Social Workers	12
Private Doctors	20

Educational Facilities
The MM IDP indicates that there are 71 primary schools, 6 high schools, 12 combined schools and 11 secondary schools in the MM. There is 1 FET College, but no tertiary facility (Table 3.2). The IDP notes that given the growth in the area there is a need for at least a tertiary institution within the GSDM. Development within Ermelo has also created a need for more primary and high schools.

Table 3.2: Educational Facilities in Msukaligwa Municipality

Facility	Number
No. of Primary Schools	71
No. of High School	6
No. of Combined Schools	12
No. of Secondary Schools	11
No. of Tertiary Education Facilities	0
No. of FET Colleges	1
No. of Training Centres/Adult Education	9
No. of Private Schools	3
Day Care Centres	40

Community Facilities

Table 3.3 lists the community facilities in the MM. As indicated in the table, Ermelo as the administrative centre is relatively well catered for in terms of community facilities, including police stations, sports facilities, libraries, community halls and pension pay out points. However, Sheepmore, which is the closest rural settlement to the development area does not have a library and the sports facility is an informal soccer field.

Table 3.3: Community facilities

Area/Town	Police Station	Public Sport Facilities	Public Libraries	Community Halls	MPCC/TSC	Post Offices	Pension pay points	Comments
Breyten/KwaZanele	1	4	2	2	1	1	1	There is one informal soccer field at Breyten
Ermelo, Wesselton, Cassim Park and Thusiville	2	9	4	5	-	1	2	There are five informal soccer field at Wesselton. The Thusiville library is completed but not yet operating.
Chrissiesmeer/Kwachibikhulu	1	1	1	1	-	1	1	There is one informal soccer field at Chrissiesmeer
Davel/Kwadela	1	2	1	1	-	1	1	There is one informal soccer field at KwaDela. There is a complaint that the existing library at Davel is far from the majority users who reside at KwaDela.
Lothair/Silindile	1	1	1	1	1	1	1	The TSC is almost completed and postal services run by agency at Lothair
Sheepmoor	1	1	-	1	-	1	1	There is one informal soccer field at Sheepmoor. No library at Sheepmoor
Warburton/Nganga	-	1	-	-	-	1		Postal services run by agency at Warburton. The sport facility is an informal soccer field. No library service at Warburton.
TOTAL	**7**	**19**	**8**	**11**	**2**	**6**		

3.6 ECONOMIC OVERVIEW

The economic growth rate for Msukaligwa was at 3.0% per annum on average over the period 1996 to 2017 and forecasted average annual GDP growth for 2017-2022 relatively

low at 1.3%. The contribution of Msukaligwa to the Mpumalanga economy was around 4.3%, making it the fifth largest local economy in the province. It is the second largest economy in the District, contributing around 15.5%.21

The key economic sectors in the MM in 2017 in terms of contribution to GDP were mining (20.3%), community services (18.5%), trade (including industries such as tourism) (18.2%) and finance (14.2%) (Table 3.4). Despite the importance of agriculture, it only contributed 6% to GDP in 2017. The IDP notes that the MM has a comparative advantage in economic sectors such as agriculture, transport, and mining.

Table 3.4: Contribution of sectors to Msukaligwa Municipality GDP

Economic Sector	2014	2017	Change
Agriculture	5,3%	6,0%	0,7%
Community Services	18,4%	18,5%	0,1%
Construction	2,7%	2,7%	0,0%
Finance	13,3%	14,2%	0,9%
Manufacturing	5,1%	5,1%	0,0%
Mining	20,8%	20,3%	-0,5%
Trade	18,5%	18,2%	-0,3%
Transport	11,3%	11,3%	0,0%
Utilities	4,5%	3,8%	-0,7%

Finance and Agriculture achieved the highest, although slight, growth in contribution from 2014 to 2017. The contribution of utilities, mining and trade declined slightly.

In terms of employment, the trade sector (20.6%) was the most important sector in terms of employment, followed by community services (15.3%), mining (12.8%), finance (11.6%) and manufacturing (10.1%) (Table 3.5).

Table 3.5: Contribution to employment of sectors in Msukaligwa Municipality

Employment Sector	2014	2017	Change
Agriculture	6%	6,3%	0,3%
Community Services	14,5%	15,3%	0,8%
Construction	7,9%	8,5%	0,6%
Finance	11,2%	11,6%	0,4%
Manufacturing	9,9%	10,1%	0,2%
Mining	14,7%	12,8%	-1,9%
Trade	21,1%	20,6%	-0,5%
Transport	4,5%	4,7%	0,2%
Utilities	2,5%	2,4%	-0,1%

In terms of unemployment, the MM unemployment rate was the 6th lowest among all the municipal areas of Mpumalanga. The unemployment rate deteriorated slightly from 23.1% in 2014 to 24.1% in 2017. Unemployment rates are higher for females at 29.8% and for males at 24.1%. However, youth unemployment at 34.5% is a key concern.

The IDP notes that in terms of future economic development, coal mining can be expected to remain an important sector for the short to medium term. However, the role of this sector is expected to decline in the medium to long term due to limited coal resources, and a move away from a coal-based economy locally and globally due the impact on climate.

The current transport and logistics sector is also likely to be impacted on by a decline in coal mining.

3.7 OVERVIEW OF STUDY AREA

3.7.1 Introduction

The study area is located ~ 10 km to the south-east of the town of Ermelo, which is the administrative centre of the MM. Ermelo is the administrative seat of both the Msukaligwa Local Municipality (MLM) and the Gert Sibande District Municipality (GSDM) and is also known as the garden city of Mpumalanga and the gateway to the province. The small settlement of Camden associated with Camden Power station (located 2.3 km north of the project site), is the only other urban area located in significant proximity. Three national highways, namely the N2, N11 and the N17 intersect at Ermelo. The N2 freeway connects Ermelo with Richards Bay on the KwaZulu Natal coastline. The N11 South connects the town to Newcastle to the south and then onto the Ladysmith before linking up with the N3 to Durban. The N11 north connects to Middelburg and the N4 freeway west to Pretoria. The N17 West connects the town to the southern suburbs of Johannesburg and N17 East to eSwatini. Ermelo is also a major railway junction between Mpumalanga and KwaZulu-Natal. The rail junction connects to Machadodorp which is on the Pretoria and Maputo railway line. The town also lies on the Richards Bay railway line that connects the Mpumalanga coalfields with the export Port of Richards Bay on the Indian Ocean.

The study area is flanked by the N2 to the north and north-east of the site, and the N11 to the west and south west of the site. The Richards Bay railway line traverse the site to the south of the Camden Power station site. The proposed Camden Green Hydrogen and Ammonia facility is located just to the south of the Camden Power station (Figure 3.2).

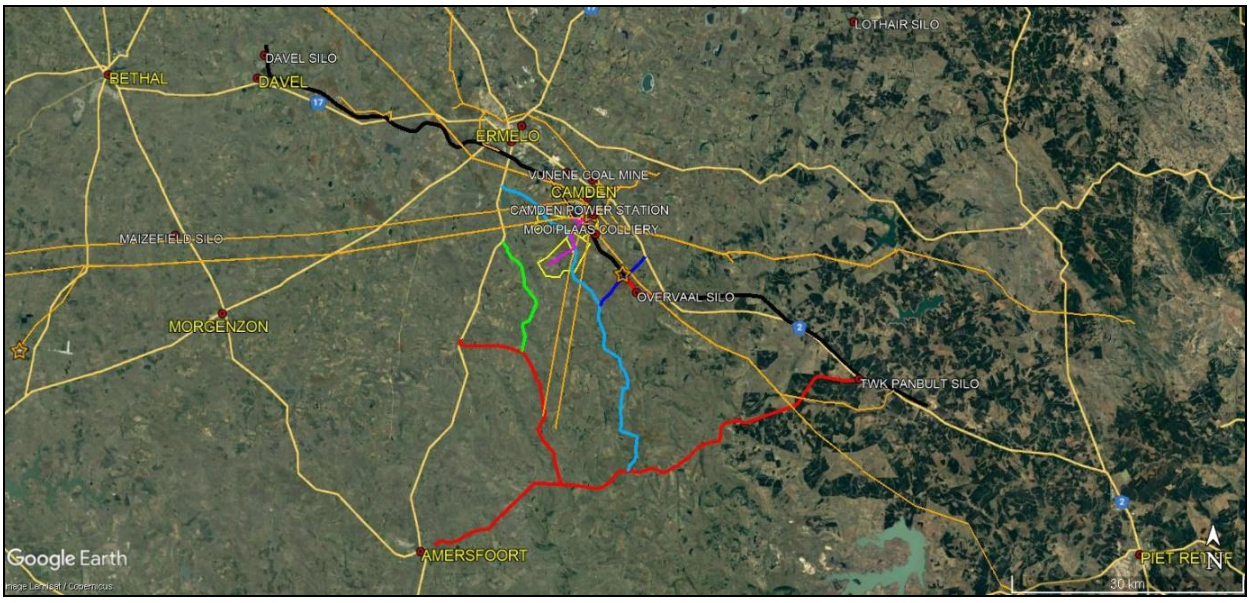


Figure 3.2: Proposed Camden I Green Hydrogen and Ammonia Plant infrastructure alternatives (pink) and subject properties (yellow) indicated in relation to Camden power plant, existing Eskom lines (orange lines), railway line (black) and local public gravel road network, viz., the Familiehoek Road (green) De Emigratie Road (light blue), Overvaal Road (dark blue) and other (red)

