



Final Environmental Impact Report

Construction of a 2 500m² processing facility to remove
contaminants from waxy oil at FFS

Govan Mbeki Municipality
January 2014

EIA Number 17/2/3/8 GS – 05

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The information in this report is based on information supplied by the client, FFS Refiners. All information is given in good faith, however, no physical testing or chemical analyses were performed by Kerry Seppings Environmental Management Specialists cc during the course of this assessment.

Although every effort was made to request and obtain all pertinent information for this assessment Kerry Seppings Environmental Management Specialists cc cannot be held accountable or accept responsibility for any discrepancies in this information or for the disclosure or review of information which has not been presented to the consultant. All reports presented to the consultant for review have been referenced.

As per Regulation 31 (2) (a) of the NEMA EIA regulations herewith (ii) the expertise of the EAP to carry out an Environmental Impact Assessment;

Expertise to Conduct Scoping and EIAs

Kerry Seppings Environmental Management Specialists cc (KSEMS) has been based in KZN since 1998. The consultancy is responsible for numerous Environmental Impact Assessments per annum and all consultants managing our EIAs have a minimum of a Master of Science degree in the Environmental Sciences. In early 2008 the business was converted to a closed corporation (cc). In the new organisation each project is reviewed by at least 3 qualified staff. The increased staff component has allowed for specialised staffing in the following areas; linear EIAs, large developments, ecological expertise, coastal and estuarine ecology, ECO provision, petrol stations, roads development and industrial development. There is also a legal expertise to complement all work done by KSEMS cc.

Integrity and Independence:

Our independence in assessing environmental impacts is paramount to the EIA process. We support sustainable development and believe that as independent consultants our role is to represent the interest of the environment first and foremost and ensure an effective and efficiently conducted environmental assessment process.

Environmental Legal Knowledge:

Kerry Seppings has extensive environmental legal knowledge regarding not only the EIA process and requirements but also with regards to all other legislation at a national, provincial and local level and how these affect environmental management issues. KSEMS has compiled a number of environmental legal registers for several industries in the chemical, paint and manufacturing sector as well as for companies involved in green field developments. Kerry has also carried out several environmental legal audits and as such is conversant with a wide range of legislation relating to various aspects of industry and development.

Specialist Training:

Kerry Seppings has been extensively involved in implementing ISO 14001 Environmental management systems for a number of industries and has good industrial knowledge as well as sound ecological experience when it comes to green field development. Kerry is an ecologist by training and has experience in terrestrial and estuarine environments having obtained her honours degree working on the St Lucia estuary. She was awarded her Master of Science (cum lauded) for work done on a thesis on Environmental Management and Open Space Planning. Her continued involvement in the EIA process has resulted in her being an experienced facilitator of the public participation process and is often contracted to resolve environmental related conflict. Kerry has also been certified as an Environmental Assessment Practitioner by the EAPSA and is a GCX certified Carbon Footprint Analyst (Level 1). Kerry is also registered as a Professional Natural Scientist by the South African Council for National Scientific Professions.

Major Clients and Projects:

KSEMS cc is involved with the full range of environmental assessments from a client developing a site for a single resident to some of the Nation's biggest corporations, government departments and parastatal organisations.

Key Areas of Focus Include:

Ecological system planning, hydroelectric power plant and dam construction, retail and residential developments, road and bridge development, transmission and power line installation, gas pipelines and metering stations, filling stations development, multi-use complex development, EIA and ECO work, 24G applications, carbon footprint calculations and analyses, development of rural roads, water use licensing and waste licenses and management of diverse specialist teams on major projects.

As per Regulation 31 (2) (a) of the NEMA EIA regulations herewith details of – (i) the EAP who compiled the report;

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Review by: Kerry Stanton

EXECUTIVE SUMMARY

FFS Refiners (Pty) Ltd are in the business of refining hydrocarbon liquids for use in the industrial heating fuel market. The FFS Evander plant located at 3 Brunel Road, currently processes tar derived fuels into industrial heating fuels. The site also produces creosote for wooden pole treatment. FFS propose to construct a new 2 500m² facility to process a residue termed “waxy oil”. The site was designed for a future expansion of this nature in mind as the site has approval for 15 000m³ storage tank capacity. FFS intends to use 2 x 1200m³ storage tanks already erected under the original environmental authorisation as raw material/initial storage tanks in the waxy oil process and construct 6 x 250m³ (process/intermediate tanks) and 7 x 60m³ process tanks under this EIA application.

The process involves the filtration of iron catalyst fines and carbon particulates from the waxy oil to produce a low sulphur oil used as an industrial heating fuel for sale to the industrial heating fuel market. The full process is described in section 3.0 of the EIR.

The waxy oil will be received by FFS in road tankers from SASOL Synfuels located in Secunda, Mpumalanga. The proposed processing facility will consist of two raw material tanks, six process tanks and seven static plant tanks with a total new additional storage capacity of 1 920m³. Other equipment includes centrifugal separators, static separators, a distillation unit, a filtration unit, heat exchangers, a magnetic separator, chillers, cooling towers, scrubbers and oil fired heaters.

An application for environmental authorisation was submitted to the Mpumalanga Department of Economic Development, Environment and Tourism (DEDET) on the 22nd January 2009. Notification of interested and affected parties (I & APs) commenced on the 17th February 2009 and the relevant adverts placed as required by the 2010 EIA regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 as amended. The second draft Scoping Report was submitted to I & APs for review and comment on 13th October 2010. The Final Scoping Report was submitted to the DEDET along with all comments received on 24 November 2010. The DEDET approved the Scoping Report on 19th May 2011. The project was put on hold and the application timeframe lapsed however DEDET have granted exemption from re-doing the Scoping Report (Appendix 9.6). The Draft EIR was therefore compiled and submitted to I & APs for comment on the 05 September 2013. All comments received during the comment period have been included in Appendix 9.8. **The Final EIR was submitted to I & APs for final comments, which have been included in the Final EIR submitted to DEDET for environmental authorisation.**

Using independent specialist input, the contribution that the additional waxy oil processing facility may have on ambient air quality, MHI risk potential (on and offsite) and the hazardous nature of various products and materials utilised during the waxy oil process were assessed to identify all environmental and social impacts. Recommendations and mitigation measures have been included and a final Environmental Impact Statement prepared with recommended conditions for environmental authorisation. Based solely on the specialist information provided, the EAP is satisfied that the ambient air concentrations will not be significantly affected and that the increase in offsite risks posed by the future Evander operations is very low. The increase in onsite risks can be sufficiently mitigated against combined with hazardous waste management.

The attached Environmental Management Programme (EMPr) should be adhered to during all phases of development: pre-construction, construction and operational. Specialist input provided during the Environmental Impact Assessment has been incorporated in the EMPr to ensure that potential impacts of the proposed development are minimized, mitigated against or prevented.

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ACRONYMS

AEL	Atmospheric Emission License
ADMS	Atmospheric Dispersion Modelling System
AQIA	Air Quality Impact Assessment
AQMP	Air Quality Management Programme
BID	Background Information Document
BLEVE	Boiling Liquid Expanding Vapour Explosion
C ₆ H ₆	Benzene
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DEDET	Mpumalanga Department of Economic Development, Environment and Tourism
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme Report
EPA	Environmental Protection Agency
FFE	Force Feed Evaporator
FFS	FFS Refiners (Pty) Ltd
GIS	Geographical Information Systems
HECEMA	Highveld East Conservation Environment Management Association
HPCMS	High Pressure Customer Metering Station
HFO	Heavy Fuel Oil
I & AP	Interested and Affected Party
KSEMS	Kerry Seppings Environmental Management Specialists cc
LDAR	Leak Detection and Repair Programme
NAAQS	National Ambient Air Quality Standards
NACA	National Association for Clean Air
NEMA	National Environmental Management Act 107 of 1998
NEMAQA	National Environmental Management Air Quality Act
NO ₂	Nitrogen Dioxide
MHI	Major Hazard Installation
MRG	Methane Rich Gas
OHS	Occupational Health and Safety
PCA	Post Construction Audit
PM ₁₀	Particulate Matter
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SAWS	South African Weather Services
SEF	Smelter Enrichment Fuel
SO ₂	Sulphur Dioxide
USEPA	United States Environmental Protection Agency
VOC's	Volatile Organic Compounds
WESSA	Wildlife and Environment Society of South Africa

1.0 Introduction

1.1 Brief Description of the Proposed Activity [Regulation 31 (2b)]

FFS Refiners (Pty) Ltd (hereafter referred to as FFS) propose to construct a processing facility at their existing Plant on 3 Brunel Road, Evander (Figure 1, Appendix 1). The Evander plant currently processes coal tar derived fuels into industrial heating fuels for a wide variety of applications. The site currently also produces wood preservative for wooden pole treatment.

Kerry Seppings Environmental Management Specialists cc (KSEMS) were appointed by FFS to conduct the Environmental Impact Assessment (EIA) for the proposed waxy oil processing facility. Please refer to Table 8, which lists the relevant listed activities that triggered Environmental Authorisation (EA).

The new proposed waxy oil processing plant will occupy a total area of 2 500m² within the boundaries of the existing plant (Figure 1). The facility will process a heavy distillate residue termed “waxy oil”.

Waxy oil is the resultant remaining residue after a valuable petroleum distillate fraction is removed for further processing into petrol, diesel and other petroleum products.

The waxy oil received at the proposed new facility will be further processed to produce a Heavy Fuel Oil which is suitable for use as an industrial heating fuel for sale to the industrial heating fuel market and an iron enriched fuel for the smelter fuel market. A full break down of the production process is outline in section 3.0 of the Environmental Impact Report (EIR) but briefly, the facility is used to filter iron catalyst fines and carbon particulates from the waxy oil to produce a low sulphur oil. The major market for the final product is the Gauteng area where power stations are numerous.

The proposed processing facility will consist of six new processing/intermediate 250m³ tanks and seven 60m³ tanks for static plant with a total capacity of 1920m³. Other equipment that will be installed includes:

- 4 Centrifugal Separators
- Static Separators
- Distillation Plant
- Filtration Plant
- Various Heat Exchangers
- Magnetic Separation Plant
- 2 Chillers
- 2 Cooling Towers
- 2 Scrubbers
- 2 Oil Fired Heaters.

FFS will be also be utilizing their existing raw material/initial storage tanks (2 x 1 200m³), which were erected under the original EA (ref no: 17.2.25.16H45). The total combined capacity for the full waxy oil process will therefore be 4 320m³. **Two types of hazardous waste will be stored temporarily on site. Firstly, oily sludge will be generated from the waxy oil process which will be disposed of at a nearby registered landfill site. Currently, the volume of ash from the coal-fired boilers that is stored on the site falls below the previous 35m³ threshold however with the additional waxy oil process, more steam will be required and the amount of ash will increase. Together, the oily sludge and ash will increase the amount of hazardous waste being stored on the site and once the waxy oil process is fully operational, this could lead to approximately 150 tons a month of hazardous waste requiring disposal.**

An alternative layout and tank designs have been considered by the applicant and are discussed in section 3.4 of the EIR as well as the no-go option. The environmental, social and economic impacts are discussed throughout the EIR and a summary of the potential impacts provided in Table 11 under section 6.0 of the EIR.



Figure 1: Google Earth image illustrating the location of the existing FFS plant in Evander with the proposed position of the new waxy oil processing plant outlined in red (source: Google Earth & FFS Refiners Pty Ltd)

1.2 Description of the property on which the activity is to be undertaken and the location of the activity on the property [Regulation 31 (2c)]

The existing FFS Evander plant occupies stands 1941 through 1943 on 3 Brunel Road. Geographically the site is situated at 26°29'12" South and 29°06'02" East. It is located \pm 18 km north-east of Secunda. North of the site is the Kinross Gold slimes dam and the town of Evander (1km) (Figure 1). The site proposed for the waxy oil processing facility is zoned and used for industrial purposes. It is located within an industrial area in the Evander Industrial Park surrounded by light to medium industries.

The proposed new waxy oil processing facility will occupy approximately 2 500m² of floor area within the existing FFS tar processing facility opposite the transport workshop. Please refer to Appendix 2 for a detailed site plan of the existing Evander plant which includes the location of the proposed new waxy oil facility outlined in red. A photograph showing the location of the proposed new facility within the Evander site is provided in Figure 2 below.

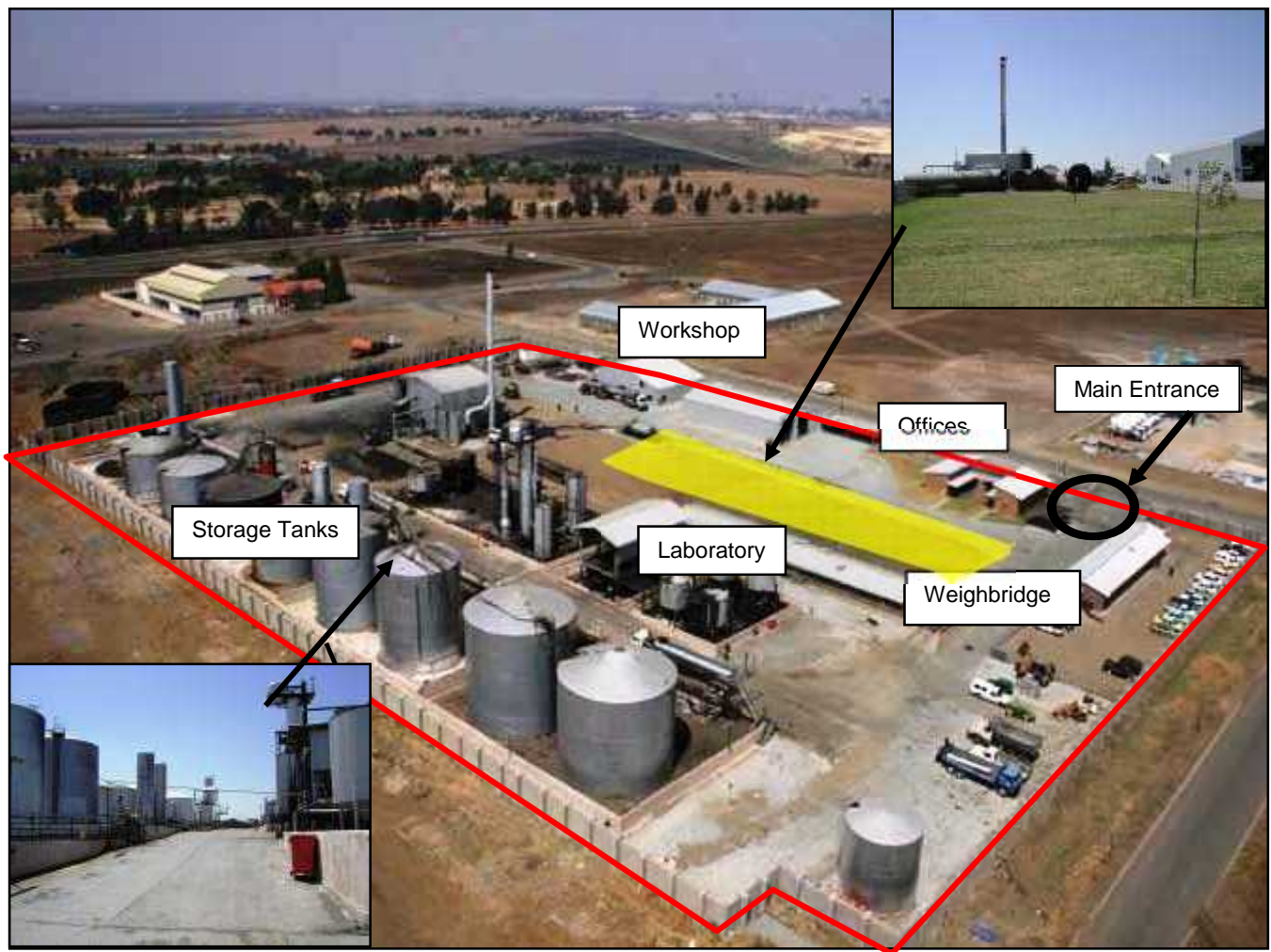


Figure 2: Existing FFS Evander tar processing facility (red outline) and location of the proposed activity (in yellow).

1.3 Description of the Need and Desirability [Regulation 31 (2) (f)]

Sasol Synfuels of Secunda, Mpumalanga, generate a process residue called waxy oil which remains after the valuable petroleum distillate fraction is removed for further processing into petrol, diesel and other petroleum chemicals. This heavy distillate residue is suitable for re-refining into a Heavy Furnace Oil (HFO). FFS Refiners are proposing to design and build a process to remove the catalyst fines from this product at their existing Plant located in the Evander Industrial complex (Figure 2 above). The new processing facility envisaged will require new technology to significantly improve on the quality of the product produced.

1.4 Purpose and Structure of this Report

The EIA process is a planning tool that assists with the assessment of social and environmental impacts through independent specialist input and public participation. The role of the Environmental Assessment Practitioner (EAP) is to provide independent specialist input, manage the public participation and consolidate all relevant information culminating in the EIR and Environmental Management Programme [Regulation 32 (2) (o)].

The purpose of the EIR is to assess environmental impact and illustrate significance according to the extent, intensity and duration, taking into account specialist input and interested and affected party (I&AP) comment. All of this is done with the intent of making recommendations to reduce or avoid the negative impacts of the proposal. Ultimately a statement on whether or not the project should go ahead is made. Another important function of the EIR is the inclusion of the Environmental Management Programme (EMPr). The EMPr is a document where the findings of the EIR have been translated into measurable actions that must occur during construction and operation in order to mitigate identified environmental impacts. The EMPr is intended as a standalone, public document that becomes legally binding should the EIA be approved. The EMPr is included as Appendix 3.

This EIR has been structured according to the requirements of the NEMA EIA regulations. Section 1.5 provides an overview of the scoping process indicating key issues raised and investigated and summarising the process itself. Through each of the following sections leading up to the table of assessment of impacts, impacts that have been identified throughout each section have been highlighted in italics to ensure that all impacts have been identified for assessment. Where specific issues for assessment have been newly identified as a result of the specialist report review or due to further investigation, these have been added to the impacts identified in scoping and are shown in the table in section 6.0 in purple.

In section 3.0 the development proposal including associated aspects such as management of stormwater, sewage, water and electricity supply as well as traffic impacts are described and discussed. Once again potential environmental risks identified in each section are listed for review and assessment in section 6.0. Section 4.0 describes the environment of the site in terms of physical, biological, social, economic and cultural characteristics. Throughout this section, potential environmental risks are identified for further assessment and rating under section 6.0.

Public participation carried out during scoping is included in section 5.0 and comments raised are discussed throughout the report in the relevant sections. In section 5.4, the reader is directed to the comments and responses tables which are provided in Appendix 9.8. Section 6.0 commences with the identification and assessment of issues and impacts, identifying the underlying principles used to determine the importance of certain impacts identified and how these are rated once the mitigation measures have been taken into account. The EIMPr, which is intended to function as a standalone document identifying key construction impacts and controls for mitigating these is included in Appendix 3.

Finally the report concludes by identifying assumptions gaps and uncertainties in terms of information used in the assessment (section 8.0), ending with an Environmental Impact Statement intended to summarise significant impacts (section 9.0) with the conclusion and opinion on authorisation provided in section 10.0.

1.5 Summary of Scoping Process

The draft Scoping Report was distributed to I & APs on the 23rd June 2010. After amendments were made to the draft, it was resubmitted to I & APs on the 13th October 2010. Comments on the Draft Scoping Report have been included in Appendix 9.8 on Public Participation. The DEDET accepted the final Scoping Report on 19th May 2011. An Air Quality Impact Assessment was required to assess the potential contribution that the proposed waxy oil facility may have to ambient air quality. In the interim, the application timeframe lapse in terms of section 67 of the EIA regulations. Since no changes were made to the scope of work originally applied for, the DEDET granted exemption in terms of section 50 of the EIA regulations from resubmitting a scoping report (section 29 of the EIA regulations). Proof of the exemption is provided in Appendix 9.6.

During the Scoping Report, the following issue were raised by an I & APs and required further discussion in the EIR:

- The Major Hazardous Installation (MHI) circles must be indicated on a map as part of the MHI Assessment Report.

A preliminary Major Hazardous Installation Risk Assessment was carried out by Ishecon to determine whether the inclusion of the proposed waxy oil processing plant would have a major impact on the sites risk profile. The report is addressed in section 4.0 of the EIR and includes MHI circles.

Below is a summary of the EIA process followed to date:

EIA PROCESS

The current application is undergoing Scoping and EIA and as such the following steps have or will be followed:

An application form was submitted to the Provincial Environmental Authority (DEDET) on the 21/01/2009.

The application was advertised in a local and regional newspapers (The Beeld and The Ridge Times) on the 25/02/2009 and 27/02/2009 and notices were placed around the site on the 18/02/2009. Notices were handed out to neighbours within 100m of the boundary of the site on the 18/02/2009. A public meeting was not held.

The Scoping Report and plan of study for EIA has been produced detailing impacts to be investigated. This was made accessible to all registered I & APs and to the authorities for comment and review on the 23/06/2010. A second draft scoping report was submitted to I & APs on the 13/10/2010 for review.

