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# POST-APPLICATION DRAFT BASIC ASSESSMENT REPORT

FOR THE

## PROPOSED DEVELOPMENT OF A PILOT DEPOLYMERISATION PROCESSING PLANT ON PORTION 21 OF THE REMAINDER OF THE FARM RHEEBOKSFONTEIN NO.142 IN MOSSEL BAY, WESTERN CAPE.



In Terms Of The National Environmental Management Act, 1998 (Act No. 107 Of 1998) And The Amended (April 2017) Environmental Impact Assessment Regulations, 2014

**PREPARED FOR:** ROOIKAT RECYCLING PTY LTD  
POST BOX 308,  
MOSSEL BAY  
6500

**DATE:** October 2020

**SES REF NO:** CT12/DBAR/10/2020  
**DEA&DP REF NO:** 19/2/5/1/D6/29/WL0096/20



## **BASIC ASSESSMENT REPORT**

**THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND  
THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS.**

**NOVEMBER 2019**

(For official use only)	
Pre-application Reference Number (if applicable):	
EIA Application Reference Number:	
NEAS Reference Number:	
Exemption Reference Number (if applicable):	
Date BAR received by Department:	
Date BAR received by Directorate:	
Date BAR received by Case Officer:	

### **GENERAL PROJECT DESCRIPTION**

(This must Include an overview of the project including the Farm name/Portion/Erf number)

**PROPOSED DEVELOPMENT OF A PILOT DEPOLYMERISATION PROCESSING PLANT ON  
PORTION 21 OF THE REMAINDER OF THE FARM RHEEBOKSFONTEIN NO.142 IN MOSSEL  
BAY, WESTERN CAPE.**

## IMPORTANT INFORMATION TO BE READ PRIOR TO COMPLETING THIS BASIC ASSESSMENT REPORT

1. **The purpose** of this template is to provide a format for the Basic Assessment report as set out in Appendix 1 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended) in order to ultimately obtain Environmental Authorisation.
2. The Environmental Impact Assessment ("EIA") Regulations is defined in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") hereinafter referred to as the "NEMA EIA Regulations".
3. The required information must be typed within the spaces provided in this Basic Assessment Report ("BAR"). The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided.
4. All applicable sections of this BAR must be completed.
5. Unless protected by law, all information contained in, and attached to this BAR, will become public information on receipt by the Competent Authority. If information is not submitted with this BAR due to such information being protected by law, the applicant and/or Environmental Assessment Practitioner ("EAP") must declare such non-disclosure and provide the reasons for believing that the information is protected.
6. This BAR is current as of **November 2019**. It is the responsibility of the Applicant/ EAP to ascertain whether subsequent versions of the BAR have been released by the Department. Visit this Department's website at <http://www.westerncape.gov.za/eadp> to check for the latest version of this BAR.
7. This BAR is the standard format, which must be used in all instances when preparing a BAR for Basic Assessment applications for an environmental authorisation in terms of the NEMA EIA Regulations when the Western Cape Government Department of Environmental Affairs and Development Planning ("DEA&DP") is the Competent Authority.
8. Unless otherwise indicated by the Department, one hard copy and one electronic copy of this BAR must be submitted to the Department at the postal address given below or by delivery thereof to the Registry Office of the Department. Reasonable access to copies of this Report must be provided to the relevant Organs of State for consultation purposes, which may, if so indicated by the Department, include providing a printed copy to a specific Organ of State.
9. This BAR must be duly dated and originally signed by the Applicant, EAP (if applicable) and Specialist(s) and must be submitted to the Department at the details provided below.
10. The Department's latest Circulars pertaining to the "One Environmental Management System" and the EIA Regulations, any subsequent Circulars, and guidelines must be taken into account when completing this BAR.
11. Should a water use licence application be required in terms of the National Water Act, 1998 (Act No. 36 of 1998) ("NWA"), the "One Environmental System" is applicable, specifically in terms of the synchronisation of the consideration of the application in terms of the NEMA and the NWA. Refer to this Department's Circular EADP 0028/2014: One Environmental Management System.
12. Where Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) ("NHRA") is triggered, a copy of Heritage Western Cape's final comment must be attached to the BAR.
13. The Screening Tool developed by the National Department of Environmental Affairs must be used to generate a screening report. Please use the Screening Tool link

<https://screening.environment.gov.za/screeningtool> to generate the Screening Tool Report. The screening tool report must be attached to this BAR.

14. Where this Department is also identified as the Licencing Authority to decide on applications under the National Environmental Management: Air Quality Act (Act No. 29 of 2004) ('NEM:AQA"), the submission of the Report must also be made as follows, for-

Waste Management Licence Applications, this report must also (i.e., another hard copy and electronic copy) be submitted for the attention of the Department's Waste Management Directorate (Tel: 021-483-2728/2705 and Fax: 021-483-4425) at the same postal address as the Cape Town Office.

Atmospheric Emissions Licence Applications, this report must also be (i.e., another hard copy and electronic copy) submitted for the attention of the Licensing Authority or this Department's Air Quality Management Directorate (Tel: 021 483 2888 and Fax: 021 483 4368) at the same postal address as the Cape Town Office.

### DEPARTMENTAL DETAILS

CAPE TOWN OFFICE: REGION 1 and REGION 2 (Region 1: City of Cape Town, West Coast District) (Region 2: Cape Winelands District & Overberg District)	GEORGE OFFICE: REGION 3 (Central Karoo District & Garden Route District)
<p>BAR must be sent to the following details:</p> <p>Western Cape Government Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 1 or 2) Private Bag X 9086 Cape Town, 8000</p> <p>Registry Office 1<sup>st</sup> Floor Utilitas Building 1 Dorp Street, Cape Town</p> <p>Queries should be directed to the Directorate: Development Management (Region 1 and 2) at: Tel: (021) 483-5829 Fax (021) 483-4372</p>	<p>BAR must be sent to the following details:</p> <p>Western Cape Government Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 3) Private Bag X 6509 George, 6530</p> <p>Registry Office 4<sup>th</sup> Floor, York Park Building 93 York Street George</p> <p>Queries should be directed to the Directorate: Development Management (Region 3) at: Tel: (044) 805-8600 Fax (044) 805 8650</p>

## MAPS

<b>Provide a location map (see below) as Appendix A1 to this BAR that shows the location of the proposed development and associated structures and infrastructure on the property.</b>	
<b>Locality Map:</b>	<p>The scale of the locality map must be at least 1:50 000. For linear activities or development proposals of more than 25 kilometres, a smaller scale e.g., 1:250 000 can be used. The scale must be indicated on the map. The map must indicate the following:</p> <ul style="list-style-type: none"> <li>• an accurate indication of the project site position as well as the positions of the alternative sites, if any;</li> <li>• road names or numbers of all the major roads as well as the roads that provide access to the site(s)</li> <li>• a north arrow;</li> <li>• a legend; and</li> <li>• a linear scale.</li> </ul> <p>For ocean based or aquatic activity, the coordinates must be provided within which the activity is to be undertaken and a map at an appropriate scale clearly indicating the area within which the activity is to be undertaken.</p> <p>Where comment from the Western Cape Government: Transport and Public Works is required, a map illustrating the properties (owned by the Western Cape Government: Transport and Public Works) that will be affected by the proposed development must be included in the Report.</p>
<b>Provide a detailed site development plan / site map (see below) as Appendix B1 to this BAR; and if applicable, all alternative properties and locations.</b>	
<b>Site Plan:</b>	<p>Detailed site development plan(s) must be prepared for each alternative site or alternative activity. The site plans must contain or conform to the following:</p> <ul style="list-style-type: none"> <li>• The detailed site plan must preferably be at a scale of 1:500 or at an appropriate scale. The scale must be clearly indicated on the plan, preferably together with a linear scale.</li> <li>• The property boundaries and numbers of all the properties within 50m of the site must be indicated on the site plan.</li> <li>• On land where the property has not been defined, the co-ordinates of the area in which the proposed activity or development is proposed must be provided.</li> <li>• The current land use (not zoning) as well as the land use zoning of each of the adjoining properties must be clearly indicated on the site plan.</li> <li>• The position of each component of the proposed activity or development as well as any other structures on the site must be indicated on the site plan.</li> <li>• Services, including electricity supply cables (indicate aboveground or underground), water supply pipelines, boreholes, sewage pipelines, storm water infrastructure and access roads that will form part of the proposed development <b>must</b> be clearly indicated on the site plan.</li> <li>• Servitudes and an indication of the purpose of each servitude must be indicated on the site plan.</li> <li>• Sensitive environmental elements within 100m of the site must be included on the site plan, including (but not limited to):             <ul style="list-style-type: none"> <li>○ Watercourses / Rivers / Wetlands</li> <li>○ Flood lines (i.e., 1:100 year, 1:50 year and 1:10 year where applicable);</li> <li>○ Coastal Risk Zones as delineated for the Western Cape by the Department of Environmental Affairs and Development Planning ("DEA&amp;DP"):                 <ul style="list-style-type: none"> <li>○ Ridges;</li> <li>○ Cultural and historical features/landscapes;</li> <li>○ Areas with indigenous vegetation (even if degraded or infested with alien species).</li> </ul> </li> </ul> </li> <li>• Whenever the slope of the site exceeds 1:10, a contour map of the site must be submitted.</li> <li>• North arrow</li> </ul> <p>A map/site plan must also be provided at an appropriate scale, which superimposes the proposed development and its associated structures and infrastructure on the environmental sensitivities of the preferred and alternative sites indicating any areas that should be avoided, including buffer areas.</p>
<b>Site photographs</b>	<p>Colour photographs of the site that shows the overall condition of the site and its surroundings (taken on the site and taken from outside the site) with a description of each photograph. The vantage points from which the photographs were taken must be indicated on the site plan, or locality plan as applicable. If available, please also provide a recent aerial photograph. Photographs must be attached to this BAR as <b>Appendix C</b>. The aerial photograph(s) should be supplemented with additional photographs of relevant features on the site. Date of photographs must be included. Please note that the above requirements must be duplicated for all alternative sites.</p>

<b>Biodiversity Overlay Map:</b>	A map of the relevant biodiversity information and conditions must be provided as an overlay map on the property/site plan. The Map must be attached to this BAR as <b>Appendix D</b> .
<b>Linear activities or development and multiple properties</b>	GPS co-ordinates must be provided in degrees, minutes and seconds using the Hartebeeshoek 94 WGS84 co-ordinate system. Where numerous properties/sites are involved (linear activities) you must attach a list of the Farm Name(s)/Portion(s)/Erf number(s) to this BAR as an Appendix. For linear activities that are longer than 500m, please provide a map with the co-ordinates taken every 100m along the route to this BAR as <b>Appendix A3</b> .

## ACRONYMS

<b>DAFF:</b>	Department of Forestry and Fisheries
<b>DEA:</b>	Department of Environmental Affairs
<b>DEA &amp; DP:</b>	Department of Environmental Affairs and Development Planning
<b>DHS:</b>	Department of Human Settlement
<b>DoA:</b>	Department of Agriculture
<b>DoH:</b>	Department of Health
<b>DWS:</b>	Department of Water and Sanitation
<b>EMPr:</b>	Environmental Management Programme
<b>HWC:</b>	Heritage Western Cape
<b>NFEPA:</b>	National Freshwater Ecosystem Protection Assessment
<b>NSBA:</b>	National Spatial Biodiversity Assessment
<b>TOR:</b>	Terms of Reference
<b>WCBSP:</b>	Western Cape Biodiversity Spatial Plan
<b>WCG:</b>	Western Cape Government

## ATTACHMENTS

**Note:** The Appendices must be attached to the BAR as per the list below. Please use a ✓ (tick) or a x (cross) to indicate whether the Appendix is attached to the BAR.

The following checklist of attachments must be completed.

APPENDIX			✓ (Tick) or x (cross)
Appendix A:	<b>Maps</b>		
	Appendix A1:	Locality Map	✓
	Appendix A2:	Coastal Risk Zones as delineated in terms of ICMA for the Western Cape by the Department of Environmental Affairs and Development Planning	n/a
	Appendix A3:	Map with the GPS co-ordinates for linear activities	n/a
Appendix B:	Appendix B1:	Site development plan(s)	✓
	Appendix B2	A map of appropriate scale, which superimposes the proposed development and its associated structures and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffer areas;	✓
Appendix C:	Photographs		✓
Appendix D:	Biodiversity overlay map		✓
Appendix E:	Permit(s) / license(s) / exemption notice, agreements, comments from State Department/Organs of state and service letters from the municipality.		
	Appendix E1:	Final comment/ROD from HWC	n/a
	Appendix E2:	Copy of comment from Cape Nature	✓
	Appendix E3:	Final Comment from the DWS	n/a
	Appendix E4:	Comment from the DEA: Oceans and Coast	n/a
	Appendix E5:	Comment from the DAFF	✓
	Appendix E6:	Comment from WCG: Transport and Public Works	n/a
	Appendix E7:	Comment from WCG: DoA	n/a
	Appendix E8:	Comment from WCG: DHS	n/a
	Appendix E9:	Comment from WCG: DoH	n/a

	<b>Appendix E10:</b>	<b>Comment from DEA&amp;DP: Pollution Management</b>	n/a
	<b>Appendix E11:</b>	<b>Comment from DEA&amp;DP: Waste Management</b>	✓
	<b>Appendix E12:</b>	<b>Comment from DEA&amp;DP: Biodiversity</b>	n/a
	<b>Appendix E13:</b>	<b>Comment from DEA&amp;DP: Air Quality</b>	n/a
	<b>Appendix E14:</b>	<b>Comment from DEA&amp;DP: Coastal Management</b>	n/a
	<b>Appendix E15:</b>	<b>Comment from the local authority</b>	✓
	<b>Appendix E16:</b>	<b>Confirmation of all services (water, electricity, sewage, solid waste management)</b>	n/a
	<b>Appendix E17:</b>	<b>Comment from the District Municipality</b>	n/a
	<b>Appendix E18:</b>	<b>Copy of an exemption notice</b>	n/a
	<b>Appendix E19</b>	<b>Pre-approval for the reclamation of land</b>	n/a
	<b>Appendix E20:</b>	<b>Proof of agreement/TOR of the specialist studies conducted.</b>	✓
	<b>Appendix E21:</b>	<b>Proof of land use rights</b>	n/a
	<b>Appendix E22:</b>	<b>Proof of public participation agreement for linear activities</b>	n/a
<b>Appendix F:</b>	<b>Public participation information: including a copy of the register of I&amp;APs, the comments and responses Report, proof of notices, advertisements and any other public participation information as is required.</b>		✓
<b>Appendix G:</b>	<b>Specialist Report(s)</b> • <b>Air Quality Impact Assessment</b>		✓
<b>Appendix H:</b>	<b>EMPr</b>		✓
<b>Appendix I:</b>	<b>Screening tool report</b>		✓
<b>Appendix J:</b>	<b>The impact and risk assessment for each alternative</b>		n/a
<b>Appendix K:</b>	<b>Need and desirability for the proposed activity or development in terms of this Department's guideline on Need and Desirability (March 2013)/DEA Integrated Environmental Management Guideline</b>		n/a
<b>Appendix L:</b>	<b>Waste Licence Application Additional Information</b>		✓



## SECTION A: ADMINISTRATIVE DETAILS

Highlight the Departmental Region in which the intended application will fall	CAPE TOWN OFFICE:		GEORGE OFFICE:
	REGION 1 (City of Cape Town, West Coast District)	REGION 2 (Cape Winelands District & Overberg District)	REGION 3 (Central Karoo District & Garden Route District)
Duplicate this section where there is more than one Proponent Name of Applicant/Proponent: Name of contact person for Applicant/Proponent (if other): Company/ Trading name/State Department/Organ of State: Company Registration Number: Postal address:  Telephone: E-mail:	Rooikat Recycling Pty Ltd		
	Krizelda Human / Mark Hobbs		
	Rooikat Recycling Pty Ltd		
	2019/271867/07		
	PO Box 308, Mossel Bay		
			Postal code: 6500
			Cell: 072 218 9196 / 083 267 7263
Company of EAP: EAP name: Postal address:  Telephone: E-mail:  Qualifications: EAPASA registration no:	Sharples Environmental Services cc		
	Betsy Ditcham		
	PO Box 9087, George		
			Postal code: 6530
	(021) 554 5195		Cell: 082 456 6918
	betsy@sesc.net		Fax: (086) 575 2869
	BSc Hons in Wildlife Management (University Pretoria); BSc in Zoology and Ecology (University of Cape Town) EAPASA Reg No: 2020/1480		
Duplicate this section where there is more than one landowner Name of landowner: Name of contact person for landowner (if other): Postal address:  Telephone: E-mail:	MobiCast (SWD Concrete Investment (Pty) Ltd)		
	Chris van Zyl		
	PO Box 43, Grootbrak		
			Postal code: 6525
	(044) 620 2433		Cell: 082 804 9710
	chris@mobicast.co.za		Fax: (044) 620 2435
Name of Person in control of the land: Name of contact person for person in control of the land: Postal address:  Telephone: E-mail:	Chris van Zyl		
	Chris van Zyl		
	PO Box 43, GrootBrak		
			Postal code: 6525
	(044) 620 2433		Cell: 082 804 9710
	chris@mobicast.co.za		Fax: (044) 620 2435
Duplicate this section where there is more than one Municipal Jurisdiction Municipality in whose area of jurisdiction the proposed activity will fall: Contact person: Postal address:  Telephone E-mail:	Mossel Bay Municipality		
	Adv T Giliomee (Municipal Manager)		
	101 Marsh Street, Mossel Bay		
			Postal code: 6500
	(044) 606 5003		Cell:
	admin@mosselbay.gov.za		Fax: (044) 606 5003

## SECTION B: CONFIRMATION OF SPECIFIC PROJECT DETAILS AS INCLUDED IN THE APPLICATION FORM

1.	Is the proposed development (please tick):	New	<input checked="" type="checkbox"/>	Expansion	
2.	Is the proposed site(s) a brownfield of greenfield site? Please explain.				
Although the site is considered a greenfield site as it has not been formally developed, it has been used by the landowner for storage of materials and vehicles and is in a disturbed state.					
3.	For Linear activities or developments				
3.1.	Provide the Farm(s)/Farm Portion(s)/Erf number(s) for all routes:				
N/A					
3.2.	Development footprint of the proposed development for all alternatives.				m <sup>2</sup>
N/A					
3.3.	Provide a description of the proposed development (e.g. for roads the length, width and width of the road reserve in the case of pipelines indicate the length and diameter) for all alternatives.				
N/A					
3.4.	Indicate how access to the proposed routes will be obtained for all alternatives.				
N/A					
3.5.	SG Digit codes of the Farms/Farm Portions/Erf numbers for all alternatives	N/A			
3.6.	Starting point co-ordinates for all alternatives				
	Latitude (S)	N/A	"	"	
	Longitude (E)	N/A	"	"	
	Middle point co-ordinates for all alternatives				
	Latitude (S)	N/A	"	"	
	Longitude (E)	N/A	"	"	
	End point co-ordinates for all alternatives				
	Latitude (S)	N/A	"	"	
	Longitude (E)	N/A	"	"	
<b>Note: For Linear activities or developments longer than 500m, a map indicating the co-ordinates for every 100m along the route must be attached to this BAR as Appendix A3.</b>					
4.	Other developments				
4.1.	Property size(s) of all proposed site(s):				48 800m <sup>2</sup>
4.2.	Developed footprint of the existing facility and associated infrastructure (if applicable):				N/A
4.3.	Development footprint of the proposed development and associated infrastructure size(s) for all alternatives:				2 108m <sup>2</sup>
4.4.	Provide a detailed description of the proposed development and its associated infrastructure (This must include details of e.g. buildings, structures, infrastructure, storage facilities, sewage/effluent treatment and holding facilities).				
<p>Rooikat Recycling proposes to construct a Pilot Depolymerisation Processing Plant on Portion 21 of the Remainder of the Farm Rheebookfontein No.142 in Mossel Bay.</p> <p>Rooikat Recycling are proposing to develop a robust, fit for purpose thermal depolymerisation technology consisting of depolymerization and separation sections. This technology will allow the treatment of domestic plastic and tyres at a large scale to produce a basket of fuels that can be successfully placed in the existing market.</p> <p>To demonstrate the technology, it is required to construct a pilot plant to demonstrate and refine the technology. A test/pilot facility that can process 10 to 20 tons a day of either residential plastic or tyres, or a combination of both, is required. The data collected during the operation of the plant will be used to develop and optimize the technology.</p> <p>The plastic would not have to be separated into the different types of plastic and typically non-recyclable plastics could now be converted into fuel without adding strain on the environment. The process would be a closed loop system and the generated off gasses would be used internally for energy production. Two products would be produced, heavy fuel oil (HFO) and minimal amounts of carbon black (which is a substitute for coal and can be used as a pigment).</p>					

**Plastics and tyres as an energy source**

Alternative fuel is fuel which is obtained in the process of recovery of waste with a calorific value. Post-consumer plastics and used tyres are among the wastes with the highest calorific values, being 40-46MJ/kg and 29.2MJ/kg respectively. These high calorific values make them an ideal feedstock for the depolymerisation process.