The Eskom Camden Coal Power station is located immediately to the north and north east of the site (Photograph 3.1). Construction of the 1600 MW power station commenced in November/December 1962 and the first turbo-generator was commissioned in April 1967. The last of the eight units was commissioned in 1969. The Camden Power station became the starting point of the national power grid, consisting of a series of 400 kV lines which today interconnect the entire country. The power station has six 111.86 m high cooling towers and four 154 chimney (smoke stacks) that served 8 boilers.

Between 1990 and 2006 the station was mothballed, but South Africa's energy crisis in the early 21st century prompted Eskom to recommission the station, starting with unit 6 in July 2005 and completing with unit 1 in July 2008. The development of the Camden Power station also involved the construction of the village of Camden, located ~ 1.3km to the north of the power station. The village, which consists of 356 was established to accommodate administration, operating and maintenance personnel. Community facilities including a community hall, sports facilities, included four tennis courts, a bowling green, swimming bath, shooting range, rugby, hockey, soccer, and cricket fields and jukskei, and the associated clubhouses and changerooms were also established. Several parks, situated throughout the residential property, provided playgrounds for some 500 children at Camden. Schooling was provided in Ermelo for these children, with a regular bus service operating between Camden and Ermelo[5]. The settlement currently accommodates a SANDF military base (Camden).

Photograph 3.1: Camden Power Station

[5] https://www.eskom.co.za/sites/heritage/Pages/Camden.aspx

Study area properties are primarily accessed off three public gravel roads which intersect with the N11 or N2, viz. the De Emigratie- (N11), Familiehoek- (N11) and Overvaal (N2) roads. Of these, the De Emigratie road is of most relevance to the project. The road functions as a north-south-aligned spine, providing two routes between the N11 and the N2 via the study area (Photograph 3.2). Base farms are typically accessed directly off these roads, with internal roads providing access to uninhabited farm portions or properties. Access to farm roads is typically unrestricted (i.e., no access gates – but there are exceptions). A road off the Overvaal road (N2-De Emigratie Rd) provides the only access road to the Overvaal silo complex.

Photograph 3.2: De Emigratie Road looking west on Uitkomst farm.

The study area forms part of the Ermelo commercial farming district. Ermelo is a key producer of field crops and livestock, typically in mixed operations. Field crops are grown under dryland conditions. Key crops include maize and field beans (Photograph 3.3). Six large silo complexes are located within a 40 km of Ermelo, including the silos at the Overvaal rail siding (Photograph 3.4).

Photograph 3.3: Maize fields on Uitkomst farm along the De Emigratie gravel road with Camden Power station in the background

Photograph 3.4: Overvaal silo located adjacent to Richards Bay railway line

Both beef cattle and sheep are farmed in the area (Photographs 3.5 and 3.6). The natural grassveld grazing resource has a relatively high carrying capacity of around 1 head of cattle (LSU) to 3 hectares. By utilizing harvest residue, carrying capacities may be increased to 1 LSU/ ha, i.e., the activities are interdependent. Most owners also utilize pastures for hay production. The veld is prone to veldfires. The risk is greatest during the dry winter months. Key grazing spp. such as Oulandsgras (*Eragrostis curvula*) may take up to 3 years to recover to full productivity (van der Meulen, pers. comm).

Photograph 3.5: Beef cattle on Klipfontein Farm

Photograph 3.6: Sheep grazing on Uitkomst Farm

The study area settlement pattern is sparse and concentrated along the main public gravel roads (Photograph 3.7). Study area operations typically consist of a number of (often

adjacent) properties. Many farmers also lease additional land. The estimated minimum size of an economically feasible cropping operation is around 1000 ha. There is a tendency towards larger operations in order to maintain a viable economy of scale in the face of continuously rising input costs. Base farms are typically inhabited by farm owners and or managers. Some properties are devoid of structures, while farmsteads on a few have become redundant.

Photograph 3.7: Adrianople farmstead and access road off the Overvaal Road

Farms typically consist of a patchwork of cropped areas and veld used as rangeland. Essentially all higher potential arable land has been brought under cultivation. The study area terrain is undulating. The landscape is largely treeless, but substantial (and distinctive) oak lanes and small groves are located on some study area properties. Relatively small numbers of farm labourer families continue to reside on a few farms, but the general trend is towards transporting in labourers from Ermelo on a daily or weekly basis (Photograph 3.8). Larger operations may provide permanent employment to up to 40 workers. Most of the opportunities are associated with cropping activities. Small groups of households with historical tenure rights reside on study area properties in small clusters on a number of farms along the key public gravel roads.

Photograph 3.8: Accommodation of non-tenured staff working on Klipfontein seen from Familiehoek Road

A number of historic and operational coal mines are located in the immediate vicinity of Camden power station. These include the active Mooiplaas colliery 1.3 km to the north-east of the proposed Camden I Green Hydrogen and Ammonia Plant site, and the large La Brie and Vunene mines to the north of the N2 between Camden and Ermelo. No historic diggings or active mining currently takes place to the west (south) of the railway line, i.e., the

immediate study area. Prospecting has recently been carried out on a number of study area farms.

Fourteen overhead lines (88 kV to 400 kV) currently feed into/ out of Camden substation adjacent to the plant (various approach directions) (Photograph 3.9). Camden power station occupies a substantial site. Its 6 cooling towers are visible for kilometres around. The small Camden settlement is located approximately 1.3 km to the north of the plant. Camden consists of 356 dwellings and was constructed to accommodate Eskom personnel[6]. The settlement currently accommodates a SANDF military base (Camden).

Photograph 3.9: Camden power station and power lines seen from the east from near Mooiplaas colliery on the N2

The area located to the south of Camden (study area) is currently affected by 5 Eskom line corridors. These include two parallel line corridors from the west (both traversing the N11, Photograph 3.10), two parallel corridors from the south (traversing De Emigratie Road, Photograph 3.11), and a corridor aligned parallel to the north of the KZN railway line, entering Camden from the south-east via a small substation located along the railway line just to the west of the Overvaal road.

Photograph 3.10: 400 kV line crossing the N11 approximately 6 km south of Ermelo

[6] https://www.eskom.co.za/sites/heritage/Pages/Camden.aspx

Photograph 3.11: Two 400 kV lines crossing De Emigratie Road, looking east from intersection with access road to Uitkomst Farm

Visitor accommodation in Ermelo largely caters for travellers and business people. The town in not a regarded as a tourism destination. A few venue-type facilities are located to the south of the town and largely cater for local functions such as weddings.

3.7.2 Site properties

The Camden I Green Hydrogen and Ammonia Plant infrastructure alternatives directly affect four properties owned by two land owners, namely Ms Petronella Reyneke and Mr Lood de Jager (Table 3.6).