I&AP
Input

I & APs were requested to provide comment within 40 days with the comment period closing on 22/11/2010. All comments received were included in the final Scoping Report which was submitted to DEDET for approval on 17/01/2011.

DEDET accepted the final Scoping Report on 19/05/2011.

KSEMS proceed with the draft EIR which will has been submitted to all I & APs and authorities for review on the 05 September 2013. This report will assess the impacts identified during scoping phase and investigates mitigation measures.

The 40 day comment period ended on the 18 October 2013. All comments received have been considered and responded to in the final EIR. The final EIR was made available to I & APs on 03rd December 2013 with the final submitted to the DEDET for environmental authorisation or rejection in January 2014. **I & APs were given 2 weeks to provide further comments on the Final EIR, which have been included in the Final EIR submitted to DEDET.**

I&AP
Input

Current
status

DEDET and DEA have 60 days after acknowledging receipt of the report to accept or reject the EIR. The Departments have a further 45 days to provide the environmental authorization.

2.0 Legislation and Guidelines Considered in Developing this Environmental Impact Report

The following sub-sections contain a list of relevant legislation, guidelines and regulations that were consulted during the EIA process.

2.1 Legal Requirements and Legislation

This section aims to provide an overview of the key legal requirements that apply to the proposed waxy oil processing facility. Legislation will be addressed in terms of its relevance to environmental protection and conservation, water use and protection, health and safety, waste management, noise management, as well as the activities requiring an impact assessment under the NEMA regulations. Govan Mbeki Municipality by-laws have not been included under the relevant sections as the by-laws are still in their draft form for public comment.

2.2 Environmental Protection and Conservation

Environmental legislation provides for the effective protection and controlled use of the environment and its services. Although development is seen as key to economic growth, it has the potential to negatively impact the environment through altering biological functions and affecting fauna and flora. Table 1 provides a list of applicable legislation in terms of environmental protection and conservation.

Table 1: List of Legislation Key to Environmental Protection and Conservation

Legislation	Description
National Environmental Management Act, 1998	This Act places an onus on all levels of government to ensure that risk to the environment is identified and where it cannot be avoided, is minimised and mitigated against. Should there be any impact on the environment during or after construction, FFS refiners (Pty) Ltd as the responsible

	<p>parties, have a responsibility to take measures to address these impacts and undertake the necessary clean up and mitigation measures.</p> <p>There are no natural areas on the site however due to the hazardous nature of the chemicals involved in the waxy oil processing; FFS have a duty of care to ensure that the ambient air quality is not compromised. Mitigation measures are required to be implemented to ensure that the air and surrounding communities are not compromised.</p>
National Heritage Resources Act, 1999	<p>The act provides protection of and management of conservation worthy places, areas and objects by heritage authorities, by means of registration and the implementation of certain protections.</p> <p>SAHRA have confirmed in the scoping phase that the proposed project is located within an existing industrial landscape and as such, the likelihood of archaeological resources within the proposed project area is minimal.</p>
Environment Conservation Act, 1989	<p>The act empowers government authorities to prohibit any action which, in their opinion, may cause serious damage to the environment, or to instruct responsible parties to take any steps that they deem fit to remedy or rectify the situation. The Act also provides for declaration of conservation areas and protected natural environments.</p>
National Environmental Management: Biodiversity Act, 2004	<p>The Act lists critically endangered, vulnerable and protected species.</p> <p>It is not expected that the proposal will have an impact on fauna and flora as no endangered or protected species were noted at the site.</p>
Relevant International Environmental Conventions	
Kyoto Protocol to the United Nations Framework Convention on Climate Change	<p>Requires developed country signatories to implement and/or further elaborate policies and measures in order to achieve quantified emission limitation and reduction commitments in order to promote sustainable development.</p>
Paris Convention for the Protection of the World Cultural and Natural Heritage	<p>Imposes an obligation on State Parties to ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural and natural heritage situated on its territory.</p>

2.3 Water Use and Protection

According to the Department of Water Affairs (DWA), water in South Africa is viewed as a national asset. In global terms, South Africa's water resources are scarce and extremely limited. Poor spatial distribution of rainfall means that the natural availability of water across the country is also highly uneven. However, provided South Africa's water resources are judiciously managed and wisely allocated and used, sufficient water of appropriate quality will be available to sustain a strong economy, high social standards and healthy aquatic ecosystems for many generations. Legislation such as the National Water Act of 1998, provide regulations to govern the use, management and protection of water. Table 2 provides a list of legislation that applies to the proposed processing facility in terms of water use and protection.

Table 2: List of Legislation Key to Water Use and Protection

Legislation	Description
National Water Act, 1998	Aims to ensure that water resources are protected, used, developed, conserved, managed and controlled in a

	sustainable manner, for the benefit of everyone in South Africa. Section 19 includes various requirements to prevent and control water pollution. Water use is defined broadly and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities, altering a water course and removing water from underground. Unless the water use is for basic human needs, is an existing lawful use or is permitted under general authorisation, it must be licensed.
National Water Resources Strategy 2004	Describes how the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the National Water Policy and the National Water Act, 1998.

2.4 Health and Safety

The existing FFS plant in Evander is classified as a major hazard installation (MHI), meaning that incidental explosive risks have the potential to adversely affect the health and safety of employees and the public. For this reason, major hazardous installations are governed by the Occupational Health and Safety Act 1993 and the Major Hazardous Installations Regulations 1998 and 2001. Table 3 provides a list of legislations that are applicable to the proposal in terms of health and safety.

Table 3: Health, Safety and Major Hazardous Installations Regulations

Legislation	Description
Major Hazardous Installations Regulations (GNR 96 of 1998 and GNR 692 of 2001)*	<p>Prior to the erection and commencement of operation of any hazardous installation the developer is required to submit an application accompanied by a risk assessment to the local authority concerned.</p> <p>The MHI Risk Assessment is summarised in section 3.2.1 of the EIR and is provided in Appendix 4.</p>
Occupational Health and Safety Act, 1993	Main objective is to provide for the health and safety of persons at work, including aspects which are hazardous to health and safety. In terms of major hazardous installation, the regulations shall apply to employers, self-employed persons and users, who have on their premises, either permanently or temporarily, a major hazard installation or a quantity of a substance which may pose a risk that could affect the health and safety of employees and the public.
Hazardous Chemical Substance Regulations, 1995	These regulations stipulate requirements for storage and handling of hazardous chemical substances and provide guidelines for training of staff.
Environmental Regulations for Workplaces, 1987	These regulations specify optimal working conditions for staff including thermal conditions, illumination requirements, requirements for ventilation; noise levels etc. and also specify requirements for housekeeping.
General Administrative Regulations, 2003	These regulations stipulate the administration of the various OHS regulations including designation of health and safety committees, reporting and recording of incidents and occupational diseases.
Construction Regulations, 2003	These Regulations apply to any persons involved in construction work and are therefore applicable to the construction phase. The regulations provide guidelines for safe operation during construction.

* The Major Hazard Installation Regulations (MHI Regulations) were first promulgated in Government Gazette No. 18608 as Government Notice No. R. 96 of 16 January 1998. At the request of the industry the Regulations were reviewed and

promulgated a second time in Government Gazette No. 22506 as Government Notice No. R. 692 of 30 July 2001. The first Regulation was repealed in Government Gazette No. 22580 as Government Notice No. 767 of 24 August 2001.

2.5 Noise Management

There is a potential for the generation of noise during construction and operation of the proposed processing facility. Table 4 lists the regulations which apply to the current project in terms of noise management.

Table 4: Legislation Applicable To Noise Management

Legislation	Description
Environment Conservation Act, 1989	<p>The Act outlines general prohibitions for noise control. It also specifies noise management during construction. Specifically section 3(i) states that no person shall use any power tool or power equipment for construction, earth drilling or demolition works, or allow it to be used in a residential area during the following periods of time:</p> <ul style="list-style-type: none"> i) Before 06:00 and after 18:00 from Monday to Saturday; and ii) at any time on any Sunday, Good Friday, Ascension Day, Day of the Covenant and Christmas Day, or any other day as may be determined by a local authority; <p>The provisions of the regulations may not apply if any person may by means of a written application, in which the reasons are given in full, apply to the local authority concerned for exemption from any provision of these Regulations.</p>
Occupational Health & Safety Act 1993 & Noise induced Hearing Loss Regulations, 2003	These regulations specify safe working conditions in environments where noise exceeds safe levels and gives guidelines for assessment of noise, training measures, provisions of information to staff etc.
National Standards (SANS10103:2003)	Specifies the maximum ambient noise level acceptable in various land use type zones
National Environmental Management: Air Quality Act, 2003 section 34 on the control of noise.	<p>This section of the Act states that the Minister may prescribe essential national standards -</p> <ul style="list-style-type: none"> a) for the control of noise, either in general or by specified machinery or activities or in specified places or areas; or b) for determining - <ul style="list-style-type: none"> i. a definition of noise; and ii. the maximum levels of noise. <p>This section of the act further states that the provincial and local spheres of government are bound by may prescribed national standards when controlling noise levels.</p>

2.6 Air Quality Management

The proposed waxy oil processing facility has the potential to release vapours, as well as potentially result in fire or explosion. In the event of such a situation, air quality will be negatively impacted. The potential impact on air quality is governed by the National Environmental Management Air Quality Act of 2004 (NEMAQA). Table 5 lists the legislation and describes the relevant legislation and SANS codes applicable to air quality management.

Table 5: Air Quality Management Legislation

Legislation	Description
National Environmental Management Air Quality Act, 2004	Aim is to reform the law regulating air quality in order to protect and enhance the quality of air in South Africa.

	Section 35 on offensive odours states that the occupier of any premises must take all reasonable steps to prevent the emission of any offensive odour caused by any activity on such premises. Furthermore, the Minister / MEC may prescribe measures for the control of offensive odours emanating from specified activities (i.e. the processing of waxy oil).
GNR 1210 dated 13 March 2009 (GG 32816) National Ambient Air Quality Standards	The legislated standards for common pollutants are prescribed. The common pollutants are sulphur dioxide, nitrogen dioxide, particulate matter, ozone, benzene, lead and carbon monoxide.
GNR 893 dated 22 November 2013 (GG37054) "List of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage".	Lists the minimum emission standards applicable to normal operating conditions for various categories of activities. Please note that this Government Notices amends the previous listed activities which were published under GNR 248 dated 31 March 2010.

2.7 Waste Management

During construction and operation, the production of wastes, either liquid, solid or and/or hazardous, will require that they be adequately disposed of. To regulate waste disposal and management several legislations and regulations have been formulated. Table 6 provides a list of these as well as a short description.

Table 6: Legislation for waste management which applies to the current project

Legislation	Description
Environment Conservation Act, 1989	Section 31A provides that the Minister of Environmental Affairs or the Administrator, local authority or government institution concerned may take specified action if any person performs any activity or fails to perform any activity as a result of which the environment is or may be seriously damaged. Section 20(6) of the Act states that, subject to the provisions of any other law, no person shall discard waste or dispose of it in any manner, except at a disposal site for which a permit has been issued, and in a manner or by means of a facility or method and subject to such conditions as the Minister may prescribe. All waste generated during both the construction and operational phase of the development must be disposed of appropriately and is outlined in the EMPr.
National Environmental Management Act, 1998	Outlines principles that serve as the general framework within which environmental management and implementation plans must be formulated: "4 (iv) that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner."
National Environmental Management: Waste Act, 2008	To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities, the remediation of contaminated land; the national waste information system and to provide

	compliance and enforcement measures.
GN 921 dated 29 November 2013 (GG 37083) “list of waste management activities that have, or are likely to have, a detrimental effect on the environment”.	Provides a list of activities that require a Waste Management License in terms of the National Environmental Management: Waste Act, 2008. Please note that this Government Notices amends the previous listed activities which were published under GN 718 in Government Gazette 32368 of 03 July 2009.

Since the release of the Draft EIR, the List of Waste Management Activities requiring a Waste Management License has been amended (GN 921 dated 29 November 2013). The two waste activities previously triggered [Cat A(2) and B(7)] are no longer applicable to the amended list and therefore a Waste Management License is no longer necessary for the proposed activity. In terms of the amended Government Notice “The storage of hazardous waste at a facility that has the capacity to store in excess of 80m³ of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste” falls under Category C. The facility is therefore to comply with the relevant requirements of standards i.e. Norms and Standards for Storage of Waste, 2013. This has been included in the recommended conditions for environmental authorisation in section 10 of the EIR.

2.8 Environmental Impact Assessment

NEMA (107 of 1998 as amended) requires that the potential impact on the environment, socio-economic conditions and cultural heritage of activities that require authorisation or permission by law, and which may significantly affect the environment must be considered, investigated and assessed prior to implementation. The application for the FFS Waxy Oil project was submitted in 2009. At the time of submission of the application form, the proposed activity required that a Scoping and EIA process be followed in terms of the 2006 EIA Regulations. The following activities listed in the table below were relevant at the time:

Table 7: List of activities requiring Environmental Impact Assessment in terms of the 2006 EIA Regulations Identified for the proposed waxy oil processing facility

Government Notice No.	Activity No(s)	Description
GNR 387	1(c)	The construction of facilities or infrastructure, including associated structures or infrastructure, for: c. the above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of 1000 cubic metres or more at any one location or site including the storage of one or more dangerous goods, in a tank farm;
GNR 387	1(e)	The construction of facilities or infrastructure, including associated structures or infrastructure, for: e. any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution or effluent or waste and which is not identified in GN R 386 of 2006

The 1st version of the Scoping Report listed the above mentioned activities and the 2nd version submitted to I &APs listed the activities as per Table 8 below. The Scoping Report was accepted by DEDET in May 2011. Since submitting the Scoping Report, the 2006 EIA Regulations were repealed in August 2010. During this time the EIR was still being compiled. As per regulation 76(1), an application that was submitted in terms of the 2006 EIA Regulations and which is pending when the 2010 EIA came into effect must be dispensed with in terms of the previous regulations as if they had not been repealed. As per regulation 76 (2 & 3), if an activity is no longer listed you can ignore it, but if a new activity is triggered, as long as all the impacts of the newly listed activity have been considered and assessed in line with the requirements of the new regulations, then authorisation can be granted for these new activities even if they were not originally applied for.

As such Table 8 identifies all the activities in terms of the new 2010 EIA regulations that now apply to this pending application.

Table 8: List of activities requiring Environmental Impact Assessment in terms of the 2010 EIA Regulations and 2009 Waste Management Activities Identified for the proposed waxy oil processing facility

Government Notice No.	Activity No(s)	Description
Government Notice No. 545 of 18 th June 2010	3	<p>The construction of facilities or infrastructure for the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.</p> <p><i>FFS Refiners are constructing a processing facility which will consist of six tanks and seven static plant tanks with a total combined capacity of 4 320m³. Two 1200m³ tanks are already erected as part of the original EA.</i></p>
Government Notice No. 545 of 18 th June 2010	4	<p>The construction of facilities or infrastructure for the refining, extraction or processing of gas, oil or petroleum products with an installed capacity of 50m³ or more, excluding facilities for the refining, extraction or processing of gas from landfills</p> <p><i>The applicant is constructing a facility to process oil with a total combined capacity of 4 320m³.</i></p>
Government Notice No. 545 of 18 th June 2010	5	<p>The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice no. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.</p> <p><i>In terms of the National Environmental Management: Air Quality Act, the proposed activity will trigger a Category 2 (subcategory 2.2 and subcategory 2.3) listed activity. FFS have submitted their application for an Atmospheric Emission License and await authorisation.</i></p>

2.9 Mitigation of Environmental Impacts

Section 28 of NEMA (107 of 1998 as amended) places a duty of care on every person who causes, has caused or may cause pollution or degradation of the environment to take responsible measures to prevent, minimise and rectify such pollution or degradation. Such measures may include the investigation, assessment and evaluation of the impact on the environment; informing and educating employees about the environmental risk of their work and the manner in which the task must be performed to avoid causing significant pollution or degradation of the environment; modifying or controlling any activity causing the pollution or degradations; containing or preventing the movement of pollutants or the cause of degradation; eliminating any source of the pollution or degradation; or remedying the effects of the pollution or degradation.

In terms of Section 19 of the National Water Act of 1998, the owner of land, person in control of land or person who occupies or uses any land in which any activity or processes performed or undertaken which causes or may cause pollution a water source, must take all reasonable measures to prevent such pollution from occurring, continuing or recurring. Such measures may include modifying or controlling the act or process causing the pollution; complying with any prescribed waste standards or management practice; containing or preventing the movement of pollutant; eliminating any source of the pollution; remedying the effect of the pollution; and remedying the effect of any disturbance to the bed and banks of a water course.

2.10 Permit Requirements

Table 9 summarises the permits and authorisations that will be required for the processing facility. Only those permits pertaining to the environmental impact assessment of the current project are included in this section.

Table 9: Permit and Authorisation Requirements for the Current Project.

Permit/Authorisation	Description
General Environmental Authorisation	Authorisation required under regulations GNR 545 of the 18 th June 2010 in terms

	of the National Environmental Management Act, 1998. In the current project, authorisation will be issued by the provincial Department of Economic Development, Environmental and Tourism.
Waste license	<p>In terms of section 19 (1) of the National Environmental Management Waste Act, 2008:</p> <p>Category A 3 (2) “The storage including the temporary storage of hazardous waste at a facility that has the capacity to store in excess of 35m² of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons” and Category B (7) “The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15000m³ or more.”</p> <p>A waste license application has been submitted to the National Department of Environmental Affairs (reference number: 12/9/11/L425/6).</p> <p>As explained in section 2.7 above, the two waste activities previously triggered [Cat A(2) and B(7)] are no longer applicable to the amended list and therefore a Waste Management License is no longer necessary for the proposed activity.</p>
Air Emission License	<p>In terms of section 21 (1) National Environmental Management: Air Quality Act, 2004:</p> <p>Previous list of activities requiring an Atmospheric Emissions License (AEL; GN 248 in Government Gazette 33064 of 31 March 2010):</p> <p>Section 11 Category 2: Petroleum Industry, the production of gaseous and liquid fuels as well as petrochemicals from crude oil, coal, gas or biomass.</p> <p>Subcategory 2.2: “Storage and Handling of Petroleum Products” and</p> <p>The listed activities requiring an AEL has since been amended (GN 893 in Government Gazette 37054 published on 22 November 2013). The relevant activities include:</p> <p>Category 2: Petroleum Industry, the production of gaseous and liquid fuels as well as petrochemicals from crude oil, coal, gas or biomass.</p> <p>Subcategory 2.4: “Storage and Handling of Petroleum Products”</p> <p>Subcategory 3.3: “Tar Processing”</p> <p>The applicants have submitted the application for an AEL and are currently awaiting the license from the Gert Sibande District Municipality (correspondence is included in Appendix 12 of the Final EIR).</p>

3.0 Proposed Activity [Regulation 31 (2) (b)]

Section 3 provides a detailed description of the waxy oil production process which includes a description of the raw waxy oil product and the equipment required to remove contaminants from the product. Process flow diagrams of the existing processes and proposed waxy oil process are provided in Appendix 11. The different effluents and emissions that will result from the waxy oil process are outlined in subsection 3.1. Health and safety impacts are discussed under subsection 3.2. Potential environmental risks have been identified and are included in *italics* below the various subsections. These impacts have been summarised in Table 11 in section 6.0 of the EIR. A comparison of all proposed alternatives is also provided in this section (subsection 3.3). The alternative comparison includes the effect that the identified alternatives may have on the environment and surrounding communities.

The applicant is proposing to construct a separate facility in their existing Evander plant for processing a heavy distillate residue termed “waxy oil”. Waxy oil is a residue remaining after the valuable petroleum distillate fraction is removed for further processing into petrol, diesel and other petroleum chemicals. It is characterised as a long chain paraffinic hydrocarbon that can be further processed to produce a heavy fuel oil suitable for use as an industrial heating fuel. Waxy oil is a desirable fuel oil component due to its low sulphur content (<0,5%). This material can be described as **a low hazard flammable hydrocarbon** (Class III B SANS 10089:2003) with an iron catalyst and carbon particulate components. Under ambient conditions, waxy oil has a similar consistency to that of shoe polish. The oily component of the product is a paraffinic oil and the wax component constitutes around 8 – 12%.

The waxy oil product to be processed by FFS has the following characteristics:

Solids content	1 – 1.5% v/v
Ash content	0,5 – 1,0% w/w
Wax content	8 -12% w/w
Carbon content	>80% w/w
Gross Energy Value	43 – 44 MJ/kg
Viscosity @ 100°C	<20 cSt
Flash Point (close cup)	>100°C
Pour Point	30 – 40°C
Initial Boiling Point	>240°C
Sulphur content	<0,2% w/w

The aim of the proposed processing facility is to remove particulates and other components of varying sizes from the waxy oil to produce a low sulphur oil that will be used for sale to the industrial heating fuel market.

The production process is described in point form below and is also illustrated in Figure 3.