**Process breakdown**

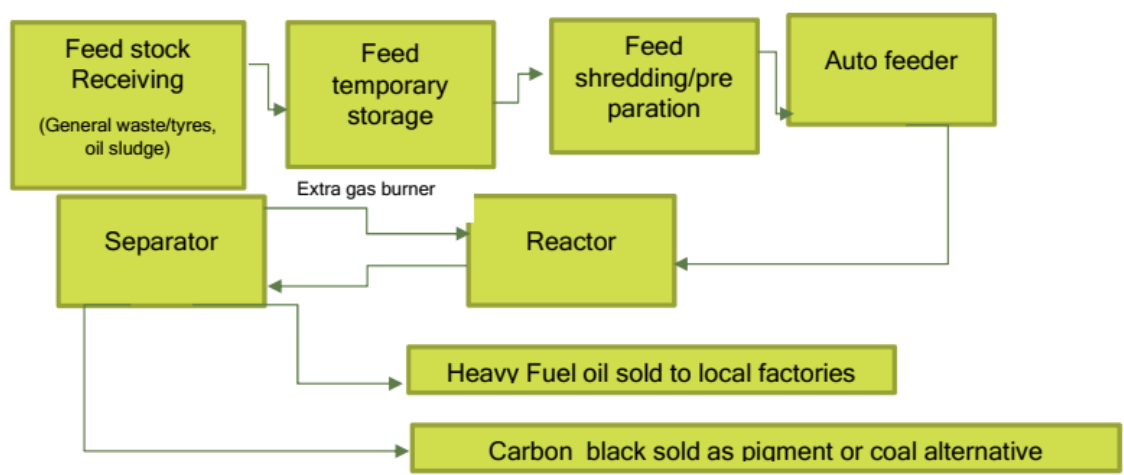
Feedstock will be received at the facility by road. The facility will not serve as a long-term storage site, but will only store the feed to be processed by the facility. The feed will be manually loaded into the auto feeder from where it will be loaded into the reactor. The reactor will operate on the gas and HFO produced by the process.

**THERMAL DEPOLYMERISATION** is a process which reduces complex organic materials (usually waste products of various sorts, often biomass and plastic) into light crude oil. It mimics the natural geological processes thought to be involved in the production of fossil fuels. Under pressure and heat, long chain polymers of hydrogen, oxygen, and carbon decompose into short-chain petroleum hydrocarbons.

The reactor product will be cooled and separated into three streams. The gas stream will be routed to back to the reactor for energy generation and the resulting HFO and carbon black will be sold as products. The process thus has no discernible waste streams.

The depolymerization process will produce two product streams, i.e. high-carbon solids (carbon black) and a gas stream. The gas stream will pass through a condensing stage to produce heavy fuel oil (HFO). All non-condensable gases will be returned to the reactor to serve as heating fuel and may be supplemented with some of the HFO, should this be required.

The reactor would run for approximately 10 hours to provide heating for the process. The pilot plant, however, would be run in batches throughout the day. Based on the production and loading rates, as well as the cooling steps, the facility may be operational over a 24 hour period.



According to the newly promulgated South African Biofuels Regulatory Framework (GN: 116 of 07 February 2020), any fuel produced from solid municipal waste is classified as a second-generation biofuel. The National Biofuels Feedstock Protocol defines second-generation biofuels as advanced biofuels, being derived from technologically advanced manufacturing methods. They differ from first-generation biofuels with regard to the fact that the feedstocks used in producing second-generation biofuels are generally not food crops. These include biomass, used cooking oil and solid municipal waste.

**Receiving of General waste**

All waste will be delivered to the site for processing. Loads will be weighed in order to ensure that complete batch sizes are ready for processing. All waste made ready for process will be stored on cemented surfaces.

**Storage of waste**

- Tyres will be stored in accordance with the National Waste Regulations. Note that this will not be a long term storage site and that only waste to be processed will be on site.
- All waste will be stacked in skips in a central area where the stock of at least 1 – 2 days (approximately 40 tons) may be accumulated.
- All general waste stored will be cleaned offsite prior to delivery to avoid contaminated run-off water accumulating.

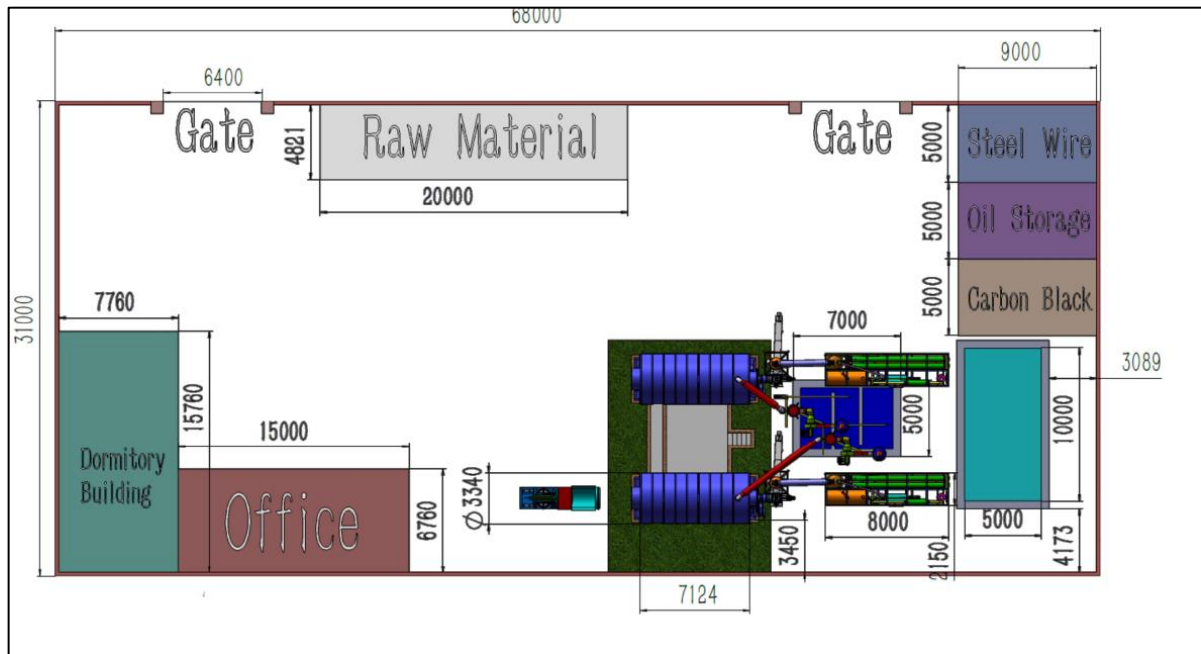
- All tyres to be used will be cut up into smaller pieces prior to being loaded into the reactor chamber. Encased steel will be recovered and sold to recycling companies.
- The various waste product streams destined for depolymerization will be blended to provide a stable feed composition into the reactor, thus contributing to stable operating conditions.

#### **Plant Infrastructure**

The proposed plant layout is shown below. The entire plant will be fenced with separate entrance and exit gates to allow for one way traffic through the facility.

The plant will consist of the following:

- Raw Material temporary storage area – approx. 96m<sup>2</sup>
- Dormitory Building – approx. 122m<sup>2</sup>
- Office Block – approx. 100m<sup>2</sup>
- Processing Plant – approx. 400m<sup>2</sup>
- Product storage area for steel wire, heavy fuel oil and carbon black – approx. 135m<sup>2</sup>



**Figure 1: Rooikat Recycling Plastic depolymerization Pilot plant layout**

#### **Stormwater**

Storm water will be collected in a storm water sump with an oil separation weir to ensure no contaminated water runoff. All process equipment will be on concreted surfaces with sumps around them.

#### **The Process**

The reactor chamber will be loaded by a hydraulic loader to ensure a firm stacking and avoid space being underutilized. Heating to approximately 350 °C will initially be by LP gas or heavy fuel oil until the depolymerization process generates its own gas and fuel oil. This gas and oil will then be piped to the heating chamber and used as heating fuel.

Carbon black will be dumped in an underground bunker from where it will be moved mechanically to be bagged for use off site. Gases from the reactor will be passed to a condenser where the condensable fraction will be converted to liquid to form combustion oil.

Non-condensable gases will be returned to the reactor to serve as an energy source for heating of the reactor. The system will not use flare-off to rid the system of unwanted gases, however emergency instances the off gases will be flared.

After combustion in the reactor, all off-gas will pass through a wet scrubber system prior to being emitted to atmosphere. Due to the heat, steam will be formed that will be released.

#### **Products of the Pyrolysis Process**

**Steel:** The steel would be high quality steel rings that make up around 10% of the total make-up of tyres. Steel will be stored in skips on-site in a designated area for regular collection by a reputable scrap metal dealer.

**Carbon Black:** Carbon black will be moved from the reactor chamber into an underground bunker from where it will be mechanically lifted to be bagged/pelletized and sold off. Carbon Black is used extensively in the rubber, plastics and ink industries. It can also be sold as a coal alternative.

**Oil / HFO:** Condensable gases are passed through the condensers and form oil. These oils are sought after as industrial or heating oil. Further processing will be required to yield high value oil or fuel. The oil will be stored temporarily in an above ground storage facility, however there will be no long term storage.

**Gases:** Condensable gases are passed through the condensers and are condensed into oil. The non-condensable gases are re-routed back to the heating chamber and are used to heat the process and replace the use of LPG gas. After burning the off gas is cooled, scrubbed and released into the atmosphere.

NOTE: Gases will only be flared in the unlikely event of an emergency being detected by the computerised control system.

**4.5. Indicate how access to the proposed site(s) will be obtained for all alternatives.**

Access to the site will be via the existing access off Sorgfontein Road.

<b>4.6. SG Digit code(s) of the proposed site(s) for all alternatives:</b>	C	0	3	9	0	0	0	6	0	0	0	0	0	5	6	2	0	0	0	0
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**4.7. Coordinates of the proposed site(s) for all alternatives:**

<b>4.7.</b>	<b>Latitude (S)</b>	34°	2'	44.47"
	<b>Longitude (E)</b>	22°	11'	10.04"

## SECTION C: LEGISLATION/POLICIES AND/OR GUIDELINES/PROTOCOLS

### 1. Exemption applied for in terms of the NEMA and the NEMA EIA Regulations

Has exemption been applied for in terms of the NEMA and the NEMA EIA Regulations. If yes, include a copy of the exemption notice in Appendix E18.	YES	NO
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### 2. Is the following legislation applicable to the proposed activity or development.

The National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) ("ICMA"). If yes, attach a copy of the comment from the relevant competent authority as Appendix E4 and the pre-approval for the reclamation of land as Appendix E19.	YES	NO
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) ("NHRA"). If yes, attach a copy of the comment from Heritage Western Cape as Appendix E1.	YES	NO
The National Water Act, 1998 (Act No. 36 of 1998) ("NWA"). If yes, attach a copy of the comment from the DWS as Appendix E3.	YES	NO
The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) ("NEM:AQA"). If yes, attach a copy of the comment from the relevant authorities as Appendix E13.	YES	NO
The National Environmental Management Waste Act (Act No. 59 of 2008) ("NEM:WA")	YES	NO
The National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004 ("NEMBA").	YES	NO
The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) ("NEMPAA").	YES	NO
The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). If yes, attach comment from the relevant competent authority as Appendix E5.	YES	NO

### 3. Other legislation

<b>List any other legislation that is applicable to the proposed activity or development.</b>
<ul style="list-style-type: none"> <li>The Constitution of South Africa Act, 1998 (Act No. 108 of 1996)</li> <li>Amended Environmental Impact Assessment Regulations, 2014</li> <li>South African Biofuels Regulatory Framework (GN 116, 07 February 2020)</li> </ul>

### 4. Policies

<b>Explain which policies were considered and how the proposed activity or development complies and responds to these policies.</b>
N/A

### 5. Guidelines

<b>List the guidelines which have been considered relevant to the proposed activity or development and explain how they have influenced the development proposal.</b>				
<ul style="list-style-type: none"> <li>Circular EADP 0028/2014: One Environmental Management System</li> <li>Guideline for determining the scope of specialist involvement in EIA processes, June 2005.</li> <li>Guideline on Public Participation (2013)</li> <li>Guideline on Alternatives (2013)</li> <li>Guideline on Need and Desirability (2013)</li> <li>Guideline on Environmental Management Plans (2005)</li> <li>External Guideline: Generic Water Use Authorization Application Process (2007)</li> <li>Integrated Environmental Management Information Series 5: Impact Significance (2002)</li> <li>Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)</li> <li>Western Cape Biodiversity Spatial Plan Handbook (2017)</li> <li>Waste Minimisation Guideline for Environmental Impact Assessment Reviews (May 2003)</li> </ul>				
<table border="1"> <thead> <tr> <th><b>GUIDELINES</b></th> <th><b>How the proposed development complies with and responds:</b></th> </tr> </thead> <tbody> <tr> <td><b>Circular EADP 0028/2014: One Environmental Management System</b></td> <td>The One Environmental System was taken into consideration for the synchronisation of the Environmental Authorisation process and the Air Emissions Licencing process.</td> </tr> </tbody> </table>	<b>GUIDELINES</b>	<b>How the proposed development complies with and responds:</b>	<b>Circular EADP 0028/2014: One Environmental Management System</b>	The One Environmental System was taken into consideration for the synchronisation of the Environmental Authorisation process and the Air Emissions Licencing process.
<b>GUIDELINES</b>	<b>How the proposed development complies with and responds:</b>			
<b>Circular EADP 0028/2014: One Environmental Management System</b>	The One Environmental System was taken into consideration for the synchronisation of the Environmental Authorisation process and the Air Emissions Licencing process.			

<b>Guideline for determining the scope of specialist involvement in EIA processes, June 2005</b>	Guideline considered during the compilation of the Terms of Reference for the Specialist.
<b>Guideline on Public Participation (2013)</b>	Guideline considered in the undertaking of the public participation for the proposed development. All relevant provisions contained in the guideline were adhered to in the basic assessment process as appropriate, except where an exemption/ deviation has been granted by the Competent Authority.
<b>Guideline on Alternatives (2013)</b>	Guideline considered when identifying and evaluating possible alternatives for the proposed development. Alternatives that were considered in the impact assessment process are reported on in this Basic Assessment Report (see section E).
<b>Guideline on Need and Desirability (2013)</b>	Guideline considered during the assessment of the Need and Desirability of the proposed development project.
<b>Guideline on Environmental Management Plans (2005)</b>	Guideline considered in the compilation of the EMPr attached to this Basic Assessment Report.
<b>Guideline for the Review of Specialist Input into the EIA Process (2005)</b>	Guideline considered during the review and integration of specialist input into this Basic Assessment Report.
<b>Integrated Environmental Management Information Series 5: Impact Significance (2002)</b>	Guideline considered during the identification and evaluation of potential impacts associated with the proposed development, and the reporting thereof in this Basic Assessment Report.
<b>Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)</b>	Guideline considered during the assessment of the cumulative effect of the identified impacts.
<b>Western Cape Biodiversity Spatial Plan Handbook (2017)</b>	This handbook was consulted when determining the desirability of the development within the extent of WCBSPP layers.
<b>Waste Minimisation Guideline for Environmental Impact Assessment Reviews (May 2003)</b>	Guideline considered in the compilation of this Basic Assessment Report.

## 6. Protocols

### Explain how the proposed activity or development complies with the requirements of the protocols referred to in the NOI and/or application form

The following is a summary of the development footprint environmental sensitivities identified by the DEA Screening Tool (see Appendix I). Only the highest environmental sensitivity is indicated.

THEME	VERY HIGH	HIGH	MEDIUM	LOW
<b>Agriculture</b>				X
<b>Animal Species</b>		X		
<b>Aquatic Biodiversity</b>				X
<b>Archaeological and Cultural Heritage</b>		X		
<b>Civil Aviation</b>			X	
<b>Plant Species Theme</b>			X	
<b>Defence</b>				X
<b>Terrestrial Biodiversity</b>	X			

As per the requirements in the Protocols, an Initial Site Sensitivity Verification was undertaken. The on-site inspection confirmed that the current land use of the proposed development footprint is in a highly disturbed state, currently used by the landowners for parking of heavy vehicles and storage of material. The Very High Terrestrial Biodiversity sensitivity identified by the Screening Tool was, therefore, found to be inaccurate for the development footprint and the need for the recommended specialist assessments found to not be required.

## SECTION D: APPLICABLE LISTED ACTIVITIES

List the applicable activities in terms of the NEMA EIA Regulations

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1	Describe the portion of the proposed development to which the applicable listed activity relates.
Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3	Describe the portion of the proposed development to which the applicable listed activity relates.
<b>Note:</b> <ul style="list-style-type: none"> <li>The listed activities specified above must reconcile with activities applied for in the application form. The onus is on the Applicant to ensure that all applicable listed activities are included in the application. If a specific listed activity is not included in an Environmental Authorisation, a new application for Environmental Authorisation will have to be submitted.</li> <li>Where additional listed activities have been identified, that have not been included in the application form, and amended application form must be submitted to the competent authority.</li> </ul>		

List the applicable waste management listed activities in terms of the NEM:WA

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Category A	Describe the portion of the proposed development to which the applicable listed activity relates.
3	The recycling of general waste at a facility that has an operational area in excess of 500m <sup>2</sup> , excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.	The proposed operational area of the facility where recycling would take place is approximately 400m <sup>2</sup> .  As such, this Activity is <b>Not Applicable</b> .
5	The recovery of waste including the refining, utilisation, or co-processing of waste in excess of 10 tons but less than 100 tons of general waste per day or in excess of 500kg but less than 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.	The proposed development includes the controlled extraction and retrieval of Heavy Fuel Oil and carbon black from waste plastics and tyres, in excess of 10 tons of general waste per day.
6	The treatment of general waste using any form of treatment at a facility that has the capacity to process in excess of 10 tons but less than 100 tons.	In order for the proposed Pilot Depolymerisation Processing Plant to demonstrate the technology effectively, the applicant is proposing to process 10 to 20 tons per day of either mixed plastic or tyres, or both.
12	The construction of a facility for a waste management activity listed in Category A of this Schedule (not in isolation to associated waste management activity).	The proposed construction of the facility triggers waste management activity 6 listed in Category A of this schedule.

List the applicable listed activities in terms of the NEM:AQA

Activity No(s):	Provide the relevant Listed Activity(ies)	Describe the portion of the proposed development to which the applicable listed activity relates.				
Subcategory 3.4 Char, Charcoal and Carbon Black Production (2015)	<table border="1"> <tr> <th>Description</th> <td>Production of char, charcoal and the production and use of carbon black</td> </tr> <tr> <th>Application</th> <td>All installations producing more than 20 tons of char or charcoal per month. Installations consuming more than 20 tons per month of carbon black in any process</td> </tr> </table>	Description	Production of char, charcoal and the production and use of carbon black	Application	All installations producing more than 20 tons of char or charcoal per month. Installations consuming more than 20 tons per month of carbon black in any process	The facility may produce marginal amounts of carbon black as a by-product of their process. It will not be consumed, but separated and sold to a third party.
	Description	Production of char, charcoal and the production and use of carbon black				
Application	All installations producing more than 20 tons of char or charcoal per month. Installations consuming more than 20 tons per month of carbon black in any process					
Subcategory 8.1: Thermal Treatment of General and Hazardous Waste	<table border="1"> <tr> <th>Description</th> <td>Facilities where general and hazardous waste are treated by the application of heat</td> </tr> <tr> <th>Application</th> <td>All installations treating 10kg per day of waste.</td> </tr> </table>	Description	Facilities where general and hazardous waste are treated by the application of heat	Application	All installations treating 10kg per day of waste.	The definition of "thermal treatment" states the incineration, co-processing and other high temperature treatment of hazardous and general waste.  In order for the proposed Pilot Depolymerisation Processing Plant to demonstrate the technology effectively, the applicant is proposing to process
	Description	Facilities where general and hazardous waste are treated by the application of heat				
Application	All installations treating 10kg per day of waste.					