Table 3.6: Overview of properties affected by proposed infrastructure

PROPERTY	OWNER	DIRECT IMPACT	LAND USE
292/2 Uitkomst	Mr Lood de Jager	Pipeline Alt 1: 1.1 km Pipeline Alt 3: 1.1 km	Residential (base farm) Dryland cropping; Grazing
290/14/RE Mooiplaats	Mr Lood de Jager	Pipeline Alt 1: 1.4 km Pipeline Alt 2: 3.3 km Pipeline Alt 3: 1.4 km Pipeline Alt 4: 3.3 km	Dryland cropping; Grazing
322/1 Welgelegen	Ms Petronella Reyneke	Plant Alt 2: 18.2 ha Pipeline Alt 1: 730 m Pipeline Alt 2: 2.9 km Pipeline Alt 3: 2.9 km Pipeline Alt 4: 730 m	Dryland cropping; Grazing Land leased out
322/2 Welgelegen	Ms Petronella Reyneke	Plant Alt 1: 21.5 ha Pipeline Alt 2: 3 km Pipeline Alt 3: 3 km	Residential (base farm) Residential (labour, tenured) Dryland cropping; Grazing Land leased out

The properties owned by Ms Petronella Reyneke (322/1 and 322/2) would be affected by all of the infrastructre alternatives. Mr de Jager (292/2 and 290/14/RE) properties would only be affected by the proposed pipeline alternatives (Figure 3.3). All affected properties are primarily used for mixed farming operations. Dwelling clusters are located on Welgelegen 322/2 and Uitkomst 292/2, which are both accessed off the De Emigratie Road. The portion of Mooiplaas located south of the railway line is accessed via internal roads (Uitkomst), and the section to the north via the N2. The portions are linked via a rail underpass. All the site properties are currently affected by Eskom lines to varying extents.

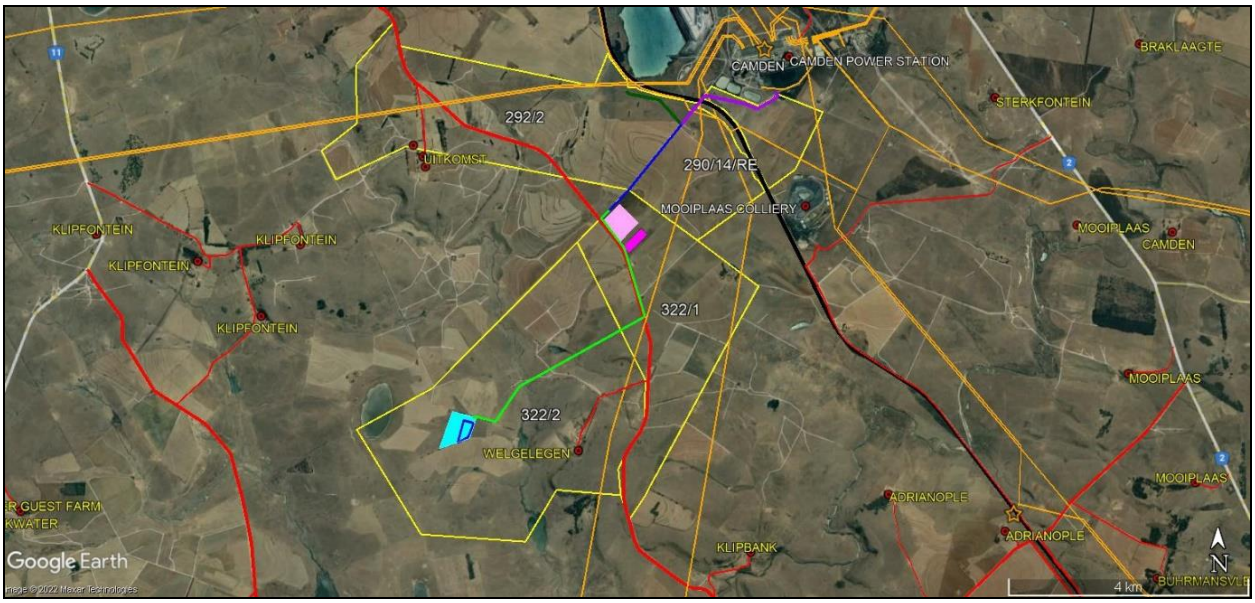


Figure 3.3: Proposed Camden I Green Hydrogen& Ammonia Plant and subject properties (yellow outlines) indicated in relation to existing Eskom lines (orange lines), railway line (black) and local gravel roads (red): Plant Alt 1 (light blue fill), Alt 2 (light pink fill); Collector substation Alt 1 (dark pink fill) and Alt 2 (dark blue outline); and pipeline alternative segments: Alts 2 and 3 (light green line), all Alts (dark blue line), Alts 1 and 3 (dark green), and Alts 2 and 4 (purple)

Welgelegen 322/1 (Plant Alt 2) and 322/2 (Plant Alt 1) are part of three contiguous properties owned by Ms Reyneke. The Reyneke property is currently leased out for cropping and stock farming purposes to two separate local farmers, Messrs. Lood de Jager and Bernard Scheepers (Photograph 3.12). Ms Reyneke and her son reside in separate dwellings on the main yard on 322/2 (Photograph 3.13). Mr Reyeneke is employed as farm manager by Mr Scheepers, and also runs a small logistics (grain transport) operation from 322/2. Eight households reside in a cluster of small houses adjacent to the De Emigratie road (Photograph 3.14). Members of two households are employed by the Reynekes. Both properties are affected by the existing 2 x 400 kV corridors approaching Camden power station from the SW.

Photograph 3.12: Rangeland and cropped fields (middle ground) on Welgelegen 322/1

Photograph 3.13: Farmstead on Welgelegen Farm to west of De Emigratie Road

Photograph 3.14: Farm labourers' dwellings on Uitkomst Farm

Uitkomst 292/2 and Mooiplaas 290/14/RE form part of a substantially larger mixed farming operation belonging to Mr Lood de Jager. Mr De Jager's operation is based on Uitkomst. The extensive farmyard straddles Uitkomst 292/2 and 292/10, and includes three primary dwellings, a few workers' houses and outbuildings (Photographs 3.15). Mooiplaas straddles the KZN railway line. No structures are located on the property. Extensive portions of both properties are used for cropping activies. Uitkomst is currently affected by a single (2 lines) Eskom Tx corridor. Mooiplaas is currently affected by 4 Eskom line corridors. This is linked to its location relatve to Camden substation. As indicated, the De Jager properties would only be affected by portions of the water pipeline alternatives.

Photograph 3.15: One of three primary dwellings located on Uitkomst Farm

3.7.3 Potentially sensitive social receptors

The proposed Plant infrastructure is located in a relatively sparsely populated area used primarily for farming. Residential receptors are limited to a few base farms. All the directly affected land owners and most adjacent properties rely on the De Emigratie road for access to their properties (Figure 3.4).

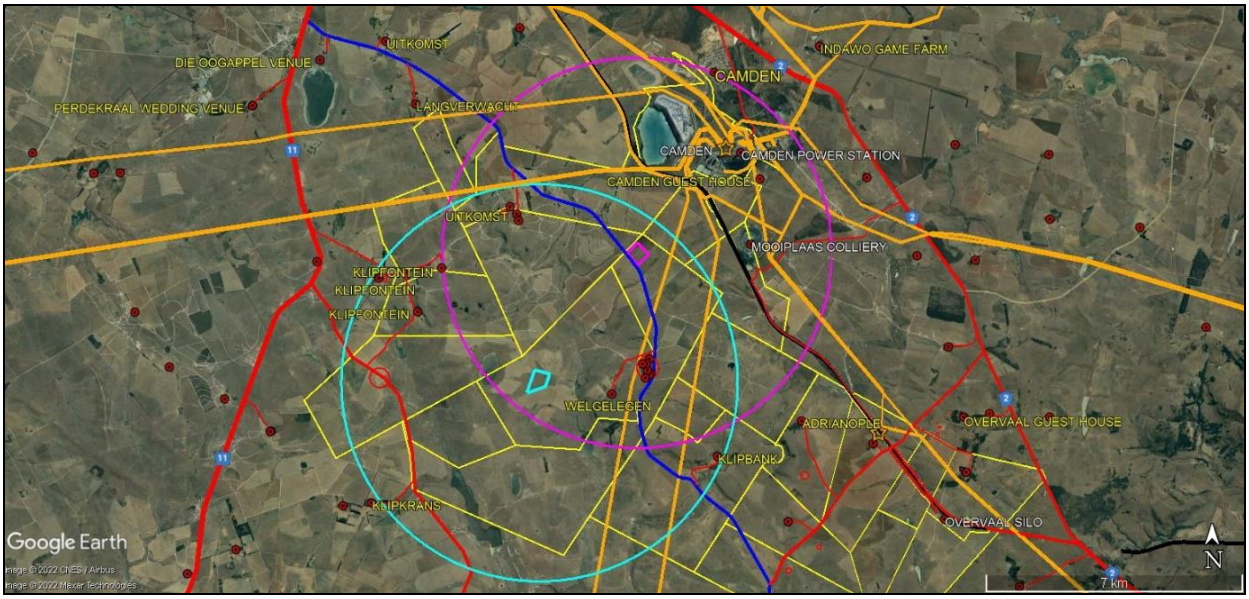


Figure 3.4: Proposed Plant site Alternative 1 (light blue rectangle) and associated 5 km radius from outer boundary (light blue circle) and Alternative 2 (pink) in relation to De Emigratie Road (dark blue) and remaining local road network (red), Eskom lines (orange) and the Richards Bay railway line (black)