- The waxy oil product will be received in road tanker loads, which vary in capacity from 26-34 tons. These will be received on site via a weighbridge to determine the mass of product received and then pumped into raw product tanks.
- The viscosity of the waxy oil is reduced by using a fired oil heater. The product will be heated to around 340°C under pressure. Further “trimming” of the viscosity is done with additives.
- Once the viscosity is reduced, the large particles within the material are separated using a static separator. This process is assisted by the temporary reduction of viscosity by means of heat (120°C), reduction of pH and surface tension through the addition of nitric acid.
- Should iron components be excessive, the use of magnetic separators on the hot stream exiting the heat soak plant will be used to reduce loading. The oily sludge is transferred into a hazardous waste skip for disposal at Holfontein H:H landfill site.
- From the static separator, material containing a high content of solids is fed into the de-ashing vessel where wash water is used to facilitate the removal of the ash in a liquid phase.
- The water is then removed and recovered using an FFE and distillation. This water is further treated in the existing effluent plant and may be disposed to sewer under the existing permit (Appendix 10).
- Further removal of solids may be required using centrifugal separation. Any carbon particulate is then removed by filtration. However excessive waxes in the process stream may blind filter media requiring the chilling of the stream which will result in the separation and removal of waxes prior to filtration. This stream of wash would be retreated in the de-ashing plant and re-constituted with the oil after the filtration stage.
- Nitric acid can also be added to the waxy oil process to react with inorganic elements in the de-ashing process.
- This process of filtration produces the least amount of waste and the lowest loss of oil. The filter cake can be oil free and is suitable for use as a heating source in a coal fired steam boiler.
- After filtration, the processed low sulphur oil stream is stored in blend tank. It will then be blended into an industrial heating fuel with various other fuel oils before final storage.
- The product will be pumped to a final storage tank where it will be kept at a temperature of 60°C - 70°C ready for loading into road tankers for delivery to customers (refer to Appendix 2 for the proposed waxy oil processing facility layout).
- The concentrated iron catalyst stream will be suitable for a product, smelter enrichment fuel (SEF) for use in smelter furnaces as energy value while the iron will be reclaimed into the raw steel produced in the smelter and not emitted as an airborne pollutant.

Coal-fired boilers on site are used to create steam to drive the various FFS process (existing and proposed). Ash is created as a by-product and is currently stored on the site in a bunded area and removed on a regular basis. The additional waxy oil process will increase the demand for steam and therefore a greater volume of ash will be produced (estimated total volume of 75 – 150 tons of ash per month). The combination of oily sludge from the waxy oil process and ash from the boilers may trigger the storage of hazardous waste trigger in terms of the List of Waste Management Activities, Category C. The applicant is to comply with the relevant requirements or standards listed in the “Norms and Standards for Storage of Waste”. Should the facility have the capacity to store in excess of 80m³ of hazardous waste at any one time, FFS Refiners are to register with the

competent authority within 90 days prior to the construction taking place (see recommended EA condition in section 10 of the EIR).

Identified environmental risks: possible spill of raw product when waxy oil is transferred from the road tankers to the storage tanks and vice versa, risk of spills/leakages from other hazardous materials used in the production process (oils, sludge, waste water etc.), potential contamination of stormwater as a result of spillages/leaks from tanks, improper disposal of oily sludge, release of fugitive emissions during filling, loading and offloading operations, increased risk posed on surrounding industries (fire, explosion etc.), risk of fire and/or explosion on the site, effluent discharged not meeting municipal standards, potential increase in noise, occupational health impact associated with workers handling the waxy oil, potential failure of bund integrity leading to spillage of material and possible environmental risk associated with the generation, storage and disposal of wastes associated with the production process (including the storage and disposal of ash).

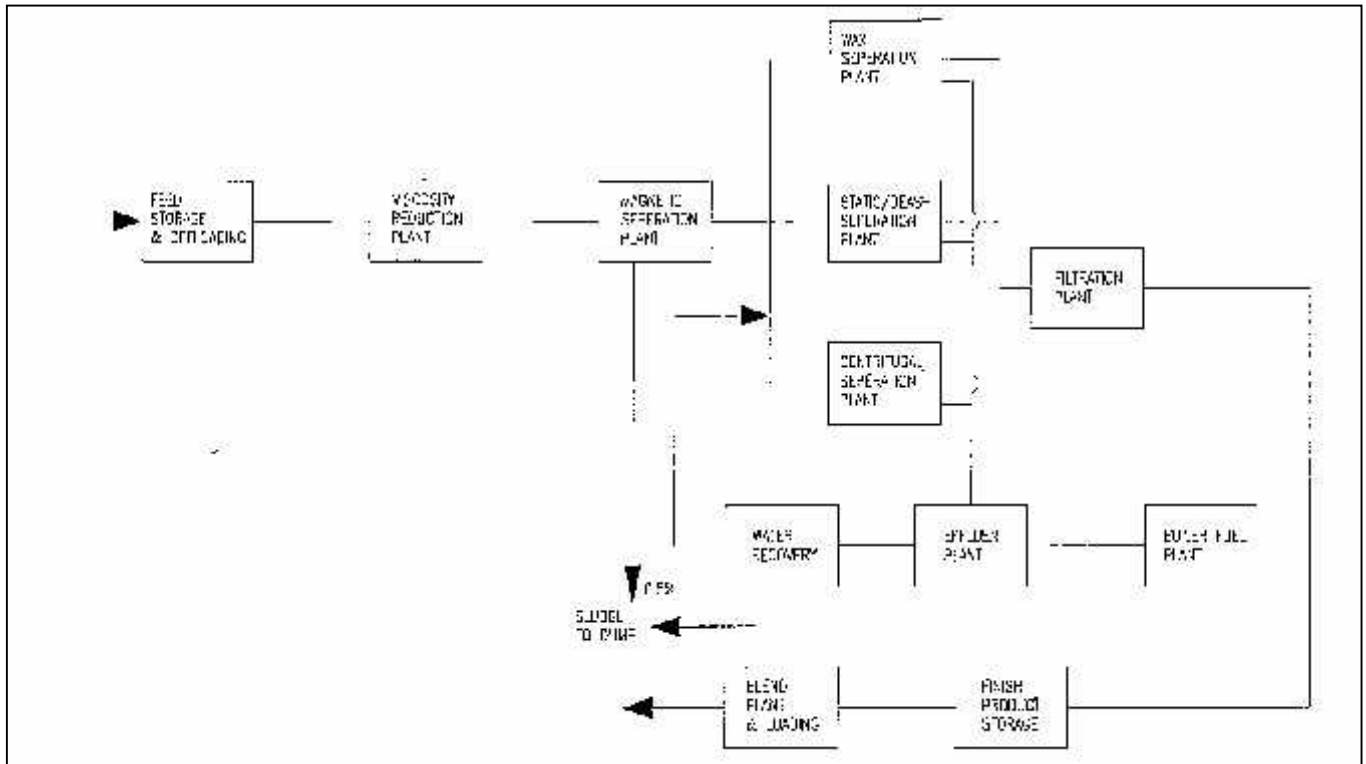


Figure 3: Illustration of the waxy oil production process to be followed (source: FFS Refiners Pty (Ltd))

The site currently has approval for 15 000m³ storage tank capacity granted on 20th March 2006 by DEDET for the existing tar processing plant at Evander. Two of the 1 200m³ tanks (raw materials) erected under the original EA will be used. The following additional storage tanks will be erected, compliant to the SANS code 10089, for the proposed waxy oil production process on site.

Process tanks: 6 x 250 m³
 Static plant: 7 x 60 m³

New additional storage capacity of 1 920m³

The following new equipment is required:

- Four Centrifugal Separators
- Static separators
- Distillation unit
- Filtration unit
- Various Heat exchangers
- Magnetic separation plant
- Two chillers
- Two cooling towers
- Two scrubbers
- Two oil fired heaters

The proposed waxy oil processing facility will occupy a total floor area of 2 500m² (including tanks).

All tanks of the new storage facility will be designed according to BS EN 14015:2004 for the design of petroleum industry vertical welded steel tanks. The pertinent design features are:

- Low pressure tanks of less than 20 kPa internal pressure and maximum 6 kPa external pressure with weak roof-to-shell seam weld,
- Fixed roof design,
- The tanks will be of welded steel construction,
- Manways fitted for de-sludging,
- Loading lines extended from the top to the bottom of the tank with anti-siphon hole to remove splash loading vapour generation,
- Tank top access will be by individual cat-ladders for access to the top manway and instruments.

The tank foundations will be according to the engineer's instructions and will conform to the BS EN 14015:2004 code of practice. The pertinent features as they affect safety and pollution controls are:

- The tank shell will be supported on a reinforced concrete ring beam.
- The inside of the ring beam will be filled with suitable stable and well compacted material.
- A sealing layer of bentonite or equivalent of 50 – 75mm will be laid below the level of the leak detection pipes.
- A series of leak detection pipes of 50mm diameter are to be cast into the ring beam 100mm below the top level of the ring beam which is above ground level. This allows any tank leakage to show itself by dripping out of the leak detection pipes onto the hard surfacing of the floor bund.
- A layer of permeable crusher run is to be laid above the bentonite seal layer.
- A capping layer of bitumen pre-mix is to be laid with a slope from the centre to the tank shell.
- The flooring from the ring beam is to fall at a 1:100 slope away for 15m or to the bund wall. This is to ensure that any spillage will drain away from the tank and reduce the fire hazard.

All instrumentation and electrical equipment on the tanks and within the bunded area to be intrinsically safe
All pump motors to be E x N fire proof rated for Zone 2 areas in a separate bund.

The following is the expected quantity of waxy oil to be received on site:

- Initially: 1000 tons/month 12 000 tons/year
- Within 12 – 24 months: 2500 tons/month 30 000 tons/year
- Finally: 5000 tons/month 60 000 tons/year

3.1 Effluents and Emissions

The waxy oil process is expected to produce the following effluents and emissions:

3.1.1 Sludge

The inorganic concentrate that will be produced by the centrifuge discharge, static separation and filter discharge as well as magnetic separation plant will be collected in skips. The concentrate will then be sold as a smelter enrichment fuel while some may be transported to an appropriate landfill site for disposal when the market is flat. It is expected that the process will produce approximately 30 tons of sludge per month at the beginning of the process. This amount will increase to approximately 75 tons per month and finally to 150 tons per month. This means that the process will initially utilise 5 skips per month, this will eventually increase to 21 skips per month.

3.1.2 VOC Emission

The waxy oil product has a high flash point and no low boiling point components. The product will be processed at temperatures of up to 95°C. It is anticipated that this may result in the release of some VOC's, however the potential release of VOCs can be mitigated against. Mitigation measures will include storage tank vapour space balancing, pressurisation of tanks and vapour vent condensers. There will however be a small insignificant fugitive emission potential from the filters on discharge.

3.1.3 Rainwater

The equipment required for the process will be located within a bunded and hard-surfaced area which will also be roofed to prevent the rainwater becoming contaminated with oil. Any oily water effluent that may inadvertently occur will be treated in the existing effluent water system.

3.1.4 Spillages

There is a potential that a spillage may occur and as such all areas will be bunded and hard-surfaced. The sumps will recover any spilt product which will be pumped back to the raw material tank.

Identified environmental risks: *incorrect storage of sludge in skips resulting in sludge coming into direct contact with the ground, skips containing sludge not collected regularly resulting in a large amount of sludge accumulating on the site, incorrect disposal of the sludge, release of VOC's decreasing air quality in the area potentially affecting the neighbouring communities and the incorrect disposal of contaminated rainwater or spills from the bunded area.*

3.2 Health and Safety

A Major Hazardous Installation (MHI) Risk Assessment of the existing Evander facility was conducted in 2007 and concluded that the site was classified as a small MHI (under the equivalent UK regulations this facility would not be considered an MHI¹). It is therefore important to determine whether the inclusion of the proposed waxy oil processing plant would have a major impact on the sites risk profile.

A “major hazard installation” is defined in the Occupational Health and Safety Act 85 of 1993 as an installation-
 “(a) where more than the prescribed quantity of any substance is or may be kept, whether permanent or temporarily; or
 (b) where any substance is produced, processed, used, handled or stored in such a form and quantity that it has the potential to cause a major incident”

The following hazardous materials are either used/produced/handled on site:

- Waxy oil
- Recovered heating oil (Heavy Fuel Oil)
- Nitric acid
- Thermal oils

The above is representative only of the largest or most hazardous materials. It is important to note that not all materials on site have the potential to affect person outside the site (expanded on in section 3.2.1 below). The hazardous materials have been classified according to SANS 10228:2003. Waxy Oil, HFO and thermal oil have been classified as Class 3 (flammable liquids) and nitric acid has been classified as Class 6 (toxic vapours released from spill or mixing) and Class 8 (corrosive substances). The Material Safety Data Sheets for Waxy Oil, HFO and nitric acid have been included in Appendix 5.

ISHECON was therefore commissioned to identify and analyse potential risks associated with the new waxy oil production process. The report is included in Appendix 4 of the EIR and is summarised below.

3.2.1 Summary of Specialist MHI Risk Assessment [Regulation 31 (2)(j)]

As stated above, an MHI Risk Assessment has been carried out for the site in 2007 and this MHI Risk Assessment conducted by ISHECON in July 2010 must be considered as an addendum to this existing site MHI risk assessment report until such time that a combined updated MHI report is issued. The MHI Risk Assessment identified potential hazards on the site, reviewed the incident and accident history for incidents relating to the production, transport and storage of oils and nitric acid and identified potential major hazardous events. The cause, consequence, severity and likelihood of the hazardous events were then analysed. The MHI was defined according to thresholds and the effects of potential incidents on adjacent installations considered. Finally, the risk levels and risk acceptability was determined.

The following hazards were considered by the specialist:

Fire	Pool fire	Refers to fires involving an entire bunded area and can be particularly intense and may lead to damage to other tanks in the bund. The potentially fatal effects of only the worst case pool fire scenario can extend beyond the site boundary (page 28 of the MHI Risk Assessment in Appendix 4 of the EIR).
	Jet fire	Any leaks on high pressure, high temperature equipment may result in a jet fire which refers to high intensity fires. These fires often have an effect directly on near-by equipment leading to domino failures. Most of the equipment on the plant operates under vacuum conditions and therefore jet fires are highly

¹ Ishecon MHI Risk Assessment 2010

		unlikely and in addition should be limited to the plant area and will have no offsite effects .
	Flash fire	There are not likely to be major flash fires associated with failures of the stock tanks as the liquids are stored at low temperatures. The areas of concern for flash fires are the high temperature processing units. As per the risk assessment, the effects of most flash fires on the processing or storage units are unlikely to have catastrophic effects on persons outside the site . There could be significant effects on employees from major and minor flash fires. Although flash fires are not significant MHI events, were these release lead to explosions, the effects are significant .
Explosions	Internal	Confined explosion where the event occurs within a vessel. This results in the bursting of the vessel and tends not to be destructive as other types of explosions; however, there are some large vessels on site where the potential effects can extend slightly beyond the boundary .
	Confined within a building	This type of explosion requires the accumulation of flammable vapours within a building or structure prior to ignition and could potentially occur where the ventilation system is inadequate allowing flammable vapours to accumulate in the building. The effects of such explosions are often limited to within 10-15m of the building / structure .
	Unconfined	If a large amount of flammable vapour is formed in the air due to a rupture of a high pressure high temperature vessel containing hydrocarbons, the gas can ignite as a flash fire or explode with great force. The likelihood of explosions was found to be relatively small although the consequences are severe .
	Boiling Liquid Expanding Vapour Explosion (BLEVE)	This is one of the more significant types of event associated with liquefied hydrocarbons. This occurs when an external fire impinges on a vessel weakening the metal and heating up the contents of the tank. This type of event is most likely to occur in the reboiler on the distillation plant. The MHI threshold for a BLEVE of the reboiler extends 20m from the unit and not beyond the site boundary .
Toxic gases	Acute exposure	Nitric acid is the only potential material on the site that can release large quantities of toxic fumes. The photograph provided on page 33 of the MHI Risk Assessment (Appendix 4) shows that the effect will not go beyond the site boundary.

As the hazards being assessed will usually originate from loss of containment, the specialist identified the following main causes of hazardous incidents:

- Failure of equipment
- Failure of systems
- Inadequate purging during shut down and start-up operations

A full list of all potential incidents considered in the study that could affect persons outside the site and therefore employees on site, is included in Appendix B of the MHI Risk Assessment (Appendix 4). Preventative and protective measures are to be incorporated in the design of the installations to minimise the potential for the above mentioned incidents to occur. These measures are listed below and have been included in the EMP.

Quality Assurance

- There will be safe operating procedures of most of the activities on site
- Operators will be trained and retrained where necessary to perform their allotted functions
- Tanks designed to comply with SANS10089.
- There will be a permit to work system in operation on the site.

Protective Features

- All bulk storage tanks and all processing areas are fully bunded to contain 110% of the largest tank.
- Curbed nitric acid offloading area.
- There is an on-site emergency plan.

- There is fire water, foam spraying systems, trained fire fighting personnel on site.

The MHI report found that the **most likely failure events** on the site are small leaks on heat exchangers, **once in 500 years**. However, these are unlikely to be MHI events with major off site impacts.

The large ruptures on heat exchangers may have **impacts offsite, once in 2000 years** whilst a **major catastrophic event** such as the rupture of a large stock tank overtopping or comprising the bund walls are likely to occur **less than once in 500 000 years**. It is anticipated the most release will not ignite; therefore the associated risk is reduced.

The most unlikely MHI type event relate to those involving the catastrophic rupture of the bulk road tankers during loading and off-loading. Section 5.6 of the MHI Risk Assessment provides a number of maps, photos and graphs illustrating the expected extent of the various potential accidents.

The consequences of flammable hazardous events will be radiation and explosive effects with the major consequence of an explosion being the shock wave effect. For the FFS Evander plant, it is unlikely that missiles, produced from an explosion, will affect the public directly due to the large distance they will have to travel. These are therefore not considered a major hazard. Using key fire radiation levels (see table 5.3.3.2 of MHI Risk Assessment), it was calculated that any person in the 37.5kW/m² radiation circle for a minute is likely to be burned, while there is a 50% chance of those people between 12.5 and 37.5kW/m² radiation circles being fatally burned within a minute. Outside the 12.5kW/m² radiation level, there are less than 1% fatalities.

There are no other MHI's in the immediate vicinity of the site and therefore no significant domino effects are expected. Potentially highly destructive levels of radiation and explosion over-pressure could however result from accidents on the distillation plant or the FFE plant etc. These could extend over the plant control room, administration and workshop buildings. This may pose high risks and an update of the site occupied building study should be conducted as part of the MHI update to evaluate the risks against international guidelines. In the interim FFS should harden the structures in the form of shatter-proof film on the windows of the admin building and workshop as well as ensuring escape routes out of these buildings away from the plant towards the south. In addition to the above there is a risk of large failures on one plant leading to secondary failures on adjacent plants.

The following aspects in terms of individual risks need to be highlighted as per section 5.10.1 of the MHI Risk Assessment:

- The increase in offsite risks is very low;
- The proposed facility does not present any major concerns over and above those from the current site from an MHI perspective;
- The risks are not low enough to be considered totally acceptable and all reasonable risk reduction measures need to be incorporated into the design so that the risks may be considered tolerable;
- The onsite risks have increased, however the increase is not unacceptably high. This increase is due to the new processing plant facilities;

In terms of societal risks, the MHI found that the risks associated with the MHI type events could be considered acceptably low. According to the MHI, it is estimated that should the industrial area around the site be fully occupied with low occupancy industrial operations, up to 150 people could die in the very worst case fire and explosion scenarios.

It is expected that the extent of only the worst case potential accident scenarios for the proposed waxy oil facilities may have impacts beyond the site boundary. As such, the events of the operation of the Waxy Oil facility should be considered as a Major Hazard Installation. It should however be noted that the more likely events will not have a major impact beyond the site boundary. There is not expected to be any impact on the residential areas in Evander.

The specialist concluded that under the worst case conditions, offsite impacts can occur and as such the proposed waxy oil facility is therefore classified as an MHI addition to the existing MHI facility. The following recommendations were therefore prescribed by the specialist:

- Notification must be done as per the requirement of the MHI regulations;
- A copy of this report must be attached as an addendum to the existing MHI and must be made available on site at all times;
- Although there could be offsite impacts, the likelihood of occurrence of such accidents is low with the result that the increase in offsite risks posed by the future Evander operations is very low. As such, the proposed waxy oil facility does not present any major concerns over and above those of the existing site;

- All reasonable risk reduction measures should be incorporated into the design of the facility so that the risks are tolerable;
- The proposed facility will increase the onsite risks and as such the following recommendations must therefore be considered for the admin building and workshops located within 50m of the new processing plant:
 - Emergency exits from the buildings exiting towards the north, south or west / east;
 - Hardening of structures to ensure blast resistant windows on all sides; and
 - In terms of assembly points, it should be noted that with toxic fumes from nitric acid the best protection is afforded by a policy of shelter-in-place indoors.
- The on-site emergency plans may need to be reviewed to take the new facilities and hazards into account;
- Land use planning restrictions as per the existing MHI remains unchanged; and the full site MHI risk assessment and occupied building study should be updated prior to commissioning of the new facilities.
- Appendix E in the MHI Risk Assessment provides a checklist that can be used to review the organisational measures in place on the site.
- Any catastrophic spill that breaches the bunding/massive fire fighting operation may lead to direct oil contamination of the stream approximately 300m north-west of the site. Fire water management therefore requires particular attention in the FFS emergency plans.