PROPOSED DEVELOPMENT OF A PILOT DEPOLYMERISATION PROCESSING PLANT ON PORTION 21 OF THE REMAINDER OF THE FARM RHEEBOKSFONTEIN NO.142 IN MOSSEL BAY, WESTERN CAPE

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		10 to 20 tons per day of either mixed plastic or tyres, or both at temperatures of between 350° and 450°C.
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## SECTION E: PLANNING CONTEXT AND NEED AND DESIRABILITY

<b>1.</b>	<b>Provide a description of the preferred alternative.</b>
<p>Rooikat Recycling proposes to construct a Pilot Depolymerisation Processing Plant on Portion 21 of the Remainder of the Farm Rheeboksfontein No.142 in Mossel Bay.</p> <p>Rooikat Recycling are proposing to develop a robust, fit for purpose thermal depolymerisation technology consisting of depolymerization and separation sections. This technology will allow the treatment of domestic plastic and tyres at a large scale to produce a basket of fuels that can be successfully placed in the existing market.</p> <p>To demonstrate the technology, it is required to construct a pilot plant to demonstrate and refine the technology. A test/pilot facility that can process 10 to 20 tons a day of either plastic or tyres, or a combination of both, is required. The data collected during the operation of the plant will be used to develop and optimize the technology.</p> <p>The plastic would not have to be separated into the different types of plastic and typically non-recyclable plastics could now be converted into fuel without adding strain on the environment. The process would be a closed loop system and the generated off gasses would be used internally for energy production. Two products would be produced, heavy fuel oil (HFO) and carbon black (which is a substitute for coal and can be used as a pigment).</p>	
<b>2.</b>	<b>Explain how the proposed development is in line with the existing land use rights of the property as you have indicated in the NOI and application form? Include the proof of the existing land use rights granted in Appendix E21.</b>
<p>The existing land use right of the property is Industrial Zone 3. Based on discussions between the applicant and the Mossel Bay Municipality, this land use is ideal for the proposed development as the objective of this zone is to provide for those industries which are noxious in terms of smell, product, waste or other objectionable consequence of their operation, or which carry a high risk in the event of fire or accident.</p>	
<b>3.</b>	<b>Explain how potential conflict with respect to existing approvals for the proposed site (as indicated in the NOI/and or application form) and the proposed development have been resolved.</b>
<p>N/A</p>	
<b>4.</b>	<b>Explain how the proposed development will be in line with the following?</b>
<b>4.1</b>	<b>The Provincial Spatial Development Framework.</b>
<p>The aim of the 2014 Provincial Spatial Development Framework (PSDF) is the bridge the gap between the National Development Plan and provincial strategies with the aim of improving service delivery. The 2014 Western Cape PSDF identifies that as the population of the Western Cape continues to increase additional waste disposal facilities will be required, unless the waste management hierarchy is implemented.</p> <p>The PSDF for the Western Cape released in 2014 notes that the increasing amount of waste generation in the Western Cape, if not recycled, may give rise to the need for more waste disposal sites, especially in proximity to urban concentrations. The location of regional waste sites has the potential to either unlock opportunities or unnecessarily burden municipalities operationally. As such, the PSDF highlights the need to roll out recovery / recycling facilities, as well as awareness programmes. The development of the proposed Pilot Depolymerisation Processing Plant would be seen as aligning with the PSDF, as the proposed project would reduce the amount of tyres and plastic being sent to landfill.</p> <p>The Western Cape Infrastructure Framework (WCIF) acknowledges the need for a transition towards a more innovative waste sector, one which increases recycling and reuse, as well as the adoption of waste-to-energy in the longer term. The proposed development further supports the Province's PSDF by adopting this transition. The generation of fuel from tyres and plastic through the process of Depolymerisation is an innovation in its own right, and can be seen to support the waste-to-energy goals. The proposed development will also see an increase in the reuse and recycling of tyres and plastics, waste streams which have historically proved difficult to manage in South Africa.</p>	
<b>4.2</b>	<b>The Integrated Development Plan of the local municipality.</b>
<p>The second review of the fourth-generation Integrated Development Plan (IDP) for the Mossel Bay local municipality (2019/2020) was approved in May 2019. The IDP highlighted various strategic objectives set out by the Mossel Bay Municipality to achieve their vision of "We strive to be a trend-setting, dynamic Municipality delivering quality services responsive to the demands and challenges of the community and our constitutional mandate, in which all stakeholders can participate in harmony and dignity."</p> <p>These objectives include;</p> <ul style="list-style-type: none"> <li>• Create an inclusive, responsive, and healthy environment conducive for living and sustainable growth.</li> <li>• To render efficient environmental health and disaster management services.</li> </ul> <p>The proposed development of a Pilot Depolymerisation Processing Plant is directly related to sustainable growth and the promotion of efficient environmental health. The proposed development involves the processing of tyres and plastic to produce fuel. By doing this, the need for, and reliance on, non-renewable energy sources can be minimised, thus utilising a waste stream in a sustainable way, which would otherwise end up at a landfill site contributing to the negative impact on environmental health.</p>	

The IDP further identifies the following waste management implementation instruments for the Mossel Bay Municipality;

- Waste reduction - To promote the reduction of all waste so that nothing of neither value, nor anything that can decompose, gets disposed.
- Waste disposal - To store, dispose or treat waste that cannot be avoided nor reduced at licensed facilities with regular operational and environmental monitoring in line with regulatory requirements.

These instruments have been outlined in order to ensure effective waste management. These instruments are directly aligned with the principles of the proposed development. The applicant has identified value in waste that be processed to generate fuel. This will reduce plastic and tyre waste due to the value the waste streams hold for the Depolymerisation process.

Plastic and tyres are produced and discarded in abundance. Of the 8 municipal landfill sites with the municipality, only 1 is capable of receiving tyres and plastic waste. The 7 others are only licenced to receive garden or building rubble or are closed. The 1 disposal facility available is also privately owned by PetroSA. The proposed development should therefore be seen as a beneficial solution to the issue of waste disposal in the Municipality.

#### **4.3. The Spatial Development Framework of the local municipality.**

The Spatial Development Framework (SDF) for the Mossel Bay Municipality released in May 2018 aims to provide long term forward planning which spatially indicates proposed growth and development in the Municipality.

The SDF incorporates the Western Cape infrastructure framework into the Mossel Bay's strategic agenda in order to;

- Identify and guide the planning and execution of major infrastructure interventions for the period 2012–2040.
- Mobilise and direct new investments.
- Facilitate partnerships and collaboration.
- Outline strategic decisions and trade-offs that need to be made to achieve the provincial 2040 vision in a complex and changing environment.

These objectives are set out to combat the various issues facing the Mossel Bay Municipality, from a spatial perspective. The proposed development of a Pilot Depolymerisation Processing Plant in the Mossel Bay Municipality would assist the municipality with addressing the various issues presented to the Municipality. This new investment would encourage partnerships and collaborations due to the nature of the activity. The processing plant requires tyres and plastic in order to produce a fuel, this will require strategic partnerships and relationships in order to ensure functionality.

The objective to contribute to the achievement of the Provincial 2040 vision highlights the need for strategic decisions in a changing environment. This objective places emphasis on the need to make informed choices in a changing world. The proposed development of the Pilot Depolymerisation Processing Plant may be seen as a strategic decision made to address the impacts and needs of a changing environment. In a changing environment where tyre and plastic waste disposal and management provide endless challenges, the opportunity to manage these waste streams in a more sustainable and strategic manner will be seen as a small step towards achieving the provincial 2040 vision.

By focusing on specific sectors, the spatial development framework outlines various transitions that are to be made in order for the objectives to be met. One of these sectors being: Settlement. Regarding settlement, the spatial development framework aims to transition towards an innovative waste sector that increases recycling and reuse, as well as the adoption of waste-to-energy concepts. The proposed Pilot Depolymerisation Plant is innovative in the way it proposes to produce industry grade fuel through the processing of plastic and tyres. Furthermore, this proposed development will encourage innovation within the waste sector.

The proposed location of the development falls within the Groot-Brakrivier area. According to the SDF, the area's spatial layout is impacted upon by it's topography and wide river estuary. The proposed site is situated within the mapped Urban Edge, with no mapped constraints from a Spatial Development perspective.

PROPOSED DEVELOPMENT OF A PILOT DEPOLYMERISATION PROCESSING PLANT ON PORTION 21 OF THE REMAINDER OF THE FARM RHEEBOKSFONTEIN NO.142 IN MOSSEL BAY, WESTERN CAPE

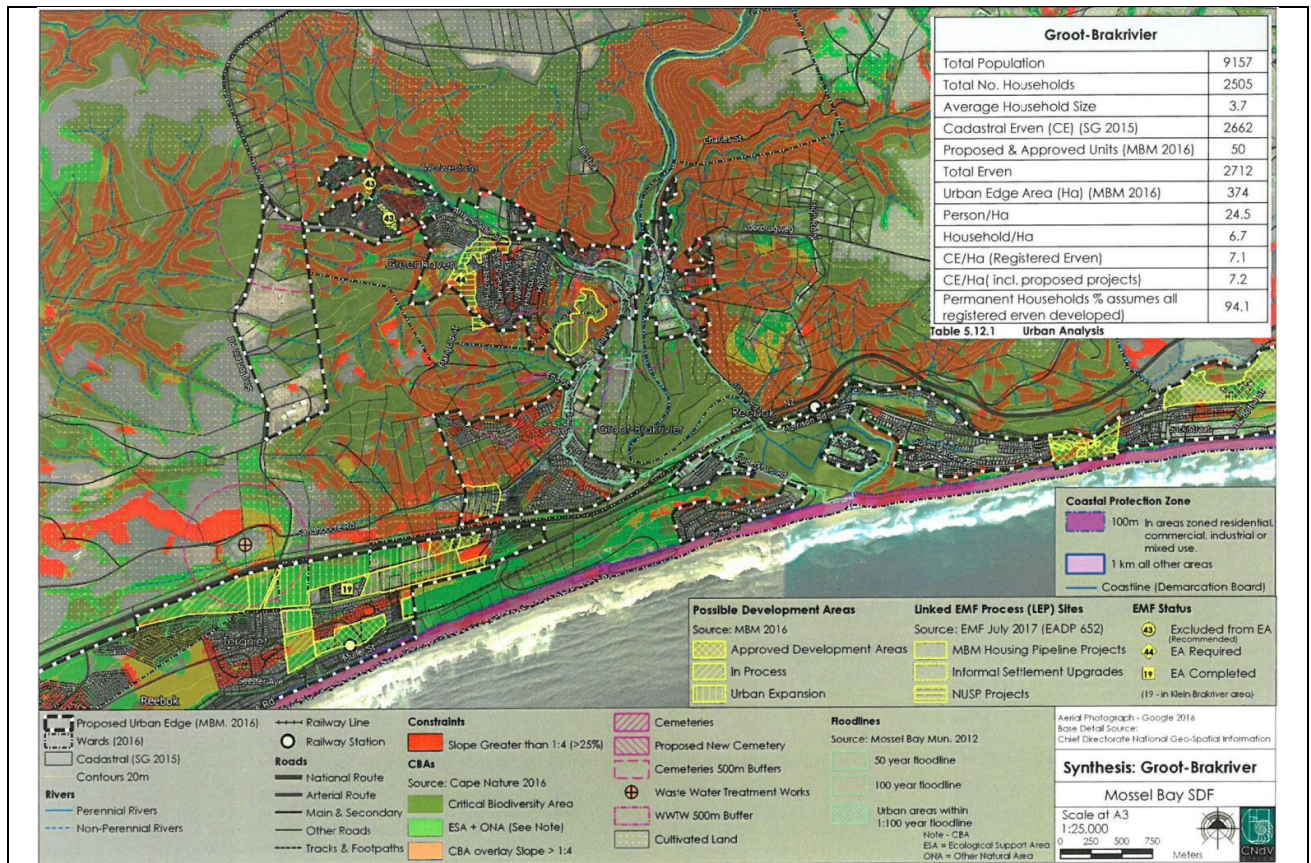


Figure 2: Extract from Mossel Bay SDF (2018)

The Groot-Brak waste disposal facility is currently located west of Groot-Brak and accessed via a gravel road from the N2. This site receives only garden waste and builders' rubble. There are also two solid waste transfer facilities located in Kwanonqaba and Sonskynvallei. All general waste is therefore transported to the PetroSA site. Limited land availability for waste management facilities has been identified as a challenge in the SDF.

The Pilot Depolymerisation Processing Plant, located within an existing industrial area, would be able to assist with reducing waste volumes having to be transported to PetroSA.

**4.4. The Environmental Management Framework applicable to the area.**

There is no EMF developed for this area.

**5. Explain how comments from the relevant authorities and/or specialist(s) with respect to biodiversity have influenced the proposed development.**

**6. Explain how the Western Cape Biodiversity Spatial Plan (including the guidelines in the handbook) has influenced the proposed development.**

According to the WCBS (2017), the north-eastern portion of the property is mapped as CBA. As such, the footprint of the development has been limited to the south-western corner of the property, outside of the mapped sensitive area.

**7. Explain how the proposed development is in line with the intention/purpose of the relevant zones as defined in the ICMA.**

The Proposed development does not lie within any of the zones identified by the ICMA.

**8. Explain whether the screening report has changed from the one submitted together with the application form. The screening report must be attached as Appendix I.**

The screening report submitted with the application form has not changed from the one submitted with this Draft BAR.

**9. Explain how the proposed development will optimise vacant land available within an urban area.**

The footprint of the proposed development has been placed within a degraded area of an existing development within the Municipal urban edge, thereby optimally using the vacant land available.

**10. Explain how the proposed development will optimise the use of existing resources and infrastructure.**

Due to the proposed location of the development within the property of an operational development, there are existing services and access available to the proposed development.

<b>11.</b>	<b>Explain whether the necessary services are available and whether the local authority has confirmed sufficient, spare, unallocated service capacity. (Confirmation of all services must be included in Appendix E16).</b>
Confirmation of services has not been received, but will be requested for inclusion in the Final BAR.	
<b>12.</b>	<b>In addition to the above, explain the need and desirability of the proposed activity or development in terms of this Department's guideline on Need and Desirability (March 2013) or the DEA's Integrated Environmental Management Guideline on Need and Desirability. This may be attached to this BAR as Appendix K.</b>
<p><b><u>REGIONAL NEED AND DESIRABILITY</u></b></p> <p><b>Demographic Analysis</b></p> <p>Statistics South Africa (Stats SA) defines urbanisation as an increase in the urban population due to natural growth and net migration into a particular area.</p> <p>The population growth of the Eden District has been very consistent from 2001 to 2011. The average population growth rate from 2001 until 2011 is 2.36%. Currently Eden's population is growing slower than the Provincial Population (2.56%) but faster than the national average of 1.45%.</p> <p>Mossel Bay shows a slower growth rate, calculated at 1% for the period 2011 to 2016. In 2016, the Mossel Bay LM (MBLM) population was estimated to be 94 140.</p> <p><b>Alignment with Sector Plans</b></p> <p>Various National, Provincial &amp; Municipal land use planning and policy documents have been considered during the assessment process. These include the:</p> <ul style="list-style-type: none"> <li>• National Development Plan 2030 (2012);</li> <li>• Western Cape Provincial Spatial Development Framework (PSDF) 2014;</li> <li>• Mossel Bay Municipality Integrated Development Plan (IDP) 2019 - 2020;</li> <li>• Mossel Bay Municipal Spatial Development Framework (SDF) (2019)</li> </ul> <p>The proposed development is compatible with and supports the key principles and objectives contained in these key land use planning and policy documents that pertain to the area (See Section E). The area has therefore been identified as suitable for development in terms of the spatial priorities and desired spatial patterns of not only the local municipality, but also the Province.</p> <p><b>Securing ecological sustainable development and use of natural resources</b></p> <p>The Draft National Waste Management Strategy (2018) has three strategic goals to drive an improvement in waste management in South Africa:</p> <ol style="list-style-type: none"> <li>1. Waste minimisation</li> <li>2. Effective and sustainable waste services</li> <li>3. Awareness and compliance</li> </ol> <p>Goal 1 aims to prevent waste, and where waste cannot be prevented, divert 50% of waste from landfill within 5 years; 80% within 10 years; and at least 95% of waste within 15 years through reuse, recycling, and recovery and alternative waste treatment. This would be accomplished through:</p> <ul style="list-style-type: none"> <li>• Waste Prevention:             <ul style="list-style-type: none"> <li>○ Reduction of the generation of waste in the manufacturing sector through cleaner production and industrial symbiosis</li> <li>○ Prevention of food waste by working with agricultural producers, retailers, the hospitality sector and consumers.</li> </ul> </li> <li>• Waste as a Resource:             <ul style="list-style-type: none"> <li>○ Diversion of organic waste from landfill through composting and the recovery of energy</li> <li>○ Diversion of construction and demolition waste from landfill through beneficiation</li> <li>○ Increase recycling and recovery rates</li> <li>○ Increase technical capacity and innovation for the beneficiation of waste</li> </ul> </li> </ul> <p>In addition to the Waste Management Strategy, the South Africa National Development Plan (NDP) (2012_ outlined the required steps to eliminate poverty and reduce inequality by 2030.</p> <p>The NDP sets the following objectives related to waste management:</p> <ul style="list-style-type: none"> <li>• An absolute reduction in the total volume of waste disposed to landfill site each year through a national recycling strategy</li> <li>• Carbon price, building standards, vehicle emission standards and municipal regulations to achieve scale in stimulating renewable energy, waste recycling and retrofitting buildings</li> <li>• Consumer awareness initiatives and sufficient recycling infrastructure should result in South Africa becoming a zero waste society</li> <li>• Implement a waste management system through rapid expansion of recycling infrastructure and encouraging composting of organic domestic waste to bolster economic activity in poor urban communities</li> </ul> <p>The NDP also recognises the opportunity for the manufacturing sector to reuse waste.</p>	

In 2015 the Eden Municipality (Mossel Bay) started a waste characterization study of the area to add to the Mossel Bay Municipality's Integrated Waste Management Plan (Eden District Municipality, 2016) (IWMP). This comprehensive study indicated that 42% (mass) of the waste sampled from black bags were recyclable. In total 16% (mass) were plastics. On a volume basis a staggering 39% of the contents sampled were plastics (Eden District Municipality, 2016). This indicated that although there are recycling initiatives in the area, a large fraction of the plastic still ends up in the landfill sites.

The study indicated that the recyclable portion of the total waste landfilled on a monthly basis is an astounding 986 tons and 6 420m<sup>3</sup>. Of that, 157 ton is plastic. This equates to 2 504m<sup>3</sup> of plastic to landfill per month. Based on the study done (Eden District Municipality, 2016), it is thus required to process approximately 10 to 20 tons of plastic per day to effectively reduce the amount of plastic to the environment.

The IWMP was revised in October 2019, however a new waste characterisation was not conducted. Waste profile data was sourced from landfill site disposal records, records from waste management companies, industry interviews, MBLM and the IPWIS and tabulated below.

**Table 1: MBLM waste profile (source: IPWIS data provided on 27/03/2019, MBLM data, survey data and results from surveys with business and industry)**

Waste Type	Data source	Average per month (tonnes)	% of waste generated	Management method
Domestic Waste	MBLM, PetroSA data	2,390.1	48.7	Disposal at landfill
Commercial and industrial waste	DEA&DP, IPWIS data provided on 26 March 2019	11.4	0.2	Disposal at landfill
Recyclables	MBLM and private recycling companies	193.8	3.9	Recycling
Green waste	DEA&DP, IPWIS data provided on 26 March 2019	492.1	10.0	Landfill/ cleaning of WWTW ponds
Construction and demolition	DEA&DP, IPWIS data provided on 26 March 2019	1,709.8	34.8	Landfill/ stockpiled for construction of platform at composting facility
Health care risk waste	WCDoH	1.5	0.0	Treatment/ disposal
Industrial hazardous waste	Hazardous waste survey	60.5	1.2	Various
Abattoir waste	Hazardous waste survey	52.0	1.1	Processing into fishmeal
<b>Total</b>		<b>4,911.2</b>	<b>100.0</b>	

The MBLM has a multi-bag waste collection system in operation. The bags are colour coded as follows:

- Black bags: for general waste non recyclables, and these are collected by a combination of municipal trucks, service providers and co-operatives
- Blue bags: source separated recyclables that are collected by a service provider
- Green bags: garden waste that is collected by a service provider

On average 178 tonnes of recyclable waste is collected through the blue bag system per month. The service provider that manages the system indicates that approximately 40% of households in areas covered by the blue bag system participate in the programme. The participation of households in the programme varies significantly between different suburbs. The households which do participate in the system generally follow the guidelines provided by the service provider on the types of waste which can be placed into blue bags. Only approximately 10% of the waste collected through the blue bags system is diverted to landfill either due to contamination or the material not being suitable for recycling.