Dwellings on four properties are located within a 5 km distance of the proposed Plant site Alternative 1, and three in the case of Alternative 2. Dwellings on Uitkomst and Welgelegen 322/2 are located within a 5 km radius for both Alternative 1 and 2 and are also the most proximate to the two Alternative sites. The nearest dwelling to either alternative is the main dwelling (yard) on Welgelegen, namely 1.7 km from the Alternative 1. Only one tourist accommodation facility is located within 5 km of the site, namely Camden Guest House adjacent to Camden power station 3.7 km to the north of the nearest plant alternative (Alternative 2). The nearest venue location is Oogappel, located near the intersection of the N11 and De Emigratie road 9.8 km north-west of the nearest plant site alternative (Alt 2). The only public road located within significant proximity is the De Emigratie Road. In this regard Alternative 2 is located adjacent to the road to the north (See Figure 3.4).

Table 3.7 provides a summary of the location of dwellings in relation to plant Alternative 1 and 2.

Table 3.7: Overview of dwellings and public roads in relation to plant site Altatives 1 and 2

PROPERTY	ALT 1	ALT 2	ACCESS	COMMENT
Uitkomst 292/2& 292/10	4.1[7] km	3.1 km	De Emigratie Rd	Existing Eskom 2 x 400 kV + 1 x 88 kV lines
290/14/RE Mooiplaats	n.a.	n.a.	De Emigratie Rd	Existing Eskom 2 x 400 kV + 1 x 88 kV lines
322/1 Welgelegen	n.a.	n.a.	De Emigratie Rd	Existing Eskom 2 x 400 kV lines; Plant site 2.5 km of dwellings 322/2; Affected by 7 Camden I& II projects; Plant site 3.1 km of dwellings 292/10 (Uitkomst)
322/2 Welgelegen	1.8 km (main) 2.5 km (labour)	3.6 km (main) 2.5 km (labour)	De Emigratie Rd	Existing Eskom 1 x 400 kV line; Affected by 6 Camden I& II projects; Plant site 4.1 km of dwellings 292/10 (Uitkomst)
Camden Guest House	7.8 km	3.7 km	N2	Located to the north of the railway line adjacent to Camden power station
Adrianople 296/RE	7 km	6.1 km	Overvaal Rd	
Klipbank 295/RE	5 km	5.6 km	De Emigratie Rd	Existing Eskom 2 x 400 kV lines (2 corrodors)
Klipkrans	5.1 km	9.6 km	Familiehoek Rd	
Klipfontein 443/3	3.6 km	5.9 km	Familiehoek Rd	
Klipfontein 443/1	3.7 km	5 km	N11	Existing Eskom 2 x 400 kV lines (single corridor)
Die Oogappel	10.2 km	9.8 km	De Emigratie Rd	
De Emigratie Rd	2.6 km	40 m	n.a.	Affected portion on 332/1
Familiehoek Rd	3.4 km	7 km	n.a.	
N11	6.5 km	8.3 km	n.a.	

The green hydrogen and ammonia plant is one of eight projects proposed in the broader study area. Welgelegen 322/1 and 322/2 (Reyneke) would be affected by seven and six projects respectively. These include the Camden I WEF, Camden I Green Hydrogen and Ammonia Plant, and four sets of transmission lines and associated substations (Figure 3.5). There is therefore potential for cumulative impacts on the property. Generally speaking, project alternatives associated with Collector Substation Alternative 1 (namely Plant Alternative 2) would result in the least cumulative impact, as the impacts would be restricted to 322/1. Plant Alternative 2 located on 322/1 adjacent to Collector Substation Alternative 1 is therefore the preferred option.

[7] Shading indicates distances less than 5 km (for reference).

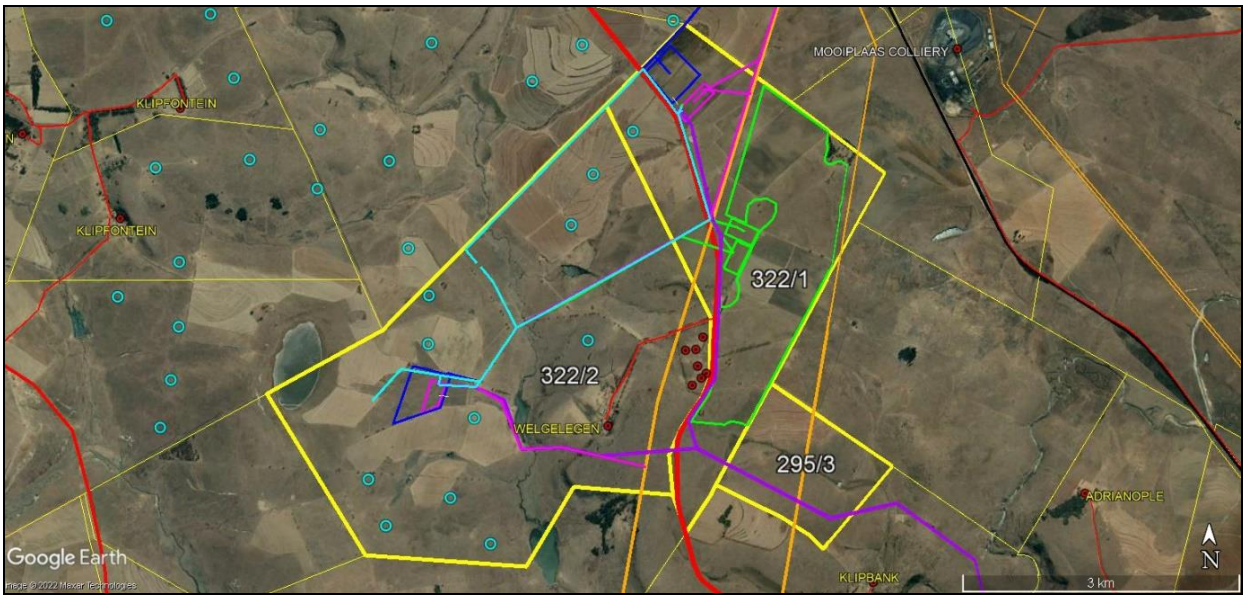


Figure 3.5: Cumulative impact of proposed Camden I and II projects infrastructure on Reyneke properties (yellow outlines) and De Emigratie Road (red): Camden I Hydrogen and Ammonia plant (dark blue), Camden 1 PV and Tx (green), Camden 1 WEF& Tx (light blue), Camden I Collector substation& 400 kV line; and Camden II WEF Tx line. Also indicated are Eskom lines (orange) and the railway line (black)

SECTION 4: ASSESSMENT OF KEY SOCIAL ISSUES

4.1 INTRODUCTION

Section 4 provides an overview of key social issues identified that will be assessment during the Assessment Phase. The identification of key issues was based on:

- Review of project related information.
- Experience/ familiarity of the author with the area and local conditions.
- Experience with similar projects.

The section is divided into the following sections:

- Compatibility with relevant policy and planning context ("planning fit").
- Social issues associated with the construction phase.
- Social issues associated with the operational phase.
- Social issues associated with the decommissioning phase.
- Social implications of "no development" alternative.
- Social implications associated with cumulative impacts.

4.2 ASSESSMENT OF POLICY AND PLANNING FIT

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The development of renewable energy is also supported by the MMSDF. In this regard the SDF acknowledges the importance of the mining sector and notes that it will need to be accommodated over the short to medium term. However, of relevance to the proposed development the SDF refers to green industries and indicates that the existing site of the Camden Power Station and surrounds should be made available for new industrial development in the long term, to manage the long-term impact of the Power Station being decommissioned.

Given the link between green hydrogen energy and the renewable energy, the proposed green hydrogen and ammonia facility is supported by key policy and planning documents.