Identified environmental risk for assessment: potential contamination of the stream if catastrophic spill occurs, pool fire damaging bund or tank integrity resulting in a possible leakage, unlikely impact of a potential flash fire occurring in the high temperature processing units effecting employees on site, potential for an internal explosion to occur within the large vessels on site, inadequate ventilation could result in a confined explosion, small possibility of a ruptured high pressure high temperature vessel containing hydrocarbons could result in an unconfined explosion, the potential for a BLEVE in the reboiler on the distillation plant effecting workers on the site and possible release of toxic fumes from acute exposure to nitric acid which could impact the workers on the site. Possible equipment failure resulting in an uncontrolled rise in pipe/vessel pressure increasing the potential for a fire/explosion, hot work tools used during maintenance/ warming up procedures increasing the risk of a source of ignition. Potential leak/rupture in waxy oil loading/off-loading hose and/or pipe transferring the waxy oil to new 1 200m³ feed tank resulting in spillage of hydrocarbon, potential puncture/rupture in the waxy oil feed tank resulting in an explosion or internal fire open roof, pipe rupture/leak during the iron removal process, potential leaks, punctures or ruptures in the pipes/ tanks used during the distillation process in the FFE and/or blending tanks, potential internal explosion in the fired heater in the distillation plant, rupture or puncture of nitric acid road tanker resulting in possible MHI event depending on quantity of nitric acid spilt, rupture/leak of nitric acid offloading hose and/or transfer piping and potential catastrophic rupture or puncture in nitric acid bulk storage tank/s.

3.3 Bulk Services

The existing FFS site in Evander was designed and built with an expansion of this nature in mind and thus allowance has already been made for all utility requirements.

3.3.1 Stormwater

The proposed waxy oil facility will connect to the existing stormwater system on site. All stormwater falling within the bunded area will drain into a sump and be transferred to the effluent plant for treatment before release into the municipal system under permit.

Identified environmental risk for assessment: potential contamination of stormwater and incorrect disposal of contaminated rainwater collecting in bunded areas.

3.3.2 Water Provision

Water for the proposed waxy oil facility and for fire control, water will be obtained from the municipal system. A water storage tank of adequate capacity will be provided. Hydrants will also be provided to allow fire services to provide additional foam and fire fighting capabilities. Wastewater from routine maintenance and washing of the tank farm area will drain into a sump and be sent to the effluent treatment plant at FFS. The following utilities will be required for the processing facility and are available on site:

- Steam (10 Bar [Bar gauge]): 300 – 900 kg/hr 135 – 400 tons/month
- Potable water: 80 – 120 kl/month

During construction, water will be obtained through the existing domestic water supply for the site. Contaminated water will drain into the existing effluent treatment plant for treatment and released into the existing sewer as per the effluent permit (dated 03 March 2005 and included in Appendix 10 of the Final EIR) or if the contaminated water can be recycled or reused this will be done.

Identified environmental risk for assessment: *potential increased pressure on municipal services (i.e. water supply).*

3.3.3 Sewage

There is not expected to be any changes to the volume of domestic sewage with the installation of the new waxy oil facility however domestic sewage will be directed to the municipal sewerage system. Any other waste water produced from waxy oil processing facility will be transferred to the effluent plant for treatment before release to the municipal system.

Identified environmental risk for assessment: *None.*

3.3.4 Electricity Supply

The existing facility is supplied with electricity. It is anticipated that the existing electricity supply will be sufficient for the proposed waxy oil facility which is expected to require approximately 50 – 75 kW/month of electricity to operate.

Identified environmental risk for assessment: *Potential for increased pressure on existing electric services.*

3.3.5 Traffic

It is not anticipated that traffic during operation will increase significantly as there will only be a small increase in the number of additional tankers to and from the FFS Evander site daily. It is recommended that flagsman be provided to control traffic during construction. Tankers waiting to enter the site must ensure that they are not obstructing the flow of traffic.

Identified environmental risk for assessment: *Negligible increase in traffic around the site.*

3.3.6 Solid Waste

The majority of the solid waste resulting from the proposed waxy oil processing facility is likely to be hazardous in nature and should therefore be disposed of accordingly at a registered hazardous landfill site. For example, the Holfontein H;H Landfill site is located on Portion 24 of Farm Holfontein, Springs (approximately 70km from the Evander Plant). Waste and sludge skips are to be clearly labelled to ensure workers on site are aware of the various waste streams. It is unlikely that there will be a significant increase in general solid waste during operation.

Identified environmental risk for assessment: *incorrect disposal of hazardous waste.*

3.4 Description of Identified Potential Alternatives to the proposed activity, including Advantages and Disadvantages that the proposed activity or alternatives may have on the Environment and the Community that may be affected by the Activity [Regulation 31 (2) (d)]

The Western Cape Department of Environmental Affairs and Development Planning (DEA & DP) guideline² on alternatives has been used as a guide to the identification of feasible alternatives to the proposed activity. The NEMA EIA Regulations define alternatives as a “*different means of meeting the general purpose and requirements of the activity*”.

Alternatives to the proposed activity were identified according to the following criteria:

- i. Is the alternative feasible and reasonable?
- ii. Does the alternative suit the general purpose of the proposed activity?
- iii. Does the alternative align with the need and desirability considerations of the proposed activity?
- iv. Is the alternative designed to prevent and minimise negative impacts and to maximise benefits?
- v. Does the alternative compromise the integrity of the proposal?
- vi. Does the alternative comply with policy and legal requirements?

Based on the above, the following alternatives were considered for further investigation in the Scoping Report:

² Source: DEA&DP (2009). *Guideline on Alternatives, NEMA EIA Regulations Guideline and Information Document Series*. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP).

There are no alternatives sites considered as this is the only available space within the existing Evander plant. It is also not feasible to locate the proposed new facility outside of the existing facility boundaries as the cost of another facility would be prohibitive due to the duplication of certain infrastructure involved in the waxy oil production process (e.g. fire system, weighbridge, roads etc.).

An alternative layout was also considered which involved the installation of two small tanks for the product and two smaller storage tanks for the raw material (combined storage capacity of 2 400m³). The spacing between the tanks would however not be in line with the SANS 10089-1:2008 code of practised and the impacts would remain the same. Underground tanks were also considered however extensive excavation and construction would be required compared to the above ground alternative. The layout as proposed in Appendix 2 therefore remains the preferred layout alternative.

Different tank designs were also reviewed by the applicant however the proposed preferred tank design was considered the best available technology for the design of fuel tanks and meet the relevant SANS and BS codes. Only the current preferred alternative as outlined above and the no go option are assessed in the table below. The no go option means that FFS Refiners will not construct the waxy oil processing facility and has been included in the assessment as a baseline study. The potential impacts of the no go alternative are used to compare the impact of the preferred alternative to.

Alternative 1 (preferred option): Construction of a 2 500m² waxy oil processing facility opposite the laboratory on the existing facility as indicated in the site layout (Appendix 2).

Alternative 2 (no go option): FFS will not construct the waxy oil processing facility.

Table 10 summarises the main advantages and disadvantage of each alternative.

Table 10: Advantages and Disadvantages of the Proposed Alternative for the Waxy Oil Processing Facility.

	Alternative 1	No-go option
Advantages	<ul style="list-style-type: none"> - Employment opportunities (approximately 12 new positions) - Recycles a non-renewable resource which would otherwise be disposed of as hazardous waste. - Prevents the disposal of a large volumes of waxy oil. - Will replace this amount of high sulphur Heavy Furnace Oil in the industrial fuel market and will reduce the emission of sulphur dioxide from client installations by between 900 – 1800 tons per annum. - Potential to increase the economic activity in the area in the form of services, spares, housing etc. 	<ul style="list-style-type: none"> - No additional construction activities on the site. - No additional release of emissions (including VOC's) from the site. - No additional hazardous waste (i.e. sludge) produced/accumulating on the FFS site.
Disadvantages	<ul style="list-style-type: none"> - Short-term peaks in air pollution concentrations could result from spilled product and fugitive emissions from general operations. - Slight increase in air benzene concentrations on site. - Minor increase in the Evander plants MHI status. 	<ul style="list-style-type: none"> - FFS would miss an economic opportunity to diversify its ability to process low sulphur fuels which are in high demand due to stringent air emission standards set by the DEA.

4.0 Description of environment and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity [Regulation 31 (2) (d)]

The National Environmental Management Act (107 of 1998 as amended) states that the “environment” is made up of:

- (i) The land, water and atmosphere of the earth;

- (ii) Micro-organisms, plant, and animal life;
- (iii) Any part or combination of (i) and (ii) and the inter-relationships among and between them; and
- (iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

This section aims to describe the various aspects of the environment that may be affected by the proposed development. The physical and biological characteristics of the proposed site are considered and the Air Quality Impact Assessment (AQIA) specialist report summarised to identify potential impacts that the proposed development could have on the environment as well as recommending mitigation measures to minimize or alleviate these impacts. Social, economic and cultural features within and surrounding the site has all been assessed to reach a holistic description of the environment that the proposed waxy oil processing facility will be located in.

4.1 Surrounding Land Use

It is important to note that the Evander Plant has already been classified as a small Major Hazardous Installation (see section 3.2.1 for the summary of the ISHECON MHI Risk Assessment results). Since the waxy oil processing plant will contribute to the MHI status of the existing plant, it is important to take into consideration the surrounding land uses to ensure that they are not impacted on by the proposed activity.

The proposed site is located within an existing industrial area surrounded by light to medium industries. Other factories and facilities in the immediate area include Joran's Tanker cleaning services to the north-east and a concrete and sand supply yard to the south. Land to the north and west of the site are vacant. The main road from Evander to Standerton (R546) is approximately 250m east of the FFS Evander plant. The Evander Golf Course is a further 100m east of the R546 and the residential area of Evander is located approximately 750m to the north-east of the proposed site (Figure 4). There is a small stream to the north of the site however it is approximately 300m away and it is therefore unlikely to be impacted on in any way by the construction and operation of the proposed facility.

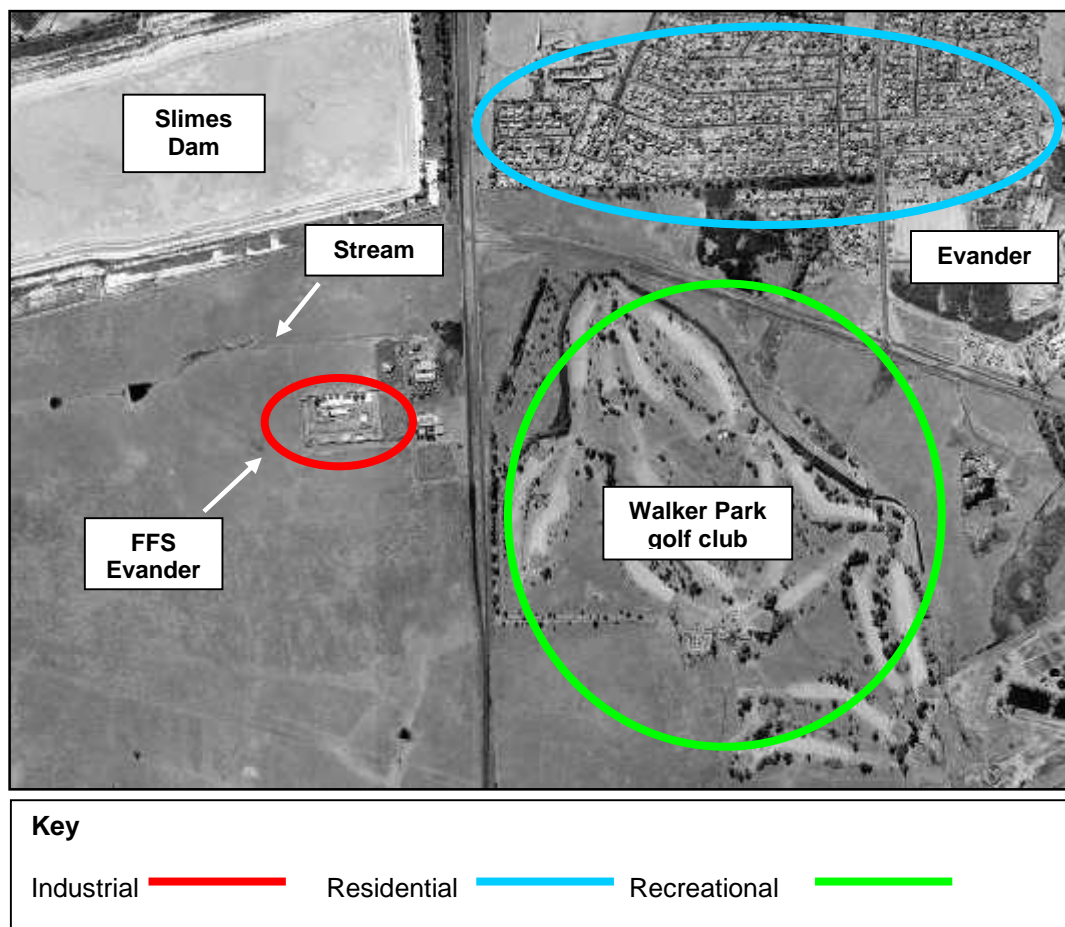


Figure 4: Aerial Photograph of FFS Evander site (circled in red) showing surrounding land uses (source: S3 Technologies-Geographic Information Systems & Large Format Printing specialists, 2008).

4.2 Physical

The topography of the proposed site is relatively level with a slight westerly slope (gradient decreases by 5m across the site from east to west). Evander is situated in the Watervaal Catchment Area and water from this catchment area ultimately flows into the Vaal River. There is a small stream situated to the north-west of the site which drains into a dam to the west of the site. Previous groundwater monitoring for the existing FFS tar processing facility indicates that the probability that groundwater contaminants will be readily dispersed within the groundwater system is unlikely³. A Geotechnical Report was prepared for the Evander site by WSP Environmental (Appendix 7) and is summarised below.

The identified significant environmental risk for assessment in terms of the physical aspect of the environment is the contamination of soil and groundwater in the event of a spill and/or the release of untreated effluent. A geotechnical report was submitted in February 2009 which investigated the nature and condition of the underlying geology and soil to ensure that the proposed piece of land where the new facility is being constructed is stable. The findings of the geotechnical report are summarised below. Currently, FFS conducts groundwater monitoring biannually for the existing tar processing facility. FFS will, in conjunction with its groundwater specialists, determine the groundwater monitoring requirements with the addition of the proposed waxy oil plant.

Identified environmental risk for assessment: *Impact on soil and groundwater in the event of a spill / leakage of storage tanks and/or various pipes.*

4.2.1 Summary of Specialist Geotechnical Investigation [Regulation 31 (2)(j)]

The report outlines the nature and thickness of the soils on the FFS Evander site, the foundation conditions for the proposed hydrocarbon storage tank facility and the nature of materials on site for the construction of surface beds, paved layers and drainage.

The site is relatively flat with an approximate fall of 1:100 to the north-west. It is partially covered by dumped earth from the grading and construction of the adjacent developed land. The site was originally farmland and is situated on the edge of an extensive mining property.

The geotechnical investigation consisted of field work with the excavation of pits taking place and soil profiling and sampling (Appendix A of the geotechnical report included as Appendix 7 of the EIR). Laboratory testing was then carried out on the samples taken (Appendix B of the geotechnical report included as Appendix 7 of the EIR).

The following conclusions were drawn from the findings:

- The site consists of colluvial, residual sandy clays and silts overlying highly weathered dolerite.
- Slow groundwater seepage was encountered at a depth of 2.2m in one trial hole.
- The upper clayey soils have poor compaction characteristics and a high swell. These materials are a very poor subgrade for roads and pavements and are considered unsuitable for load-bearing fill. Importation of granular fill is recommended for highly trafficked areas and for layer works below concrete slabs and bunds.
- The soils within the uppermost 0.75m are highly variable in stiffness and are considered to be mildly expansive. Bearing capacity for shallow foundations is estimated to be only 100 kPa. For foundations at depths of approximately 1m the bearing capacity is estimated to be 300 kPa. For contact pressures in excess of 300 kPa we recommend founding directly on good quality, un-fractured, hard rock dolerite at depths of approximately 2.0m to 2.5m below existing ground level.
- Foundations should be inspected and approved by a competent person to ensure removal of soft clayey material has been achieved prior to casting foundations.

Identified environmental risk for assessment: *None.*

4.3 Biological

The waxy oil processing facility will be located within a fully operational industrial site which does not offer any biological or environmental services.

Identified environmental risk for assessment: *None.*

³ WSP Environmental (2009). Groundwater Monitoring Report for FFS Evander.

4.4 Air Quality

In November 2007 the Minister of Environmental Affairs and Tourism officially declared the eastern part of Gauteng and the western part of Mpumalanga as a priority area referred to as the “Highveld Priority Area” in terms of section 18(1) of the National Environmental Management: Air Quality Act, 2004. The area that has formally declared as the Highveld Priority Area includes the Govan Mbeki municipal area which includes the town of Evander. The control of emissions and odours at the FFS site is therefore crucial as specific air quality management action is required for the entire Highveld Priority Area (Government Notice No. 30518).

Currently FFS undertakes ambient monitoring on a biannual basis for the Evander site and this will incorporate the waxy oil plant. Pollutants measured biannually from point sources and dispersed emissions are the Benzene, Toluene, Ethylbenzene and Xylene (Volatile Organic Compounds), as well as the inorganic oxides of nitrogen and sulphur dioxide. These may change with the National Air Quality Act point source emission limits and requirements.

The waxy oil product has a high flash point and no low boiling point components and will be processed at temperatures of up to 95°C. This may result in some Volatile Organic Compounds (VOC's) being present. There will also be a small fugitive emission potential from the filters on discharge. WSP Environmental (Pty) Ltd was therefore commissioned to determine the impact of ambient air quality of any increases in atmospheric emissions associated with the proposed waxy oil plant. The Air Quality Impact Assessment (AQIA) is included in Appendix 8 and is summarised below.

Identified environmental risk for assessment: *potential release of vapours and odours, release of fugitive emissions and a reduction in air quality in the Evander area.*

4.4.1 Summary of Specialist Air Quality Impact Assessment [Regulation 31 (2)(j)]

WSP Environmental (Pty) Ltd was appointed to update the existing emissions inventory and undertake a revised Air Quality Impact Assessment (AQIA) for the FFS Refiners (Pty) Ltd Evander branch (29 May 2013). FFS is located immediately south-west of Evander's residential zone whose primary sources of air quality concern are vehicular emissions, dust from decommissioned mining operations and potential odours from a nearby sewage works. SASOL Secunda, 8km south-east of the site is the only industrial polluter in the region with significant stack emissions of Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂) and particulates.

Since accurate modelling of pollution dispersion requires knowledge of the local climate and weather, the macro-scale climate of South Africa and the micro-scale climate of Evander are described in section 2.2 of AQIA. This includes a description of the local temperature, rainfall, wind direction and speed. Due to the wind conditions, it was envisaged that air pollution emissions from FFS Evander plant will predominantly be dispersed in south-easterly, west-south-westerly and south-south-easterly directions.

FFS propose to construct a separate facility for processing a heavy distillate residue termed “waxy oil”. This requires the removal of iron catalyst fines and carbon particulates from the waxy oil to produce a low sulphur oil for the industrial heating fuel market. It is proposed that all emissions from the waxy oil plant and associated tanks will be linked to a common scrubber. Furthermore, two small oil fired heaters, ducted to a common stack, are to be installed. Emissions from these two additional stacks, as well as fugitive emissions from the waxy oil process, will potentially increase the impact of the FFS Evander plant on local air quality.

The production process was broken down into stages and each stage analysed in terms of potential atmospheric emissions (illustrated by red arrows in the figure 5 below). A map showing the location of the various emission sources across the site is attached in Appendix A (section 10.2) of the Air Quality Impact Assessment.

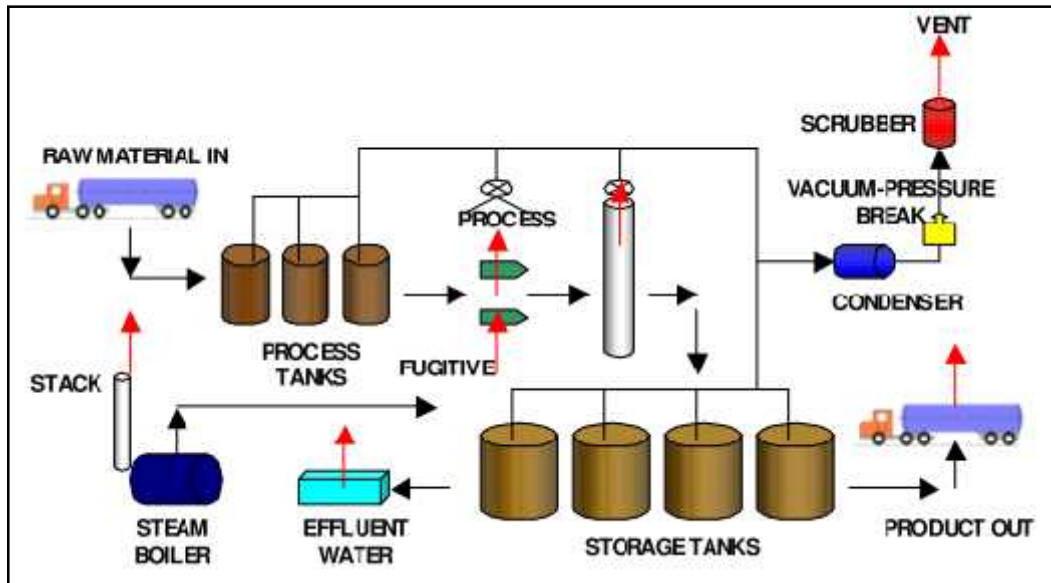


Figure 5: Simplified diagram of the production process at the FFS Evander facility for the proposed waxy oil facility (source: WSP Air Quality Impact Assessment, May 2013).