Plastic has formed such a substantive part of our everyday life and it is hard to evade. The Garden Route is developing at a rapid pace and with the increased number of households being established, there is also an increase in the amount of discarded plastic.

Plastic separation and recycling projects have been successful in the Eden District to some extent, but only a small fraction of the plastic collected is actually reprocessed into other plastic goods, while the majority still ends up in landfill sites. This is due to the fact that the recycling of plastics is not as easy as melting everything together and making useful items. Not all plastics are created equal and the contaminants in plastics make the processing of it challenging.

Although used tyres are being collected for intended recycling, most of the tyres are simply stored in bulk. These cannot be landfilled and there is a need to find alternative uses and means of processing/recycling of these tyres.

#### **Climate Change**

The Western Cape Government acknowledges climate change as one of the biggest threats to its communities, economy, and environment. Broadly, the scientific consensus is that sub-Saharan Africa, given its geographic location straddling the



equator, will experience the greatest negative effects of global warming of any region. For South Africa, under the current emissions trajectory, this is projected to be an average increase above the 20th century average of 1.5°C around the coast, to 3°C in the interior, by 2050, with a doubling of these figures to 3°C and 6°C by the end of the century. As a result, coastal regions like the Western Cape are likely to see significant in-migration from the interior of the country (as well as from further north on the continent) (**Western Cape Government, Department of Environmental Affairs and Development Planning, 2018**).

In recognition of the urgent need to rapidly reduce greenhouse gas (GHG) emissions and adapt to climate changes already being experienced, the Western Cape Government (WCG) recognises the necessity to contribute to global efforts to reduce its GHG emissions, particularly with a longer-term view to reducing climate change impacts to 1.5°C globally as agreed at the UNFCCC COP21 in the Paris Agreement in December 2015.

The National Climate Change Response Policy highlighted eight near-term Priority Flagship Programmes that are being undertaken; these have since been expanded to ten Flagship programmes:

1. The Climate Change Response Public Works Flagship Programmes;
2. The Water Conservation and Water Demand Management Flagship Programme;
3. The Energy Efficiency and Energy Demand Management Flagship Programme;
4. Low Carbon, Climate Resilient Transport Systems Flagship Programme;
5. The Renewable Energy Flagship Programme;
- 6. The Waste Management Flagship Programme;**
7. The Carbon Capture and Storage Flagship Programme; and
8. The Adaptation Research Flagship Programme.
9. The Agriculture, Food Systems and Food Security Flagship Programme
10. The Low Carbon, Climate Resilient Built Environment, Communities and Settlements Flagship Programme

The Western Cape Climate Change Response Strategy (WCCCRS) was approved by the Western Cape Cabinet in 2014. The Strategy is developed as a coordinated climate change response; it aims to guide the implementation of innovative projects and the search for opportunities that combine a low carbon development trajectory with increased climate resilience, enhancement of ecosystems and the services they provide, and economic stability and growth.

The WCCCRS document highlights nine focus areas:

- Energy efficiency;
- Renewable energy;
- Built environment – critical infrastructure, disaster management, **integrated waste management**, human settlements;
- Sustainable transport;
- Water security and efficiency;
- Biodiversity and ecosystem goods and services;
- Coastal and estuary management;
- Food security; and
- Healthy communities.

The current priorities for addressing waste minimisation and management in the Western Cape include:

1. Development of waste characterisation profiles for municipalities in the Western Cape;
2. Promotion of the waste economy and identification of opportunities to reduce waste going to landfill; and
3. Development of waste-to-energy generation opportunities for both municipal and private (industrial and commercial) waste systems.

The Greenhouse Gas emissions profile of the Western Cape shows that solid waste currently contributes 7% to the total emissions of the Province. Waste generation is a direct result of population and economic growth, increased standard of living and urbanisation. These factors determine the amount of goods manufactured, consumed and eventually the total waste that ends up in landfills. In addition to the indirect GHG emissions from the manufacturing of products, the disposal of waste also produces greenhouse gasses. Changing material consumption patterns and prioritising waste management that reduces waste going to landfill will play a role in reducing the GHG emissions associated with the waste sector (**Western Cape Government, Department of Environmental Affairs and Development Planning, 2018**).

Twelve waste-to-energy facilities, which include anaerobic digesters, biogas, biomass fuel combustion and pyrolysis, have been licensed in the Western Cape, of which a number are in the agricultural sector. With multiple local municipalities currently investigating the feasibility of waste-to-energy facilities.

The proposed Pilot Depolymerisation Processing Plant directly addresses all of these identified priorities. By reviewing the local municipal waste characterisation (**Eden District Municipality, 2016**), Rooikat Recycling have identified the need to reduce the plastic waste going to landfill. They have developed a thermal depolymerisation process which will generate heavy fuel oil from plastics and tyres, which can then be used by various industries in the area for energy in their own processes.

In the Western Cape, the waste stream analysis shows that plastics make up approximately 3% of the total waste stream, however, in the Mossel Bay Municipality, this percentage is increase to 16% by mass. However, by volume, plastics make up 38% of the waste to landfill.

**LOCAL NEED AND DESIRABILITY**

**Supply and Offtake demand evaluation**

Based on the waste classification study cited (Eden Distric Municipality, 2016), there is a steady supply of plastic in the Garden Route area. The "In Principle" supply agreement with a waste collector can be found attached to prove availability of sorted plastic feed. As part of the testing it is planned to supplement the feed with recycled tyres.

Many fuel-consuming industries are based in the Eden district. These include brick factories, a fishmeal factory, a petrochemical factory, and food and beverage factories that all use heavy fuel oil (HFO) and/or coal. An "In Principle" agreement is currently in progress with a large food and beverage manufacturer to ensure offtake of the produced fuels.

**Local Employment**

A plant to convert plastic to fuel will serve as a catalyst for waste segregation in the area as it will provide an outlet for plastic waste, which is currently not available. Waste segregation will employ between 15 to 30 persons in temporary and permanent positions. The pilot plant will employ between 10 and 20 persons in permanent positions. Additional persons will be employed during construction and in support services. In total at least 35 new permanent jobs will be created during the pilot plant phase. Significantly more job opportunities will be created on completion of the pilot plant phase should the commercial plant be commissioned.



## SECTION F: PUBLIC PARTICIPATION

The Public Participation Process ("PPP") must fulfil the requirements as outlined in the NEMA EIA Regulations and must be attached as Appendix F. Please note that if the NEM: WA and/or the NEM: AQA is applicable to the proposed development, an advertisement must be placed in at least two newspapers.

1. Exclusively for linear activities: Indicate what PPP was agreed to by the competent authority. Include proof of this agreement in Appendix E22.

N/A

2. Confirm that the PPP as indicated in the application form has been complied with. All the PPP must be included in Appendix F.

Pre-Application Public Participation was conducted from 28 February 2020. An initial period of 30 days was intended, however, due to the Covid-19 Lockdown, this period was extended until 30 June 2020.

An advert was placed in the MosselBay Advertiser on 28 February 2020, notifying I&APs of the proposed project and their opportunity to provide comment.

In addition, site notices were placed at the entrance to the site and all adjacent landowners and identified I&APs were informed of the release of the Draft BAR for review and comment.

3. Confirm which of the State Departments and Organs of State indicated in the Notice of Intent/application form were consulted with.

The following Organs of State were consulted as part of the Pre-Application consultation process:

- DEADP: Development Region 3
- DEADP: Waste Management
- DEADP: Pollution Management
- DEADP: Air Quality
- Breede-Gouritz CMA
- CapeNature
- Heritage Western Cape
- Mossel Bay Municipality
- Garden Route District Municipality
- Garden Route District Municipality: Air Quality Control
- Department of Health
- WCG: Transport and Public Works
- Department of Agriculture, Forestry and Fisheries
- DEA&DP: Biodiversity

4. If any of the State Departments and Organs of State were not consulted, indicate which and why.

The following State Departments will not be consulted in the Pre-Application Phase:

- DEA: Oceans and Coast
- DEA&DP: Coastal Management
- Department of Human Settlement

Due to the proposed site's location, comment from DEA: Oceans and Coast and DEA&DP: Coastal Management was not required, as the development would not have an impact on the coastal environment.

WCG: DHS were not consulted as this development is not applicable to housing.

5. If any of the State Departments and Organs of State did not respond, indicate which.

The following Organs of State did not respond during the Pre-Application phase:

- DEADP: Pollution Management
- DEADP: Air Quality
- Breede-Gouritz CMA
- Heritage Western Cape
- Mossel Bay Municipality
- Garden Route District Municipality
- Department of Health

- WCG: Transport and Public Works
- DEA&DP: Biodiversity

6. Provide a summary of the issues raised by I&APs and an indication of the manner in which the issues were incorporated into the development proposal.

The following main issues were raised by I&AP's during the Pre-Application phase:

- Search and rescue of indigenous vegetation with applicable permits
  - The EMPr has been revised to include search & rescue measures
- Alien vegetation eradication and management
  - The EMPr has been revised to include more comprehensive alien vegetation management measures
- Inclusion of fire breaks
  - The EMPr has been revised to include the need for a fire break around the development.
- Details of the commercial plant
  - Concern responded to in Comments & Responses Table
- Source of materials
  - The applicant has a letter of intent from Southern Cape Waste & Recycling for the provision of approximately 200 tons of material per month.
  - Additional sources of material, such as the Municipal Waste Manager, will be investigated.
- Air Quality / Licencing
  - An AQI has been compiled and air emissions licencing process commenced with in line with the required legislation
- Request for Plant Species Assessment
  - The proposed site of the project is in a completely transformed state, with no natural vegetation of significance remaining. In addition, comment from CapeNature has been received and they have not identified the need for a botanical specialist. As such, no additional study will be conducted.

**Note:**

A register of all the I&AP's notified, including the Organs of State, and all the registered I&APs must be included in Appendix F. The register must be maintained and made available to any person requesting access to the register in writing.

The EAP must notify I&AP's that all information submitted by I&AP's becomes public information.

Your attention is drawn to Regulation 40 (3) of the NEMA EIA Regulations which states that "*Potential or registered interested and affected parties, including the competent authority, may be provided with an opportunity to comment on reports and plans contemplated in subregulation (1) prior to submission of an application but **must** be provided with an opportunity to comment on such reports once an application has been submitted to the competent authority.*"

All the comments received from I&APs on the pre -application BAR (if applicable and the draft BAR must be recorded, responded to and included in the Comments and Responses Report and must be included in Appendix F.

All information obtained during the PPP (the minutes of any meetings held by the EAP with I&APs and other role players wherein the views of the participants are recorded) and must be included in Appendix F.

Please note that proof of the PPP conducted must be included in Appendix F. In terms of the required "proof" the following is required:

- a site map showing where the site notice was displayed, dated photographs showing the notice displayed on site and a copy of the text displayed on the notice;
- in terms of the written notices given, a copy of the written notice sent, as well as:
  - if registered mail was sent, a list of the registered mail sent (showing the registered mail number, the name of the person the mail was sent to, the address of the person and the date the registered mail was sent);
  - if normal mail was sent, a list of the mail sent (showing the name of the person the mail was sent to, the address of the person, the date the mail was sent, and the signature of the post office worker or the post office stamp indicating that the letter was sent);
  - if a facsimile was sent, a copy of the facsimile Report;
  - if an electronic mail was sent, a copy of the electronic mail sent; and
  - if a "mail drop" was done, a signed register of "mail drops" received (showing the name of the person the notice was handed to, the address of the person, the date, and the signature of the person); and
- a copy of the newspaper advertisement ("newspaper clipping") that was placed, indicating the name of the newspaper and date of publication (of such quality that the wording in the advertisement is legible).

## SECTION G: DESCRIPTION OF THE RECEIVING ENVIRONMENT

All specialist studies must be attached as Appendix G.

### 1. Groundwater

1.1.	Was a specialist study conducted?	YES	NO X
1.2.	Provide the name and or company who conducted the specialist study.	N/A	
1.3.	Indicate above which aquifer your proposed development will be located and explain how this has influenced your proposed development.	According to CapeFarmMapper (accessed January 2020), the proposed development is above a minor aquifer, with moderate vulnerability. This did not influence the proposed development.	
1.4.	Indicate the depth of groundwater and explain how the depth of groundwater and type of aquifer (if present) has influenced your proposed development.	According to CapeFarmMapper (accessed January 2020), the depth to groundwater at the development site is 23.17 metres below ground level (mbgl). This did not have an influence on the proposed development.	

### 2. Surface water

2.1.	Was a specialist study conducted?	YES	NO X
2.2.	Provide the name and/or company who conducted the specialist study.	N/A	
2.3.	Explain how the presence of watercourse(s) and/or wetlands on the property(ies) has influenced your proposed development.	There are no watercourses / wetlands present on the proposed site and the development is further than 32m from the nearest watercourse. As such, this feature has not influenced the proposed development.	

### 3. Coastal Environment

3.1.	Was a specialist study conducted?	YES	NO X
3.2.	Provide the name and/or company who conducted the specialist study.	N/A	
3.3.	Explain how the relevant considerations of Section 63 of the ICMA were taken into account and explain how this influenced your proposed development.	N/A – The site is not within an area affected by the ICMA.	
3.4.	Explain how estuary management plans (if applicable) has influenced the proposed development.	N/A	
3.5.	Explain how the modelled coastal risk zones, the coastal protection zone, littoral active zone and estuarine functional zones, have influenced the proposed development.	N/A	

### 4. Biodiversity

4.1.	Were specialist studies conducted?	YES	NO X
4.2.	Provide the name and/or company who conducted the specialist studies.	N/A	
4.3.	Explain which systematic conservation planning and other biodiversity informants such as vegetation maps, NFEPA, NSBA etc. have been used and how has this influenced your proposed development.	<p>The following conservation planning and biodiversity informants were consulted:</p> <ul style="list-style-type: none"> <li>Western Cape Biodiversity Spatial Plan (2017)</li> <li>NFEPA</li> <li>BGIS Land Use Development Planning Tool</li> </ul> <p>These informants confirmed the presence of a mapped CBA area to the north east of the property. As such, the development footprint was moved to the south-western corner in order to avoid impacting on these areas.</p>	
4.4.	Explain how the objectives and management guidelines of the Biodiversity Spatial Plan have been used and how has this influenced your proposed development.	As explained above, the site is in a transformed state and, as such, the objectives and management guidelines are not applicable to the proposed development.	

<b>4.5.</b>	<b>Explain what impact the proposed development will have on the site specific features and/or function of the Biodiversity Spatial Plan category and how has this influenced the proposed development.</b>
The proposed development would not impact on the site specific features of the BSP.	
<b>4.6.</b>	<b>If your proposed development is located in a protected area, explain how the proposed development is in line with the protected area management plan.</b>
The proposed development is not within a protected area.	
<b>4.7.</b>	<b>Explain how the presence of fauna on and adjacent to the proposed development has influenced your proposed development.</b>
Due to the transformed state of the site, there are no fauna present or directly adjacent to the proposed development, despite being mapped on the DEA Screening Tool.	

## 5. Geographical Aspects

<b>Explain whether any geographical aspects will be affected and how has this influenced the proposed activity or development.</b>
No geographical aspects would be affected by the proposed development.

## 6. Heritage Resources

<b>6.1.</b>	<b>Was a specialist study conducted?</b>	YES	<b>NO X</b>
<b>6.2.</b>	<b>Provide the name and/or company who conducted the specialist study.</b>		
N/A			
<b>6.3.</b>	<b>Explain how areas that contain sensitive heritage resources have influenced the proposed development.</b>		
Due to the size and transformed state of the site, there are no sensitive heritage resources present on the proposed development site.			

## 7. Historical and Cultural Aspects

<b>Explain whether there are any culturally or historically significant elements as defined in Section 2 of the NHRA that will be affected and how has this influenced the proposed development.</b>
Due to the transformed state of the site, and it's location within an existing industrial area, there are no culturally or historically significant elements present on the proposed development site.

## 8. Socio/Economic Aspects

<b>8.1.</b>	<b>Describe the existing social and economic characteristics of the community in the vicinity of the proposed site.</b>										
<b>Demographic analysis</b>											
The population growth of the Eden District has been very consistent from 2001 to 2011. The average population growth rate from 2001 until 2011 is 2.36%. Currently Eden's population is growing slower than the Provincial Population (2.56%) but faster than the national average of 1.45%.											
Mossel Bay has the third largest population in the Eden District with a population size of 96 120 as per the 2018 Socio-Economic Profile results. According to the forecasts of the Western Cape Department of Social Development, the population is estimated to reach 101 680 in 2021. This total gradually increases across the 5-year planning cycle and is expected to reach 107 829 by 2024 (Mossel Bay Municipality, 2018), which equates to a 1.9 % annual growth rate.											
The total population is broken down into three different groups: Age 0 - 14: children; Age 15 - 65: working age population; Age 65+: seniors. The comparison with the base year (2011) and the estimated numbers for 2023 shows growth in all age cohorts with the highest growth in the working age population for Mossel Bay.											
CENSUS 2011						COMMUNITY SURVEY 2016					
Population			Youth			Population			Youth		
43751	45679	89430	14321	14468	28789	45763	48372	94135	15335	16143	31478
Male	Female	Total	Male	Female	Total	Males	Female	Total	Male	Female	Total
Youth Proportion 32,2						Youth Proportion 33,4					

**Figure 3: Population growth Mossel Bay Municipality**

The majority of Mossel Bay's population is concentrated between the ages of 20 to 39, which is possibly reflective of an influx of young working professionals into the region (increased employment opportunities as a result of positive economic growth in the region). It is also noticeable that the population numbers in the older age categories remain relatively high in comparison to other districts. This trend can be attributed to the fact that Mossel Bay and its surrounding areas remain a popular retirement destination.

The annual income for households is divided into three categories, namely the proportion of people that fall within the low, middle- and high -income brackets. Poor households fall under the low-income bracket, which ranges from no income to just over R50 000 annually (R4 166 per month). An increase in living standards can be demonstrated by a rising number of households entering the middle- and high-income brackets.

Amount (2016)	Eden	Mossel Bay	
No income	13,4	18,0	Low income
R1 – R6 327	2,8	2,9	
R6 328 – R12 653	4,4	4,2	
R12 654 – R25 306	14,3	12,6	
R25 307 – R50 613	19,8	15,1	Middle Income
R50 614 – R101 225	16,9	15,6	
R101 226 – R202 450	12,0	13,1	
R202 451 – R404 901	9,0	10,5	High income
R404 902 – R809 802	5,1	5,2	
R809 803 – R1 619 604	1,5	1,8	
R1 619 605 – R3 239 208	0,5	0,6	
R3 239 209 or more	0,3	0,4	

**Figure 4: Income comparison between Eden District Municipality and Mossel Bay Municipality**

Approximately 52,8 percent of households fall within the low-income bracket, of which 18 per cent have no income. Less than 50 per cent of households fall within the middle to higher income categories, split between 39,2 per cent in middle income group and 8 per cent in the higher income group.

**Economic analysis**

The Mossel Bay municipal area is the second largest local economy within the Eden District, with regional gross domestic product amounting to R6.47 billion in 2015. Economic activity in the Mossel Bay municipal area is dominated by the tertiary sector which amounted to R4.6 billion (or 71.7 per cent) in 2015. The tertiary sector is estimated to have grown by 1.9 per cent in 2016, boosted by the finance, insurance, real estate and business services sector and the wholesale, retail trade, catering and accommodation sector. The finance, insurance, real estate and business services sector recorded an above average growth rate of 4.9 per cent between 2005 and 2015, and has continuously reported high growth rates post the 2008 recession.