4.3 CONSTRUCTION PHASE SOCIAL IMPACTS

The construction phase impacts are similar for each alternative location for the proposed Green Hydrogen and Ammonia facility. The significance ratings therefore apply to each option. The following key social issues are of relevance to the construction phase:

Potential positive impacts

- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of job-seekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

4.3.1 Creation of local employment, training, and business opportunities

The construction phase for the Hydrogen and Ammonia facility will extend over a period of approximately 18 months and create in the region of 150-250 employment opportunities that will benefit members from the local communities in the area, specifically Ermelo. These opportunities will include opportunities for low, semi and highly workers. Most of the employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area, specifically Ermelo. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. Based on information from similar projects the total wage bill will be in the region of R 30 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area.

The capital expenditure for the Green Hydrogen and Ammonia facility will be approximately R 3.75-4 billion (2022 Rand value) and will create opportunities for local businesses. Due to the presence of the mining and energy sector, there are likely to suitably qualified companies in Ermelo that can provide the required services and products. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. The hospitality industry in the area will also benefit from the provision of accommodation and meals for professionals (engineers, quantity surveyors, project managers, product representatives etc.) and other (non-construction) personnel involved on the project. Experience from other construction projects indicates that the potential opportunities are not limited to on-site construction workers but also to consultants and product representatives associated with the project.

Table 4.1: Impact assessment of employment, skills development, and business creation opportunities during the construction phase

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Medium (3)
Reversibility	N/A	N/A
Probability	Probable (3)	Highly probable (4)
Significance	Low (24)	Moderate (32)
Status	Positive	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Opportunity to up-grade and improve skills levels in the area.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended enhancement measures
In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:

Employment
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
- Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
- Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

4.3.2 Impact of construction workers on local communities

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The potential impact on the local community is therefore likely to be negligible.

Table 4.2: Assessment of impact of the presence of construction workers in the area on local communities

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	With rehabilitation/mitigation (3)	With rehabilitation/mitigation (3)
Probability	Probable (3)	Low Probability (2)
Significance	Moderate (33)	Low (22)
Status	Negative	Negative
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be entirely eliminated	

Mitigation: See below
Residual impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent residual/cumulative impacts on the affected individuals and/or their families and the community.

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended enhancement measures
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents.
- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
- The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP.
- The proponent and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP.
- No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

4.3.3 Influx of job seekers

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. While the proposed project on its own does not constitute a large construction project, the establishment of a number of renewable energy projects in the area may attract job seekers to the area. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the way in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

These issues are similar to the concerns associated with the presence of construction workers and are discussed in Section 4.3.2. The findings of the SIA indicate that the potential for economically motivated in-migration and subsequent labour stranding is likely

to be negligible. The risks associated with the influx of job seekers are therefore likely to be low.

Table 4.3: Assessment of impact of job seekers on local communities

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Very Low (1)
Reversibility	With rehabilitation/mitigation (3)	With rehabilitation/mitigation (3)
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (24)	Low (18)
Status	Negative	Negative
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be entirely eliminated	
Mitigation: See below		
Residual impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended mitigation measures
It is impossible to stop people from coming to the area in search of employment. However, as indicated above, the proponent should ensure that the employment criteria favour residents from the area. In addition:

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities.
- The proponent should implement a policy that no employment will be available at the gate.

4.3.4 Risk to safety, livestock, and farm infrastructure

The presence on and movement of construction workers on and off the site poses a potential safety threat to local famers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft

linked either directly or indirectly to the presence of farm workers on the site. The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction on and off the site workers during the construction phase.

Table 4.4: Assessment of risk to safety, livestock, and damage to farm infrastructure

Nature: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation (3)	Reversible with compensation (3)
Probability	Probable (3)	Probable (3)
Significance	Moderate (30)	Low (27)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: No**,** provided losses are compensated for.		

Assessment of No-Go option
There is no impact as the current status quo would be maintained.

Recommended mitigation measures
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for.
- All farm gates must be closed after passing through.
- Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.
- The proponent should establish a CoC for workers (see above).
- The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).
- The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to report issues related to damage to farm infrastructure, stock theft and poaching etc.

- The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
- Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. All dismissals must be in accordance with South African labour legislation.
- No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site

4.3.5 Increased risk of grass fires

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The local landowners indicated that the area is very susceptible to grass fires during the winter months (May-October) and that the veld can take up to 3 years to recover to full productivity. The impacts will be largely local and can be effectively mitigated.

Table 4.5: Risk posed by veld fires to livestock, farm infrastructure and grazing

Nature: Potential loss of livestock and grazing and damage to farm infrastructure associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation (3)	Reversible with compensation (3)
Probability	Probable (3)	Low Probability (2)
Significance	Moderate (30)	Low (18)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: No**,** provided losses are compensated for.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.

- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
- Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
- Smoking on site should be confined to designated areas.
- Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months.
- Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.
- Contractor should provide fire-fighting training to selected construction staff.
- No construction staff, with the exception of security staff, to be accommodated on site overnight.

As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities

4.3.6 Nuisance impacts associated with construction related activities

The construction activities on site and movement of heavy construction vehicles during the construction phase has the potential to create noise and dust impacts, damage local roads and create safety impacts for other road users. Based on the findings of the SIA the potential dust and noise impacts associated with the construction phase are likely to be limited. The traffic related impacts associated with the transport of materials to the site can also be effectively managed if the required mitigation measures are implemented.

In terms of impacts to local roads, construction traffic for all projects would need to be co-ordinated with farming activities in order to avoid harvesting periods when unimpeded access to silos at Ermelo and Overvaal is required. The De Emigratie Road and Overvaal Road are of key importance. The critical period is from May to August. The relevant roads also serve as primary access to and link between a number of study area farms, i.e., are used on a daily basis.

Table 4.6: **Assessment of the impacts associated with construction related activities**

Nature: Potential noise, dust and safety impacts associated with movement of construction related activities and movement of traffic to and from the site		
	Without Mitigation	**With Mitigation**
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible (3)	Reversible (3)
Probability	Highly Probable (3)	Low Probability (2)
Significance	Moderate (33)	Low (20)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Mitigation: See below		
Residual impacts: If damage to local roads is not repaired then this will affect the other road users and result in higher maintenance costs. The costs will be borne by road users who were no responsible for the damage.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include:

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- Timing of construction activities should be planned to avoid / minimise impact on access to the silos at Ermelo and Overvaal, specifically access along the De Emigratie Road and Overvaal Road. The critical period is from May to August.
- Ongoing communication with land owners and road users during construction period. This should be outlined in the SEP.
- The proponent should implement a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.
- Repair of all affected road portions at the end of construction period where required.
- Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.
- All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

4.3.7 Impacts associated with loss of farmland

The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for crops and grazing. However, the impact on farming operations can be effectively mitigated by the careful planning in the final layout of the proposed facility and associated components, where possible. The final disturbance footprint can be therefore reduced by careful site design and management of operation. The impact on farmland associated with the construction phase can also be mitigated by minimising the footprint of the construction related activities and ensuring that disturbed areas are fully rehabilitated on completion of the construction phase. Recommended mitigation measures are outlined below. Affected landowners also indicated that new linear infrastructure such as power lines and pipelines should ideally be located along existing cadastral boundaries.

Table 4.7: **Assessment of impact on productive farmland**

Nature: Potential impact on productive farmland due to construction related activities and movement of traffic on the site		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (3)	Low (2)
Reversibility	Reversible with compensation and rehabilitation (3)	Reversible with compensation and rehabilitation (3)
Probability	Highly Probable (4)	Probable (3)
Significance	Moderate (40)	Low (27)
Status	Negative	Negative
Can impact be mitigated?	Yes	Yes
Mitigation: See below		
Residual impacts: If damage to and or loss of productive land is not avoided and or minimised can impact on viability of farming operations and livelihoods.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
The potential impacts associated with damage to, and loss of farmland can be effectively mitigated. The aspects that should be covered include:

- The loss of high-quality agricultural land should be avoided and or minimised by careful planning in the final layout of the proposed facilities where possible.
- Affected landowners should be notified about the timing of construction related activities in advance.
- The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised.

- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.
- All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase.
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up by the Environmental Consultants appointed to manage the EIA.
- The implementation of the Rehabilitation Programme should be monitored by the ECO.