1. Delivery of Raw Product – displacement of vapour space into the atmosphere.
The Evander plant however has installed a tank balancing system which greatly reduces the potential for vapour emissions.
2. Solids Removal – takes place in the decanter shed and results in fugitive emissions that are ducted to the vapour scrubber.
3. Water Removal – Water is heated to boiling point where water is flashed off at the top of a closed column. The vapour is then condensed through a water-cooled condenser and the light ends separated from the water in a static separator. On the separator column, there is a vent installed which is an emission source linked to the vapour scrubber system.
4. Blending Processes – no potential atmospheric emissions
5. Storage – All tanks connected via vapour balancing ducts to the scrubber stacks therefore all breathing and working losses are not vented to the atmosphere but rather to an abatement technology. The storage tanks are also pressure controlled ensuring that a vent discharge will only occur at pressures exceeding 2.0kPag. Air will also not be drawn into the tanks unless the vacuum drops below -0.6kPag.
6. Vapour Ducts – all emissions mentioned above are ducted to a wet scrubber. Most condensable hydrocarbons are recovered by means of static separation for use in the process.
7. Product Loading – Top loading system could result in the emission of vapours to the air. Operating a closed tank system results in safety issues for workers due to the potential for the tanks to explode.
8. Boiler – There is a coal fired boiler used to generate steam for the boiler. A standby oil fired boiler is also installed. Emissions from the oil fired boiler are much lower than the coal fired boiler and therefore WSP conservatively assumed that the coal fired boiler operate at all times.
9. Effluent Water Treatment – Rainwater and any effluent water are contained and gravity-drained to an effluent water treatment plant. The water flows through a static separator to recover all free hydrocarbons. This is an enclosed system running at ambient temperature that results in marginal emissions from a small vent (not considered in the report as the values will be insignificant and could not be estimates confidently).

The legal framework regulating air quality in South Africa is provided in section 4 of the AQIA. The FFS Evander site fall under the following Listed Activity as published by DEA Government Notice No. 248, 31 March 2010, GG No. 33064 "List of Activities

which result in Atmospheric Emission which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological or cultural heritage”:

- Category 2 (Petroleum Industry), subcategory 2.2: Storage and Handling of Petroleum Products

FFS have submitted an application for an Atmospheric Emission License (AEL) and await authorisation.

The methodology used for the assessment is detailed in section 5 of the report but is summarised below. An emissions inventory for the FFS Evander plant's production process was initially compiled in 2005 and updated by FFS in 2013 (included emissions from the storage tanks, boiler, vapour recovery stacks, emissions from idling trucks and possible product spills). An additional heater and scrubber stacks for the proposed waxy oil plant are considered in this assessment. Atmospheric Dispersion Modelling System (ADMS) was used as the modelling software with GIS input (site and receiving environment) and Meteorological data and statistics being used for the dispersion modelling. Gridded and discrete receptor points were used for model validation tests. Gridded receptor points are defined X and Y coordinates off a regular Cartesian grid. A summary of the locations of the discrete receptors relative to the FFS Evander site is provided below:

Receptor	Direction from Nearest Boundary	Distance from Nearest Boundary (m)
Fire Water Tank	North-west	0
Tank Farm	North-east	0
Workshop	South-east	0
Main Gate	South-west	0
School	North-east	1000
Walker Park Golf Course	South-east	1000

Tank Emissions

Volatile Organic Compound (VOC) emissions from storage tank vents that are not linked to the scrubber stack were quantified using the United States Environmental Protection Agency's (USEPA) TANKS model. One year of meteorological data (2011) from the onsite weather station was consolidated for use in the model. Cloud cover data was obtained from the South Africa Weather Services (SAWS) station in Bethal. The product stored in the tanks has similar chemical properties to coal tar fuel (highest flash point of all fuels currently handled by the plant and a lowest vapour pressure of all the fuels). The TANKS model calculates the working loss and breathing loss for total VOCs.

Boiler Stack and Vapour Scrubber Emissions

Isokinetic stack monitoring is undertaken on an annual basis at the boiler and vapour scrubber stacks. The efficiency of the scrubber was tested on two occasions in 2012. Results from these stack monitoring campaigns have been used for the Atmospheric Dispersion Modelling System (ADMS). ADMS was used to calculate suspended particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), SO_2 , NO_2 and benzene (C_6H_6) concentrations onsite and in the site's vicinity. The various pollutant emissions rates were thus calculated for the boiler stack and vapour scrubber.

Truck Exhaust Emissions

Emissions from idling trucks from three onsite areas were calculated from emission factors presented in the USEPA Emissions Fact Sheet for Idling Vehicle Emissions (EPA, 1998).

Spill Emissions

There is the potential for the spillage of coal tar product within bunded areas. Emission rates were calculated for a 3m x 3m area of spilled product and the temperature of the spilled product is at 90°C. It was conservatively assumed that spills occurred in four out of 6 bunds.

Waxy Oil Plant – Vapour Scrubber

The six process tanks and seven static plant tanks are linked via vapour balancing lines to two wet scrubbers. These two scrubbers are ducted to a common stack resulting in a single point source of emissions. Total VOC emissions from the tanks was calculated using the US EPA's TANKS model.

Waxy Oil Plant – Heater Stack

Two oil fired heaters are to be located on the site for the generation of steam. Water is sourced from the municipality with a consumption rate of 80-120 kl/month. The heater stacks are to be ducted to a common stack and the emissions for each heater

estimated using emission factors from the Australian National Pollutant Inventory Emission Estimation Technique Manual for Petroleum and USEPA AP42 factors.

Results for the dispersion modelling are provided in section 6 of the AQIA but are summarised below for Particulate Matter (PM₁₀), Nitrogen Dioxide (NO₂), Sulphur Dioxide (SO₂) and Benzene (C₆H₆). Maps illustrating the annual average contributions to ambient air concentrations and the worst case scenario (P100 24 hour) are provided for each of the pollutants in Appendix B of the AQIA.

Particulate Matter (PM₁₀)

The plume extends in north-easterly (towards Evander), south-easterly (towards the Golf Club) and south-westerly directions away from the plant. The highest proposed contributions (maximum = 0.759 µg/m³) are predicted to occur to the east of the plant. All modelled contributions (current and proposed) are fully compliant with the annual PM₁₀ NAAQS of 50 µg/m³. Current annual average concentrations at each receptor point will not increase significantly with the marginal increase in PM₁₀ emissions from the proposed heater stack. In the worst case scenario, all modelled contributions remain fully compliant with the 24 hour NAAQS of 120 µg/m³ for PM₁₀ with a proposed peak value of 12.61 µg/m³. There is a slight increase in worst-case daily PM₁₀ concentrations at each receptor point due to the marginal increase in PM₁₀ emissions from the proposed heater stack.

Nitrogen Dioxide (NO₂)

The plume extends in north-easterly (towards Evander), south-easterly (Golf Club) and south-westerly directions away from the plant. The maximum predicted NO₂ contribution of 4.91 µg/m³ is less than the annual NAAQS of 40 µg/m³. Annual average NO₂ concentrations are expected to increase marginally with addition of emissions from the waxy oil plant, with the greatest increases experienced closer to the site. The maximum hourly contribution from the Evander site is 46.80 µg/m³, and is fully compliant with the hourly NAAQS of 200 µg/m³. Concentrations are expected to increase marginally at each receptor location.

Sulphur Dioxide (SO₂)

The plume extends in north-easterly (towards Evander), south-easterly (Golf Club) and south-westerly directions away from the plant. The maximum SO₂ contribution from the existing plant including the additional, heater stack is approximately 1.61 µg/m³ and is less than the annual NAAQS of 50 µg/m³. Concentrations are expected to increase marginally at each receptor location. The modelled P100 (worst case) hourly SO₂ concentrations were plotted and shown in Section 11.6 in Appendix B of the AQIA. The maximum modelled contribution including the proposed heater stack at the waxy oil plant (42.60 µg/m³) to ambient concentrations onsite is compliant with the hourly NAAQS for SO₂ of 350 µg/m³. Contributions to ambient concentrations at receptor points are well below the respective NAAQS with the highest concentrations onsite at the Tank Farm (proposed modelled concentration value of 40.06 µg/m³). It is expected that SO₂ concentrations will increase at each receptor location. There is a slight decrease in the P100 hour SO₂ concentrations at the school and is likely to be an artefact of the plume interpolation process.

Benzene (C₆H₆)

The plume extends in north-easterly (towards Evander), south-easterly and south-westerly directions away from the plant. The maximum annual benzene concentration with the additional vapour scrubber at the waxy oil plant results in approximately 0.86 µg/m³ generated from FFS is less than the annual NAAQS of 10 µg/m³ presented in the NAAQS. Due to the high efficiency of the scrubber to be installed on the vapour duct, there are no increases in benzene emissions predicted at the receptor locations.

As the distance away from the FFS Evander site increases, air pollution concentrations decrease as the effect of dilution takes place. Annual average air pollutant plumes extend in north-easterly, south-easterly and south-westerly (towards Evander residential areas) directions due to prevailing wind directions. None of the NAAQS are exceeded. Worst case modelled contributions for SO₂, NO₂ and PM₁₀ do not exceed the corresponding NAAQS. The predicted increase in emissions from the additional waxy oil plant remains marginal due to the high efficiency of the abatement technology fitted onto each heater and vapour recovery stack. Although background concentrations are not included in this assessment, it is not expected that background concentrations are high and would alter this conclusion due to the lack of proximate pollutant sources. Limitations and uncertainties are outlined in section 8 of the AQIA.

The specialist concludes that pollution concentrations are expected to only increase marginally therefore no significant concerns are expected to arise with respect to the impact of the proposed waxy oil plant on ambient air quality and local environmental health. Short-term peaks in air pollution concentrations could result from spilled product and fugitive emissions from the general

operation. Benzene concentrations measured onsite however, were higher than those measured at the off-site locations indicating that the operations undertaken at FFS Evander does result in the generation of benzene.

An Air Quality Management Program (AQMP) is recommended to comprise of the following:

- Frequent (bi-annual) stack monitoring be undertaken at the current plant stacks as well as the proposed heater and vapour scrubber stack at the waxy oil plant to test their efficiency,
- A leak detection and repair program (LDAR) approved by the licensing authority in line with requirements of the NEMAQA,
- Frequent inspection and repair of processing units to reduce hydrocarbons venting to the atmosphere,
- Possible linking of Tanks E37 - E40 via vapour balancing lines to the common vapour scrubber stack,
- Minimisation of truck idling during loading/offloading of product,
- Continuous inspection of tanks rims and seals,
- Reduction in fugitive dust emissions from vehicular traffic by sealing or paving roadways,
- Improvements in response time to spilled product within bunded areas,
- Real-time analysis of air pollution concentrations prevailing at the site to determine periods of elevated concentrations emanating the plant. This dataset would also serve as background ambient air quality that will enhance the representivity of air pollution modelling results and
- The on-site meteorological station should be upgraded to ensure hourly sequential data is collected for the following parameters: wind speed, wind direction, temperature relative humidity, and precipitation.

Identified environmental risk for assessment: Nominal displacement of vapour space into the atmosphere during delivery of raw product, emissions from top loading system during product loading, emissions from truck idling, coal fired boiler releasing emissions into the atmosphere, potential emission of volatile organic compounds from the various storage tanks, potential short-term peaks in air pollution concentrations resulting from spilled product/fugitive emissions from general operation and an increase in benzene concentrations on site.

4.5 Social

The site is located in an industrial area and all surrounding land uses are industrial. The closest residential area is the town of Evander which is located 1.5km north east of the site (see Figure 4). The Walker Park Golf Club is located approximately 1km east of the site. Positively, the project is expected to require approximately 12 additional staff, comprising the following:

- | | |
|---|---|
| • Process controllers (2 per shift x 4 shifts): | 8 |
| • Assistants (1 per day shift) | 1 |
| • Drivers: | 2 |
| • Maintenance personnel (artisan): | 1 |

Identified environmental risk for assessment: Potential safety issues for workers on site related to the MHI status of the proposal and potential health impacts from the release of emissions to workers on site. Positive impact with employment opportunities.

4.6 Economic

The construction of the proposed project will provide employment for construction companies during the construction period. The proposal will create 12 jobs during operation of the proposed project as described above.

Identified environmental risk for assessment: None

4.7 Cultural

The South African Heritage Resources Agency (SAHRA) was notified of the application who have confirmed that since the development is in an existing industrial landscape, the likelihood of architectural resources within the proposed project area are minimal (see Comments and Response table, Appendix 9.8).

Identified environmental risk for assessment: None.

4.8 Specialist studies [Regulation 31 (2) (q)]

The following specialist studies were conducted and have been summarised in the sections above.

1. Preliminary Major Hazardous Installation Risk Assessment for FFS Refiners – Evander New Waxy Oil Facility (ISHECON, July 2010)
2. FFS Evander Storage Tanks Geotechnical Report (WSP Environmental, February 2009)
3. Air Quality Impact Assessment – Proposed Waxy Oil Plant (WSP Environmental, May 2013)

As per Regulation 31 (2) (q), copies of the reports have been provided in full in Appendices 4, 6 and 7 respectively.

5.0 Public Participation Process [Regulation 31 (2) (e) and [Regulation 54, 55, 56]

(e) details of the public participation process conducted in terms of subregulation (1), including – (i) steps undertaken in accordance with the plan of study;

As per the plan of study, Interested and Affected Parties (I & APs) were given the opportunity to provide comment on the draft Scoping Report and draft EIR.

5.1 Timeline for Public Participation

Activity	Date
Submission of Application to DEDET	22 January 2009
Notification of application to Authorities and Community groups	17 February 2009
Notification of neighbours within 100m of the site boundary	18 February 2009
Placement of site notices	18 February 2009
Placement of adverts in the BEELD (regional paper) and The Ridge Times (community paper)	25 February and 27 February 2009
Distribution of BID	03 and 4 March 2009
Public meeting	n/a
Notification of release of 1 st draft scoping report	23 June 2010
Scoping report placed at the Walker Park Golf Club and submitted to authorities	23 June 2010
40 day comment period ended	02 August 2010
Notification of release of 2 nd draft scoping report	13 October 2010
Scoping report placed at the Walker Park Golf Club and submitted to authorities	13 & 14 October 2010
40 day comment period ended	22 November 2010
Acceptance of scoping report	19 May 2011
Exemption Request	21 February 2013
Exemption Approved	19 June 2013
Notification of release of Draft EIR	05 September 2013
EIR placed at Walker Park Golf Club and submitted to authorities	09 September 2013
40 day comment period ends	18 October 2013
Submission of Final EIR to I & APs	02 December 2013
Submission of Final EIR_version 2 to I & APs	03 December 2013
Final comment period closes	06 January 2014
Submission of Final EIR to DEDET	09 January 2014
Acknowledgement of receipt (2 weeks)	23 January 2014
Assessment of EIR (60 days)	25 March 2014
Compilation of EA (45 days)	13 May 2014

5.2 Notification

54. (2) The person conducting a public participation process must take into account any guidelines applicable to public participation and must give notice to all potential interested and affected parties of the application which is subjected to public participation by –

- (a) fixing a notice board at a place conspicuous to the public at the boundary or on the fence of -
 (i) the site where the activity to which the application relates is or is to be undertaken; and

- (ii) any alternative site mentioned in the application;*
- (4) A notice board referred to in subregulation (2) must –*
 - (a) be of a size at least 60cm by 42cm; and*
 - (b) display the required information in lettering and in a format as may be determined by the competent authority.*

Four site notices (60cm by 42cm in English and Afrikaans) were placed around the site on Brunel, York, Essex and Bradford Roads on 18th February 2010. Proof of notice placement is provided in Appendix 9.1.

- 54. (2)(b) giving written notice to –*
- (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;*
 - (ii) occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;*
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site;*
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represents the community in the area;*
 - (v) the municipality which has jurisdiction in the area; and*
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity;*

Neighbours adjacent to and within 100m of the property boundaries were notified by hand delivered notice (Appendix 9.1). Where possible, people were requested to sign a register indicating that they had received the notice. Where people were unavailable to accept delivery, the address was noted and the notices were placed in the post box.

The following authorities and interest groups were notified on the 17th February 2010 (proof provided in Appendix 9.1): Mpumalanga Department of Agriculture Rural Development and Land Administration, Govan Mbeki Municipality (Environmental Dept, Technical & Engineering Services), DWAF, WESSA, SAHRA, Harmony, Ward councilor, Evander Rate Payers Association, Sasol Synfuels, Sasol Mining, Roodebank Farmers Union, Randwater, Highveld East Environmental Monitoring Association (HECEMA) and National Association for Clean Air (NACA).

Background Information Documents were sent to Mpumalanga Department of Agriculture Rural Development and Land Administration, Govan Mbeki Municipality (Environmental Dept, Technical & Engineering Services), DWAF, WESSA, SAHRA, Harmony, the ward councilor, Evander Rate Payers Association, Sasol Synfuels, Sasol Mining, Roodebank Farmers Union, and Randwater, Highveld East Environmental Monitoring Association (HECEMA) and the National Association for Clean Air (NACA) and all registered I & APs on the 03rd and 4th March 2009 (Appendix 9.3).

- 54. (2)(c) placing an advertisement in –*
- (i) one local newspaper; or*
 - (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations; and*
 - (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in subregulation (c)(ii).*

An advert was placed in the Ridge Times on the 27th February 2009 and the Beeld on the 25th February 2009 in the classified section as a public notice (Appendix 9.4).

- 54. (3) A notice, notice board or advertisement referred to in subregulation (2) must –*
- (a) give details of the application which is subjected to public participation; and*
 - (b) state –*
 - (i) that the application has been or is to be submitted to the competent authority in terms of these Regulations, as the case may be;*
 - (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;*
 - (iii) the nature and location of the activity to which the application relates;*
 - (iv) where further information on the application or activity can be obtained; and*

(v) the manner in which and the person to whom representations in respect of the application may be made.

All notices, signboards and advertisements (Appendices 9.1 and 9.4) stated that the application in question is subject to scoping and EIA and that it had been submitted to DEDET. Each notice also stated the nature and location of the activity along with a brief description. The contact details for the company (phone, fax and e-mail) were provided where further information could be obtained.

54. (7) When complying with this regulation, the person conducting the public participation process must ensure that
(a) information containing all relevant facts in respect of the application is made available to potential interested and affected parties; and
(b) participation by potential interested and affected parties is facilitated in such a manner that all potential interested and affected parties are provided with a reasonable opportunity to comment on the application.

56. (2) Before the EAP managing an application for environmental authorisation submits a report compiled in terms of these Regulations to the competent authority, the EAP must give registered interested and affected parties access to, and an opportunity to comment on the report in writing.

56. (3) Reports referred to in subregulation (2) include –
(c) scoping reports;
(d) scoping reports amended and resubmitted in terms of regulation 30 (3);
(e) specialist reports and reports on specialised processes compiled in terms of regulation 32;
(f) environmental impact assessment reports submitted in terms of regulation 31; and
(g) draft environmental management plans compiled in terms of regulation 33.

All parties who registered for the process by contacting KSEMS were provided with copies of the BID on the 03rd and 04th March 2009 (Appendix 9.3). A public meeting date was set for 18th March 2013, however due to technical details regarding the project proposal, I&APs were notified on 10th March 2009 that the project was placed on hold temporarily and that they will be notified of the new meeting date. On 08th July 2009 I&APs were re-notified that the project had resumed and that the new meeting was scheduled for 22nd July 2009. Registered I &APs were given details of the time and venue on the 08 July 2009 (Appendix 9.1). Due to a lack of interest in attending, the meeting was not held and all registered I&APs were notified of the meeting cancellation on 13th July 2009 (Appendix 9.1). The 1st draft Scoping Report has been prepared and I &APs were notified of its availability at the Walker Park Golf Club on the 23rd June 2010 (Appendix 9.5). After amendments were made to the 1st draft Scoping Report, the 2nd draft Scoping Report was released for comment on 13th October 2010 (Appendix 9.5). Hard copies of the 2nd draft scoping report were couriered or hand delivered to the following bodies (Appendix 9.5):

Name	Authority / Group / Company
Mike Knowles	Govan Mbeki Municipality
Keet Marius	DWAF
James Harris	Ward Councillor

I & APs were instructed that they have 40 days to comment on the draft scoping with comment period ending on the 22nd November 2011. A final Scoping Report including all comment received has been submitted to DEDET and DEA (Air Quality Department).