The local economy of the Mossel Bay municipal area is driven by the finance, insurance, real estate and business services sector (27.5 per cent), the wholesale and retail trade, catering and accommodation sector (17.3 per cent), and the manufacturing sector (15 per cent). Combined, these sectors contribute more than R3.87 billion to the economy. In 2014 and 2015, the finance, insurance, real estate and business services sector's GDP growth rate was 3.3 and 4.4 per cent respectively. The sector subsequently decelerated to an estimated GDP growth rate of 2.9 per cent in 2016.

<b>8.2.</b>	<b>Explain the socio-economic value/contribution of the proposed development.</b>
	A plant to convert plastic to fuel will serve as a catalyst for waste segregation in the area as it will provide an outlet for plastic waste, which is currently not available. Waste segregation could employ between 15 to 30 persons in temporary and permanent positions.  The proposed pilot plant will employ between 10 and 20 persons in permanent positions. Additional persons will be employed during construction and in support services. In total at least 35 new permanent jobs will be created during the pilot plant phase. Significantly more job opportunities will be created on completion of the pilot plant phase should the commercial plant be commissioned.
<b>8.3.</b>	<b>Explain what social initiatives will be implemented by applicant to address the needs of the community and to uplift the area.</b>
	As described above, waste segregation could employ between 15 to 30 persons in temporary and permanent positions, with additional opportunities created on completion of the pilot phase should the commercial plant be commissioned.
<b>8.4.</b>	<b>Explain whether the proposed development will impact on people's health and well-being (e.g. in terms of noise, odours, visual character and sense of place etc) and how has this influenced the proposed development.</b>
	There will be a temporary increase in the noise and alteration of the visual character of the site during the construction phase, which will have a temporary negative impact on the "sense of place" of the areas. However, this will only be on temporary/short term duration.

During operations, the proposed development would have a negligible impact on people's health and well-being. The site is within an existing Industrial area and therefore the development would not affect the visual character and sense of place of the area.

The proposed Pilot Depolymerisation Processing Plant would not produce excessive noise in comparison to other industries in the area, nor would there be odour impacts. The source materials (plastics and tyres) do not have the usual odour impacts of general mixed waste and, as the plant would be a closed system, there would be negligible emissions.

Anticipated emissions include CO<sub>2</sub>, water and traces of CO, which inherently do not emit offensive odours.

According to the Air Quality Impact Assessment (2020), the impact of the proposed development's emissions on air quality in the area is negligible as all estimated ground-level concentrations are well below the official air quality standards published in GN1210.

## SECTION H: ALTERNATIVES, METHODOLOGY AND ASSESSMENT OF ALTERNATIVES

### 1. Details of the alternatives identified and considered

<b>1.1.</b>	<b>Property and site alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.</b>
<b>Provide a description of the preferred property and site alternative.</b>	
The preferred site is located on portion 12 of the farm Rheebookfontein No. 142, Groot Brak. The site is located directly northwest of the existing Groot Brak township. The preferred site is on the existing Mobicast land, bordered to the north by a saw mill / pole yard and the south by the Rheebookstone brick factory. The landfill site is north of the pole yard.	
<b>Provide a description of any other property and site alternatives investigated.</b>	
An Industrial Zone 2 area was considered as an alternative location, in the Mossdustria area.	
<b>Provide a motivation for the preferred property and site alternative including the outcome of the site selectin matrix.</b>	
The Mossel Bay Municipality indicated that the alternative location in Mossdustria may be challenged with respect to air emissions on the basis of existing complaints in the areas. It was further advised that an application for rezoning would have to be lodged for reclassification to an Industrial Zone 3 and it was unclear if such an application would be successful.	
As such, the preferred site was identified as being preferable as it is already zoned as Industrial Zone 3.	
<b>Provide a full description of the process followed to reach the preferred alternative within the site.</b>	
As discussed above, a site within Mossdustria was not considered feasible and the preferred site was identified. This site is part of an existing serviced development in Industrial Zone 3 and is in a disturbed state, making it ideal for the proposed development.	
<b>Provide a detailed motivation if no property and site alternatives were considered.</b>	
N/A	
<b>List the positive and negative impacts that the property and site alternatives will have on the environment.</b>	
The property would not have any impacts on the environment.	
<b>1.2.</b>	<b>Activity alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.</b>
<b>Provide a description of the preferred activity alternative.</b>	
Rooikat Recycling proposes to construct a Pilot Depolymerisation Processing Plant on Portion 21 of the Remainder of the Farm Rheebookfontein No.142 in Mossel Bay.	
Rooikat Recycling are proposing to develop a robust, fit for purpose thermal depolymerisation technology consisting of depolymerization and separation sections. This process would allow the treatment of domestic plastic at a large scale to produce a basket of fuels that can be successfully placed in the existing market.	
To demonstrate the technology, it is required to construct a pilot plant to demonstrate and refine the technology. A test/pilot facility that can process 10 to 20 tons a day of either plastic or tyres, or both, is required. The data collected during the operation will be used to develop and optimize the technology to process discarded rubber and plastic.	
The plastic would not have to be separated into the different types of plastic and typically non-recyclable plastics could now be converted into fuel without adding strain on the environment. The process would be a closed loop system and the generated off gasses would be used internally for energy production. Two products would be produced, heavy fuel oil (HFO) and minimal volumes of carbon black (which is a substitute for coal and can be used as a pigment).	
<b>Provide a description of any other activity alternatives investigated.</b>	
It was originally proposed to include oil sludge as an input, however, due to this triggering a full Environmental Impact Assessment Process ( <i>Category B: Treatment of Hazardous Waste over 500kg per day</i> ) and the associated longer more expensive process, it was decided to exclude it for this piloting project.	
<b>Provide a motivation for the preferred activity alternative.</b>	
The proposed activity would assist with the minimisation of waste to landfill in the area, while providing heavy fuel oil to existing industries in the area. This would aid the reduction of use of non-renewable energy sources.	
<b>Provide a detailed motivation if no activity alternatives exist.</b>	
As described above, the proposed activity is borne from a need identified in the area. The inclusion of oil sludge was determined to not be feasible for the pilot plant, due to the additional triggers and potential environmental impacts.	
<b>List the positive and negative impacts that the activity alternatives will have on the environment.</b>	
The following impacts are anticipated for the proposed activity alternative: <ul style="list-style-type: none"> <li>• Socio-economic – employment (positive)</li> <li>• Socio-economic – waste reduction (positive)</li> <li>• Climate change (positive)</li> </ul>	

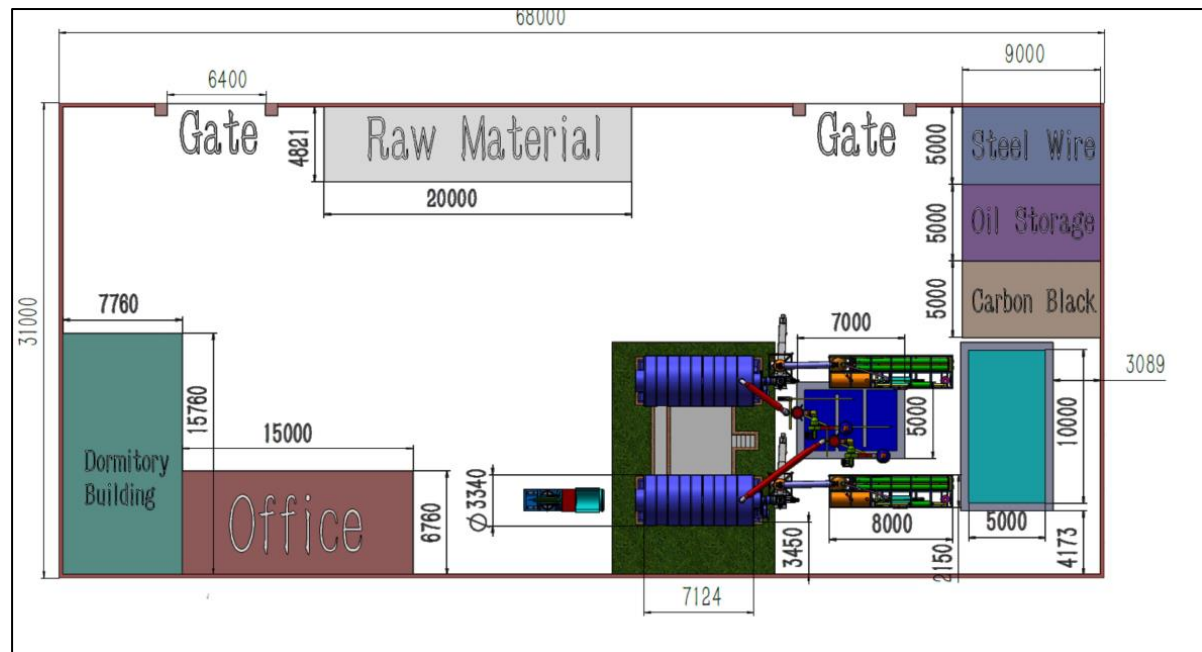
**1.3. Design or layout alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts**

**Provide a description of the preferred design or layout alternative.**

The proposed plant layout is shown below. The entire plant will be fenced with separate entrance and exit gates to allow for one way traffic through the facility.

The plant will consist of the following:

- Raw Material temporary storage area – approx. 96m<sup>2</sup>
- Dormitory Building – approx. 122m<sup>2</sup>
- Office Block – approx. 100m<sup>2</sup>
- Processing Plant – approx. 400m<sup>2</sup>
- Product storage area for steel wire, heavy fuel oil and carbon black – approx. 135<sup>2</sup>



**Figure 5: Rookat Recycling Plastic depolymerization Pilot plant layout**

**Provide a description of any other design or layout alternatives investigated.**

No alternative layouts were investigated.

**Provide a motivation for the preferred design or layout alternative.**

The proposed layout has been designed for optimal processing capability, allowing for natural flow of resources into and out of the plant.

**Provide a detailed motivation if no design or layout alternatives exist.**

The proposed layout was designed based on research of similar facilities worldwide. This tool takes into account the existing access as well as the environmental sensitivities to the north east of the site.

**List the positive and negative impacts that the design alternatives will have on the environment.**

The following impacts are anticipated for the proposed design alternative:

- Traffic (negative)
- Visual (negative)

**1.4. Technology alternatives (e.g., to reduce resource demand and increase resource use efficiency) to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.**

**Provide a description of the preferred technology alternative:**

Rookat Recycling are proposing to develop a robust, fit for purpose depolymerisation processing plant, consisting of depolymerization and separation sections. The preferred technology alternative proposed is a form of Pyrolysis called Thermal depolymerisation.

Pyrolysis is a generic term, used to describe thermal degradation in the absence of oxygen. The absence of oxygen means that combustion does not occur and that the feed is devolatilized and decomposed to produce gas, liquid and carbon black. The produced gas is typically used for internal heating and the liquid and carbon black can be sold as fuels.

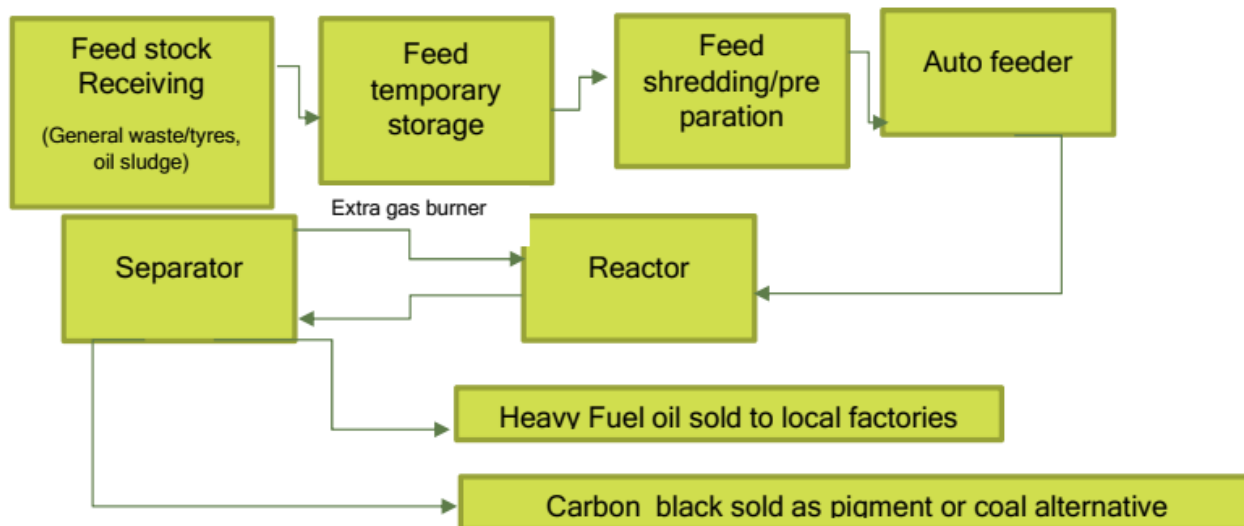
Thermal depolymerization is the breakdown of polymers into smaller molecules. Thermal depolymerization processes may utilize steam, catalyst, high temperatures and elevated pressures to achieve the objective. Depending on the application,



depolymerization can break down molecules into the monomers (smallest polymer building blocks). In the proposed application the size of the final molecule is controlled to yield molecules within the diesel and fuel oil boiling point ranges.

**Process breakdown**

Feedstock will be received at the facility. The facility will not serve as a long-term storage site, only the feed to be processed will be at the facility. The feed will be manually loaded into the auto feeder from where it will be loaded into the reactor. The reactor will operate on the gas and HFO produced by the process. The reactor product will be cooled and separated into three streams. The gas stream will be routed to back to the reactor for energy generation and the resulting HFO and carbon black will be sold as products. The process thus has no waste streams.



**Provide a description of any other technology alternatives investigated.**

The following alternative technologies were investigated:

- Combustion/Incineration, this process is where the plastic is reacted in excess oxygen to produce heat that in turn can be used for electricity generation. The combustion process can handle a large variety of different feedstock and ratio's, but it requires sophisticated and expensive gas cleaning, monitoring and control to ensure the emissions are within the governmental specifications.
- Gasification, this method is used under stringent process conditions (specific reaction temperature & pressure, steam and oxygen feed rate) to produce syngas and carbon black from plastic. Syngas is formed during the total decomposition of the feed into carbon monoxide, carbon dioxide, hydrogen, water and methane. Due to the nature of the process tars are also formed which needs to be removed from the syngas as a waste stream. The produced syngas then needs to be processed in multiple steps to finally produce fuels. This is capital intensive, fastidious and complex process which is sensitive to the feedstock and feedstock composition.
- Plasma gasification, this form of technology is the decomposition of plastic into gasses and carbon black in an oxygen deprived environment using electricity as a power source. This technology uses electrons, ions and excited molecules together with the high energy radiation to decompose chemicals.
- Hydrothermal carbonization, this process replicates the production of coal by converting material into hydro char under high pressures and temperatures.

**Provide a motivation for the preferred technology alternative.**

As highlighted in the previous section, various means exist to produce fuel from waste. The key to a successful facility is to select technology that is:

- Robust
- Easy to control
- Safe
- Treat varying feed compositions and material (varying types of plastic and tyres in varying ratios)
- Environmentally sustainable
- Low emissions
- Simple engineering
- Easy to maintain
- Reproducible
- Implementable at local municipality level
- Once commissioned, personnel can be easily trained to control the process

	<ul style="list-style-type: none"> <li>• Produce useable products</li> <li>• Economical</li> </ul> <p>None of the alternative technologies fully covers all the listed considerations. Incineration is not environmentally beneficial due to the associated emissions and inefficiencies. Gasification is too expensive and sensitive to feed variations and requires several more processing steps to yield fuels. Plasma pyrolysis is highly specialized and hydrothermal carbonization is relatively new and requires operation at high pressures. Pyrolysis produces a wide range of molecules which require refining before being sold as products. As a result, these technologies were not selected as the preferred technology.</p>
<p><b>Provide a detailed motivation if no alternatives exist.</b></p>	
<p>N/A</p>	
<p><b>List the positive and negative impacts that the technology alternatives will have on the environment.</b></p>	
<p>The impacts anticipated for the proposed technology alternative are the same as those for the activity alternative:</p> <ul style="list-style-type: none"> <li>• Socio-economic – employment (positive)</li> <li>• Socio-economic – waste reduction (positive)</li> <li>• Climate change (positive)</li> </ul>	
<p><b>1.5.</b></p>	<p><b>Operational alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts.</b></p>
<p><b>Provide a description of the preferred operational alternative.</b></p>	
<p>The preferred operational alternative is the thermal depolymerisation of between 10 and 20 tons of plastic and tyres to convert them into heavy fuel oil and minimal volumes of carbon black.</p>	
<p><b>Provide a description of any other operational alternatives investigated.</b></p>	
<p>No operational alternatives are being proposed for the development.</p>	
<p><b>Provide a motivation for the preferred operational alternative.</b></p>	
<p>Plastic has formed such a massive part of our everyday life and it is hard to evade. The Garden Route is developing at a rapid pace and with the increased number of households being established, there is also an increase in the amount of discarded plastic and tyres. Plastic separation and recycling projects have been successful in the Eden District to some extent, but only a small fraction of the plastic collected is actually reprocessed into other plastic goods, while the majority still ends up in landfill sites. This is because the recycling of plastics is not as easy as melting everything together and making useful items. Not all plastics are created equal and the contaminants in plastics make the processing of it challenging.</p> <p>Although used tyres are being collected for intended recycling, most of the tyres are simply stored in bulk. These cannot be landfilled and there is a need to find alternative uses and means of processing/recycling of these tyres.</p> <p>Currently, most of the refuse generated in the Garden Route is transported to the Mossel Bay landfill site. Landfill sites are fast becoming overfilled with the large amount of refuse generated by households and businesses.</p> <p>In 2015 the Eden Municipality (Mossel Bay) started a waste characterization study of the area to add to the Mossel Bay Municipality’s Integrated waste Management Plan (Eden Distric Municipality, 2016). This comprehensive study indicated that 42% (mass) of the waste sampled from black bags were recyclable. In total 16% (mass) were plastics. On a volume basis a staggering 39% of the contents sampled were plastics (Eden Distric Municipality, 2016). This indicated that although there are recycling initiatives in the area, a large fraction of the plastic still ends up in the landfill sites. This is problematic since the plastic takes many years to decompose and it poses a risk to the environment. The study indicated that the recyclable portion of the total waste landfilled on a monthly basis is an astounding 986 tons and 6420m<sup>3</sup>. Of that, 157 ton is plastic. This equates to 2504m<sup>3</sup> of plastic to landfill per month.</p> <p>There is a need to process 10 to 20 tons of discarded plastic (different types) in the Mossel Bay Municipality based on the surveys done by the Mossel Bay Municipality. The operation of the proposed depolymerisation processing plant would meet this need.</p>	
<p><b>Provide a detailed motivation if no alternatives exist.</b></p>	
<p>The plant is designed to operate in a specific way in order to minimise environmental impacts and maximise the efficiency of the process. As such, other alternatives were not investigated.</p>	
<p><b>List the positive and negative impacts that the operational alternatives will have on the environment.</b></p>	
<p>The impacts anticipated for the proposed operational alternative are the same as those for the activity/technology alternatives:</p> <ul style="list-style-type: none"> <li>• Socio-economic – employment (positive)</li> <li>• Socio-economic – waste reduction (positive)</li> <li>• Climate change (positive)</li> </ul>	

<b>1.6.</b>	<b>The option of not implementing the activity (the 'No-Go' Option).</b>
<b>Provide an explanation as to why the 'No-Go' Option is not preferred.</b>	
<p>The No-Go Option would mean the current status quo relating to waste continuing. As discussed above, although there are recycling initiatives in the area, a large fraction of the plastic still ends up in the landfill sites. This is problematic since the plastic takes many years to decompose and it poses a risk to the environment. The current recyclable portion of the total waste landfilled on a monthly basis is an astounding 986 tons and 6420m<sup>3</sup>. Of that, 157 ton is plastic. This equates to 2504m<sup>3</sup> of plastic to landfill per month.</p> <p>In addition to the ongoing negative effects of the plastic going to landfill, the opportunity to supply the local industries with HFO would be missed, resulting in the continued use of non-renewable fuel and the impacts this has on climate change.</p>	
<b>1.7.</b>	<b>Provide an explanation as to whether any other alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist.</b>
No other alternatives were investigated.	
<b>1.8.</b>	<b>Provide a concluding statement indicating the preferred alternatives, including the preferred location of the activity.</b>
The preferred alternative is the development of a Pilot Depolymerisation Processing Plant on Portion 21 of Farm Rheeboekfontein No. 142, which will convert 10-20 tons per day of plastic waste and tyres to heavy fuel oil and minimal volumes of carbon black.	