4.4 OPERATIONAL PHASE SOCIAL IMPACTS

The operational phase impacts are similar for each alternative location for the proposed Green Hydrogen and Ammonia facility. The significance ratings therefore apply to each option. The following key social issues are of relevance to the operational phase:

Potential positive impacts
- Produce green hydrogen and ammonia for the South Africa economy.
- Creation of employment, skills development, and business opportunities.
- Benefits to the affected landowners.

Potential negative impacts
- Visual impacts and associated impacts on sense of place.
- Noise and odour impacts.
- Health and safety impacts associated with incidents and accidents.

4.4.1 Produce green hydrogen and ammonia

The aim of the project is to produce commercially usable green hydrogen and ammonia that can be used as a fuel for transport in hydrogen fuel cells and or in different industrial uses. The ammonia will be primarily used for the production of ammonium nitrate (fertiliser) and manufacture of plastics, explosives, textiles, pesticides, and other chemicals. Ammonia can also be used as a stable 'carrier' of hydrogen, allowing hydrogen to be readily stored and transported. The proposed project will therefore create opportunities to improve energy security in South Africa by generating alternative energy sources and reduce the carbon footprint associated with current energy generation. The project will also produce green ammonium nitrate for the South African farming and industrial sector and support the transmission of South Africa's fossil fuel-based economy to renewable energy.

Table 4.8: Produce green hydrogen and ammonia

Nature: Development of infrastructure produce green hydrogen and ammonia for SA		
	Without Mitigation	**With Mitigation**
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	High (4)	High (4)
Reversibility	N/A	N/A
Probability	Highly Probable (4)	Definite (5)
Significance	Moderate (48)	High (60)
Status	Negative	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Support the transmission of South Africa's fossil fuel-based economy to renewable energy and the associated benefits for economic development and investment.		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
- As a policy level, government should be encouraged to develop and implement economic incentives to support investment in and the development of green hydrogen and ammonia initiatives.
- Maximise opportunities for local content and procurement.
- Maximise employment opportunities for local community members.
- Implement training and skills development programs for members from the local community.

4.4.2 Creation of employment, skills development, and business opportunities

The proposed development will create ~ 40 permanent employment opportunities during the operational phase. The majority of opportunities are likely to benefit members from the local communities in Ermelo and surrounding towns in the MM. The operational budget for green hydrogen and ammonia plant is estimated to be in the region of R 190-200 million per annum. The operational phase will therefore create business and procurement opportunities which will benefit local companies both at a local and national level. The generation of green hydrogen and ammonia will also create significant downstream opportunities for local companies, specifically companies operating in the chemical, industrial, agricultural and transport sector. The project will also create an opportunity for South Africa to develop skills and expertise in the field of the use of renewable energy to produce green hydrogen and ammonia.

Table 4.9: Employment, skills development, and business creation opportunities

Nature: Creation of employment, skills development and business opportunities associated with the operational phase		
	Without Mitigation	**With Enhancement**
Extent	Local, Regional and National (4)	Local, Regional and National (4)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	High (4)
Reversibility	N/A	N/A
Probability	Highly Probable (4)	Definite (5)
Significance	Moderate (44)	High (60)
Status	Positive	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area and local and national economy.		

Recommended enhancement measures

- As a policy level, government should be encouraged to develop and implement economic incentives to support investment in and the development of green hydrogen and ammonia initiatives.
- Maximise opportunities for local content and procurement.
- Maximise employment opportunities for local community members.
- Implement training and skills development programs for members from the local community.

4.4.3 Generate income for affected landowners

The proponent will enter into rental agreements with the affected landowners for the use of the land for the establishment of the proposed projects. In terms of the rental agreement the affected landowners will be paid an annual amount dependent upon the production/generation on site (or similar arrangements). The additional income will reduce the risk to his livelihoods posed by droughts and fluctuating market prices for livestock, crops, and farming inputs, such as fuel, feed etc. Given the risks posed by climate change the additional income represents a significant benefit for the affected landowner.

Table 4.10: Benefits associated with income generated for the affected farmer(s)

Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.		
	Without Mitigation	**With Enhancement**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Medium (3)
Reversibility	N/A	N/A
Probability	Probable (3)	Definite (5)
Significance	Low (24)	Moderate (45)
Status	Positive	Positive
Can impact be enhanced?	Yes	
Enhancement: See below		
Residual impacts: Support for local agricultural sector and farming		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended enhancement measures
- Implement agreements with affected landowners.
- The loss of high-quality agricultural land should be avoided and or minimised by careful planning in the final layout of the proposed facilities, where possible.

4.4.4 Visual impact and impact on sense of place

The proposed facility will impact on the areas existing rural sense of place. The potential impact of lights at night was raised as a concern. However, the impact on the areas sense of place should be viewed within the context of the impact of the Camden Power Station and associated transmission lines on areas sense of place. The areas sense of place has also been impacted by large-sale coal mining operations. The potential visual impact on the areas sense place is therefore likely to be limited. In addition, most of the local farmsteads are also screened by the rolling topography or trees.

The findings of the Visual Impact Assessment (VIA) (Sivest 2022) indicate that the based on the physical characteristics of the study area, economic activities and land use that predominates, the area has a **low** visual sensitivity. The VIA notes that the visual impact on the area associated with the operation phase post mitigation would be **Moderate Negative** significance with relatively few mitigation measures available to reduce the visual impact. In conclusion, the VIA notes that from a visual perspective the proposed Camden I Green Hydrogen and Ammonia Facility is deemed acceptable.

Table 4.11: Visual impact and impact on sense of place

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	Probable (3)	Probable (3)
Significance	Moderate (33)	Moderate (33)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on current rural sense of place		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
- The recommendations contained in the VIA should also be implemented.

4.4.5 Potential impacts associated with noise

The operational phase has the potential to generate noise that may impact on adjacent landowners. This would impact on quality of life and may also impact on property values. An Environmental Acoustic Impact Assessment was undertaken by WSP (2022) as part of the EIA. The findings of the study are summarised below.

- Baseline monitoring indicated that current day-time noise levels exceed the rural guideline rating level of 45 dB(A) at all three monitoring locations (receptors).
- The average night-time noise levels at all receptor locations also exceed the rural guideline rating level of 35 dB(A). From the day-time monitoring campaign it is evident that the current noise climate surrounding the proposed site is predominantly natural, with small anthropogenic influences from the Camden Power Station and farm activities. At night, the current noise climate is predominantly natural, with no anthropogenic influences.

Based on the findings of the study, the day-time noise levels during the operational phase of the facility at all receptor locations are predicted to increase slightly. Noise levels will increase by between 0.1 and 0.2 dB(A) resulting in "little" community response. The study notes that "such increases are so negligible that are likely to go unnoticed". The study also notes that the projected increases are below the 7 dB(A) threshold for annoyance as per the Noise Control Regulations.

The predicted night-time noise levels at all the receptor locations are predicted to increase slightly with the operation of the facility. Noise levels will increase by between 0.4 and 1.5 dB(A) resulting in "little" community response. As in the case of the day-time levels, the study notes that "such increases are negligible that are likely to go unnoticed, and the increases are below the 7 dB(A) threshold for annoyance as per the Noise Control Regulations".

The study also notes that the findings are based on worst-case assessments of noise impacts, with all equipment located in the same area on the boundary closest to the receptor in question, which will not occur in reality.

Based on the overall findings of the study the acoustic risks during both day and night-time are ranked as "very low". As such, it is envisaged that the operation of the facility can be authorised without any major impacts or complaints. The facility is adequately positioned away from sensitive receptors and will not negatively impact the noise climate at the receptors. The study also identifies mitigation options to further minimise noise from the facility.

Table 4.12: Potential impacts associated with noise

Nature: Potential noise associated with the operation of the facility and impact on adjacent landowners and property values.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	Low Probability (2)	Low Probability (2)
Significance	Low (26)	Low (26)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on ambient noise levels and rural sense of place		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
- The recommendations contained in the Acoustic Impact Assessment should also be implemented.

4.4.6 Potential health and safety risks associated with plant incidents

Incidents during the operational phase have the potential to release ammonia gas and other potentially harmful substances that may pose a health risk to adjacent landowners and local communities in the area. A Major Hazardous Installation (MHI) study will be undertaken

once the final design of the green hydrogen and ammonia plant has been finalized. The final design will also comply with the MHI regulations in place at the time of the plant being commissioned. The plant will not be authorized if it does not meet the requirements of the MHI regulations.