Acknowledgement of receipt of the Scoping Report was received from DEDET on the 17th January 2011. The report was accepted on the 19th May 2011. Due to a delay in the compilation of the specialist reports, the submission of the EIR was delayed. The DEDET exempt the EAP and applicant from resubmitting another Scoping Report since the scope of work has not changed and I & APs were notified of the exemption (Appendix 9.6).

The draft EIR was prepared and I &APs were notified of its availability at the Walker Park Golf Club on the 05 September 2013 (Appendix 9.7). Hard copies of the draft EIR were couriered or hand delivered to the following bodies as requested:

Name	Authority / Group / Company
Surgeon Marebane	DEDET

Joyce Lekoane
Dan Hlanyane
BR Dlamini

DWA
Gert Sibande District (Air Quality Official)
DEA: Waste Division

The various other authorities and I & APs listed in the I&AP register in Appendix 9.2 receive email copies of the report as requested by the I&APs. The I & APs were instructed that they had 40 days to comment on the draft EIR with comment period ending on the 18 October 2013.

I & APs were notified of the release of the Final EIR on the 29th November 2013, which was uploaded onto the KSEMS website (Appendix 9.7). Since the release of the Final EIR, the list of Waste Management Activities requiring a Waste Management License and the list of activities resulting in atmospheric emissions requiring an Atmospheric Air Emissions License were amended. The EIR was therefore amended to exclude the irrelevant listed activities and resubmitted on the KSEMS webpage on the 03rd December 2013. I & APs were informed of the revised EIR (Appendix 9.7).

A site meeting was held at the FFS Evander site on 04th December 2013. Alison Haycock (FFS Refiners), Stephanie Williams (KSEMS) and Ms Shabalala (DEDET) attended the meeting. The final EIR including all comment received to date was submitted to DEDET in January 2014.

5.3 Register of Interested and Affected Parties [Regulation 31 (2) (e) (ii); 55 and 56]

55. (1) An EAP managing an application must open and maintain a register which contains the names and addresses of –
(a) all persons who, as a consequence of the public participation process conducted in respect of that application in terms of regulation 54, have submitted written comments or attended meetings with the applicant or EAP;
(b) all persons who, after completion of the public participation process referred to in paragraph (a), have requested the applicant or the EAP managing the application, in writing, for their names to be placed on the register; and
(c) all organs of state which have jurisdiction in respect of the activity to which the application relates.
(2) An applicant or EAP managing an application must give access to the register to any person who submits a request for access to the register in writing.

Regulation 31 (2) (e) ii- a list of persons, organisations and organs of state that were registered as interested and affected parties;

A register of all persons that were specifically identified for notification over and above neighbours within 100m is included in Appendix 9.2. A register of all I & APs who registered for the project as well as organs of state with jurisdiction in respect of the activity was maintained and is provided in Appendix 9.2.

5.4 Registered Interested and Affected Parties Entitled to Comment on Submissions (Regulation 56 & 57) Comments of Interested and Affected Parties to be Recorded in Reports Submitted to Competent Authority (Regulation 56) and Regulation 31

56. (1) A registered interested and affected party is entitled to comment, in writing, on all written submissions made to the competent authority by the applicant or the EAP managing an application, and to bring to the attention of the competent authority any issues which that party believes may be of significance to the consideration of the application, provided that –
(a) comments are submitted within –
(i) the timeframes that have been approved or set by the competent authority; or
(ii) any extension of a timeframe agreed to by the applicant or EAP;
(b) a copy of comments submitted directly to the competent authority is served on the applicant or EAP
(c) the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

57. (1) The EAP managing an application for environmental authorisation must ensure that the comments of interested and affected parties are recorded in reports.

Regulation 31 (2) (e) (iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and

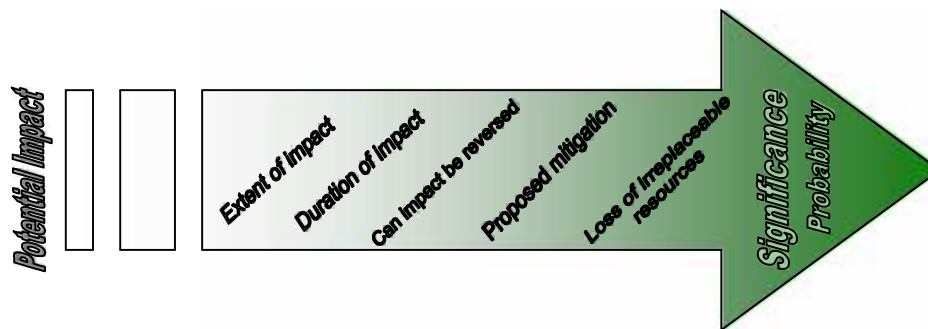
(iv) copies of any representations, objections and comments received from registered interested and affected parties;

Comments received on the draft scoping report have been included in a comments and response table and in full in Appendix 9.8.

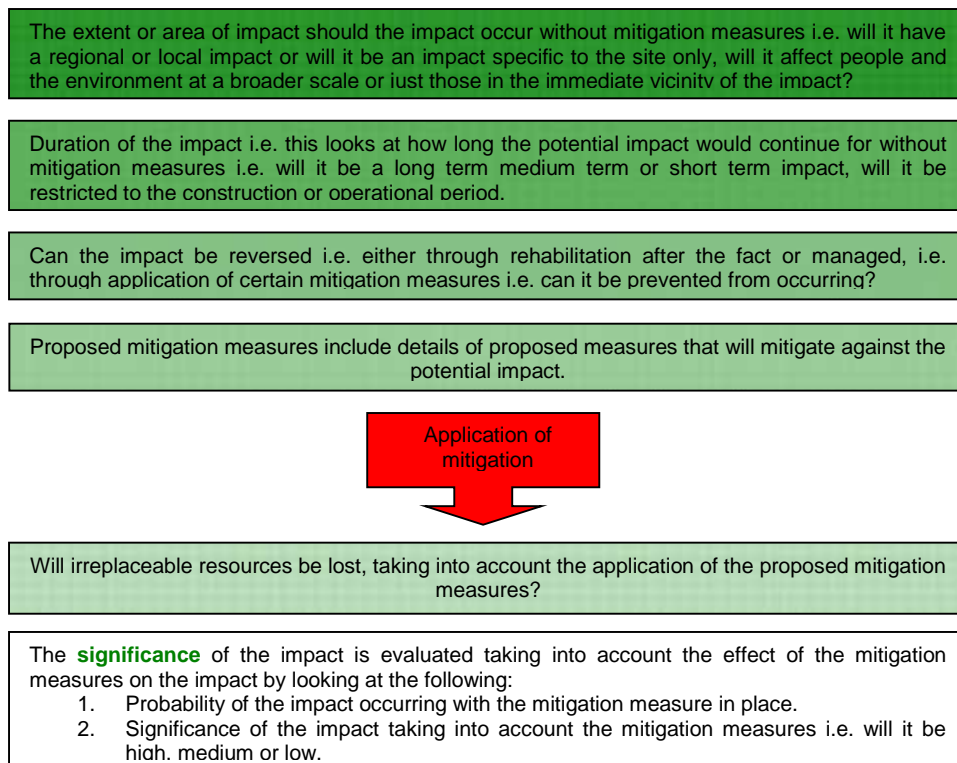
6.0 Environmental Issues and Investigation of Potential Impacts

6.1 Methodology Used In Determining Significance of Potential Environmental Impacts [Regulation 32 (h)]

In terms of how impacts have already been assessed, aerial photos and the 1 in 50 000 map for the area have been reviewed. Site visits have been conducted during which information on the surrounding environment as well as photographs of the affected areas has been gathered. The professional judgment of the EAP based on previous EIA experience in the industrial and ecological fields has been used. The potential impacts associated with the proposed development have been identified and rated in terms of their significance in a table, looking at the following:



As demonstrated above the significance of an impact is established using a progressive process whereby a potential impact is investigated using a number of parameters. **Potential impact** describes the potential environmental impact that might be associated with a specific aspect of the project i.e. without taking into account mitigation measures, extent of impact duration, or intensity of the impact. All of these factors have to be considered before the significance and probability of an impact can be established.



In addition, the following DEA (formerly known as DEAT) guideline has been used to assess impacts and Alternatives “DEAT (2006) *Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006. Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria*”.

6.2 Description Of Environmental Issues Identified, Assessment Of The Significance Of Each Issue And An Indication Of The Extent To Which The Issue Could Be Addressed By The Adoption Of Mitigation Measures [Regulation 31 (2) (h, k)]

The following impacts were identified for further investigation during scoping and all potential impacts have been listed, been where these can be mitigated against. Additional potential impacts identified through the impact assessment phase and review of the specialist reports have been added and are shown in purple in the table below.

Table 11 provides an assessment of each identified potential impact, including:

- (i) the nature of the impact;
- (ii) the extent of the impact (i.e. spatial area that may be affected by the impact);
- (iii) duration of the impact (long-term/ short-term, construction / operation);
- (iv) the probability of the impact occurring before and after mitigation, i.e. the likelihood of impact occurring with or without any mitigation measures in place = low/medium/high);
- (v) the degree to which the impact can be reversed;
- (vi) the degree to which the impact may cause irreplaceable loss of resources; and
- (vii) the degree to which the impact can be mitigated, i.e. the **mitigatory potential** which has been classified as follows:
 - Low (little or no mitigation measure exists to mitigate negative impacts),
 - Medium (mitigation measures exists however some negative effects cannot be fully mitigated)
 - High (can be fully mitigated);

The assessment into potential impacts also considered the type of impact i.e. is the impact direct or indirect; whereby the definition is as follows:

Direct Impact: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity, e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

Indirect Impact: Induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

The significance of each impact after mitigation has also been evaluated according to the following criteria:

- (i) Will the impact result in an alteration to the environment?
- (ii) Does the level of public concern (including both norms and values) influence the impact?
- (iii) Is there scientific and professional evidence against/for the impact?
- (iv) Will there be environmental loss or degradation?
- (v) Will the environmental impact result directly or indirectly in social change?
- (vi) What is the likelihood and acceptability of the residual risk?

Based on the above criteria, **significance of the impact after mitigation** has been classified as follows:

- low (little or no residual negative impact occurs after mitigation; probability of impact occurring after mitigation is low)
- medium (residual impact is acceptable to society but has an undesirable effect – impact can be further reduced through rehabilitation / abatement measures; impact will occur to a lesser extent after mitigation)
- high (impact cannot be mitigated and will result in alteration of environment impact will definitely occur even after mitigation; potential investigation into offsets or alternative designs/proposals)
- very high (impact results in loss of irreplaceable resources even after mitigation i.e. protected areas, world heritage sites, etc.)

Table 11: Assessment of identified potentially significant impacts for the construction and operation of the proposed waxy oil facility [Regulation 31 (2) (k, l)i-vii]

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
SOIL										
Erosion of stockpiled material (stone, sand and gravel) on the FFS site during construction activity.	Direct	Local	Construction phase (short-term)	Yes – can be managed.	No	Low	High	Material must be stockpiled in such a way that it cannot fall or cause injury or damage to properties or the natural environment. Stockpiles must not exceed 2m in height and must be covered if exposed to heavy wind or rain. Alternatively, low walls or berms must be constructed around the stockpiles. An Environmental Management Programme (EMPr) has been designed to manage construction activities and is attached under Appendix 3.	Low	Low
Risk of contamination to soil and stormwater during concrete mixing.	Direct	Local	Construction phase (short-term)	Yes – can be prevented.	No	Medium	High	Cement mixing will need to take place on a hard surface or cement mixing trays will need to be used. Cement mixing will not be permitted to occur where run off can enter stormwater drains. Construction will be monitored by an ECO who will ensure compliance with the construction EMPr.	Low	Low
Risk of spills from construction equipment (oil, fuels, etc.) contaminating soil	Direct	Local	Construction phase (short-term)	Yes – can be prevented.	No	Medium	High	Any construction equipment that could leak oil must be placed on a drip tray or hard surfaced area. Construction vehicles must have a drip tray and any oil leaks must	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
and stormwater.								attended to over a drip tray. All equipment must be in good working order to reduce the likelihood of oil leaks occurring. Any re-fuelling of equipment must occur on a hardened surface, within a designated re-fuelling area where any spills can be contained. Construction will be monitored by an ECO who will ensure compliance with the construction EMP.		
Risk of spills and leakage during storage of construction hazardous materials (cement, oils, paints etc.) contaminating soil.	Direct	Local	Construction phase (short-term)	Yes – can be prevented	No	Medium	High	Implementation of measures as stipulated in the EMP can prevent the impact from occurring. FFS Procedure 3 (spills) to be complied with. Hazardous materials used during construction should be stored in the existing store with all Material Safety Data Sheets (MSDS) at hand. Spill kits must be readily available.	Low	Low
Potential for improper storage and disposal of waste materials generated during construction resulting in leachate contaminating the soil.	Direct	Local	Construction phase (short-term)	Yes – can be prevented	No	Medium	High	Waste must be stored in the bins within the waste management area and must not be allowed to blow around the site or be placed in piles adjacent to the skips/bins/ Separate waste bins for each waste stream generated must be provided by the contractor. The waste containers must be appropriate to the waste type contained therein and where	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								<p>necessary should be lined and covered. Waste must not be allowed to accumulate on site but should be disposed of regularly by a reputable contractor. Hazardous waste such as oils, contaminated rags etc. must be disposed of at a hazardous class landfill.</p> <p>It is not expected that there will be any generation of scrap metal as the metal sheets for the tank are brought to the site ready rolled and measured to size. Any rubble must not be buried on site.</p>		
NOISE										
Noise generated by construction workers, machinery and construction vehicles disturbing surrounding businesses.	Direct	Local	Construction phase (short-term)	Yes – can be managed	No	Low	Medium	<p>Construction will be managed through implementation of the construction EMPr (Appendix 3). Construction will be during normal plant working hours and only if required, over weekends. The existing tank farm is however located in an industrial area so it is unlikely that the proposed new tank will create a noise nuisance for neighbours.</p> <p>Excessive noise must be controlled on site. All construction workers must be aware of the proximity of the neighbouring industries and all precautions must</p>	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								be taken to ensure that noise generation is kept to a minimum. If excessive noise is expected during certain stages of the construction, all neighbours must be notified of the events timeously.		
Potential increase in noise generation on site (electrical pumps in the processing facility).	Direct	Local	Operational phase (long-term)	Yes – can be managed	No	Low	Low	The proposed pumps for the tanks are unlikely to generate excessive levels of noise. The Noise is not expected to exceed 85dBA. If excessive noise is expected during certain stages of the construction, all neighbours must be notified of the events timeously however the existing tank farm is located in an industrial area so it is unlikely that the proposed new tank will create a noise nuisance for neighbours.	Low	Low
RESOURCE USE										
Sourcing of raw materials i.e. gravel, stone, sand, cement and water from unsustainable sources resulting in illegal sand winning and mining operations causing significant environmental	Indirect	Potential for regional impact	Construction phase (short-term)	Yes – can be prevented	Yes	Low	High	All materials must be obtained from a registered and sustainable source and all delivery notes and slips must be made available to the ECO e.g. mined material such as stone must only be obtained from permitted quarries. Municipal water must be used for dust suppression on site if necessary.	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
damage.										
WASTE										
Littering on and around the site and windblown wastes can have an impact on the aesthetics of the surrounding area.	Direct	Local	Construction phase (short-term)	Yes – can be managed	No	Low	Medium	Littering will not be permitted on the site. Waste containers with lids must be provided on site during construction. These must be cleaned on a regular basis to prevent overflow. The EMPr has been designed to manage waste during construction and is attached under Appendix 3.	Low	Low
Environmental contamination risk associated with generation, storage and disposal of various waste streams.	Direct	Local with the potential of a regional impact.	Construction and Operational phase (long-term)	Yes – can be managed.	No	Medium	High	<p>Separate skips/bins are to be clearly labelled as “general waste” and “hazardous waste”. The skip/bin is to be contained to prevent rain ingress and preferably located on a hard surface to prevent any spills or leachate from coming into direct contact with the soil/groundwater.</p> <p>During construction safe disposal slips for hazardous waste are to be retained on the site in the environmental file for ECO audit purposes.</p> <p>All waste should not be stored on site for periods longer than three months⁴.</p>	Low	Low
Skips containing	Direct	Local	Operational	Yes – can be	No	Low	High	As above, hazardous waste	Low	Low

⁴ Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste, DWAF 1998

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
oily sludge not collected regularly resulting in large amounts of hazardous sludge accumulating on site.			phase (long-term)	prevented.				should not be stored on site for longer than three months. The applicant is therefore to ensure that a regular waste collection schedule is agreed on with the relevant waste collection service being used. The schedule is to be tightly followed to ensure that the skips are regularly collected from the site and disposed of accordingly. The Holfontein Landfill H:H site and KwaDukuza Landfill in KZN accepts hazardous waste of this nature.		
Incorrect disposal of contaminated rainwater or spills from the bunded areas.	Direct	Local	Operational phase (long-term)	Yes – can be prevented.	No	Medium	High	FFS Refiners have an existing effluent treatment plant on the site which will be used to treat rainwater mixed with any spills that have accumulated in the bunded areas. Alternatively, contaminated rainwater from the bunded areas is to be disposed of as hazardous waste at a registered landfill site. Safe disposal slips should be retained on site for auditing purposes.	Low	Medium
Incorrect storage and disposal of iron oxides and contaminants that are removed from the waxy oil.	Direct	Local	Operational phase (long-term)	Yes – can be prevented.	No	Medium	High	The applicant has stated that the iron oxides and other components are to be stored on site in waste skips until they are disposed of at a registered landfill site. Skips containing waste should be covered to prevent rain ingress,	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								labelled clearly and should not be kept on site for longer than three months.		
AIR QUALITY										
The use of the product, Heavy Furnace Oil, in industrial heating market.	Indirect	Regional	Long-term	No	No	High	n/a	Although liquid fuels have various advantages over using electricity or solid fuels, there is sulphur dioxide and nitrous oxides produced during combustion. When sulphur dioxide combines with moisture, this produces sulphuric acid (impact on health and the environment). There is no mitigation measure for this impact as it is an offsite impact that the applicant cannot be held fully responsible for.	High	Medium
Emissions generated from construction vehicles.	Direct	Local	Construction phase (short-term)	Yes – can be managed	No	Low	Low	Emissions generated from construction vehicles will be minimal and is not expected to significantly affect surrounding communities or air quality. This impact is only relevant during the construction and/or decommissioning phase.	Low	Low
Increase in dust levels during construction.	Direct	Local	Construction phase (short-term)	Yes – can be managed	No	Low	High	There is not expected to be a large amount of dust generated during the construction of the proposed waxy oil facility however dust levels should be visually monitored on site by the contractor. Should dust levels	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								become a problem, the ground should be dampened with municipal water. Dust control is included in the EMP and will be monitored by the ECO during the site audits.		
Release of VOCs and fugitive emissions during filling/ loading/ offloading operations impacting on ambient air quality (AQIA, May 2013).	Direct	Local with the potential of a regional impact	Operational phase (long-term)	Yes – can be managed	No	High	Medium	Trucks offloading or receiving product should not be permitted to idle unnecessarily on the site for long periods of time. All vehicles are to be maintained regularly to ensure efficiency and roadworthiness.	Low	Low
Potential release of odours from the processing facility (i.e. when the decanters are de-sludged).	Direct	Local	Operational phase (long-term)	Yes – can be managed.	No	Medium	Medium	Odours should be monitored on site however neighbouring communities are not expected to be affected by the odours. Ambient air monitoring to be undertaken six monthly. Scrubber/s will be placed on relevant component/s in the deashing process to reduce emissions. De-sludging should be carried out regularly to prevent the build-up of large amounts of sludge which is likely to result in odours.	Medium	Low
Nominal displacement of vapour space into	Direct	Local	Operational phase (long-term)	Yes – can be prevented.	No	Low	High	This usually results in a working loss of vapours from tanks that are vented to the atmosphere. The	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
the atmosphere during delivery of raw product (AQIA, May 2013).								specialist has confirmed that the Evander plant has installed a tank vapour balancing system that greatly reduces the potential for vapour emissions.		
Emissions from coal fired boiler releasing emissions into the atmosphere (AQIA, May 2013).	Direct	Local	Operational phase (long-term)	Yes – can be managed.	No	High	Medium	The air quality specialist recommends that frequent (as prescribed by the relevant authority in the AEL) stack monitoring be undertaken at the proposed heater and vapour scrubber stack at the waxy oil plant to test their efficiency (included in EMPr and as a recommended condition of the environmental authorisation; section 10.0 of the EIR). Ambient air monitoring is to be undertaken on a 6 monthly basis which is part of the AQMP. The oil fired boiler cannot be used as it cannot provide enough steam needed for the operation of the plant.	Medium	Low
An increase in benzene concentrations on site (AQIA, May 2013).	Direct	Local	Operational phase (long-term)	Yes – can be managed	No	Low	Low	The air quality specialist has stated that the benzene concentrations from the additional waxy oil plant ambient concentrations fall well within the respective NAAQS. The AQMP must however include frequent inspection and repair of processing units to reduce hydrocarbons from venting into the	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								atmosphere. There is also to be continuous inspection of tanks rims and seals (inspections as per API 650).		
HAZARDOUS MATERIALS										
Incorrect storage of raw material resulting in soil or groundwater contamination.	Direct	Local	Operation phase (long-term)	Yes – can be prevented.	No	Medium	High	Tanks storing the raw material must be sealed to prevent rain ingress and be within a bunded area to contain 110% of the largest tank. ISHECON have also stated that the tanks are to be designed to comply with SANS 10089.	Low	Low
Potential hydrocarbon spills/ leakages during construction and operation of the waxy oil facility polluting surface and/or groundwater.	Direct	Local	Construction phase (short-term) and operational phase (long-term)	Yes – can be managed	No	Medium	High	<p>The contractor and construction staff must be made aware of the potential groundwater and stormwater impacts. During construction, cement mixing must only occur on a hard surface. Any equipment that could leak oil must be placed on a drip tray. This has been included in the EMPr which will be monitored by the ECO.</p> <p>ISHECON has stated that the tanks are to be designed to comply with SANS 10089. All bulk storage tanks and all processing areas are fully bunded to contain 110% of the largest tank. There is to be a curbed nitric acid offloading area and an onsite emergency plan (MHI Risk</p>	Low	Medium

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								Assessment, July 2010).		
Possible spill of raw product when waxy oil is transferred from the road tankers to the storage tanks and visa versa during offloading. This could contaminate soil/water as well as increasing the risk of fire/explosion events.	Direct	Local	Operational phase (long-term)	Yes – can be prevented and managed.	No	Medium	High	<p>Offloading of the waxy oil and loading of the product onto road tankers should not be carried out where there is the potential for a spill/leak to come into direct contact with the soil (i.e. in a bunded area or soil protected by a drip tray). The loading hoses are to be tested and inspected regularly for leaks. Measures to ensure a quick response time to spilled product within bunded areas to be implemented.</p> <p>Employees are trained annually on loading and offloading procedures (1 and 2E) in order to reduce the potential for spills. Tanks are checked every year as per Procedure 45. Preventative maintenance is also conducted on all equipment regularly as per Procedure 46E.</p>	Low	Low
Risk of spills/leakages from other hazardous materials used in the production process (oils, sludge, waste water etc)	Direct	Local	Operational phase (long-term)	Yes – can be prevented and managed.	No	Medium	High	An organisational measures checklist has been provided by ISHECON in Appendix E of the MHI Risk Assessment (July 2010, Appendix 4 of EIR). These measures aim to reduce the potential major risks associated with the site and include various relief valve testing and inspections	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
polluting the surrounding environment.								<p>of the storage tanks. Measures to ensure a quick response time to spilled product within bunded areas to be implemented. Any hazardous spills that occur are required to be cleaned up appropriately and the waste disposed of at a registered landfill site. FFS adheres to a strict spillage procedure which is improved and upgraded on an on-going basis. FFS has stated that the entire process will be located within a bunded and hard-surfaced area. Sumps will recover any spilt product which will be pumped back to the raw material tank.</p> <p>Various tank features that have been included into the design for pollution control are:</p> <ul style="list-style-type: none"> - the bentonite sealing layer laid below the level of the leak detection pipes. - the series of leak detection pipes cast into the ring beam 100mm below the top level of the ring beam which is above ground level (allows any tank leakage to show itself by dripping out of the leak detection pipes onto the hard surfacing of the floor bund). - the capping layer of bitumen pre- 		

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								<p>mix laid with a slope from the centre to the tank shell.</p> <p>- the flooring from the ring beam to fall at a 1:100 slope away for 15m or to the bund wall (ensures any spillage will drain away from the tank and reduce any fire hazard).</p>		
Improper disposal of oily sludges (byproduct of the waxy oil process) and ash from the coal fired boilers.	Indirect	Local with the potential of a regional impact.	Operational phase (long-term).	Yes – can be prevented.	No	Medium	High	<p>Oily sludges and ash will be collected in road skips for transportation to the appropriately classified landfill site (e.g. Holfontein H;H Landfill). Oily sludges and ash should not be stored on the site for longer than three months. FFS expect approximately 30 tons of oily sludge per month initially, increasing to 75 tons and finally 150 tons a month once fully operational. This equates to 5, 12 and 21 skips per month respectively. Approximately 75 – 150 tons of ash will be produced per month. This is to be stored in a bunded area and the receptacle covered to prevent rain ingress. A reputable, experienced company is to be used to transport the oily sludge and ash to the landfill to ensure that there are no spillages on route.</p>	Low	Low
Failure or deterioration of	Direct	Local	Operational phase (long-term).	Yes – can be prevented.	No	Medium	High	ISHECON have stated that the best assurance against failure is	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
equipment and/or bund integrity leading to spillage of material (MHI, July 2010).			term)					correct design, specification, fabrication and construction procedure. Tanks will be designed to comply with SANS10089 and all bulk storage tanks and processing areas are to be fully bunded to contain 110% of the largest tank. These design requirements should be followed by thorough inspections throughout the life of the equipment.		
Incorrect storage of sludge resulting in oily sludge coming into direct contact with the ground.	Direct	Local	Operational phase (long-term)	Yes – can be prevented.	No	High	High	Sludge will accumulate at the bottom of the designated tanks over a period of time. The oily sludge is to be stored in a designated waste management area which is to be located on an impermeable surface and bunded to prevent any potential seepage from coming into direct contact with the ground. The proposed waste management area will be located adjacent to Tank 12 (see Appendix 4 for layout). Waste is handled as per procedure 18E.	Low	Low
Spills during road transport of the waxy oil and final product to and from the FFS site.	Direct	Local	Operational phase (long-term)	Yes – can be prevented.	No	High	High	A reputable, experienced company is to be used to transport the raw and final products to and from the site to ensure that there are no spillages on route. Existing FFS Evander procedures to handle the loading/ offloading of raw materials and products	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								(Procedures 1 and 2E), handling, storage and use of hazardous substances (Procedure 20E) and waste management (Procedure 18E) must all be revised to include the new processing facility.		
Potential contamination of the “spruit” (stream) if a catastrophic spill occurs and there is a massive firefighting operation).	Direct	Local with the potential to impact regional.	Operational phase (long-term)	Yes – can be prevented.	Yes	Low	High	Unlikely as the stream is located over 250m away from the proposed location of the new waxy oil processing facility. All bulk storage tanks and processing areas will however be bunded to contain 110% of the largest storage tank. Fire water management requires particular attention in the updated FFS on-site emergency plans dealing with major fire emergencies.	Low	Low
Potential leak/rupture in waxy oil loading/off-loading hose and/or pipe transferring the waxy oil to new 1 200m ³ feed tank resulting in spillage of hydrocarbon (MHI, July 2010).	Direct	Local.	Operational phase (short-term impact duration)	Yes – can be prevented and/or managed.	No	Medium	High	ISHECON have confirmed that a hose rupture will not have a major impact beyond the site boundary. Personnel loading/ off-loading the waxy oil are to be trained on the FFS procedures for handling the loading/ offloading of raw materials and products (Procedures 1 and 2E), which is to be updated to include the new process. Loading and off-loading should take place within a contained area so if a leak or spill was to occur, it would be within the bunded area.	Medium	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
Potential leaks, punctures or ruptures in the pipes/ tanks used during the distillation process in the FFE and/or blending tanks resulting in a hydrocarbon spill, (MHI, July 2010).	Direct	Local	Operational phase (short-term impact duration)	Yes – can be prevented.	No	Medium	High	As above, ISHECON have confirmed that tank failure into the bunded areas will not have a major impact beyond the site boundary. Tanks will be designed to comply with SANS10089 and all bulk storage tanks and processing areas are to be fully bunded to contain 110% of the largest tank. These design requirements should be followed by thorough inspections throughout the life of the equipment.	Medium	Low
Rupture/leak of nitric acid offloading hose and/or transfer piping and/or nitric acid bulk storage tank resulting in a safety concern (MHI, July 2010).	Direct	Local	Operational phase (short-term impact duration)	Yes – can be prevented.	No	Medium	High	The specialist recommends that the nitric acid offloading area be curbed. A nitric acid spill should be incorporated into the onsite emergency plan (an Emergency Procedures checklist has been included in Appendix E of the MHI Assessment as a guide to improving the onsite emergency plan for an MHI). All tanks will be designed to comply with SANS10089 and all bulk storage tanks and processing areas are to be fully bunded to contain 110% of the largest tank. Thorough inspections throughout the life of the equipment should be undertaken. ISHECON has stated that the offloading points should be fitted with different couplings to	Medium	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								reduce the risk of a mixing incident which could result in an explosion or the generation of heat/ NO _x fumes.		
Incorrect storage of nitric acid at the site leading to an explosion/ spill or the release of NO _x fumes.	Indirect	Local	Operational phase (short-term impact duration).	Yes – can be prevented.	No	Medium	High	<p>Nitric acid should be safely stored away from bases and organic compounds such as turpentine, cleaning detergents⁵ or metallic powders. It should also not be stored near any assembly points as nitric acid give off fumes if not handled and stored correctly. Excess quantities of nitric acid should not be stored on the site. The storage area should be clearly labelled with signage indicating the flammable nature of the acid.</p> <p>The Material Safety Data Sheet (MSDS) for Heavy Fuel Oil (Appendix 5) states that Heavy Fuel Oil should avoid strong oxidisers and is incompatible with nitric acid. Nitric acid should therefore not be stored directly adjacent to any Heavy Fuel Oil.</p> <p>The MSDS for nitric acid (Appendix 5) includes a list of materials that the chemical reacts with. Nitric acid must not be stored</p>	Low	Low

⁵ ISHECON MHI Assessment, July 2010.

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								or exposed to these listed materials (includes wood, paper, cloth and most metals).		
Ineffective treatment of effluent.	Direct	Local, with potential to impact regional.	Operational phase (long-term)	Yes – can be prevented.	No	Medium	High	Effluent is treated on site. Any contaminated and or uncontaminated water from bunded or unbunded areas (directed to sumps); oily water from FFE/Decanters are directed into the effluent plant for treatment. Effluent is fed into the Dissolved Air Flotation Unit (DAF) where air is bubbled through the water to separate the tar/oil and water. Oil is skimmed off and transferred to designated tank. Effluent may then be discharged under permit to sewer. Effluent samples are taken daily for analysis of pH and phenol, and weekly for settleable solids, suspended solids, TDS, COD and oil content. Full effluent analysis are undertaken annually.	Low	Low
SERVICES										
Increase in traffic disruptions on surrounding access roads during the construction period.	Direct	Local	Construction phase (short-term)	Yes – can be managed	No	Low	Medium	There is only expected to be a negligible increase in traffic on the surrounding road networks however flagsmen must be provided where necessary if it is anticipated that construction vehicles or machinery may affect traffic along the access roads.	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
								Traffic has been included in the EMP (Appendix 3).		
Effluent discharged not meeting municipal standards.	Direct	Local with the potential of a regional impact	Operational phase (long-term)	Yes – can be managed	No	Medium	High	All stormwater falling within the bunded area will drain into a sump and be transferred to the existing effluent plant for treatment before release into the municipal system or possible re-use on site. There is currently a permit for discharging the treated effluent.	Low	Low
Potential increased pressure on municipal services (i.e. water supply and electricity).	Direct	Local	Operational phase (long-term)	Yes – can be managed.	No	Low	Low	The existing FFS site in Evander was designed and built with an expansion of this nature in mind and thus allowance has already been made for all utility requirements. There is not expected to be any changes to the volume of domestic sewage with the installation of the new waxy oil facility. It is anticipated that the existing electricity supply will be sufficient for the proposed waxy oil facility which is expected to require approximately 50 – 75 kW/month of electricity to operate.	Low	Low
Leak on high pressure high temperature equipment may result in a jet fire impinging directly on near-by equipment	Direct	Local	Operation phase (short-term)	Yes – can be prevented.	No	Low	High	Unlikely as “most of the equipment on the plant operates under vacuum conditions and therefore jet fires are highly unlikely” (MHI, July 2010). Preventative and Protective measures to be incorporated into the design of the installations to minimize Major	Low	Medium

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
leading to domino failures (MHI, July 2010).								<p>Hazard Incidents are outlined on page 21 of the MHI report (and summarized in section 3.2.1 of the EIR). These include employee training, tank design, bunds, curbed offloading areas, emergency plans and firefighting on the site.</p> <p>There is an existing fire protection system in place that will be extended to cover the new facility. The applicant is to consult with the fire department once the fire system has been extended (included in section 10 of the EIR as a recommended condition for authorisation). The on-site emergency plans are required to be reviewed to take into the new facilities and associated hazards.</p> <p>Tank inspection to be undertaken as per Procedure 45 (Appendix 6). This is a recommendation of the AQMP. These inspections will aid in reducing the likelihood of a jet fire from occurring by detecting any minor leaks as soon as they occur.</p>		
SOCIAL										
Potential for job creation during	Direct	Local	Operational phase (long-	No mitigation measure required. The new facility will provide 12 new employment opportunities (see section 4.5 of the EIR for a breakdown of the expected employment opportunities).						

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
the construction period.			term)							
Potential unearthing of artifacts of cultural heritage significance	Direct	Local	Construction phase (short-term)	Yes – can be managed	No	Low	Medium	It is not anticipated that there will be any artefacts of heritage / cultural significance as this is an existing industrial site. Should any graves or artefacts be identified, construction must immediately stop and SAHRA must be notified.	Low	Low
HEALTH AND SAFETY										
Potential risks posed to surrounding industries in terms of fire, explosion, etc.).	Direct	Local with the potential to impact regional.	Operational phase (long-term)	Yes – can be prevented.	No	Low	High	<p>The MHI Risk Assessment (Appendix 4) concluded that there will only be offsite impacts under worst case scenario such as a catastrophic failure of the new bulk oil tanks, the nitric facilities and high temperature processing equipment. The increase in offsite risk posed by the proposed waxy oil facility was therefore rated as “very low” by the specialist.</p> <p>There are a number of quality assurance measures (tank design parameters and safe operating procedures) and protective features (bunds and emergency plans) that are to be incorporated into the design of the installations to minimize the potential for major hazard incidents (full list on page 21 of the MHI Risk Assessment, July 2010 attached in Appendix 4).</p>	Low	Medium

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
Occupational health impact associated with the handling of waxy oil. The handling of the oils may cause occupational diseases through inhalation of vapours, skin contact or ingestion.	Direct	Local	Operational phase (long-term)	Yes – can be prevented.	No	Medium	High	<p>This may occur during handling and maintenance of equipment. All employees who handle the proposed waxy oil and process chemicals on site will be required to wear the appropriate Personal Protective Equipment (PPE). The relevant PPE is outlined in the Material Safety Data Sheet (MSDS) for Waxy Oil (Appendix 5).</p> <p>The MSDS for Waxy Oil must be made available on site and employees working with the waxy oil are to be educated and aware of the details of the MSDS.</p> <p>Training on the use and storage of hazardous substances is currently undertaken on an annual basis and forms part of the environmental management system requirements of the FFS site. All employees will continue to be given annual health & safety training. They will also be required to have annual medicals for early detection of occupational diseases. Current ambient air sampling is undertaken on a 6 monthly basis, thus is to include the waxy oil plant.</p>	Low	Low

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
<p>There are a number of potential equipment or system failure events, identified by ISHECON that could result in a fire or explosion occurring on the site. The various impacts include:</p> <ul style="list-style-type: none"> - Pool fire from a vessel or pipe rupture or leak damaging bund/tank integrity, - Flash fire occurring in the high temperature processing units effecting employees on the site, - Potential for an internal explosion to occur within the large vessels on site, - Inadequate ventilation 	Direct	Local with the increase in offsite risks being very low (one in 2000 years).	Operational phase (long-term)	Yes – impact can be prevented.	No	Medium	High	<p>From an MHI perspective, the new processing facility does not present any major concerns over and above those currently onsite (page 5 of the MHI report in Appendix 4 of the EIR). ISHECON recommended that the site occupied building study should be conducted as part of the MHI update to evaluate the risks against international guidelines such as the “Guidance for the location and design of occupied buildings on chemical manufacturing sites”.</p> <p>In the interim, the admin building and workshops within 50m of the new processing plant have:</p> <ol style="list-style-type: none"> blast resistant windows on all sides and emergency exits exiting south, west or east. <p>Assembly points to consider the “shelter-in-place indoors” policy to avoid any nitric acid fumes.</p> <p>Preventative and Protective measures to be incorporated into the design of the installations to minimize Major Hazard Incidents are outlined on page 21 of the MHI report (and summarized in section</p>	Low	Medium

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
<p>resulting in a confined explosion,</p> <ul style="list-style-type: none"> - Small possibility of a ruptured high pressure high temperature vessel containing hydrocarbons could result in an unconfined explosion, - Potential for a BLEVE in the reboiler on the distillation plant effecting workers on the site, - Possible release of fumes from acute exposure to nitric acid fumes. which could impact the workers on the site. - Possible equipment failure resulting in an uncontrolled rise in pipe/vessel pressure increasing the 								<p>3.2.1 of the EIR). These include employee training, tank design, bunds, curbed offloading areas, emergency plans and firefighting on the site.</p> <p>There is an existing fire protection system in place that will be extended to cover the new facility. The applicant is to consult with the fire department once the fire system has been extended (included in section 10 of the EIR as a recommended condition for authorisation). The on-site emergency plans are required to be reviewed to take into the new facilities and associated hazards.</p> <p>Tanks to be inspected as per existing Procedure 45. These inspections will aid in reducing the likelihood of a confined explosion from occurring by detecting any minor leaks as soon as they occur.</p> <p>The FFS site is currently operating an ISO 14001 based environmental management system with the proposed project being part of a designated environmental management plan to ensure full compliance with all</p>		

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
<p>potential for a fire/explosion</p> <ul style="list-style-type: none"> - Potential puncture/rupture in the waxy oil feed tank resulting in an explosion or internal fire open roof. - Potential internal explosion in the fired heater in the distillation plant, rupture or puncture of nitric acid fumes. road tanker resulting in possible MHI event depending on quantity of nitric acid fumes. spilt. - inadequate purging during shut down and start-up operations resulting in the ingress of foreign oxidizing material. 								<p>legal requirements and to ensure appropriate monitoring and assessment takes place. The applicant has stated that existing procedures to handle the loading/offloading of raw materials and products (Procedures 1 and 2 E); handling, storage and use of hazardous substances (Procedure 20E); waste management (18E); emergency procedures (6E; 11E and 64E); sampling and analysis (32E); underground and above ground tank testing (Procedure 45); environmental reporting (58E) will all be revised to include the new project. This has been included as a recommended environmental authorization condition in section 10 of the EIR.</p>		

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
A full list of all possible equipment and system failure possibilities is included in Appendix B of the MHI Report (Appendix 4 of the EIR). All these potential impacts have a similar result (i.e. fire and/or explosion) and therefore the same mitigation measure applies.										
Hot work tools used during maintenance/ warming up procedures increasing the risk of a source of ignition (MHI, July 2010).	Indirect	Local	Operational phase (long-term).	Yes – can be prevented.	No	Medium	High	Where possible, hot work tools should be avoided during maintenance or warm up procedures. All employees working in this area must be made aware of the risk that hot tools could have as a source of ignition. After any maintenance has been carried out at the new facility, it is recommended that a designated safety person inspect the facility to ensure that no hot work tools have been left behind.	Low	Low
Potential safety issues for workers on site related to	Direct	Local	Operational phase (long-term).	Yes – can be prevented and managed.	No	Medium	High	Since the onsite risk will increase with the proposed facilities, ISHECON recommends that the	Low	Medium

Nature of Impact (potential)	Direct or Indirect	Extent of Impact	Duration of Impact	Can impact be prevented /reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
the MHI status of the proposal (MHI Risk Assessment, July 2010)								admin building and the workshops located within 50m of the proposed new processing plant have blast resistant windows on all sides, emergency exits from the buildings be towards the south or west or east (i.e. not only north) and assembly points be located indoors (best shelter from nitric acid toxic fumes). Workers on site are to be aware of the FFS EMS procedures, specifically emergency procedures (reference: 6E; 11E and 64E).		

From the assessment of impacts identified in the table above, the majority of mitigation measures involve preventative action in the form of quality assurance and protective features for the equipment and employees working at the proposed facility. After reviewing the table of impacts there are three key impact areas which are discussed in more detail below:

Waste Management

Due to the hazardous nature of the materials involved with the process on the site, it is of importance that the materials are stored, transported and disposed of appropriately to avoid any soil and/or groundwater contamination. This is also necessary from a health and safety perspective. MSDS are required to be available on the site and storage recommendations adhered to (MSDS included in Appendix 5 of the EIR). Storage and disposal of the oily sludge is of particular importance and should not be stored on site for extended periods of time due to its hazardous nature and the odours that will be released over time. **The accumulation of ash from the coal-fired boilers on site is also to be appropriately stored within a designated bunded area.** An appropriately licensed landfill site must be used for the disposal of hazardous waste and safe disposal certificates kept on the site. Section 3E and 3H in the EMPr (Appendix 3) specifically deals with waste management and hazardous materials storage. FFS employees are to be trained annually on loading and offloading procedures and tank integrity checked as per Procedure 45 (Appendix 6).

Taking into consideration the relevant MSDS' and EMPr conditions, it is unlikely that the hazardous materials will significantly impact on the surrounding environment. Precautionary measures have also been included in the design of the proposed facility (i.e. sufficiently bunded tank storage area and curbed loading areas directing spills into a sump).

It is imperative that effluent samples continue to be taken daily for analysis of pH and phenol and weekly for settleable solids, suspended solids, TDS, COD and oil content. Full effluent analysis are to continue to be undertaken annually.

Air Quality

While it is noted that all predicted concentrations of PM₁₀, SO₂, NO₂ and benzene fall well within the respective NAAQS, bi-annual stack monitoring, leak detection and ambient air monitoring is to continue and must include monitoring of the new processing plant (see environmental condition recommendations in section 10.0 of the EIR).

Once issued, any conditions prescribed in the Air Emissions License for the site are to be adhered to. The impact of the proposed waxy oil plant on ambient air quality and local environmental health should therefore be negligible (section 9.0 of the AQIA, May 2013).

MHI Risk

Please note that while the EIR includes potential safety impacts associated with the proposed processing facility, the EAP is not qualified to fully prescribe specific recommendations and draw conclusions regarding safety on site.

The risk specialist has indicated that the offsite risks are very low and only the onsite risks will increase. It will therefore be important for FFS Refiners to educate and train the relevant employees on the dangers, precautions and emergency responses for various incidents. FFS have stated that training on the use and storage of hazardous substances is included in the site environmental management system requirements. This training is to include the four new hazardous materials (Waxy oil, Heavy Fuel Oil, Nitric acid and Thermal oils). New employees working at the proposed processing facility are to be inducted before commencing work. Induction training is to include the correct storage, handling and transportation of the hazardous materials ensuring that there is no soil or groundwater contamination. Training has been outlined in section 3I of the attached EMPr.

The FFS Environmental Management Procedures (specifically the Emergency Procedures) are to be revised to include the new processing plant (see environmental condition recommendations in section 10.0 of the EIR). Preventive and protective measures outlined on page 21 of the ISHECON MHI report will sufficiently reduce the risks of an explosion/fire from occurring on the site with the most likely failure events occurring once in 500 years and major catastrophic events occurring less than once in 500 000 years.

6.3 Environmental Management Programme [Regulation 31 (2) (p) and 33]

An Environmental Management Programme (EMPr) in accordance with regulation 33 has been compiled and is included in Appendix 3.

6.4 Determination and Assessment of Cumulative impacts [Regulation 32 (2) (l) (i)]

The NEMA EIA regulations define cumulative impact as follows:

“The impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area;”

The DEA guideline on the assessment of alternatives and impacts identifies two types of cumulative impacts:

- (1) Additive cumulative impact, i.e. where the identified potential impact adds to the impact which is caused by other similar impacts; or
- (2) Interactive cumulative impact, i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts can be further classified:
 - (a) Countervailing: the net adverse cumulative impact is less than the sum of the individual impacts; or
 - (b) Synergistic: the net adverse cumulative impact is greater than the sum of the individual impacts.

Table 12 provides an assessment of potential cumulative impacts that may arise from the development proposal:

Table 12: Assessment of potential cumulative impacts for the construction and operation of the proposed waxy oil facility

Nature of Impact (potential)	Extent of Impact	Duration of Impact	Type of cumulative impact	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
Since the Evander site falls within the Highveld Priority Area, an identified pollution hotspot, the release of vapours and fugitive emissions from the storage tanks may contribute to the existing air quality of the surrounding area and contribute to poor regional air quality.	Potential regional impact due to the Highveld Priority Area	Operational phase (long-term)	Additive	High	<p>The AQIA (Appendix 8) demonstrated that the cumulative air quality impact emanating from the site when the waxy oil plant is added to the existing facility, is expected to increase marginally however no significant concerns are expected to arise with respect to the impact of the proposed waxy oil plant on ambient air quality and local environmental health.</p> <p>The ambient concentrations of PM₁₀, SO₂, NO₂, and benzene concentrations fall well within the respective NAAQS.</p> <p>All emissions will however be minimised as follows:</p> <ul style="list-style-type: none"> - All tanks will have hermetically sealed roofs. - All tank vents will have air-cooled condensers fitted to condense and return all vapour back in to the tanks. - All tanks will have vacuum-pressure breaks fitted to reduce the amount of vapour formation in the tanks. - Tanks storing Class I products will direct all vapour through a wet scrubber to remove the hydrocarbons down to the required level. <p>The storage tanks on the site are also to be design according to SANS 10089 to reduce the likelihood of leaks (MHI risk assessment, July 2010). The air quality specialist recommends that the AQMP include a LDAR approved by a licensing authority in line with requirements of the NEM: AQA. These measures will contribute to reducing short term peaks in the air pollution concentrations.</p> <p>Biannual ambient air monitoring on the FFS Evander site</p>	Low	Low

Nature of Impact (potential)	Extent of Impact	Duration of Impact	Type of cumulative impact	Mitigatory Potential	Mitigation measure	Probability after mitigation	Significance after mitigation
					must be extended to include the proposed tank storage facility. Pollutants measured biannually from point sources and dispersed emissions are the BTEX volatile organic compounds, the inorganic oxides of nitrogen and sulphur dioxide.		
The presence of an additional processing facility within the existing operations increasing the risk profile of the site and the area, adding to the existing industrial risk of the area.	Local	Operational phase (long-term)	Additive	High	The existing FFS tar processing facility is a registered MHI. ISHECON concluded that the new processing facility does not present any major concerns above those of the current site. If preventative and protective measures, outlined on page 21 of the MHI (Appendix 4) and summarized in section 3.2.1 of the EIR, are incorporated into the design of the installations the likelihood of a Major Hazardous Incidents from occurring will be greatly minimized.	Low	Medium
Increase in hazardous material to the Holfontein H: H Landfill site or other appropriately classified landfill site.	Local	Operation phase (long-term)	Additive	Low	<p>In-organic sludge (ash and metals) will be transported via road skips to an appropriately classified hazardous landfill. FFS Refiners expected approximately 30 tons per month initially, increase to 75 tons per month and finally to 150 tons per month. This will equate to 5, 12 and 21 skips per months respectively.</p> <p>It is likely that with the addition of another process on site that more ash will be generated. Ash is to be reused or sent to relevant landfill.</p> <p>FFS are required to contact the relevant landfill that will be used to ensure that there is enough capacity to handle the increase in hazardous skips over time. Proof of communication should be retained on the site for audit purposes.</p> <p>It is important to keep in mind that the proposed waxy oil facility will process a non-renewable resource which would otherwise be disposed of as hazardous waste.</p>	Low	Low

The specialist studies have confirmed that all cumulative impacts identified in Table 12 above either have a negligible impact and/or can be sufficiently mitigated. WSP have stated that there will be an insignificant increase in ambient air quality in the Highveld Priority Area when the proposed waxy oil plant is added to the existing facility (AQIA, May 2013). The proposed new facility also does not present any major concerns above those of the current site from an MHI perspective (MHI Risk Assessment, July 2010). The offsite risks posed by the proposed additional operations is very low and the onsite risks are within the 'tolerable provided ALARP' range. Recommendations made by the risk specialist (summarised in section 3.2.1. of the EIR) to reduce the onsite risks have been included in the EMP (Appendix 3).

Once the applicant has notified the relevant hazardous landfill site regarding the quantities of waste expected to be delivered to the landfill, the increase in hazardous material received by the landfill can be sufficiently managed and safely disposed of.

7.0 Comparative assessment of all alternatives identified during the Environmental Impact Assessment process [Regulation 31 (2) (i)] and the rating of the identified potential alternatives including advantages & disadvantages that the proposed activity may have on the environment and community that may be affected by the activity [Regulation 31 (2) (g)].

The various environmental, social and economic advantages and disadvantages for the proposed waxy oil processing facility as well as the no go alternative have been tabulated below. This is a comparative assessment which includes the advantages and disadvantages of the two alternatives during the operational phase of the proposed facility.

Table 13: Comparative Assessment between the No Go alternative and the Operation of the Proposed Waxy Oil Processing Facility.

	No Go	Alternative: Construction of the waxy oil processing facility.
ENVIRONMENTAL impacts / opportunities	<ul style="list-style-type: none"> The proposed site will remain as a mowed grass field with no additional environmental impact or opportunities. Waxy Oil currently produced at the Sasol Synfuels synthetic fuel process in Secunda will be sold as a high ash burning fuel resulting in added particulate matter dispersion into the atmosphere at various sites around South Africa. 	<ul style="list-style-type: none"> Short-term peak in air pollution concentrations resulting from a spilled product and fugitive emissions from general operation. Marginal increase in air pollution concentrations however no local environmental health concerns. Reduction in non-renewable resource which would otherwise be disposed of as a hazardous waste.
ECONOMIC feasibility	No change in the economic status of the Evander site.	Expanding the current FFS Evander site's facilities and selling the processed waxy oil as Heavy Furnace Oil will increase the economic productivity of the site. This alternative is therefore more economically feasible compared to the no go alternative.
SOCIAL implications	No additional direct and/or indirect social implications.	<ul style="list-style-type: none"> No significant increase in offsite risk posed by the additional processing facility from a MHI perspective. No significant air quality concerns expected on ambient air quality.
Policy or legal requirements	<ul style="list-style-type: none"> Waste Management License pending Atmospheric Emissions License pending 	<ul style="list-style-type: none"> Waste Management License pending Atmospheric Emissions License pending Update of FFS EMS procedures and environmental management plan.
Positive impacts	No additional positive impacts.	<ul style="list-style-type: none"> Reduction in non-renewable resource which would otherwise increase many users particulate matter when burnt as a high ash burning fuel. Additional employment opportunities.

In terms of rating, the alternative was reviewed by a matrix system using the following criteria:

- Which alternative is more suitable from an environmental services / biological perspective at least in terms of the site itself?
- Which alternative is more feasible from the perspective of the environmental services / biological perspective from a regional perspective?
- Which alternative is more suitable from the perspective of the surrounding communities / businesses in terms of services or benefits they may receive?
- Which alternative is more suitable from the perspective of the surrounding communities / businesses in terms of impacts i.e. traffic, that may affect them?
- Which alternative is more economically feasible and also more viable for the developer?

Table 14: Rating of Alternatives

Key: 0 = not viable (or may cause impact); 1 = less viable (or impact can be mitigated); 2 = most viable (or no impact caused);

	No Go	Alternative
Environmental Services / Biological – on site	2	1
Environmental Services / Biological – regional	2	2
Surrounding Communities / Businesses – services / benefits / positive impacts	2	2
Economic Feasibility & Viability for the developer	1	2

Since there are no other biological services present on the piece of proposed site, air quality was considered when rating the impact of the proposed waxy oil processing plant on the onsite environmental services. Short-term peaks in air pollution could result from spilt product but the impact will not decrease the rating significantly to reduce the proposed development as “unviable”. The air quality specialist has stated that the ambient air concentrations fall within the respective NAAQS and therefore the impact of the proposed facility in terms of the regional environment services has the same rating as the no go option.

According to ISHECON as well as the AQIA, there will be no significant impact during the operation of the waxy oil processing facility on surrounding communities. Offsite risks are not increased with the operation of the proposed new facility. The alternative is more economically profitable for FFS Refiners when compared to the no go alternative where this section of the Plant will be left undeveloped.

8.0 Assumptions, Uncertainties and Gaps in Knowledge [Regulation 31 (2) (m)]

The EAP is satisfied that sufficient information has been made available to allow for assessment of this proposal. The opinion of the EAP has been based on the specialist studies listed in section 4.8 of the EIR. Limitations and uncertainties of the AQIA are listed under section 8 of the report (Appendix 8).

9.0 Environmental Impact Statement with Summary of Key Findings and Comparative Assessment of The Positive and Negative Implications of The Proposed Activity and Identified Alternatives; [Regulation 31 (2) (o) i-ii]

It is important to keep in mind that the FFS Evander site was constructed with an expansion of this nature in mind. The site currently has approval for 15 000m³ storage tank capacity. The proposed site within the existing plant is currently a maintained grass lawn offering very little environmental services. The Air Quality Impact Assessment (May 2013) has concluded that there will only be a marginal increase in ambient air concentrations of PM₁₀, SO₂, NO₂ and benzene which will not impact air quality or local environmental health. The onsite risks identified in the MHI Risk Assessment, can be mitigated according to recommendations in the assessment (Appendix 4).

The EAP is satisfied that once the recommended mitigation measures and monitoring procedures have been put in place and/or updated, the impact that the proposed processing facility will have on the environment and surrounding communities will be negligible.

10.0 Reasoned Opinion on Authorization and Conditions for Authorization [Regulation 31 (2) (n)]

When deciding whether the activity should or should not be authorised, the EAP has evaluated and considered all identified impacts as listed in Table 11 as well as the cumulative impacts listed in Table 12. Where impacts cannot be avoided, the significance of these impacts was measured. The EAP has included specialist recommendations and prescribed mitigation measures into the EMPr (Appendix 3). Provided that the applicants and contractors adhere to the specifically designed EMPr, the EAP is of the opinion that environmental authorisation should be **granted** for the construction and operation of the proposed waxy oil processing facility as illustrated in Appendix 2.

Taking into account the above mentioned factors, a number of conditions for Environmental Authorisation can be prescribed. These conditions include:

1. The applicant must ensure that mitigation measures and controls specified in the EMPr are adhered to.
2. Environmental audits during the construction phase should be conducted on a monthly basis or at an agreed upon interval depending upon rate of construction by an independent ECO in addition to post-construction audit (PCA).
3. Existing infrastructure (i.e. electricity lines, water pipelines) must be identified prior to construction.
4. The contractor and all staff must attend an environmental awareness training course, presented by the independent ECO prior to construction commencing. The environmental awareness training course should cover the following key aspects: (a) basic awareness and understanding of key environmental features of the work site (b) understanding the importance of, and reasons why, the environment must be protected, (c) ways to minimize environmental impacts, and (d) requirements of the Environmental Authorisation and EMPr.
5. Adequate toilet facilities must be provided for all staff members as standard construction practice.
6. When sourcing building materials such as sand and stone, company details and proof of registration must be available on site for auditing purposes. This should prove that the company is obtaining materials from a permitted site.
7. Littering must not be permitted on the site and general housekeeping must be enforced.
8. Waste must be stored in the designated waste management area and must not be allowed to blow around the site or be placed in piles adjacent to the skips / bins and must be disposed of at an appropriate land fill site.
9. If there is any hazardous waste, it must be stored on a hard surface within a bunded area and must not be allowed to enter the surrounding environment.
10. All excess material and rubble, not being used on the site, must go to an approved, designated landfill and a safe disposal certificate must be obtained.
11. Normal construction hours must be adhered to and weekend work minimised where possible.
12. As recommended in the Air Quality Impact Assessment (WSP; May 2013), an Air Quality Management Plan is to be developed for the site/ the existing AQMP is to be revised to include the proposed waxy oil facility.
13. Annual stack monitoring, leak detection and 6 monthly ambient air monitoring is to continue and must include monitoring of the new processing plant.
14. As recommended in the MHI Risk Assessment (ISHECON; July 2010), the full site occupied building study should be conducted as part of the MHI update, preferably at least prior to commissioning of the new facilities.
15. Preventative and Protective measures as outlined on page 21 of the MHI Risk Assessment (ISHECON; July 2010) are to be incorporated into the design of the installations to minimize Major Hazard Incidents.
16. The existing fire protection system and on-site emergency plans are required to be extended and reviewed to cover the new facilities and associated hazards. The updated emergency plan should take into account
 - (a) In terms of assembly points, it should be noted that with possible emissions the best protection is afforded by a policy of shelter-in-place indoors.
 - (b) The on-site assembly points, may need to be reviewed to take the new facilities into account.
17. The existing FFS procedures to handle the loading/ offloading of raw materials and products (Procedures 1 and 2 E); handling, storage and use of hazardous substances (Procedure 20E); waste management (18E); emergency procedures (6E; 11E and 64E); sampling and analysis (32E); environmental reporting (58E) and tank testing (Procedure 45) must be revised to include the new facility.
18. As recommended in the MHI Risk Assessment (ISHECON; July 2010), FFS are to confirm with the relevant local emergency services that the authorities off-site emergency plan is updated for the new installation.
19. As recommended in the MHI Risk Assessment (ISHECON; July 2010), FFS are required to record and report to the relevant national, provincial and local authorities major incidents, incidents which brought the emergency plan into action as well as near-misses. The records must be available on the site for inspection.
20. As recommended in the Geotechnical Investigation (WSP; February 2009), prior to construction, foundations should be inspected and approved by a competent person to ensure the foundation is found.

- ~~21. FFS Refiners are to secure their Waste Management License as soon as possible and comply with any prescribed conditions therein.~~

11.0 References

DEA&DP 'Guideline on Alternatives, NEMA EIA Regulations Guideline and Information Document Series. Western Cape Department of Environmental Affairs & Development Planning' (2011).

Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste: Department of Water Affairs and Forestry; 2nd Edition (1998)

Appendix 1: Locality map

Appendix 2: Site map of existing Evander Plant including the location of the proposed new facility

Appendix 3: Environmental Management Programme

Appendix 4: MHI Risk Assessment (ISHECON; July 2010)

Appendix 5: Material Safety Data Sheets for Nitric Acid, Waxy Oil and Heavy Furnace Oil

Appendix 6: FFS Environmental Management System Procedure 45

Appendix 7: Geotechnical Report (WSP, February 2009)

Appendix 8: Air Quality Impact Assessment (WSP, May 2013)

Appendix 9: Public Participation

Appendix 9.1: Proof of Notification

Appendix 9.2: I & AP Register

Appendix 9.3: BID and Proof of Distribution

Appendix 9.4: Advert

ADVERTISED: RIDGE TIMES
DATE: 27TH FEBRUARY 2009

Notice of Application for Scoping and EIA
Notice is hereby given that an application for environmental authorization in terms of the EIA Regulations, 2006 (Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998, as amended) has been lodged with the Mpumalanga Province Department of Agriculture and Land Administration

The proposed activity requires application subject to scoping and EIA and all interested and affected parties are invited to register with the contact person below within 14 days of the issuing of this notice. FFS Refiners Pty (Ltd) proposes to construct a 2500m² process facility at their existing plant located on 3 Brunel Road, Evander. The facility will be used to filter iron catalyst fines and carbon particulates from a product called Waxy Oil. The final processed product will be a low sulphur oil that can be used as a fuel source for the industrial heating market. An open day will be held on the 18th of March 2009. The time and venue will be confirmed with registered interested and affected parties. Representations with respect to this application may be made by phone, fax or e-mail to the contact person below.

ENVIRONMENTAL MANAGEMENT

Kerry Seppings Environmental Management Specialists cc

Contact: **Leena Ackbar**
Phone: **031 765 6636**
Fax: **031 765 6632**
E-mail: **kerry.seppings@telkomsa.net**

Mpumalanga-Bekend 5

Vrydag 27 Februarie 2009

Kennisgewing van aansoek vir omgewingsmagtiging
Hiermee word kennis gegee dat aansoek vir omgewingsmagtiging ingevolge Omgewingsimpakstudie-regulasies, 2006 (Regulasies ingevolge hoofstuk 5 van die Wet op Nasionale Omgewingshennatuur, 1998, soos gewys g) ingedien is by die Mpumalanga Provinsie se Departement van Landbou en Grondadministrasie.

Die voorgestelde aktiwiteit vereis dat die aansoek onderbewys is aan 'n "scoping" en omgewingsimpakstudie. Alle belangstellers en geaffekteerde partye word versoek om, binne 14 dae vanaf die uitreiking van hierdie kennisgewing, by ondergenoemde kontakpersoon te registreer.

FFS Refiners (Edms) Bpk stel voor om 'n 2 500 m² behandelingsfasiliteit op hul perseel te bou, geleë te Brunelweg 3, Evander. Die fasiliteit sal gebruik word om tyf ysterkatalisatormiddels en koolstofdeeltjies uit 'n produk genoem "waxy oil" te filter. Die finale produk wat vervaardig sal word is 'n olie met 'n lae swaartehoud wat in 'n mark gebruik kan word as 'n brandstof vir industriële verhitng. Op die 18de Maart 2009 sal 'n ops dag gehou word. Die tyd en plek van vergadering sal bevestig word met alle belangstellende en geaffekteerde partye wat registreer het. Kommentaar met betrekking tot hierdie aansoek mag per te stoon, teks of e-pos by die kontakpersoon ingedien word.

ENVIRONMENTAL MANAGEMENT

Kerry Seppings Environmental Management Specialists Bk
Kontakpersoon: **Leena Ackbar**
Tel: **031 765 6636**
Faks: **031 765 6632**
E-pos: **kerry.seppings@telkomsa.net**

Appendix 9.5: Proof of Distribution of Draft Scoping Report

Appendix 9.6: Scoping Report Approval, Distribution and Exemption letter

Appendix 9.7: Proof of Distribution of Draft and Final EIR

Appendix 9.8: Comments and Response Table

Appendix 10: Effluent Permit

Appendix 11:

- **Process Flow Diagram: Existing Process at Evander**
- **Process Flow Diagram: Proposed Waxy Oil Process**

Appendix 12: Air Emissions License Correspondence