## 2. "No-Go" areas

<b>Explain what "no-go" area(s) have been identified during identification of the alternatives and provide the co-ordinates of the "no-go" area(s).</b>
There are no "no-go" areas within the site development footprint.

## 3. Methodology to determine the significance ratings of the potential environmental impacts and risks associated with the alternatives.

<b>Describe the methodology to be used in determining and ranking the nature, significance, consequences, extent, duration of the potential environmental impacts and risks associated with the proposed activity or development and alternatives, the degree to which the impact or risk can be reversed and the degree to which the impact and risk may cause irreplaceable loss of resources.</b>	
<p>The assessment criteria utilized in this environmental impact assessment is based on, and adapted from, the <i>Guideline on Impact Significance, Integrated Environmental Management Information Series 5</i> (Department of Environmental Affairs and Tourism (DEAT), 2002) and the <i>Guideline 5: Assessment of Alternatives and Impacts in Support of the Environmental Impact Assessment Regulations</i> (DEAT, 2006).</p>	
<b>Determination of Extent (Scale):</b>	
<b>Site specific</b>	On site or within 100 m of the site boundary.
<b>Local</b>	The impacted area includes the whole or a measurable portion of the site, but could affect the area surrounding the development, including the neighbouring properties and wider municipal area.
<b>Regional</b>	The impact would affect the broader region (e.g. neighbouring towns) beyond the boundaries of the adjacent properties.
<b>National</b>	The impact would affect the whole country (if applicable).
<b>Determination of Duration:</b>	
<b>Temporary</b>	The impact will be limited to the construction phase.
<b>Short term</b>	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than 2 years.
<b>Medium term</b>	The impact will last up to the end of the construction phase, where after it will be entirely negated.
<b>Long term</b>	The impact will continue for the entire operational lifetime of the development but will be mitigated by direct human action or by natural processes thereafter.
<b>Permanent</b>	This is the only class of impact that will be non-transitory. Such impacts are regarded to be irreversible, irrespective of what mitigation is applied.

**Determination of Probability:**

<b>Improbable</b>	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
<b>Probable</b>	There is a possibility that the impact will occur to the extent that provisions must therefore be made.
<b>Highly probable</b>	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up to mitigate the activity before the activity commences.
<b>Definite</b>	The impact will take place regardless of any prevention plans.

**Determination of Significance (without mitigation):**

<b>No significance</b>	The impact is not substantial and does not require any mitigation action.
<b>Low</b>	The impact is of little importance but may require limited mitigation.
<b>Medium</b>	The impact is of sufficient importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
<b>Medium-High</b>	The impact is of high importance and is therefore considered to have a negative impact. Mitigation is required to manage the negative impacts to acceptable levels.
<b>High</b>	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.
<b>Very High</b>	The impact is critical. Mitigation measures cannot reduce the impact to acceptable levels. As such the impact renders the proposal unacceptable.

**Determination of Significance (with mitigation):**

<b>No significance</b>	The impact will be mitigated to the point where it is regarded to be insubstantial.
<b>Low</b>	The impact will be mitigated to the point where it is of limited importance.
<b>Medium</b>	Notwithstanding the successful implementation of the mitigation measures, the impact will remain of significance. However, taken within the overall context of the project, such a persistent impact does not constitute a fatal flaw.
<b>High</b>	Mitigation of the impact is not possible on a cost-effective basis. The impact continues to be of great importance, and, taken within the overall context of the project, is considered to be a fatal flaw in the project proposal.

**Determination of Reversibility:**

<b>Completely Reversible</b>	The impact is reversible with implementation of minor mitigation measures
<b>Partly Reversible</b>	The impact is partly reversible but more intense mitigation measures
<b>Barely Reversible</b>	The impact is unlikely to be reversed even with intense mitigation measures
<b>Irreversible</b>	The impact is irreversible and no mitigation measures exist

**Determination of Degree to which an Impact can be Mitigated:**

<b>Can be mitigated</b>	The impact is reversible with implementation of minor mitigation measures
<b>Can be partly mitigated</b>	The impact is partly reversible but more intense mitigation measures
<b>Can be barely mitigated</b>	The impact is unlikely to be reversed even with intense mitigation measures
<b>Not able to mitigate</b>	The impact is irreversible and no mitigation measures exist

**Determination of Loss of Resources:**

<b>No loss of resource</b>	The impact will not result in the loss of any resources
<b>Marginal loss of resource</b>	The impact will result in marginal loss of resources
<b>Significant loss of resources</b>	The impact will result in significant loss of resources
<b>Complete loss of resources</b>	The impact will result in a complete loss of all resources

**Determination of Degree to which an Impact can be avoided:**

<b>High</b>	The impact is completely avoidable
<b>Medium</b>	The impact is avoidable with moderate mitigation
<b>Low</b>	The impact is difficult to avoid and will require significant mitigation
<b>Unavoidable</b>	The impact cannot be avoided

**Determination of Degree to which an Impact can be managed:**

<b>High</b>	The impact is completely manageable
<b>Medium</b>	The impact is manageable with moderate mitigation
<b>Low</b>	The impact is difficult to manage and will require significant mitigation
<b>Unmanageable</b>	The impact cannot be managed

**Determination of Cumulative Impact:**

<b>Negligible</b>	The impact would result in negligible to no cumulative effects
<b>Low</b>	The impact would result in insignificant cumulative effects
<b>Medium</b>	The impact would result in minor cumulative effects
<b>High</b>	The impact would result in significant cumulative effects

**4. Assessment of each impact and risk identified for each alternative**

**Note:** The following table serves as a guide for summarising each alternative. The table should be repeated for each alternative to ensure a comparative assessment. The EAP may decide to include this section as Appendix J to this BAR.

	ALTERNATIVE A	NO-GO OPTION
<b>PLANNING, DESIGN AND DEVELOPMENT PHASE</b>		
<b>Potential impact and risk:</b>	<b>SENSE OF PLACE</b>	
<b>Nature of Impact:</b>	Negative	Negative
<b>Extent and duration of impact:</b>	Local and temporary	Not applicable
<b>Consequence of impact or risk:</b>	General construction nuisances i.e. dust, noise, odour, etc. will impact on the sense of place, although mainly temporary in nature.	Not applicable, as no construction will mean no such nuisances will occur.
<b>Probability of occurrence:</b>	Definite	Not applicable, as no construction means no nuisances.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resource	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	Completely reversible	Not applicable.
<b>Indirect impacts:</b>	None.	None
<b>Cumulative impact prior to mitigation:</b>	Negligible	Not applicable.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Degree to which the impact can be avoided:</b>	Medium-High	Not applicable.
<b>Degree to which the impact can be managed:</b>	Medium	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	Medium	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
<p><b>Proposed mitigation:</b></p>	<p><u>Dust Mitigation:</u></p> <ul style="list-style-type: none"> <li>• Land clearing and earthmoving activities should not be undertaken during strong winds, where possible.</li> <li>• Cleared areas should be provided with a suitable cover as soon as possible, and not left exposed for extended periods of time.</li> <li>• Stockpiles of topsoil, spoil material and other material that may generate dust must be protected from wind erosion (e.g. covered with netting, tarpaulin or other appropriate measures. Note that topsoil should not be covered with tarpaulin as this may kill the seedbank).</li> <li>• The location of stockpiles must take into account the prevailing wind direction, and should be situated so as to have the least possible dust impact to surrounding residents, road-users and other land-users.</li> <li>• Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution.</li> <li>• The speed limit on site should be set at 20-40km/h.</li> <li>• Dust must be suppressed on access roads and the construction site during dry periods by the regular application of non-potable water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of excessive run off.</li> <li>• The use of straw worked into the sandy areas may also help and the ECO must advise when this is necessary.</li> <li>• If dust appears to be a continuous problem the option of using shade cloth to cover open areas may be necessary or the erecting of shade netting above the fenced off areas may need to be explored.</li> <li>• All vehicles transporting loose material need to have tarpaulins covering their loads which will assist in any windblown sand occurring off the trucks.</li> <li>• Work on site must be well-planned and should proceed efficiently so as to minimise the handling of dust generating material.</li> <li>• Dust levels specified in the National Dust Control Regulations (GN 827 of November 2013) may not be exceeded. i.e. dust fall in residential areas may not exceed 600mg/m<sup>2</sup>/day, measured using reference method ASTM D1739;</li> <li>• A Complaints Register must be available at the site office for inspection by the ECO of dust complaints that may have been received.</li> <li>• The appointed Environmental Control Officer (ECO) must undertake a site inspection twice per month, for the duration of the construction phase, and to produce a short monthly ECO monitoring report, reporting on the</li> </ul>	<p>Not applicable.</p>

	ALTERNATIVE A	NO-GO OPTION
	<p>compliance of the developer with the conditions of the Environmental Authorisation and the approved EMP.</p> <p><u>Noise Mitigation:</u></p> <ul style="list-style-type: none"> <li>• A noise complaints register will be opened.</li> <li>• Excavations and earth-moving activities must be restricted to normal construction working hours (7:30 – 17:30) as far as possible.</li> <li>• Work on site must be well-planned and should proceed efficiently so as to limit the duration of the disturbance.</li> <li>• Vehicles and equipment must be kept in good working condition. If deemed necessary, machinery and equipment should be fitted with mufflers/ exhaust silencers. No unnecessary disturbances should be allowed to emanate from the construction site.</li> <li>• Workers should be educated on how to control noise-generating activities that have the potential to become disturbances, particularly over an extended period of time.</li> <li>• Noise levels must comply with the relevant health &amp; safety regulations and SANS codes and should be monitored by the Health &amp; Safety Officer as necessary and appropriate.</li> <li>• Affected parties must be informed of the excessive noise factors.</li> <li>• The noise management and monitoring measures prescribed in the EMP must be adhered to.</li> <li>• The appointed Environmental Control Officer (ECO) must undertake a site inspection twice per month, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP.</li> </ul>	
<b>Residual impacts:</b>	None.	Not applicable.
<b>Cumulative impacts post mitigation:</b>	None.	Not applicable.
<b>Significance rating of impact post mitigation</b>	Low.	Not applicable.



	ALTERNATIVE A	NO-GO OPTION
(e.g. Low, Medium, Medium-High, High, or Very-High)		
<b>Potential impact and risk:</b>	<b>TRAFFIC</b>	
<b>Nature of Impact:</b>	Negative	Negative
<b>Extent and duration of impact:</b>	Local and temporary	Not applicable
<b>Consequence of impact or risk:</b>	Minor disruptions to traffic to the surrounding areas will occur during the construction stage, as construction vehicles will be utilising the areas to access the sites.	Not applicable, as no construction will mean no such nuisances will occur.
<b>Probability of occurrence:</b>	Definite	Not applicable, as no construction means no nuisances.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resource.	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	Completely reversible.	Not applicable.
<b>Indirect impacts:</b>	None.	None.
<b>Cumulative impact prior to mitigation:</b>	Negligible.	Not applicable.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Degree to which the impact can be avoided:</b>	Medium-High.	Not applicable.
<b>Degree to which the impact can be managed:</b>	Medium.	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	Can be mitigated.	Not applicable.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>All construction vehicles need to adhere to traffic laws. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users.</li> </ul>	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
	<ul style="list-style-type: none"> <li>• As far as possible care should be taken to ensure that the local traffic flow pattern is not significantly disrupted, and all vehicle operators therefore need to be educated in terms of “best-practice” operation to minimise unnecessary traffic congestion or dangers. Construction vehicles should therefore, not unnecessarily obstruct the access point or traffic lanes used to access the site.</li> <li>• Construction vehicles also need to consider the load carrying capacity of road surfaces and adhere to all other prescriptive regulations regarding the use of public roads by construction vehicles.</li> <li>• Adequate signage, that is both informative and cautionary to passing traffic (motorists and pedestrians), warning them of the construction activities must be suitably located in the area where the construction is occurring and must be easily visible by all road users.</li> <li>• Signage needs to be clearly visible and needs to include, among others, the following: <ul style="list-style-type: none"> <li>○ Identifying working area as a construction site;</li> <li>○ Cautioning against relevant construction activities;</li> <li>○ Prohibiting access to construction site;</li> <li>○ Clearly specifying possible detour routes and/or delay periods;</li> <li>○ Possible indications of time frames attached to the construction activities, and;</li> <li>○ Listings of which contractors and engineers are working on the site.</li> </ul> </li> <li>• If needed, appropriate traffic management measures and/ or points men (traffic marshals) should be utilized to assist vehicles entering/ exiting the site, particularly where vehicles must cross the path of oncoming traffic.</li> <li>• Speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users.</li> <li>• The Contractor must ensure that any large or abnormal loads that must be transported to/ from the site are routed appropriately, and that appropriate safety precautions are taken.</li> </ul>	
<b>Residual impacts:</b>	None	Not applicable.
<b>Cumulative impacts post mitigation:</b>	None	Not applicable.
<b>Significance rating of impact post mitigation</b>	Low	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
(e.g. Low, Medium, Medium-High, High, or Very-High)		
<b>Potential impact and risk:</b>	<b>SOIL, STORMWATER AND GROUNDWATER POLLUTION</b>	
<b>Nature of Impact:</b>	Negative	Negative
<b>Extent and duration of impact:</b>	Local and temporary	Not applicable
<b>Consequence of impact or risk:</b>	Soil, storm water and groundwater pollution due to spillages and/or improper handling-, storage-, mixing- or disposal- of cement and concrete.	Not applicable, as no construction will mean no such nuisances will occur.
<b>Probability of occurrence:</b>	Probable	Not applicable, as no construction means no nuisances.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resource.	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	Partly	Not applicable.
<b>Indirect impacts:</b>	None.	None.
<b>Cumulative impact prior to mitigation:</b>	Low	Not applicable.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Degree to which the impact can be avoided:</b>	Medium	Not applicable.
<b>Degree to which the impact can be managed:</b>	Medium.	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	Can be mitigated.	Not applicable.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>Cement may only be mixed on an impermeable surface (not on bare soil).</li> </ul>	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
	<ul style="list-style-type: none"> <li>• Dry cement must be removed from the soil surface to prevent an impermeable layer forming on top of the soil. The cement must be disposed of together with any building rubble.</li> <li>• Ready-mix trucks are not permitted to clean chutes on site. Cleaning into foundations or a dedicated cleaning pit is permitted.</li> <li>• Bricklayers and plasterers are to minimise any cement spill or runoff in their work area and are to ensure that the work area is cleaned of all cement spillage at the end of each workday.</li> <li>• Both used and unused cement bags are to be stored in weatherproof containers so as not to be affected by rain or runoff.</li> <li>• Contaminated soil resulting from concrete or cement spills, including residue produced by the washing of cavities, are to be removed immediately after the spillage has occurred and placed on the appropriate rubble stockpile.</li> <li>• Runoff from the washing out of wall cavities is to be contained against the building by excavations or berms around the foundations. All reasonable measures must be taken to prevent the dirty water from contaminating the environment.</li> <li>• Identify all hazardous chemical substances used onsite including fuel, greases and oils.</li> <li>• Obtain the material safety data sheet of each of hazardous chemical substance.</li> <li>• Material Safety Data Sheets for all hazardous chemical substances must be readily available on site.</li> <li>• Ensure that the material safety data sheets have sufficient information to enable the user to take the necessary measures to protect his/her health and safety and that of the environment.</li> </ul>	
<b>Residual impacts:</b>	None.	Not applicable.
<b>Cumulative impacts post mitigation:</b>	None.	Not applicable.
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
<b>Potential impact and risk:</b>	<b>VISUAL</b>	
<b>Nature of Impact:</b>	Negative	Negative
<b>Extent and duration of impact:</b>	Local and temporary	Not applicable
<b>Consequence of impact or risk:</b>	Visual impacts are to be expected during this stage of the development, but the site will be fenced or screened for health and safety purposes and access controlled, thus limiting the visual impact of the actual construction work.	Not applicable, as no construction will mean no such nuisances will occur.
<b>Probability of occurrence:</b>	Definite	Not applicable, as no construction means no nuisances.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resource.	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	Partly	Not applicable.
<b>Indirect impacts:</b>	None.	None.
<b>Cumulative impact prior to mitigation:</b>	Low	Not applicable.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Degree to which the impact can be avoided:</b>	Medium	Not applicable.
<b>Degree to which the impact can be managed:</b>	Medium.	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	Can be mitigated.	Not applicable.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>The site camp, storage facilities, stockpiles, waste bins, and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible.</li> <li>Work on site must be well-planned and well-managed so that work proceeds quickly and efficiently, thus minimizing the disturbance time.</li> </ul>	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
	<ul style="list-style-type: none"> <li>The site camp, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. The site camp may require visual screening via shade cloth or other suitable material.</li> <li>Special attention should be given to the screening of highly reflective material.</li> <li>Use of lighting (if required) should take into account surrounding land users and should present little or no nuisance. Downward facing, spill-off type lighting is recommended.</li> <li>Construction vehicles must enter and leave the site during working hours.</li> <li>Working areas, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible.</li> </ul>	
<b>Residual impacts:</b>	None.	Not applicable.
<b>Cumulative impacts post mitigation:</b>	None.	Not applicable.
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low.	Not applicable.
<b>Potential impact and risk:</b>		
	<b>SOCIO-ECONOMIC IMPACTS: JOB CREATION: Creation of temporary job opportunities with potential for skills transfer, for members of the local community.</b>	
<b>Nature of Impact:</b>	Positive.	Negative.
<b>Extent and duration of impact:</b>	Local and temporary.	None.
<b>Consequence of impact or risk:</b>	The local community benefits from the employment opportunities created during the construction phase.	Negative impact, as no new jobs would be created for the local community if no construction occurs.
<b>Probability of occurrence:</b>	Definite.	No transfer of skills occurs, and the no new jobs are created if no construction occurs.
<b>Degree to which the impact may cause</b>	No loss of a resource.	Significant loss of a resource, as no opportunities will be available as a result of this option.

	ALTERNATIVE A	NO-GO OPTION
<b>irreplaceable loss of resources:</b>		
<b>Degree to which the impact can be reversed:</b>	Completely reversible.	Irreversible.
<b>Indirect impacts:</b>	There may be opportunities to transfer skills from more experienced workers to less experienced workers. The local community benefits from the employment opportunities created during the construction phase. Increase in local economy.	No upskilling of the local community members occurs, as no new jobs created.
<b>Cumulative impact prior to mitigation:</b>	None.	None.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low-Medium.	Medium, as job opportunities are a focal point for socio-economic aspects of the development to have a positive impact.
<b>Degree to which the impact can be avoided:</b>	High.	Unavoidable.
<b>Degree to which the impact can be managed:</b>	High.	Low.
<b>Degree to which the impact can be mitigated:</b>	No mitigation proposed, as it is a positive impact.	No mitigation proposed, as no impact created.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>This impact can be enhanced through the sourcing of local companies to provide construction related services. Local businesses are more likely to employ residents of the local area and more likely to use suppliers from the local economy.</li> </ul>	None proposed.
<b>Residual impacts:</b>	The majority of the construction team will be from the local community, with preference given to historically disadvantaged individuals.  Skills transfer from experienced to less experienced workers will be actively encouraged on site.	No new job opportunities created, as no construction occurs.
<b>Cumulative impacts post mitigation:</b>	High.	Medium.
<b>Significance rating of impact post mitigation</b>	Medium (+)	Medium (-).

	ALTERNATIVE A	NO-GO OPTION
(e.g. Low, Medium, Medium-High, High, or Very-High)		
<b>OPERATIONAL PHASE:</b>		
<b>Potential impact and risk:</b>	<b>AIR QUALITY</b>	
<b>Nature of Impact:</b>	Negative	Not applicable
<b>Extent and duration of impact:</b>	Local	Not applicable
<b>Consequence of impact or risk:</b>	Increased air pollution due to emissions from the Pilot Depolymerisation Processing Plant. The reactor combusts the fuel to supply heat to the process. These combustion gasses are identified as an emission.	Not applicable, as air quality in the area would remain the same.
<b>Probability of occurrence:</b>	Possible	Not applicable.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resources	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	High	Not applicable.
<b>Indirect impacts:</b>	Increase in GHG emissions leading to impacts on climate change.	None.
<b>Cumulative impact prior to mitigation:</b>	Low	Not applicable.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Degree to which the impact can be avoided:</b>	High	Not applicable.
<b>Degree to which the impact can be managed:</b>	High	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	High	Not applicable.



	ALTERNATIVE A	NO-GO OPTION
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>The Plastic Depolymerisation plant must be designed with safety precautions, such as safety valves and Carbon monoxide (CO) sensors and alarm systems for personnel working on the plant.</li> <li>Heating will initially be by LP Gas or heavy fuel oil until the depolymerization process generates its own gas and fuel oil. This gas and oil will then be piped to the heating chamber and used as heating fuel.</li> <li>Due to the heat, steam would be formed that will be released.</li> <li>All off gas will pass through a water operated scrubber system to be cleaned prior to release.</li> <li>In the condenser, the gasses will be turned back to liquid to form oil.</li> <li>The system will not use flare-off to rid the system of unwanted gasses as the gasses will be used internally for heating of the reactor however in case of emergency the off gasses will be burned.</li> <li>Any flue gas generated will be scrubbed. The scrubber will remove the particulate matter.</li> <li>Monitoring equipment will be installed and acceptable techniques used in order to accurately monitor any emissions from the plant.</li> <li>It is recommend that a comprehensive CEM system is not stipulated for the pilot plant stage, but rather a system that monitors the key components that are indicative of the efficiency of the process, e.g. CO, VOCs, etc. Other compounds, e.g. SO<sub>2</sub>, NO<sub>2</sub>, etc., can be measured manually at regularly intervals.</li> <li>Further mitigations will be employed in consultation with the local Air Emissions Authority should these be found to be required.</li> <li>The oil storage tanks must be designed in accordance with SANS 10089-1:2008 (The Petroleum Industry Part 1: Storage and distribution of petroleum products in above-ground bulk installations).</li> </ul>	Not applicable.
<b>Residual impacts:</b>	None	Not applicable.
<b>Cumulative impacts post mitigation:</b>	Negligible	Not applicable.
<b>Significance rating of impact post mitigation</b>	Negligible	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
(e.g. Low, Medium, Medium-High, High, or Very-High)		
<b>Potential impact and risk:</b>	<b>CLIMATE CHANGE – GHG EMISSIONS</b>	
<b>Nature of Impact:</b>	Positive	Negative
<b>Extent and duration of impact:</b>	Regional and permanent.	Regional and permanent.
<b>Consequence of impact or risk:</b>	Reduction in GHG emissions relating to waste management practices and the production of fuel from an alternative source (biofuel).	Acceleration of climate change due to GHG (landfill gas) emissions and the production of fuel from virgin oil (fossil fuels).
<b>Probability of occurrence:</b>	Definite	Definite
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No significant loss of a resource.	Significant loss of a resource.
<b>Degree to which the impact can be reversed:</b>	Positive impact so does not need to be reversed.	Can be reversed through innovative waste management.
<b>Indirect impacts:</b>	None	None
<b>Cumulative impact prior to mitigation:</b>	Medium	Medium
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Medium	Medium-High
<b>Degree to which the impact can be avoided:</b>	Medium	Medium
<b>Degree to which the impact can be managed:</b>	Medium	Medium
<b>Degree to which the impact can be mitigated:</b>	N/A – This is a positive impact proposed to be enhanced.	Can be mitigated.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>The impact on climate change is enhanced through the focus on diversion of 10-20 tons/day of plastic waste and tyres from landfill and</li> </ul>	Implementation of the proposed development.

	ALTERNATIVE A	NO-GO OPTION
	the generation of HFO through an alternative source to fossil fuel (biofuel) for use by local industries.	
<b>Residual impacts:</b>	Remaining volumes of waste generated in the area.	None
<b>Cumulative impacts post mitigation:</b>	Medium	Medium
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Medium (+)	Medium (-)
<b>Potential impact and risk:</b>		
	<b>SOIL, STORMWATER AND GROUNDWATER POLLUTION</b>	
<b>Nature of Impact:</b>	Negative	Negative
<b>Extent and duration of impact:</b>	Local and temporary	Not applicable
<b>Consequence of impact or risk:</b>	Soil, stormwater and groundwater pollution due to poor waste management.	Not applicable, as no construction will mean no such nuisances will occur.
<b>Probability of occurrence:</b>	Probable	Not applicable, as no construction means no nuisances.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resource.	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	Partly	Not applicable.
<b>Indirect impacts:</b>	None.	None.
<b>Cumulative impact prior to mitigation:</b>	Low	Not applicable.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Medium	Not applicable.
<b>Degree to which the impact can be avoided:</b>	Medium	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
<b>Degree to which the impact can be managed:</b>	Medium.	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	Can be mitigated.	Not applicable.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• Train staff on the use of chemicals in accordance with the risks as described in the material data sheets.</li> <li>• Keep a stock inventory register of all chemicals in the store.</li> <li>• Powders must be stored above liquids.</li> <li>• Proper storage of chemicals in a lockable, well ventilated building.</li> <li>• Ensure adequate access control for the storage area.</li> <li>• Storage areas for hazardous chemicals are to comply with standard fire safety regulations.</li> <li>• Safety signage including "No Smoking", "No Naked Lights" and "Danger", and product identification signs, are to be clearly displayed in areas housing chemicals.</li> <li>• Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water.</li> <li>• Chemicals are to be properly labelled and handled in a safety conscious manner.</li> <li>• All personnel handling hazardous chemicals and hazardous materials are to be issued with the appropriate Personal Protective Equipment (PPE).</li> <li>• Ensure that diesel, fuel and/or oil tanks are in a bunded area with capacity of holding 110% of the total storage volume.</li> <li>• The removal of only the daily-required amount of chemicals to be used from the shed.</li> <li>• If refuelling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel.</li> <li>• Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis.</li> <li>• Ensure that any spilled chemicals cannot exit the designated storage area by constructing a berm or bump at the exit, or store chemicals in a spill tray.</li> </ul>	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
	<ul style="list-style-type: none"> <li>• Immediately clean all spillage of fuels, lubricants and other petroleum based products.</li> <li>• The contaminated material must be disposed of in accordance with the waste management procedure.</li> <li>• No hazardous chemicals must be discarded in the sewage or stormwater system.</li> <li>• Soil contaminated with hazardous chemical substances shall be treated as hazardous waste and removed from site.</li> <li>• The management of waste must be in accordance with the stipulations of the municipal Solid Waste Bylaw (2013).</li> <li>• Installation of sufficient waste bins skips or bulk containers. Containers must be present on site at all times.</li> <li>• All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner.</li> <li>• Containers (bins, skips or bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly.</li> <li>• Waste material may only be temporarily stored at areas demarcated for such storage practices.</li> <li>• General waste shall be stored in a manner that prevents the harbouring of pests.</li> <li>• General waste material should always be stored or disposed of separately from hazardous waste material (e.g. oil, diesel).</li> <li>• General and hazardous waste can be deposited into appropriately demarcated bins at the construction areas. Bins must then be emptied into appropriately demarcated skips or bulk containers at the end of each day or more often if required.</li> <li>• Skips or bulk containers should be removed to a licensed landfill site on a weekly basis or more often if required.</li> <li>• No littering is permitted and site clean-ups must regularly be undertaken.</li> <li>• Training must be provided continuously to employees working with waste. The training programme must include the provisions stipulated in GNR. 926 of 29 November 2013.</li> <li>• An Emergency Preparedness Plan must be compiled in accordance with GNR. 926 of 29 November 2013.</li> <li>• Monitoring, auditing, reporting and record keeping must be conducted in accordance with GNR. 926 of 29 November 2013.</li> </ul>	

	ALTERNATIVE A	NO-GO OPTION
	<ul style="list-style-type: none"> <li>The purified oil must be stored in suitably designed storage tanks, contained within an impermeable bund area. The bund area must be capable of containing a volume not less than the greatest amount of product (oil) that can be released from the largest tank. The capacity of the bund area must be calculated after the volume of the other tanks below the bund wall (excluding the largest tank), has been deducted.</li> <li>The oil storage tanks must comply with SANS 100891:2008 (The Petroleum Industry Part 1: Storage and distribution of petroleum products in above-ground bulk installations).</li> <li>All tanks should be banded.</li> </ul>	
<b>Residual impacts:</b>	None.	Not applicable.
<b>Cumulative impacts post mitigation:</b>	None.	Not applicable.
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Potential impact and risk:</b>	<b>SOCIO-ECONOMIC IMPACTS: PERMANENT EMPLOYMENT</b>	
<b>Nature of Impact:</b>	Positive	Negative
<b>Extent and duration of impact:</b>	Regional and permanent.	Regional and permanent.
<b>Consequence of impact or risk:</b>	It is expected that approximately 10-20 job opportunities will be created during the operational phase of the proposal.	The No-Development option would represent a lost opportunity in terms of the benefits associated with employment opportunities during the operational phase.
<b>Probability of occurrence:</b>	Highly probable.	Improbable
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No significant loss of a resource.	No significant loss of a resource.
<b>Degree to which the impact can be reversed:</b>	Positive impact so does not need to be reversed.	Can be reversed.

	ALTERNATIVE A	NO-GO OPTION
<b>Indirect impacts:</b>	None	None
<b>Cumulative impact prior to mitigation:</b>	Low-Medium	Low-Medium
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low-Medium	Low-Medium
<b>Degree to which the impact can be avoided:</b>	Medium	Unavoidable
<b>Degree to which the impact can be managed:</b>	Medium	Low
<b>Degree to which the impact can be mitigated:</b>	N/A – This is a positive impact proposed to be enhanced.	Can be mitigated.
<b>Proposed mitigation:</b>	The impact on employment is enhanced through the focus on employment of residents of the local area.	Implementation of the proposed development.
<b>Residual impacts:</b>	None	None
<b>Cumulative impacts post mitigation:</b>	Low-Medium	Low-Medium
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low-Medium (+)	Low-Medium (-)
<b>Potential impact and risk:</b>	<b>SOCIO-ECONOMIC IMPACTS: REDUCTION IN WASTE MANAGEMENT COSTS</b>	
<b>Nature of Impact:</b>	Positive	Negative
<b>Extent and duration of impact:</b>	Regional and permanent.	Regional and permanent.
<b>Consequence of impact or risk:</b>	The proposed development, through the reduction of waste to landfill, would indirectly strengthen the financial sustainability of the municipality in both the short- and longer term. This would be through the reduced costs associated with the management of reduced volumes of waste in the area .	The No-Development option would represent a lost opportunity in terms of the benefits associated with increased local Government revenue during the operation phase.
<b>Probability of occurrence:</b>	Highly probable.	Probable

	ALTERNATIVE A	NO-GO OPTION
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No significant loss of a resource.	No significant loss of a resource.
<b>Degree to which the impact can be reversed:</b>	Positive impact so does not need to be reversed.	Can be reversed.
<b>Indirect impacts:</b>	None	None
<b>Cumulative impact prior to mitigation:</b>	Medium	Medium
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Medium	Medium
<b>Degree to which the impact can be avoided:</b>	Medium	Unavoidable
<b>Degree to which the impact can be managed:</b>	Medium	Low
<b>Degree to which the impact can be mitigated:</b>	N/A – This is a positive impact proposed to be enhanced.	Can be mitigated.
<b>Proposed mitigation:</b>	The proposed development represents an enhancement measure on its own.	Implementation of the proposed development.
<b>Residual impacts:</b>	None	None
<b>Cumulative impacts post mitigation:</b>	Medium	Medium
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Medium (+)	Medium (-)
<b>Potential impact and risk:</b>	<b>NOISE</b>	
<b>Nature of Impact:</b>	Increase traffic flow to site. Noise generated by the depolymerisation process and vehicles traveling to and from the facility	Not applicable



	ALTERNATIVE A	NO-GO OPTION
<b>Extent and duration of impact:</b>	Local; Permanent	Not applicable
<b>Consequence of impact or risk:</b>	Noise disturbance to surrounding land users.	Not applicable, as air quality in the area would remain the same.
<b>Probability of occurrence:</b>	Probable	Not applicable.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resource	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	Not Reversible	Not applicable.
<b>Indirect impacts:</b>	None	None.
<b>Cumulative impact prior to mitigation:</b>	Medium	Not applicable.
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low-Medium	Not applicable.
<b>Degree to which the impact can be avoided:</b>	Medium	Not applicable.
<b>Degree to which the impact can be managed:</b>	Medium	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	Low	Not applicable.
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>The Plastic Depolymerisation plant must be designed to minimise the excessive generation of noise.</li> <li>The pilot plant would be run in batches throughout the day. Based on the production and loading rates, as well as the cooling steps, the facility may be operational over a 24 hour period.</li> <li>As such, activities that will generate the most noise should be scheduled, where possible, during times of the day that will result in the least disturbance to adjacent landusers.</li> <li>Site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993.</li> </ul>	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
	<ul style="list-style-type: none"> <li>All equipment and machinery should be fitted with adequate silencers.</li> <li>Regular maintenance of vehicles and equipment.</li> <li>No noisy work to be conducted over weekends or public holidays.</li> <li>A complaints register must be kept on site. And must record the following ( date, name of complaint, details of the complaint e.g.)</li> </ul>	
<b>Residual impacts:</b>	None	Not applicable.
<b>Cumulative impacts post mitigation:</b>	Low	Not applicable.
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Potential impact and risk:</b>		
<b>Potential impact and risk:</b>	<b>TRAFFIC</b>	
<b>Nature of Impact:</b>	Traffic impacts associated with the delivery of materials to the site, as well as products leaving the site.	Not applicable
<b>Extent and duration of impact:</b>	Regional, Long Term	Not applicable
<b>Consequence of impact or risk:</b>	Wear of access roads, accidents on access roads, unpermitted transport of materials and/or loss of materials being transported on access roads.	Not applicable, as air quality in the area would remain the same.
<b>Probability of occurrence:</b>	Probable	Not applicable.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No loss of resource	No loss of resource.
<b>Degree to which the impact can be reversed:</b>	Can partly be reversed.	Not applicable.
<b>Indirect impacts:</b>	None	None.
<b>Cumulative impact prior to mitigation:</b>	Low	Not applicable.
<b>Significance rating of impact prior to mitigation</b>	Low	Not applicable.

	ALTERNATIVE A	NO-GO OPTION
<b>(e.g. Low, Medium, Medium-High, High, or Very-High)</b>		
<b>Degree to which the impact can be avoided:</b>	Medium	Not applicable.
<b>Degree to which the impact can be managed:</b>	Medium	Not applicable.
<b>Degree to which the impact can be mitigated:</b>	Medium	Not applicable.
<b>Proposed mitigation:</b>	Ensure that all vehicles using access roads are roadworthy. All loads are to be securely fastened when being transported. All vehicles are to adhere to the tonnage limitation and acquire a permit as required. All speed limits and other regulations on the public roadways must be adhered to	Not applicable.
<b>Residual impacts:</b>	None	Not applicable.
<b>Cumulative impacts post mitigation:</b>	Low	Not applicable.
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable.
<b>Potential impact and risk:</b>	<b>VISUAL &amp; ODOUR IMPACT:</b>	
<b>Nature of Impact:</b>	Negative	Negative.
<b>Extent and duration of impact:</b>	Local and permanent.	Not applicable
<b>Consequence of impact or risk:</b>	Nuisance caused by odours and unsightly appearance of waste onsite.	Not applicable.
<b>Probability of occurrence:</b>	Improbable.	Not applicable.
<b>Degree to which the impact may cause irreplaceable loss of resources:</b>	No irreplaceable loss of resources.	Not applicable

	ALTERNATIVE A	NO-GO OPTION
<b>Degree to which the impact can be reversed:</b>	Irreversible.	Not applicable
<b>Indirect impacts:</b>	Change in sense of place of the surrounding area.	Not applicable
<b>Cumulative impact prior to mitigation:</b>	Low	Not applicable
<b>Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low	Not applicable
<b>Degree to which the impact can be avoided:</b>	Medium	Not applicable
<b>Degree to which the impact can be managed:</b>	Medium	Not applicable
<b>Degree to which the impact can be mitigated:</b>	Can be partly mitigated.	Not applicable
<b>Proposed mitigation:</b>	<ul style="list-style-type: none"> <li>• Consideration should be given to the materials used for the construction so as to create the least visual disturbance in the surrounding area.</li> <li>• Indigenous trees could be used in the landscaping of the development, which may aide in reducing the visual impact particularly at the commercial site.</li> <li>• The management of waste must be in accordance with the stipulations of the municipal Solid Waste Bylaw (2013).</li> <li>• Installation of sufficient waste bins skips or bulk containers. Containers must be present on site at all times.</li> <li>• All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner.</li> <li>• Containers (bins, skips or bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly.</li> <li>• Waste material may only be temporarily stored at areas demarcated for such storage practices.</li> <li>• General waste shall be stored in a manner that prevents the harbouring of pests.</li> <li>• General waste material should always be stored or disposed of separately from hazardous waste material (e.g. oil, diesel).</li> </ul>	No mitigation measures proposed.

	ALTERNATIVE A	NO-GO OPTION
	<ul style="list-style-type: none"> <li>General and hazardous waste can be deposited into appropriately demarcated bins at the construction areas. Bins must then be emptied into appropriately demarcated skips or bulk containers at the end of each day or more often if required.</li> <li>Skips or bulk containers should be removed to a licensed landfill site on a weekly basis or more often if required.</li> <li>No littering is permitted and site clean-ups must regularly be undertaken.</li> </ul>	
<b>Residual impacts:</b>	Visual disturbance	Not applicable
<b>Cumulative impacts post mitigation:</b>	Low	Not applicable
<b>Significance rating of impact post mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)</b>	Low-Negligible (-)	Not applicable

## SECTION I: FINDINGS, IMPACT MANAGEMENT AND MITIGATION MEASURES

1.	Provide a summary of the findings and impact management measures identified by all Specialist and an indication of how these findings and recommendations have influenced the proposed development.
	<p><b>Air Quality Impact Assessment – Lethabo Air Quality Specialists (LAQS) (2020)</b></p> <p>LAQS modelled the dispersion of particulate emissions from the planned operations to estimate ground-level concentrations of particulates and compared the outcome with official ambient air quality standards. In addition, LAQS modelled the dispersion of emission together with other known sources near the planned site of operations to show the cumulative impact of all emissions on the surrounding area.</p> <p><u>PM10 Particulate Matter</u></p> <p>The highest annual average concentration of PM10 is estimated to be less than 0.1 µg/m<sup>3</sup> and was modelled to occur approximately 180 metres north-west of the site. This value is well below the ambient air quality standard of 40 µg/m<sup>3</sup>.</p> <p>The highest annual average concentration of PM10 at the residential area to the northeast is estimated to be also less than 0.1 µg/m<sup>3</sup>. The maximum 99-percentile daily concentration of PM10 was shown to be 0.8 µg/m<sup>3</sup> and was modelled to occur along the south-western fence line. The concentration is well below the maximum daily standard of 75 µg/m<sup>3</sup>.</p> <p>The highest 99-percentile daily concentration of PM10 at the residential area to the north-east is estimated to be less than 0.1 µg/m<sup>3</sup>.</p> <p><u>Sulphur Dioxide</u></p> <p>The highest annual average concentration of SO<sub>2</sub> is estimated to be 0.4 µg/m<sup>3</sup> and was modelled to occur approximately 180 metres north-west of RR's premises. This value is well below the ambient air quality standard of 50 µg/m<sup>3</sup>.</p> <p>The highest annual average concentration of SO<sub>2</sub> at the residential area to the north-east is estimated to be less than 0.1 µg/m<sup>3</sup>. The maximum 99-percentile hourly concentration of SO<sub>2</sub> was shown to be 5.6 µg/m<sup>3</sup> and was modelled to occur along the south-western fence-line of RR's premises. The concentration is well below the maximum daily standard of 350 µg/m<sup>3</sup>.</p> <p>The highest 99-percentile concentration of SO<sub>2</sub> at the residential area to the north-east is estimated to be less than 0.1 µg/m<sup>3</sup>.</p> <p><u>Nitrogen Dioxide</u></p> <p>The highest annual average concentration of NO<sub>2</sub> is estimated to be 1.5 µg/m<sup>3</sup> and was modelled to occur approximately 180 metres north-west of RR's premises. This value is well below the ambient air quality standard of 50 µg/m<sup>3</sup>.</p> <p>The highest annual average concentration of NO<sub>2</sub> at the residential area to the north-east is estimated to be less than 0.1 µg/m<sup>3</sup>. The maximum 99-percentile hourly concentration of NO<sub>2</sub> was shown to be 20.6 µg/m<sup>3</sup> and was modelled to occur along the south-western fence-line of RR's premises. The concentration is well below the maximum daily standard of 350 µg/m<sup>3</sup>.</p> <p>The highest 99-percentile concentration of NO<sub>2</sub> at the residential area to the north-east is estimated to be 0.2 µg/m<sup>3</sup>.</p> <p><u>Carbon Monoxide</u></p> <p>The highest 8-hour average concentration of CO is estimated to be 0.3 µg/m<sup>3</sup> and was modelled to occur approximately 180 metres north-west of RR's premises. This value is well below the ambient air quality standard of 10 mg/m<sup>3</sup>.</p> <p>The highest 8-hour average concentration of CO at the residential area to the north-east is estimated to be less than 0.1 µg/m<sup>3</sup>. The maximum 99-percentile hourly concentration of NO<sub>2</sub> was shown to be 5.1 µg/m<sup>3</sup> and was modelled to occur along the south-western fence-line of RR's premises. The concentration is well below the maximum daily standard of 30 µg/m<sup>3</sup>.</p> <p>The highest 99-percentile concentration of NO<sub>2</sub> at the residential area to the north-east is estimated to be less than 0.1 µg/m<sup>3</sup>.</p> <p><u>Lead</u></p> <p>The highest annual average concentration of Pb is estimated to be 2.2 ng/m<sup>3</sup> and was modelled to occur approximately 180 metres north-west of RR's premises. This value is well below the ambient air quality standard of 50 µg/m<sup>3</sup>.</p> <p>The highest annual average concentration of Pb at the residential area to the north-east is estimated to be less than less than 0.1 ng/m<sup>3</sup>.</p> <p><u>Benzene</u></p> <p>The highest annual average concentration of C<sub>6</sub>H<sub>6</sub> is estimated to be 0.04 ng/m<sup>3</sup> and was modelled to occur approximately 180 metres north-west of RR's premises. This value is well below the ambient air quality standard of 50 µg/m<sup>3</sup>.</p> <p>The highest annual average concentration of C<sub>6</sub>H<sub>6</sub> at the residential area to the northeast is estimated to be less than less than 0.01 ng/m<sup>3</sup>.</p> <p><u>Cumulative Impact</u></p> <p>When the estimated impact of RR's operations is compared with the cumulative impact it can be seen that contributions from RR's emissions will be negligible.</p>

**Conclusions & Recommendations**

The annual emissions from the operations were based on emission limits and design flue gas conditions, as stipulated in GN R.533. It is accepted that a degree of uncertainty may exist as the actual emissions during full operations may differ from design values.

Nevertheless, the impact of RR's emissions on air quality in the area is negligible as all estimated ground-level concentrations are well below the official air quality standards published in GN1210.

Emissions from PG Bison Woodline and Rheebock Bricks were based on actual emission measurements and can be regarded as typical of emissions from these two operations.

The cumulative impact of all sources on air quality in the area shows that the highest concentrations are modelled to occur on Rheebock Bricks' site. It further shows that the maximum ground-level concentrations are well below the relevant ambient air quality standards.

The calculated annual emissions and associated estimated air quality impact is so low that LAQS could not make any further recommendations to reduce the impact on air quality in the area. However, it was recommend that a comprehensive CEM system is not stipulated for the pilot plant stage of RR's plans, but rather a system that monitors the key components that are indicative of the efficiency of the process, e.g. CO, VOCs, etc.

Other compounds, e.g. SO<sub>2</sub>, NO<sub>2</sub>, etc., can be measured manually at regularly intervals.

The pilot plant is, after all, a development tool that will be used to define operating parameters for a large-scale installation. Once such an installation is set up and comprehensive CEM system can form part of the capital expenditure of the process.

**2. List the impact management measures that were identified by all Specialist that will be included in the EMPr**

System monitoring of the key components that are indicative of the efficiency of the process, e.g. CO, VOCs, etc. Other compounds, e.g. SO<sub>2</sub>, NO<sub>2</sub>, etc., can be measured manually at regularly intervals.

**3. List the specialist investigations and the impact management measures that will not be implemented and provide an explanation as to why these measures will not be implemented.**

N/A

**4. Explain how the proposed development will impact the surrounding communities.**

Employment

A plant to convert plastic to fuel will serve as a catalyst for waste segregation in the area as it will provide an outlet for plastic waste, which is currently not available. Waste segregation will employ between 15 to 30 persons in temporary and permanent positions. The pilot plant will employ between 10 and 20 persons in permanent positions. Additional persons will be employed during construction and in support services. In total at least 35 new permanent jobs will be created during the pilot plant phase. Significantly more job opportunities will be created on completion of the pilot plant phase should the commercial plant be commissioned. These employment opportunities would be available to members of the local communities.

Waste Reduction

The Garden Route is developing at a rapid pace and with the increased number of households being established, there is also an increase in the amount of discarded plastic. Through the operations of the development, significant volumes of plastic waste and tyres would be diverted from landfill and concerted to a useful resource.

Local Business

Based on the waste classification study cited (Eden District Municipality, 2016), there is a steady supply of plastic in the Garden Route area. The "In Principle" supply agreement with a waste collector can be found attached to prove availability of sorted plastic feed. As part of the testing it is planned to supplement the feed with recycled tyres.

Many fuel-consuming industries are based in the Eden district. These include brick factories, a fishmeal factory, a petrochemical factory, and food and beverage factories that all use heavy fuel oil (HFO) and/or coal. An "In Principle" agreement is currently in progress with a large food and beverage manufacturer to ensure offtake of the produced fuels.

**5. Explain how the risk of climate change may influence the proposed activity or development and how has the potential impacts of climate change been considered and addressed.**

The current priorities for addressing waste minimisation and management to address Climate Change concerns in the Western Cape include:

1. Development of waste characterisation profiles for municipalities in the Western Cape;
2. Promotion of the waste economy and identification of opportunities to reduce waste going to landfill; and
3. Development of waste-to-energy generation opportunities for both municipal and private (industrial and commercial) waste systems.

The Greenhouse Gas emissions profile of the Western Cape shows that solid waste currently contributes 7% to the total emissions of the Province. Waste generation is a direct result of population and economic growth, increased standard of living and urbanisation. These factors determine the amount of goods manufactured, consumed and eventually the total waste that ends up in landfills. In addition to the indirect GHG emissions from the manufacturing of products, the disposal of waste also produces greenhouse gasses. Changing material consumption patterns and prioritising waste management that reduces waste going to landfill will play a role in reducing the GHG emissions associated with the waste sector (**Western Cape Government, Department of Environmental Affairs and Development Planning, 2018**).

Twelve waste-to-energy facilities, which include anaerobic digesters, biogas, biomass fuel combustion and pyrolysis, have been licensed in the Western Cape, of which a number are in the agricultural sector. With multiple local municipalities currently investigating the feasibility of waste-to-energy facilities.

The proposed Pilot Depolymerisation Processing Plant directly addresses all of these identified priorities. By reviewing the local municipal waste characterisation (**Eden District Municipality, 2016**), Rooikat Recycling have identified the need to reduce the plastic waste going to landfill. They have developed a thermal depolymerisation process which will generate heavy fuel oil from plastics and tyres, which can then be used by various industries in the area for energy in their own processes.

In the Western Cape, the waste stream analysis shows that plastics make up approximately 3% of the total waste stream, however, in the Mossel Bay Municipality, this percentage is increase to 16% by mass. However, by volume, plastics make up 38% of the waste to landfill. As such, the use of plastics in the proposed Pilot Depolymerisation Processing Plant would have a significant effect on the volumes being diverted to landfill.

**6. Explain whether there are any conflicting recommendations between the specialists. If so, explain how these have been addressed and resolved.**

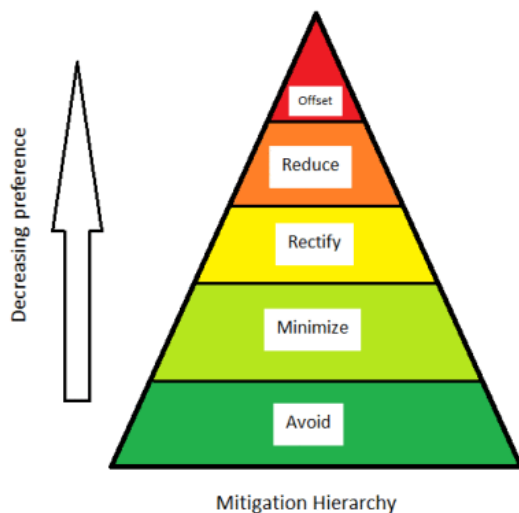
There are no conflicting recommendations.

**7. Explain how the findings and recommendations of the different specialist studies have been integrated to inform the most appropriate mitigation measures that should be implemented to manage the potential impacts of the proposed activity or development.**

N/A

**8. Explain how the mitigation hierarchy has been applied to arrive at the best practicable environmental option.**

The mitigation hierarchy refers to the steps taken to mitigate environmental impacts relating to a proposed development. The hierarchy begins with the most beneficial method of mitigation and moves to the least beneficial, as illustrated below.



**Figure 6: The Mitigation Hierarchy**

This hierarchy was considered while determining the best practicable environmental option for the proposed development. The mapped CBA on the property has been completely avoided. Impacts have further been reduced through the inclusion of additional mitigation measures into the EMPr.

No offsets are required for the proposed development.



## SECTION J: GENERAL

### 1. Environmental Impact Statement

<b>1.1.</b>	<b>Provide a summary of the key findings of the EIA.</b>
	<p>Through the EIA process, the following key findings were made by the EAP:</p> <ul style="list-style-type: none"> <li>• Two Property Location Alternatives were investigated, however only one was found to be feasible.</li> <li>• Two Activity Alternatives were investigated, however the use of oil sludge was found to not be feasible.</li> <li>• No Layout Alternatives were investigated.</li> <li>• Five Technology Alternatives were originally investigated for the development. However, the use of the Thermal Depolymerisation Process was found to be the only feasible alternative for the proposed development.</li> <li>• Limited impacts are expected to occur during construction of the development.</li> <li>• If the mitigation measures and recommendations of the Basic Assessment Report and the EMP are implemented and adhered to, no significant negative impacts are expected to occur during the construction phase.</li> <li>• Approximately 10-20 permanent job opportunities will be created during the operational phase.</li> <li>• The proposed development would have significant benefits to the local economy and community, as well as the region as a whole.</li> </ul>
<b>1.2.</b>	<b>Provide a map that superimposes the preferred activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. (Attach map to this BAR as Appendix B2)</b>
	Included as Appendix B2
<b>1.3.</b>	<b>Provide a summary of the positive and negative impacts and risks that the proposed activity or development and alternatives will have on the environment and community.</b>

The table below depicts the impacts associated with the **construction phase** of the proposed development.

<b>CONSTRUCTION PHASE IMPACTS</b>		
<b>IMPACT</b>	<b>IMPACT SIGNIFICANCE AFTER MITIGATION</b>	
	<b>Alternative A (Preferred Option)</b>	<b>No-Go</b>
Soil, Stormwater and Groundwater	Low(-)	N/A
Socio Economic Impact: Job Creation.	Medium (+)	N/A
Sense of Place	Low (-)	N/A
Traffic Impacts & Road Safety.	Low (-)	N/A
Visual Impact.	Low (-)	N/A

The table below depicts the impacts associated with the **operational phase** of the proposed development.

<b>OPERATION PHASE IMPACTS</b>		
<b>IMPACT</b>	<b>IMPACT SIGNIFICANCE AFTER MITIGATION</b>	
	<b>Alternative A (Preferred Option)</b>	<b>No-Go</b>
Air Quality	Negligible (-)	N/A
Climate Change – GHG Emissions	Medium(+)	Medium (-)
Soil, Stormwater and Groundwater	Low (-)	N/A
Socio Economic Impact: Job Creation.	Low-Medium(+)	Low-Medium(-)
Socio Economic Impact: Reduction in Waste Management Costs	Medium(+)	Medium(-)
Noise	Low (+)	N/A
Traffic	Low (+)	N/A
Visual & Odour Impact	Low-Negligible (-)	N/A

## 2. Recommendation of the Environmental Assessment Practitioner (“EAP”)

<b>2.1.</b>	<b>Provide Impact management outcomes (based on the assessment and where applicable, specialist assessments) for the proposed activity or development for inclusion in the EMPr</b>
<p>Construction Phase:</p> <ul style="list-style-type: none"> <li>• The environment (including soil, surface water and groundwater) is not contaminated.</li> <li>• Employment Opportunities for local residents.</li> <li>• No undue visual impact on surrounding land users.</li> <li>• Limited traffic disruptions.</li> </ul> <p>Operational Phase</p> <ul style="list-style-type: none"> <li>• No negative impacts on air quality.</li> <li>• Reduction in GHG emissions</li> <li>• The environment (including soil, surface water and groundwater) is not contaminated.</li> <li>• Employment Opportunities for local residents.</li> <li>• Reduction in Waste Management Costs</li> <li>• No undue visual, noise or odour impacts on surrounding land users.</li> <li>• Limited traffic disruptions.</li> </ul>	
<b>2.2.</b>	<b>Provide a description of any aspects that were conditional to the findings of the assessment either by the EAP or specialist that must be included as conditions of the authorisation.</b>
<p>An Environmental Control Officer must be appointed to monitor the implementation of the Environmental Management Programme and the mitigation measures included in the Basic Assessment Report.</p> <p>Installation of a system that monitors the key components that are indicative of the efficiency of the process, e.g. CO, VOCs, etc. Other compounds, e.g. SO<sub>2</sub>, NO<sub>2</sub>, etc., to be measured manually at regularly intervals.</p>	
<b>2.3.</b>	<b>Provide a reasoned opinion as to whether the proposed activity or development should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be included in the authorisation.</b>
<p>The EAP is of the opinion that the proposed development should be authorised .</p> <p>It is recommended that the preferred alternative, be considered for approval for the following reasons:</p> <ul style="list-style-type: none"> <li>• The construction phase impacts can be mitigated to low significance and will therefore not result in detrimental effects on the biophysical environment.</li> <li>• If the recommendations and mitigation measures included in this report and the EMPr are implemented and strictly adhered to, the impact of the construction activities is considered not to be detrimental to the environment.</li> <li>• The operational impacts would result in significant benefits to society in general, as well as the specific reduction of waste volumes in the Mossel Bay area.</li> </ul>	
<b>2.4.</b>	<b>Provide a description of any assumptions, uncertainties and gaps in knowledge that relate to the assessment and mitigation measures proposed.</b>
<ul style="list-style-type: none"> <li>• It is assumed that all the information provided in this report and on which the report is based is correct and valid at the time receipt thereof.</li> <li>• It is assumed that the proposed mitigation measures, as listed in this report and the EMPr (Appendix H), will be implemented and adhered to by all the relevant stakeholders involved.</li> <li>• The study will include every effort to enable public consultation but is limited to the public input which was forthcoming.</li> <li>• The actual emissions resulting from the proposed development is unknown as this is a pilot plant and thus a gap in knowledge.</li> </ul>	
<b>2.5.</b>	<b>The period for which the EA is required, the date the activity will be concluded and when the post construction monitoring requirements should be finalised.</b>
<ul style="list-style-type: none"> <li>• The period for which the EA is required = 10 years</li> <li>• The date the activity will be concluded = 10 years</li> <li>• When the post construction monitoring requirements should be finalised = 10 years</li> </ul>	

## 3. Water

**Since the Western Cape is a water scarce area explain what measures will be implemented to avoid the use of potable water during the development and operational phase and what measures will be implemented to reduce your water demand, save water and measures to reuse or recycle water.**

A secondary condenser in the plant will convert steam back into water that will be reused in the process. As such, all water will follow a close looped system in order to facilitate optimal reuse practices in order to reduce the potable water demand.

#### 4. Waste

**Explain what measures have been taken to reduce, reuse or recycle waste.**

The applicant plans to construct a plastic processing plant for general processing of plastic and tyres. By using processing and separation technologies, they would be able to process discarded plastic and recycled tyres to produce fuel (heavy fuel oil). The plastic does not have to be separated into the different types of plastic and typically non-recyclable plastics would now be able to be converted into fuel without adding strain on the environment.

As such, the proposed development would be reducing the volumes of waste to landfill in the greater Mossel Bay area.

#### 5. Energy Efficiency

**8.1. Explain what design measures have been taken to ensure that the development proposal will be energy efficient.**

The proposed process would be a closed loop system, with the generated off gasses used internally for energy production. The plant would therefore not require external energy sources such as municipal electricity and/or non-renewable fuel (HFO).

## SECTION K: DECLARATIONS

### DECLARATION OF THE APPLICANT

**Note:** Duplicate this section where there is more than one Applicant.

I....., ID number .....in my personal capacity or duly authorised thereto hereby declare/affirm that all the information submitted or to be submitted as part of this application form is true and correct, and that:

- I am fully aware of my responsibilities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), the Environmental Impact Assessment ("EIA") Regulations, and any relevant Specific Environmental Management Act and that failure to comply with these requirements may constitute an offence in terms of relevant environmental legislation;
- I am aware of my general duty of care in terms of Section 28 of the NEMA;
  
- I am aware that it is an offence in terms of Section 24F of the NEMA should I commence with a listed activity prior to obtaining an Environmental Authorisation;
  
- I appointed the Environmental Assessment Practitioner ("EAP") (if not exempted from this requirement) which:
  - meets all the requirements in terms of Regulation 13 of the NEMA EIA Regulations; or
  - meets all the requirements other than the requirement to be independent in terms of Regulation 13 of the NEMA EIA Regulations, but a review EAP has been appointed who does meet all the requirements of Regulation 13 of the NEMA EIA Regulations;
  
- I will provide the EAP and any specialist, where applicable, and the Competent Authority with access to all information at my disposal that is relevant to the application;
  
- I will be responsible for the costs incurred in complying with the NEMA EIA Regulations and other environmental legislation including but not limited to –
  - costs incurred for the appointment of the EAP or any legitimately person contracted by the EAP;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the NEMA EIA Regulations;
  - Legitimate costs in respect of specialist(s) reviews; and
  - the provision of security to ensure compliance with applicable management and mitigation measures;
  
- I am responsible for complying with conditions that may be attached to any decision(s) issued by the Competent Authority, hereby indemnify, the government of the Republic, the Competent Authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action for which I or the EAP is responsible in terms of the NEMA EIA Regulations and any Specific Environmental Management Act.

**Note:** If acting in a representative capacity, a certified copy of the resolution or power of attorney must be attached.

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Signature of the Applicant:

Date:

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Name of company (if applicable):

**DECLARATION OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (“EAP”)**

I ....., EAPASA Registration number ..... as the appointed EAP hereby declare/affirm the correctness of the:

- Information provided in this BAR and any other documents/reports submitted in support of this BAR;
- The inclusion of comments and inputs from stakeholders and I&APs;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties, and that:
  - In terms of the general requirement to be independent:
    - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
    - am not independent, but another EAP that meets the general requirements set out in Regulation 13 of NEMA EIA Regulations has been appointed to review my work (Note: a declaration by the review EAP must be submitted);
  - In terms of the remainder of the general requirements for an EAP, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
  - I have disclosed, to the Applicant, the specialist (if any), the Competent Authority and registered interested and affected parties, all material information that have or may have the potential to influence the decision of the Competent Authority or the objectivity of any report, plan or document prepared or to be prepared as part of this application;
  - I have ensured that information containing all relevant facts in respect of the application was distributed or was made available to registered interested and affected parties and that participation will be facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments;
  - I have ensured that the comments of all interested and affected parties were considered, recorded, responded to and submitted to the Competent Authority in respect of this application;
  - I have ensured the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
  - I have kept a register of all interested and affected parties that participated in the public participation process; and
  - I am aware that a false declaration is an offence in terms of Regulation 48 of the NEMA EIA Regulations;

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Signature of the EAP:

Date:

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Name of company (if applicable):