A high level safety, health and environmental risk assessment was undertaken by ISHECON (June 2022). The findings of the assessment note that in the event of accidents such as large releases of hydrogen, nitrogen, oxygen or ammonia, the proposed facilities have the potential to impact significantly on both employees and members of the public outside the site. Based on the current design information, worst case hydrogen events may have significant impacts up to 350m from the site and ammonia up to 1.4km from the site.

However, the risk assessment found that provided suitable preventative and mitigative measures are in place and everything reasonably practicable has been done to reduce the risks both with the design and operation of the facilities, none of the identified potential risks need be intolerably high, i.e., from a SHE perspective no fatal flaws were found with the proposed ENERTRAG Camden I Green Hydrogen and Ammonia Facilities.

The study also found that each of the hydrogen, air separation and ammonia plants have the potential to cause major accidents and the entire establishment should be classified as a Major Hazard Installation (MHI).

In terms of options, from a SHE risk assessment point of view, where there is a choice of location that is further from public roads, water courses or isolated farmhouses, this would be preferred. The Option 1 alternative location for the Green Hydrogen and Ammonia facility is approximately 175m from a stream that tributes to the Vaal River system and 1.2km from the closest farmhouse. As indicated in the comments on alternatives, Alternative 1 (Option 1) is also supported by the findings of the SIA.

Table 4.13: Health and safety impacts associated with plant related incidents

Nature: Potential incidents that result in release of harmful substances that may impact on the health of adjacent landowners.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (4)	Low (2)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	Probable (3)	Low Probability (2)
Significance	Medium (39)	Low (26)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on ambient noise levels and rural sense of place		

Assessment of No-Go option

There is no impact as it maintains the current status quo.

Recommended mitigation measures
- The recommendations contained in the Acoustic Impact Assessment should also be implemented.

4.5 CUMULATIVE IMPACT ON SENSE OF PLACE

The potential cumulative impacts on the areas sense of place will be largely linked to potential visual impacts. As indicated above, the potential impact of the proposed facility and associated infrastructure on the areas sense of place is likely to be limited. This is due to impact of the Camden Power Station and associated power lines on the areas rural sense of place. The cumulative impacts are also likely to be low with mitigation.

Table 4.14: Cumulative impacts on sense of place and the landscape

Nature: Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Reversibility	Reversible with rehabilitation (3)	Reversible with rehabilitation (3)
Probability	Probable (3)	Probable (3)
Significance	Moderate (33)	Moderate (33)
Status	Negative	Negative
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Potential impact on current rural sense of place		

Assessment of No-Go option
There is no impact as it maintains the current status quo.

Recommended mitigation measures
- The recommendations contained in the VIA should also be implemented.

4.6 ASSESSMENT OF NO-DEVELOPMENT OPTION

The aim of the project is to produce commercially usable green hydrogen and ammonia that can be used in many different industrial downstream uses. Ammonia can also be used as a stable 'carrier' of hydrogen, allowing hydrogen to be readily stored and transported. This will assist to reduce South Africa's carbon footprint.

South Africa relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the

world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions.

The No-Development option would represent a lost opportunity for South Africa to produce green hydrogen and ammonia and reduce its carbon footprint. This would represent a significant negative social cost.

Table 4.15: Assessment of no-development option

Nature: The no-development option would result in the lost opportunity for South Africa to a lost opportunity for South Africa to produce green hydrogen and ammonia and reduce its carbon footprint.		
	Without Mitigation8	**With Enhancement**9
Extent	Local-International (5)	Local-International (5)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	Medium (3)
Reversibility	N/A	N/A
Probability	High Probability (4)	High Probability (4)
Significance	Moderate (48)	Moderate (48)
Status	Negative	Positive
Can impact be mitigated?	Yes	
Enhancement: See below		
Residual impacts: Reduce carbon emissions and associated benefits in terms of global warming and climate change.		

Recommended enhancement measures
The proposed facility should be developed, and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented.

4.7 COMMENT ON ALTERNATIVES

The social impacts and associated significance ratings are similar for each of the site alternatives for the Green Hydrogen and Ammonia facility (Alternative 1 and 2). In terms of potential impacts, the impacts on Welgelegen 322/1 are unavoidable given its location relative to Eskom Camden substation. However, minimizing the impacts on 322/2 would reduce the potential cumulative impacts and land fragmentation. As such, Plant Alternative 2 located on 322/1 adjacent to Collector Substation Alternative 1 is the preferred option. However, it should be noted that both alternative options are regarded as feasible and suitable from a social impact perspective.

8 Assumes project is not developed
9 Assumes project is developed

SECTION 5: KEY FINDINGS AND RECOMMENDATIONS

5.1 INTRODUCTION

Section 5 lists the key findings of the study and recommendations. These findings are based on:

- A review of key planning and policy documents pertaining to the area.
- A review of social and economic issues associated with similar developments.
- Site visit and interviews with key stakeholders.
- The experience of the authors with other renewable energy projects.

5.2 SUMMARY OF KEY FINDINGS

The key findings of the study are summarised under the following sections:

- Fit with policy and planning.
- Construction phase impacts.
- Operational phase impacts.
- Cumulative impacts.
- Decommissioning phase impacts.
- No-development option.

The construction and operational phase impacts are similar for each alternative location for the proposed Green Hydrogen and Ammonia facility. The significance ratings therefore apply to each option.

5.2.1 Policy and planning issues

The development of renewable energy is strongly supported at a national, provincial, and local level. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework and National Infrastructure Plan, which all refer to and support renewable energy. The development of renewable energy is also supported by the MMSDF. In this regard the SDF acknowledges the importance of the mining sector and notes that it will need to be accommodated over the short to medium term. However, of relevance to the proposed development the SDF refers to green industries and indicates that the existing site of the Camden Power Station and surrounds should be made available for new industrial development in the long term, to manage the long-term impact of the Power Station being decommissioned.

5.2.2 Construction phase impacts

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

The construction phase will extend over a period of approximately 18 months and create in the region of 150-250 employment opportunities. Members from the local communities in Ermelo and the MM would qualify for the majority of low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The total wage bill will be in the region of R 30 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in Ermelo and the MM. The capital expenditure associated with the construction phase will be approximately R 4.75-6 billion (2022 Rand value). This will create opportunities for local companies and the regional and local economy. Due to the presence of the mining and energy sector, there are likely to suitably qualified companies in Ermelo that can provide the required services and products. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
- Increased risk of grass fires associated with construction related activities.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.

The findings of the SIA indicate that the significance of the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts associated with the proposed construction phase can therefore be effectively mitigated if the recommended mitigation measures are implemented. Table 5.1 summarises the significance of the impacts associated with the construction phase.

Table 5.1: Summary of social impacts during construction phase

Impact	**Significance No Mitigation/Enhancement**	**Significance With Mitigation/Enhancement**
Creation of employment and business opportunities	Medium (Positive)	Medium (Positive)
Presence of construction workers and potential impacts on family structures and social networks	Medium (Negative)	Low (Negative)
Influx of job seekers	Low (Negative)	Low (Negative)
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers	Medium (Negative)	Low (Negative)
Increased risk of grass fires	Medium (Negative)	Low (Negative)

Impact of heavy vehicles and construction activities	Medium (Negative)	Low (Negative)
Loss of farmland	Medium (Negative)	Low (Negative)

5.2.3 Operational phase impacts

The following key social issues are of relevance to the operational phase:

Potential positive impacts
- Establishment of infrastructure to improve energy security and support renewable energy sector.
- Creation of employment, skills development, and business opportunities.
- Benefits for local landowners.

Potential negative impacts
- Visual impacts and associated impacts on sense of place.
- Noise impacts.
- Health and safety impacts associated with incidents and accidents.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation will be **Low Negative**. The potential negative impacts can therefore be effectively mitigated. The significance of the impacts associated with the operational phase are summarised in Table 5.2.

Table 5.2: Summary of social impacts during operational phase

Impact	Significance No Mitigation/Enhancement	Significance With Mitigation/Enhancement
Establishment of infrastructure to produce green hydrogen and ammonia	Medium (Positive)	High (Positive)
Creation of employment and business opportunities during maintenance	Medium (Positive)	Medium (Positive)
Benefits for landowners	Low (Positive)	Medium (Positive)
Visual impact and impact on sense of place	Medium (Negative)	Medium (Negative)
Noise impacts	Low (Negative)	Low (Negative)
Health and safety impacts	Medium (Negative)	Low (Negative)

5.2.4 Assessment of cumulative impacts

Cumulative impact on sense of place

The establishment of the proposed green nitrogen and ammonia facility together with the proposed Camden wind and solar facilities will create the potential for combined and sequential visibility impacts. However, the impact on the areas sense of place should be viewed within the context of the impact of the Camden Power Station and associated transmission lines on areas sense of place. The areas sense of place has also been impacted by large-sale coal mining operations. The potential visual impact on the areas sense place is therefore likely to be limited. In addition, none of the affected landowners interviewed raised concerns about potential visual impacts associated with the proposed project. The potential cumulative impact on the areas sense of place is therefore likely to be limited.

Cumulative impact on local services and accommodation
The potential cumulative impact on local services and accommodation will depend on the timing construction phases for the different renewable energy projects in the area. With effective planning the significance of the potential impact was rated as **Low Negative**.

Cumulative impact on local economy
The significance of this impact with enhancement was rated as **Moderate Positive**.

5.2.5 Assessment of no-development option

The No-Development option would represent a lost opportunity for South Africa to improve energy security and support the development of renewable energy. The green ammonia component will also create the opportunity to reduce the carbon footprint of the chemical sector. The No-Development option is not supported by the findings of the SIA.

5.2.6 Comment on alternatives

The social impacts and associated significance ratings are similar for each of the site alternatives for the Green Hydrogen and Ammonia facility (Alternative 1 and 2). In terms of potential impacts, the impacts on Welgelegen 322/1 are unavoidable given its location relative to Eskom Camden substation. However, minimizing the impacts on 322/2 would reduce the potential cumulative impacts and land fragmentation. As such, Plant Alternative 2 located on 322/1 adjacent to Collector Substation Alternative 1 is the preferred option. However, it should be noted that both alternative options are regarded as feasible and suitable from a social impact perspective.

5.3 CONCLUSION AND RECOMMENDATIONS

Conclusion
The findings of the SIA indicate that the proposed Camden Green Hydrogen and Ammonia Facility will create a number of social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. The development will reduce the carbon footprint associated with production of hydrogen and ammonia and create potential comparative advantages for South Africa in the emerging green hydrogen sector. This will support the transmission of South Africa's fossil fuel-based economy towards renewable energy.

The findings of the SIA also indicate that the potential negative impacts associated with both the construction and operational phase are likely to be **Low Negative** with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The Camden Green Hydrogen and Ammonia Facility is therefore supported by the findings of the SIA. Alternative 2 located on 322/1 adjacent to Collector Substation Alternative 1 is the preferred option. However, it should be noted that both alternative options are regarded as feasible and suitable from a social impact perspective.

Recommendations
- The loss of high-quality agricultural land should be avoided and or minimised by careful planning of the final layout of the proposed facility where possible.
- Affected landowners should be notified about the timing of construction related activities in advance of the commencement of the construction phase.

The mitigation measures contained in the Acoustic, Major Hazardous Installation and Visual Impact Assessments should be implemented.

ANNEXURE A

INTERVIEWS

- Bester-de Jager, Ms. Jolande (2022-03-24). Uitsig and Adrianople 296/1 Farms.
- Buhrman, Mr Hein (telephonic 2022-03-22). De Emigratie 327/3/RE.
- Reyneke, Mr Louis (2022-03-24). Welgelegen farm.
- Reyneke, Ms Petronella (2022-03-24). Welgelegen farm.
- Saaiman, Mr Rassie (2022-03-25). Adrianople 296/RE.
- Van der Meulen, Mr Johan (2022-03-25). Buhrmansvlei, Adrianople 296/2 and De Emigratie farms.
- Zeelie, Mr David (2022-03-24). Klipfontein farm.

REFERENCES

- The National Energy Act (2008).
- The White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- The White Paper on Renewable Energy (November 2003).
- Integrated Resource Plan (IRP) for South Africa (2010-2030).
- The National Development Plan (2011).
- Mpumalanga Spatial Development Framework (2019).
- Msukaligwa Municipality Integrated Development Plan (2019-2020).
- Msukaligwa Spatial Development Framework (2019).

INTERNET

- https://egis.environment.gov.za/renewable_energy.
- https://www.eskom.co.za/sites/heritage/Pages/Camden.aspx

MAPS

- Chief Directorate National Geo-Spatial Information (2009). 2629DB Ermelo, Ed 4.
- Chief Directorate National Geo-Spatial Information (2009). 2630AC Chrissiesmeer, Ed 3.
- Chief Directorate National Geo-Spatial Information (2009). 2630CA Camden, Ed 3.
- Chief Directorate National Geo-Spatial Information (2009). 2630CC Kalkoenkrans, Ed 3.

ANNEXURE B

METHODOLOGY FOR THE ASSESSMENT OF POTENTIAL IMPACTS

Assessment of Impacts and Mitigation

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[10], indirect[11], secondary[12] as well as cumulative[13] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[14] presented in **Table 0-1**.

Table 0-1: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite

[10] Impacts that arise directly from activities that form an integral part of the Project.

[11] Impacts that arise indirectly from activities not explicitly forming part of the Project.

[12] Secondary or induced impacts caused by a change in the Project environment.

[13] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.

[14] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	0 – 30		31 to 60		61 – 100
Environmental Significance Rating (Negative (-))	**Low (-)**		**Moderate (-)**		**High (-)**
Environmental Significance Rating (Positive (+))	**Low (+)**		**Moderate (+)**		**High (+)**

ANNEXURE C

Tony Barbour
ENVIRONMENTAL CONSULTING AND RESEARCH

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(E-Mail) tbarbour@telkomsa.net

Tony Barbour's has 26 years' experience in the field of environmental consulting and management. His experience includes working for ten years as a consultant in the private sector followed by four years at the University of Cape Town's Environmental Evaluation Unit. He has worked as an independent consultant since 2004, with a key focus on Social Impact Assessment. His other areas of interest include Strategic Environmental Assessment and review work.

EDUCATION

- BSc (Geology and Economics) Rhodes (1984);
- B Economics (Honours) Rhodes (1985);
- MSc (Environmental Science), University of Cape Town (1992)

EMPLOYMENT RECORD

- Independent Consultant: November 2004 – current;
- University of Cape Town: August 1996-October 2004**:** Environmental Evaluation Unit (EEU), University of Cape Town. Senior Environmental Consultant and Researcher;
- Private sector: 1991-August 2000: 1991-1996**:** Ninham Shand Consulting (Now Aurecon, Cape Town). Senior Environmental Scientist; 1996-August 2000: Steffen, Robertson and Kirsten (SRK Consulting) – Associate Director, Manager Environmental Section, SRK Cape Town.

LECTURING

- University of Cape Town: Resource Economics; SEA and EIA (1991-2004);
- University of Cape Town: Social Impact Assessment (2004-current);
- Cape Technikon: Resource Economics and Waste Management (1994-1998);
- Peninsula Technikon: Resource Economics and Waste Management (1996-1998).

RELEVANT EXPERIENCE AND EXPERTISE

Tony Barbour has undertaken in the region of 260 SIA's, including SIA's for infrastructure projects, dams, pipelines, and roads. All of the SIAs include interacting with and liaising with affected communities. In addition, he is the author of the Guidelines for undertaking SIA's as part of the EIA process commissioned by the Western Cape Provincial Environmental Authorities in 2007. These guidelines have been used throughout South Africa.

Tony was also the project manager for a study commissioned in 2005 by the then South African Department of Water Affairs and Forestry for the development of a Social Assessment and Development Framework. The aim of the framework was to enable the Department of Water Affairs and Forestry to identify, assess and manage social impacts associated with large infrastructure projects, such as dams. The study also included the development of guidelines for Social Impact Assessment, Conflict Management, Relocation and Resettlement and Monitoring and Evaluation.

Countries with work experience include South Africa, Namibia, Angola, Botswana, Zambia, Lesotho, Swaziland, Ghana, Senegal, Nigeria, Mozambique, Mauritius, Kenya, Ethiopia, Oman, South Sudan, Sudan and Armenia.

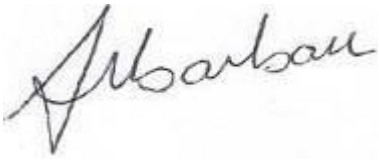
ANNEXURE D

The specialist declaration of independence in terms of the Regulations_

I, Tony Barbour, declare that -- General

declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

Tony Barbour Environmental Consulting and Research

Name of company (if applicable):

10 May 2022

Date: