Significance Rating

Environmental impacts associated with the disposal of sewage sludge will definitely occur. As the proposed project will be operational for approximately 25 years, impacts associated with the release of untreated effluent and poor sludge management are potentially long-term and may affect the study area. Without mitigation the impacts on soil and water would probably be *severe* and of high significance. However, with implementation of the recommended mitigation measures the severity of the impacts would be slight and of low significance.

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	Study Area	Severe	Definite	**High –**
With Mitigation	Long Term	Study Area	Slight	Unlikely	**Low –**
No-go Alternative	Permanent	Study Area	Severe	Definite	**Very High –**

IMPACT 4.2: HEALTH IMPACTS TO EMPLOYEES AND COMMUNITIES

Cause and Comment

Sewage sludge is normally characterised by high concentrations of pathogenic microorganisms (viruses and bacteria) and helminths. Exposure to untreated sludge, either directly or through contaminated water resources, can result in the spread of numerous diseases including cholera. Under the No-go alternative, the biogas plant will not be developed and the existing old Zimpro® will continue to run and will eventually fail. This will ultimately result in the discharge of untreated sewage sludge and a greater risk to environmental and human health if the status quo remains unchanged.

Reversibility

The impact is considered reversible if proper mitigation measures are implemented.

Mitigation Measures

Refer to mitigation measures for Impact 4.1 (above). In addition, the following mitigation measures are applicable:

- Any employees tasked with the management of the Biogas Plant should be vaccinated against key diseases, such as hepatitis B, which are associated with these waste streams.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	District	Severe	Definite	**High –**
With Mitigation	Long Term	District	Slight	Unlikely	**Low –**
No-go Alternative	Permanent	Study Area	Severe	Probable	**Very High –**

Pathogenic microorganisms are commonly found in untreated sewage sludge and release of these organisms to water bodies used for irrigation, drinking, recreation or fishing can result in the spread of disease such as cholera and hepatitis B. The health impacts associated with the release of untreated sewage sludge and poor sludge management are potentially long-term and may affect the district. Without mitigation the associated health impacts would probably be severe and of high significance. However, with implementation of the recommended mitigation measures the impacts would be of slight severity and of low significance.

IMPACT 4.3: NUISANCE IMPACTS (ODOURS AND FLIES)

Cause and Comment
Raw sewage, sewage sludge and sewage treatment facilities are frequently associated with the release of unpleasant odours and may attract large numbers of insect pests such as flies. The persistent odours and presence of insect pests would most likely be regarded as a nuisance to employees and local community members. If sewage is managed correctly, the level of these nuisance factors can normally be reduced significantly. Under the No-go alternative, the biogas plant will not be developed and the existing old Zimpro® will continue to run and will eventually fail. This will ultimately result in the discharge of untreated sewage sludge and a greater risk to environmental and human health if the status quo remains unchanged.

Reversibility
The impact is considered reversible if proper mitigation measures are implemented.

Mitigation Measures
Refer to mitigation measures for Impact 4.1 (above).

Significance Rating
The management of sewage will definitely be associated with odours and insect pests and, due to the influence of wind, the impact on any one receptor would probably be short-term. The treatment plant will, however be relatively small and so the impact is likely to be confined to the study area. There are also currently no communities in the immediately vicinity of the mine. Without mitigation the impacts would probably be Moderately Severe and of moderate significance. However, with implementation of the recommended mitigation measures the impacts would probably be of slight severity and of low significance.

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Short Term	Study Area	Moderate-Severe	Probable	**Moderate –**
With Mitigation	Short Term	Study Area	Slight	Probable	**Low –**
No-go Alternative	Permanent	Study Area	Severe	Probable	**Very High –**

10.3.5. Issue 5: Occupational Health and Safety

IMPACT 5.1: INCIDENTS RELATED TO THE OPERATION OF THE BIOGAS PLANT

Cause and Comment
The operation of the biogas plant will produce a significant portion of methane with the other major component being carbon dioxide. Carbon dioxide could displace oxygen, causing asphyxiation. Impacts from jet fires would be limited to the immediate vicinity of the fire. In worst-case weather conditions, large biogas flash fires would not extend beyond the site boundary resulting in no predicted offsite impacts. Fatalities from vapour cloud explosions from large releases of biogas

could extend beyond the site boundary into the undeveloped area to the east reaching the N2 highway. Considering the No-go option, the absence of the biogas plant, the likelihood the risk described above will not occur.

Reversibility
The impact is considered reversible if proper mitigation measures are implemented.

Mitigation Measures
As a result of the risk assessment study conducted for the proposed FWF WWTW facility in Port Elizabeth a number of risks could be mitigated to acceptable levels provided the following conditions are adhered to:

- Compliance with all statutory requirements, i.e. pressure vessel designs;
- Compliance with applicable SANS codes, i.e. SANS 10087, SANS 10089, SANS 10108, etc.;
- Incorporation of applicable guidelines or equivalent international recognised codes of good design and practice into the designs;
- Completion of a recognised process hazard analysis (such as a HAZOP study, FMEA, etc.) on the proposed facility prior to construction to ensure design and operational hazards have been identified and adequate mitigation put in place;
- Full compliance with IEC 61508 and IEC 61511 (Safety Instrument Systems) standards to ensure that adequate protective instrumentation is included in the design and would remain valid for the full life cycle:
    - Including demonstration from the designer that sufficient and reliable instrumentation would be specified and installed at the facility;
- Preparation and issue of a safety document detailing safety and design features reducing the impacts from fires and explosions:
    - Including compliance to statutory laws, applicable codes and standards and world's best practice;
    - Including the listing of statutory and non-statutory inspections, giving frequency of inspections;
    - Including the auditing of the built facility against the safety document;
- Noting that codes such as IEC 61511 can be used to achieve these requirements;
- Demonstration by FWF WWTW or their contractor that the final designs would reduce the risks posed by the installation to internationally acceptable guidelines;
- Signature of all terminal designs by a professional engineer registered in South Africa in accordance with the Professional Engineers Act, who takes responsibility for suitable designs.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Permanent	Study Area	Severe	May Occur	**Moderate –**
With Mitigation	Permanent	Study Area	Low	Unlikely	**Low –**
No-go Alternative	NA	NA	NA	NA	**NA**

10.3.6. Issue 6: Socio-economic impacts during the operational phase

IMPACT 6.1: EMPLOYMENT CREATION

Cause and Comment
At this stage, it is unclear how many employment opportunities will arise from the operation of the biogas plant, but it is envisaged a small number of employment opportunities will become available. Under the No-go alternative, the employment opportunities associated with the operation of the biogas plant will not become available.

Reversibility
Not applicable

Mitigation Measures
- As far as possible, local labour should be used during operation;
- Where possible, purchase maintenance material from nearby businesses in order to support the local communities.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	Localised	Slight Beneficial	Probable	**Low +**
Without Mitigation	Long Term	Localised	Beneficial	Probable	**Low +**
No-go Alternative	NA	NA	NA	NA	**NA**

IMPACT 6.2: DOWNSTREAM EMPLOYMENT ASSOCIATED WITH INCREASED WATER SECURITY

Cause and Comment
The biogas plant will become an essential component of the upgraded sewerage treatment works. In its operational phase, the FWF WWTW will represent an essential form of economic infrastructure in the NMBM. As a supplier of reclaimed effluent with an increased quality, the proposed development will not only be instrumental in increasing industrial water security, but will also contribute to the creation of indirect employment opportunities via the enabling effect of water security on future industrial development. Under the No-go alternative, the biogas plant will not be implemented and the sewerage capacity of the FWF WWTW will not increase. This will decrease the amount of water that is processed and decrease the water security in this area of the NMBM. Failure of the existing Zimpro® plant will result in severe water issues throughout the NMBM decreasing the likelihood future industrial investment.

Reversibility
Not applicable

Mitigation Measures
- There are no obvious mitigation measures associated with this positive impact.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	Regional	Moderate Beneficial	May Occur	**Moderate +**
Without Mitigation	NA	NA	NA	NA	**NA**
No-go Alternative	Permanent	Regional	Moderate	Probable	**High -**

10.3.7. Issue 7: Improvements to the Fish Water Flats Wastewater Treatment Works

IMPACT 7.1: SLUDGE STABILISATION

Cause and Comment

The improved beneficiation and stabilisation of sludge will result in the sewerage treatment works being able to increase its sewerage intake capacity and provide improved treatment of wastewater. This will have a long-term positive impact not only on the study area, but also on the entire portion of the NMBM whose sewerage feeds into the FWF WWTW. The improved sludge stabilisation is therefore considered to be beneficial and of high significance. If the biogas plant is not implemented, the current Zimpro® stabilisation plant will continue to operate. This is an old technology and cannot cope with the increase in sewerage that is anticipated for the FWF WWTW. Eventually the Zimpro® plant will fail and the beneficiation of sludge at the FWF WWTW will be severely diminished.

Reversibility

The impact is considered reversible if proper mitigation measures are implemented.

Mitigation Measures

- Continued maintenance and servicing of the biogas stabilisation systems;
- Additional improvements to the biogas technology used at the FWF WWTW in order to further improve the stabilisation of sludge.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	Regional	Beneficial	Definite	**High +**
Without Mitigation	Long Term	Regional	Very Beneficial	Definite	**High +**
No-go Alternative	Permanent	Regional	Severe	Probable	**High –**

IMPACT 7.2: ELECTRICITY GENERATION AND INDEPENDENCE FROM THE NATIONAL GRID

Cause and Comment

The proposed development would result in the provision of 9 MW of electricity that can support the electricity requirements of the FWF WWTW facility. This will reduce the electricity costs incurred by the NMBM and have a positive impact on its economy. Under the No-go alternative, the biogas plant will not be implemented and the FWF WWTW will continue to rely on the electricity provided by the National Grid thus incurring costs to the NMBM.

Reversibility
Not applicable

Mitigation Measures
- Continued maintenance and servicing of the biogas cogeneration system;
- Additional improvements to the biogas technology used at the FWF WWTW in order to further improve the efficiency related to electricity generation and use.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	Study Area	Beneficial	Definite	**High +**
Without Mitigation	Long Term	Study Area	Very Beneficial	Definite	**High +**
No-go Alternative	Permanent	Study Area	Moderate	Definite	**Moderate –**

10.4. Cumulative Impacts Associated with the Operation of the Biogas Plant

IMPACT 1.1: IMPACT ON SURFACE WATER RESOURCES

Cause and Comment
The compounded pollution into the greater Swartkops River Estuary system could lead to a loss of estuarine and wetland species. Estuarine and wetland systems are integral components of species conservation and must be managed as extremely sensitive ecosystems. Under the No-go alternative, the biogas plant will not be implemented and the capacity of the FWF WWTW will remain the same. Eventually, the FWF WWTW will be unable to accommodate additional sewerage. This will increase the likelihood of sewerage being disposed into the surrounding environment, especially the Swartkops River estuary.

Reversibility
The impact of pollution into the Swartkops River estuary is irreversible.

Mitigation Measures
- Post-development run-off must not exceed pre-development run-off;
- A storm water management plan must be implemented to ensure that the estuary does not receive polluted water or runoff during the operational phase of the proposed biogas facility;
- Emergency rehabilitation steps must be put in place should the biogas plant leak or spill into the estuary.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Permanent	Regional	Severe	May Occur	**Moderate –**
Without Mitigation	Permanent	Localised	Slight	Unlikely	**Low –**
No-go Alternative	Permanent	Regional	Severe	Probable	**High –**

IMPACT 1.2: LOCAL KNOWLEDGE OF WASTE MANAGEMENT PRACTICES

Cause and Comment
It is expected that a significant proportion of the employees will come from the surrounding communities of the Fishwater Flats. Through their employment, waste management practice gained at the workplace will be passed onto other community members thus resulting in a general increased awareness of the importance of waste management, and potential opportunities for recycling, within the local communities. Under the No-go alternative, there local knowledge regarding waste management will remain the same and this could contribute to ignorance concerning waste disposal in the communities.

Reversibility
Not applicable

Mitigation Measures
- Train all employees on the importance of proper management of waste streams and sanitation;
- Consider options to facilitate improved management of solid waste in local communities. This may include training local communities on composting techniques. This may be incorporated into an urbanisation plan for the area.
- Consider involving local communities in waste recycling initiatives if these are considered practical within the context of the project.

Significance Rating
The development of a knowledge and appreciation of the need for sound waste management amongst employees, and subsequent informal dissemination of this knowledge into neighbouring communities may ultimately result in an improved management of waste streams within the communities. As one of the positive impacts would be an enhanced local knowledge, the impact may be considered permanent. Without mitigation the impact would possibly be considered to be slightly beneficial and of low significance. However, with mitigation, the impact could be considered beneficial and of moderate positive significance.

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	District	Slight Beneficial	Definite	**Low +**
Without Mitigation	Long Term	District	Beneficial	Definite	**Moderate +**
No-Go Alternative	Long Term	Regional	Slight	May Occur	**Low –**

IMPACT 1.3: SUPPORT OF LOCAL ECONOMY

Cause and Comment
9MW of electricity will be generated from the CHP (biogas) plant for use at the FWF WWTW. This would ensure that the WWTW is self-sustainable in terms of electricity and the demand on ESKOM to supply electricity is reduced. In addition, the stabilised and conditioned sewage sludge generated by the biogas plant is suitable for use as fertilizer and for brick making by the local farming communities and brick manufactures, respectively. Under the No-go alternative, the FWF WWTW provides sewerage sludge for fertilizer and for brick making, however, no renewal energy be produced on site.

Reversibility
Not applicable

Mitigation Measures

- The CHP plant should be regularly maintained to ensure that the required demand of electricity is regularly supplied for use by the FWF WWTW;
- Sewage sludge from the facility should be manage as described in the Guidelines for the Utilization and Disposal of Wastewater Sludge (Vol.1 to 5) (DWAF, 2006);
- Sewage sludge management requires stabilization and drying of the sludge before either disposal at the proposed landfill or alternatively, applied as a soil conditioner, provided that levels of toxic constituents are sufficiently low. If soil application is adopted, soil contamination should be avoided and the soil standard prescribed by the DWAF (2006) should be adhered to;
- Sludge quality control measures should be developed and implemented to ensure that the treated and conditioned sludge generated are suitable for use as fertilizer and for brick manufacturing;
- The sludge management should be in accordance with the Guidelines for the Utilization and Disposal of Wastewater Sludge (Vol.1 to 5) (DWAF, 2006);
- If soil application is intended, soil contamination should be avoided and the soil standard prescribed by the DWAF (2006) should be adhered to.

Significance Rating

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
OPERATIONAL PHASE					
Without Mitigation	Long Term	District	Moderate Beneficial	Definite	**Low +**
Without Mitigation	Long Term	District	Beneficial	Definite	**Moderate +**
No-go Alternative	Long Term	District	Slight	Definite	**Low +**

11. CONCLUSIONS AND RECOMMENDATIONS

In terms of Appendix 3 (3) of the EIA regulations (2014), an environmental impact assessment report must include:

(l) an environmental impact statement which contains-

(i) a summary of the key findings of the environmental impact assessment;
(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and
(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;

(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

In line with the above-mentioned legislative requirements, this chapter of the EIR provides a summary of the findings of the proposed project's EIA process and a comparative assessment of the positive and negative implications of the proposed project. The chapter also provides the EAP's opinion as to whether the activity should or should not be authorised as well as the reason(s) for the opinion.

11.1. Summary of the Key Findings of the EIA

Three potential alternatives were included in the Scoping Report:

- Biogas Cogeneration Plant (preferred option)
- Installation of New Zimpro® Plant
- No-go Option (continuation of current Zimpro® plant)

Because the development of a new Zimpro® plant does not contribute in any way to producing renewable energy (electricity and heat) and would carry the same negative impacts as the implementation of the biogas plant, it was disregarded as an alternative in this Environmental Impact Report.

While the No-go alternative (i.e. to continuation of the current Zimpro® plant) was assessed, it is not deemed a reasonable or feasible alternative and carried several negative impacts of high significance.

The preferred alternative that was assessed was the development and operation of a Biogas Cogeneration Plant at the FWF WWTW facility. The impacts associated with this proposed development, together with the applicable No-go impacts, have been summarised in Table 11.1.

Table 11.1: Summary of Identified Impacts

IMPACT	Preferred Alternative (Biogas Plant)		No-go Alternative
	Without Mitigation	With Mitigation	
CONSTRUCTION PHASE			
Issue 1: Air Quality			
1.2. Dust Pollution	**Low –**	**Low –**	**Low –**
Issue 2: Impacts on Heritage Features			
2.3. Loss or Damage of Archaeological Resources	**Low –**	**Low –**	**NA**
2.4. Loss or Damage of Paleontological Resources	**High –**	**Mod –**	**NA**
Issue 3: Clearance of Vegetation			
3.3. Loss of Species of Conservation Concern	**Mod –**	**Low –**	**Mod –**
3.4. Disruption to Faunal Species of Conservation Concern	**Mod –**	**Low –**	**Mod –**
Issue 4: Disruption of ecosystem function and processes			
4.2. Infestation of Alien Species	**Mod –**	**Mod +**	**High –**
Issue 5: Disturbance of Wetland Systems			
5.4. Sedimentation	**Mod –**	**Low –**	**Mod –**
5.5. Alteration of the Environment Beyond the Development Footprint	**Mod –**	**Low –**	**Mod –**
5.6. Pollution of Wetland Systems	**High –**	**Low –**	**Mod –**
Issue 6: Management and disposal of excavated soil containing heavy metals			
6.3. Impact on Human Health: Option 1	**Low –**	**Low –**	**High –**
Impact on Human Health: Option 2	**High –**	**Low –**	**High –**
6.4. Impact on Ecological Functions (Terrestrial and Aquatic): Option 1	**Low –**	**Low –**	**NA**
Impact on Ecological Functions (Terrestrial and Aquatic): Option 2	**High –**	**Low –**	**NA**
Issue 7: Management and disposal of non-process wastes including construction/decommissioning rubble			
7.3. Pollution of Land and Water: General (Non-hazardous) wastes	**Mod –**	**Low –**	**Mod –**
Pollution of Land and Water: Hazardous wastes	**High –**	**Mod –**	**High –**
7.4. Nuisance Impact (Production of Odours, Visual Impact and Attraction of Pest and Vermin	**Mod –**	**Low –**	**NA**
Issue 8: Disposal of run-off / storm water			
8.2. Pollution of Land and Water	**Mod –**	**Low –**	**NA**
Issue 9: Traffic and Transport			
9.3. Transportation of Normal Loads	**Low –**	**Neg –**	**Low –**
9.4. Transportation of Abnormal Loads	**Low –**	**Low –**	**Low –**
Issue 10: Noise			
10.2. Nuisance Impact Associated with Construction Noise	**Low –**	**Low –**	**Mod –**
Issue 11: Socio-Economic Issues			
11.1. Employment	**Low +**	**Mod +**	**NA**
OPERATIONAL PHASE			
Issue 1: Air Quality			
1.3. Air Emissions	**High –**	**Mod –**	**High –**
1.4. Odours	**Mod –**	**Low +**	**High –**
Issue 2: Disruption of Ecosystem Function and Processes			
2.2. Infestation of Alien Species	**High –**	**Mod +**	**High –**
Issue 3: Disturbance of Wetland Systems			
3.2. Pollution of Wetland Systems	**High –**	**Low –**	**High –**
Issue 4: Management and disposal of stabilized and dewatered sludge			
4.4. Pollution of Soil and Water	**High –**	**Low –**	**V. High –**
4.5. Health Impacts to Employees and Communities	**High –**	**Low –**	**V. High –**
4.6. Nuisance Impacts (Odour and Flies)	**Mod –**	**Low –**	**V. High –**
Issue 5: Occupational Health and Safety			
5.2. Incidents related to the Operation of the Biogas Plant	**Mod –**	**Low –**	**NA**
Issue 6: Socio-economic impacts during the operational phase			
6.1. Employment Creation	**Low +**	**Low +**	**NA**
6.3. Downstream Employment Associated with Increased Water Security	**Mod +**	**NA**	**High –**
Issue 7: Improvements to the Fish Water Flats Wastewater Treatment Works			
7.1. Sludge Stabilisation	**High +**	**High +**	**High –**
7.3. Electricity Generation and Independence	**High +**	**High +**	**Mod –**
CUMULATIVE IMPACTS			
1.4. Impact on Surface Water Resources	**Mod –**	**Low –**	**High –**
1.5. Local Knowledge of Waste Management Practices	**Low +**	**Mod +**	**Low –**
1.6. Support of Local Economy	**Low +**	**Mod +**	**Low +**

11.2. Mitigation Measures to be Implemented

A pre-construction audit must be submitted to prove all pre-construction conditions are met.

Construction Phase

- Mitigation measures in this EIR, in the Specialist Report as well as in the EMPr must be fully adhered to;
- The final layout of the biogas plant must be presented to the relevant authorities for approval prior to the commencement of construction;
- The appointment of an ECO should be done prior to commencement of the construction activities;
- The ECO should complete site audits and audit reports on a monthly basis;
- An efficient storm-water management plan must be implemented by the developer;

Operational Phase

- Mitigation measures in this EIR, in the Specialist Report as well as in the EMPr must be fully adhered to;
- An operational storm water management plan must be completed prior to the commencement of the operational phase of the facility;
- Regular monitoring and maintenance of the biogas plant must be implemented to ensure that it is operating at its full potential

11.3. Recommendation of the EAP

The decision regarding whether to proceed with the proposed development should be based on weighing up of the positive and negative impacts as identified by the specialists and presented in this report. It is the opinion of the EAP that the Environmental Authorisation for the proposed FWF WWTW Biogas Cogeneration Plant is granted for the following reasons:

- All high negative impacts identified with the construction and operation of the Biogas Plant will be reduced to moderate or low significance with the correct implementation of the prescribed mitigation measures. In addition, beneficial impacts were identified and enhanced when properly implemented;
- The only feasible alternative to beneficiating the sludge created at the FWF WWTW, is to continue with the operation of the current Zimpro® plant which is likely to fail or to develop a new Zimpro® plant;
- The proposed biogas plant will stabilise the sludge with an added advantage of generating 9MW of electricity and heat, which will be used to operate the FWF WWTW.

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APPENDIX 1: PUBLIC PARTICIPATION PROCESS

APPENDIX 1-1: BACKGROUND INFORMATION DOCUMENT

BACKGROUND INFORMATION DOCUMENT & INVITATION TO COMMENT

PROPOSED BIOGAS (COGENERATION) PLANT AT THE FISHWATER FLATS WASTEWATER TREATMENT WORKS NELSON MANDELA BAY MUNICIPALITY, PORT ELIZABETH, EASTERN CAPE

BACKGROUND TO THE PROJECT:

As part of a renewable energy scheme, the Nelson Mandela Bay Municipality (NMBM) has proposed the development of a Biogas (Cogeneration) Plant for the stabilisation and beneficiation of sludge that is generated from the Fishwater Flats (FWF) Wastewater Treatment Works (WWTW) by means of anaerobic digestion, generating methane gas for the production of heat and 9MW of electricity.

EOH Coastal and Environmental Services have been appointed to undertake an application for environmental authorisation through an Environmental Impact Assessment (EIA) for the proposed installation of the Biogas Plant. The proposed development, which will occur entirely within the current boundary of the FWF WWTW, is situated on erf 419, Swartkops in Ward 60 along John Tallant Road, Port Elizabeth (Figures 1 and 2).

PROJECT DESCRIPTION:

The proposed Biogas Plant will be designed and constructed independently of the FWF WWTW and will not alter the current upgrading of the works except for the decommissioning of the Zimpro® plant currently used for thermal conditioning (sludge stabilisation) of the generated sludge. Upon completion of the Biogas Plant, the Zimpro® plant will be decommissioned. The sludge generated at the FWF WWTW will be transferred to the Biogas plant where it will be stabilised and beneficiated via anaerobic digestion, generating methane gas for the production of heat and 9MW of electricity supplied to the national grid.

PROJECT ACTIVITIES::

1. The infrastructures for the new development will all be within the existing FWF WWTW boundaries and will thus not increase the overall footprint of the FWF WWTW.
2. The methane produced from the anaerobic digesters will be captured, stored and converted into electricity in the Combined Heat and Power (CHP) plant to be introduced as part of the Biogas Plant.
3. The combined storage capacity (gas holders) of methane gas generated is about 5360m³.
4. Sludge will be pumped from the primary settling tanks (PST) and from the biological tanks (SAS, surplus activated sludge) to the sludge treatment building.
5. Two (2) digesters with a cylindrical form will be constructed for phase I with one additional digester of same size for phase II.
6. To avoid shock loads the digesters will be fed with raw sludge as continuously as possible, seeding the raw sludge with digested sludge before its entering the digester.
7. The digesters shall be operated within a temperature range of 35 – 37 °C. Incoming raw sludge will have a temperature between 15 – 25 °C (Summer/Winter differences) and therefore must be heated to a temperature of 35 – 37 °C.
8. Two (2) biogas engines will be implemented for phase I to heat sludge and buildings required with one additional biogas engine for phase II. The combined gas storage capacity (gas holder) is about 5360m³. Any excess gas (eg. If gas holder is out of commission) will be flared.
9. The thermal energy from the biogas engine will be used to heat the raw sludge and recover the temperature losses by radiation.
10. A volume of 50% of the daily gas production should be considered as storage volume.
11. From the gasholders the biogas is transported to the biogas engines by gas compressors to increase the pressure up to the value necessary for the biogas engines.
12. Excessive gas will automatically be burnt by a gas flare.
13. CHP Specifications: It is intended to install gas engines of the Otto type (2 CHPs each ca. 3,1 MW in phase 1 and a third CHP of 3,1 MW in phase 2). The CHPs will be installed in a compact building which will be noise protected and ventilated.
14. Electricity output capacity is as follows:

		Phase I	Phase II
Electric energy	MWh-el/a	19.125	27.00
Electric capacity of CHP	MW-el	2.55	3.60
Total capacity of CHP	MW	6.36	9.00

AIM OF THIS DOCUMENT

The aim of this Background Information Document (BID) is to provide people affected by and interested in the proposed project with information about this project, the process being followed and to provide them with an opportunity to be involved in the Environmental Impact Assessment (EIA) process.

Coastal & Environmental Services

Return address for comments:
Mr Jesse Jegels
13 Stanley Street,
Richmond Hill, Port Elizabeth

Tel: (041) 585 1715

Email:
jesse.jegels@eoh.co.za

1

15. Expected emissions will be:

Noise pressure level	max. 65 dB at 10 m distance from outer building surface
NOx in flue gas	average ca. 400 mg/m3 flue gas (at 5% oxygen)
CO in flue gas	average ca. 650 mg/m3 flue gas (at 5% oxygen)
SO_2 in flue gas	average ca. 200 mg/m3 flue gas (at 5% oxygen)
Heat from flue gas	ca. 15.000 kWh/d (phase 1), ca. 21.000 kWh/d (phase 2)
Heat from coolers	ca. 52.000 kWh/d (phase 1), ca. 73.000 kWh/d (phase 2)

16. Expected sludge production will be:

Sludge Production	Unit	Phase I	Phase II
Sludge from primary settling tanks	kg/d	59 405	69 810
	m³/d	1 697	1 995
Dry solid	%	3.50	3.50
Organic dry solids (oDS) primary sludge	%	75	75
	kg/d	44 544	52 358
Sludge from the biological basins	kg/d	27 567	35 090
	m³/d	2 757	3 509
Dry solid	%	1.00	1.00
oDS C-Tech sludge	%	65	65
	kg/d	17 919	22 809
Total sludge	kg/d	86 972	104 900
	m³/d	4 454	5 504
Dry solid	%	1.95	1.91

PHASED ACTIVITIES:

The Scoping phase: The Scoping Phase is important for informing the public and relevant authorities about the nature and size of the proposed project. A critical component of the Scoping Phase is the Public Participation Process, in which Interested and Affected Parties (I&APs) are given an opportunity to raise any issues or concerns they may have about the project. The process is outlined in Figure 3. The draft Scoping Report (SR) will be made available for review by the authorities and all I&APs. The SR will set the scope for the Environmental Impact Assessment Phase.

The Environmental Impact Assessment phase: This phase is more complex and more detailed than the Scoping Phase, because it focuses on undertaking a number of specialist studies that have been identified as being necessary during the Scoping Phase. These studies provide expert input into the EIA process based on scientific information. I&APs will be consulted again during this phase, and will be given an opportunity to comment on the Draft Environmental Impact Report (EIR) that will contain the specialist reports. During this phase an Environmental Management Plan must also be prepared for the project.

Environmental Authorisation phase: The final EIR and EMP is submitted to the National Department of Environmental Affairs (DEA) who, after considering the report, will issue an Environmental Authorisation (Waste License) either allowing the project to continue under certain conditions, or requiring additional work to be undertaken.

RELEVANT LEGISLATION:

- The Constitution of South Africa (No. 108 of 1996);
- National Environmental Management Act (NEMA No. 107 of 1998);
- Environmental Impact Assessment Regulations, 2014;
- The National Water Act (No 36 of 1998);
- National Environmental Management: Air Quality Act (No. 39 of 2004);
- The National Environmental Management: Waste Act (Act 59 of 2008);
- Compensation for Occupational Injuries and Diseases Act 130 of 1993;
- Basic Conditions of Employment Act 75 of 1997;
- Labour Relations Act 66 of 1995;
- Occupational Health & Safety Act (85 of 1993);
- Occupational Health & Safety Act: Major Hazard Installation Regulations (GNR 692 of 2001);

- National Waste Management Strategy (GN R 344 of 2012);
- National Environmental Management: Biodiversity Regulations (GNR 692 of 2001);
- Hazardous Substance Act No. 15 of 1973; and
- Municipal By-Laws

LISTED ACTIVITIES:

DETAILED DESCRIPTION OF LISTED ACTIVITIES ACCORDING TO NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998)	
NEMA Listed Activity as described in GN R. 984 of 2014	**Description of project activity triggered**
GN R 984(4) *The development of facilities or infrastructure for the storage, or the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.*	The methane produced from the digesters will be converted into electricity in the CHP. The combined storage capacity (gas holders) of methane gas generated is about 5360m³.
GN R 984(5) *The development and related operation of facilities or infrastructure for the refining, extraction or processing of gas, oil or petroleum products with an installed capacity of 50 cubic metres or more per day…*	Biogas plant will stabilise and beneficiate sludge generated at the FWF WWTW by means of anaerobic digestion, generating methane gas that will be stored for the production of heat and 9MW of electricity.
GN R 984(6) *The development of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding –* *(iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic meters or less*	Emissions of CH_4, SO_2, CO and NOx in flue gas

DETAILED DESCRIPTION OF LISTED ACTIVITIES ACCORDING TO NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (ACT 59 OF 2008)	
Waste Listed Activity as described in GN 921 as amended by 332 of 2014	**Description of project activity triggered**
Category B(2): *The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.*	The proposed Biogas Plant will recycle104.9 ton of sludge per day (Phase II) for the generation of electricity.
Category B(4): *The treatment of hazardous waste in excess of 1 ton per day calculated as a monthly average; using any form of treatment excluding the treatment of effluent, wastewater or sewage.*	The Biogas plant adopts the anaerobic digestion of the stabilisation and beneficiation of sludge to generate methane gas for the production of heat and electricity.
Category B(10): *The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).*	The Biogas Plant will be constructed
Category C(5)(2): *The storage of hazardous waste at a facility that has the capacity to store in excess of 80m³ of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste.*	134m³ of sludge will be stored at a retention time of 2hr at any one time.

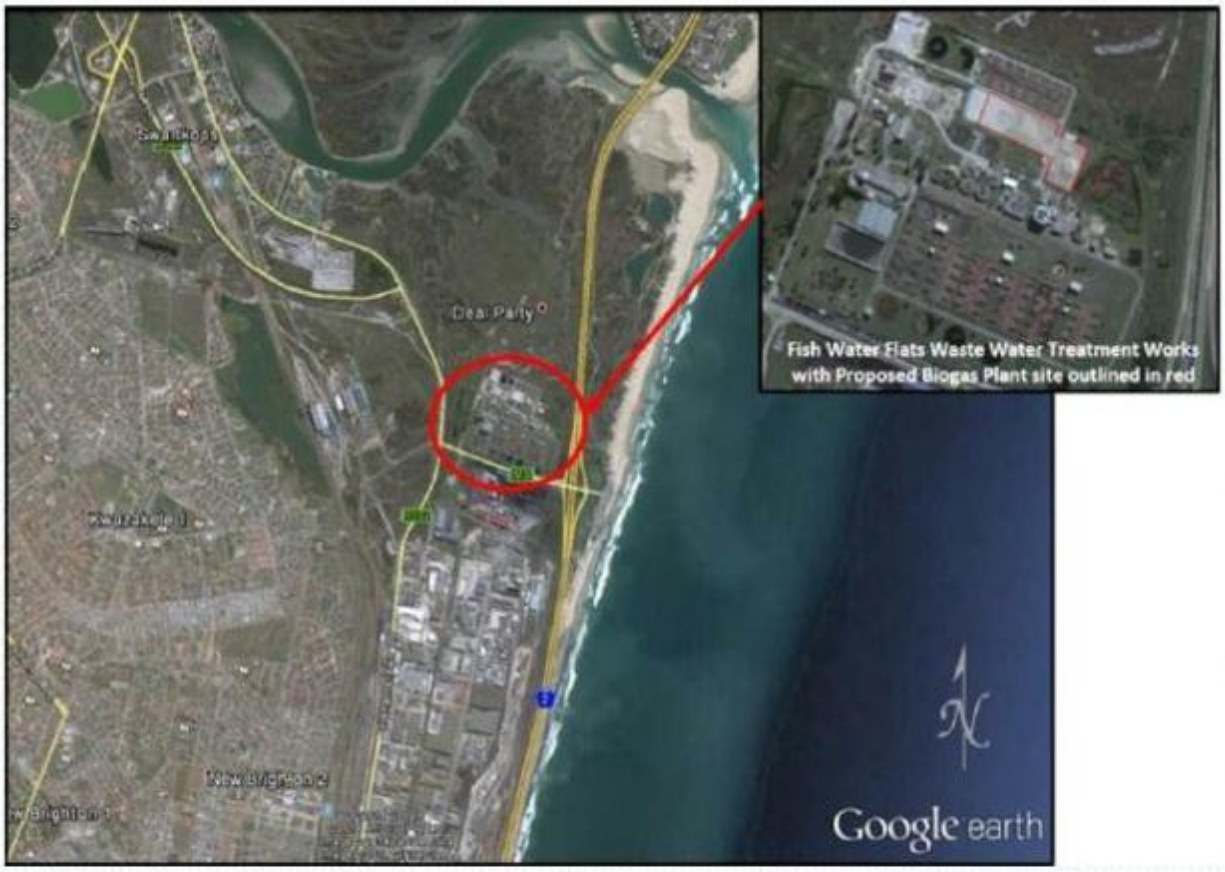


Figure 1: Locality of the proposed Biogas (Cogeneration) Plant within the FWF WWTW

Figure 2: Site Boundary of the proposed Biogas (Cogeneration) Plant within the FWF WWTW.

4

Scoping Phase

ACTIVITY	TIMEFRAME
Acknowledgement of Application	10 Days for the Department to acknowledge receipt
Public Participation Process including Comments and Response Trail	30 Days
Submission of SR	44 Days after receipt of application by the Department
Consideration of SR by the Department	43 Days of receipt of the final SR

EIR Phase

ACTIVITY	TIMEFRAME
EIA Public Participation Process	30 Days duration within the EIA Phase of 106 Days
EIR Submission	106 Days after receipt of SR consideration
Notice of extension	Must be lodged within 106 days of receipt of SR consideration and final EIR submitted within 156 of receipt of SR consideration (50 days extension)
Environmental Authorisation	107 Days after receipt of final EIR for decision
	5 Days to notify the Applicant of decision
	14 Days to notify all I&APs of decision

Figure 3: Scoping & EIR timeframes for the proposed Biogas (Cogeneration) Plant

5

I HEREBY WISH TO REGISTER AS AN INTERESTED AND AFFECTED PARTY (I&APs) FOR THE FISHWATER FLATS WWTW BIOGAS EIA PROCESS

Name:
_____

Postal address:
_____

_____

Email:
_____

Organization:
_____

Phone #: _____ **Fax #:** _____

Cell phone #: _____

Please list your initial concerns:
_____

_____

_____

_____

_____

_____

_____

Please return details to:
Mr Jesse Jegels
13 Stanley Street, Richmond Hill, Pot Elizabeth, 6001
Telephone: (041) 525 1715;
Email: jesse.jegels@eoh.co.za

APPENDIX 1-2: NOTIFICATION TO ALL INTERESTED & AFFECTED PARTIES (I&APs)

A letter of notification was sent to the adjacent landowners, to the government departments and to other key stakeholders via registered mail and/or email as per the amendments of Section 47D of the National Environmental Management Act (Act No. 107 of 1998, second amended Act of 2013):

LETTER TO ADJACENT LAND OWNERS:

The following adjacent landowners were identified and informed of the application for authorisation pertaining to the proposed project:

Name	Organisation	Telephone	Fax	Cell	Email	Address
NEIGHBOURING LAND OWNERS						
Raymond Lund	Sappi Paper and Paper Packaging	041 408 4283	041 486 1597	082 940 3768	Raymond.Lund@sappi.com	142 Burman Road, Deal Party, 6001
Dale King	African Hide Trading	041 405 7000	082 906 6373	082 906 6373	dalek@aht.co.za	P O Box 1067, Port Elizabeth, 6000
Greg Clack	Engineering Manager Umicore	041 404 3999			greg.clack@eu.umicore.com	John Tallant Road, Deal Party, Port Elizabeth
Templeton Titima	SHE Specialist Orion Carbons(Algorax)	041 402 4206	041 486 1918	060 962 6083	templeton.titima@orioncarbons.com	John Tallant Road, Deal Party, Port Elizabeth
Mark Langford	Orion Carbons(Algorax)	041 402 4238	086 613 6287		mark.langford@evonik.com	John Tallant Road, Deal Party, Port Elizabeth

The following letter of notification was sent to these landowners:

EOH
Coastal & Environmental Services

1 October 2015

To Whom it may concern

ATTENTION: ADJACENT LAND OWNER

NOTIFICATION: ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED UPGRADE AS PER THE INSTALLATION OF A BIOGAS PLANT WITHIN THE FISHWATER FLATS WASTEWATER TREATMENT WORKS, PORT ELIZABETH, EASTERN CAPE PROVINCE

In accordance with the requirements of section 41 of the Environmental Impact Assessment (EIA) Regulations (2010) made in terms of section 24(5) of the National Environmental Management Act (Act No 107 of 1998) as amended, we are required to notify, *"owners, persons in control of, and occupiers of the land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken"*. In accordance with this requirement, please find here-with a letter of notification for a full Scoping and Environmental Impact Assessment being carried out by Coastal and Environmental Services in respect of the above-mentioned project.

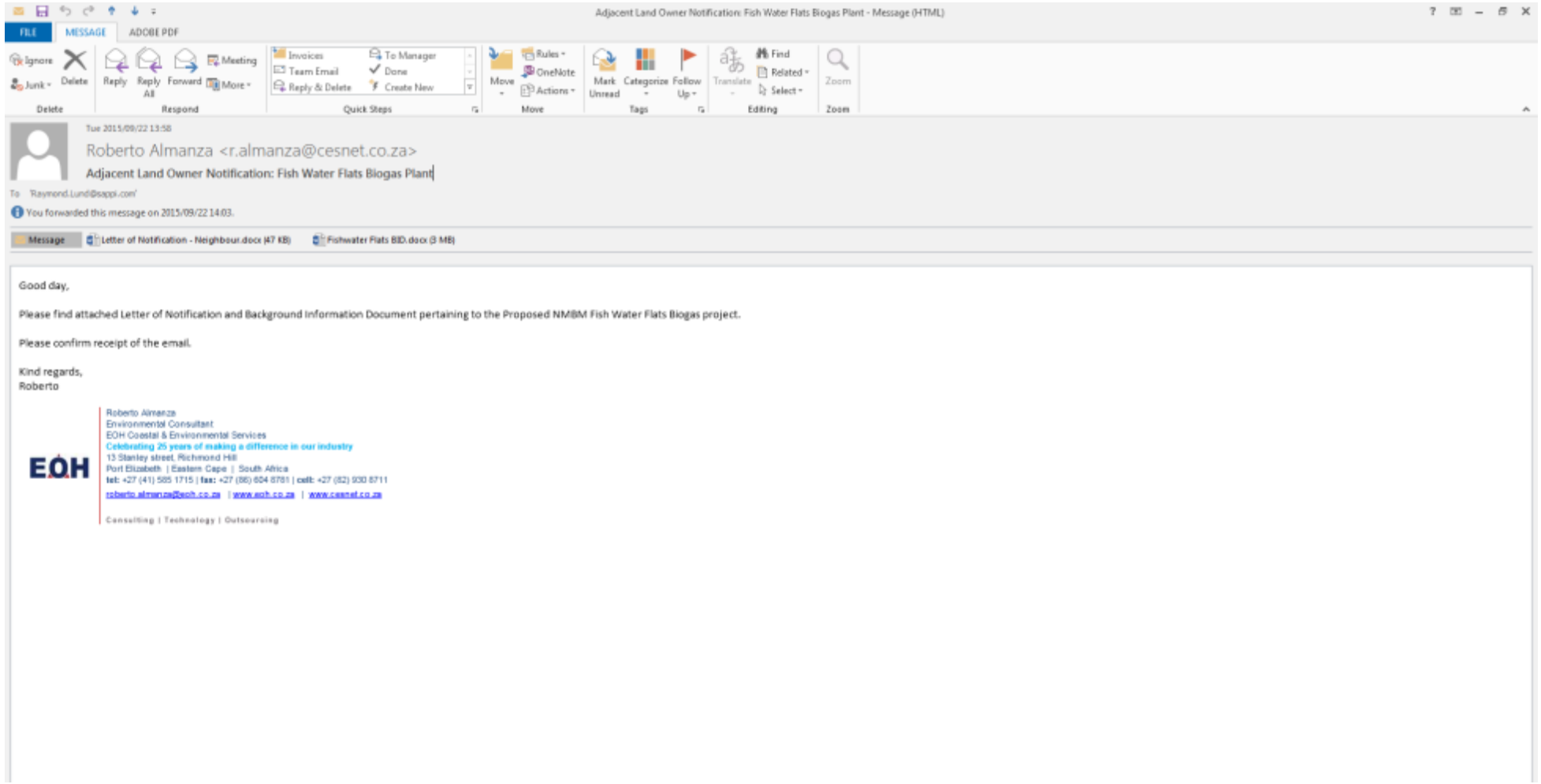
The Nelson Mandela Bay Municipality (NMBM) has proposed the upgrade of the Fishwater Flats Wastewater Treatment Works (FWF WWTW) as per the construction of a Biogas Plant in Port Elizabeth, Nelson Mandela Bay Municipality, Eastern Cape Province. Due to the additional listed activity an Environmental Authorization and a Water Use licence is required.

- EOH Coastal & Environmental Services (CES) of Port Elizabeth have been appointed by the Royal HaskoningDHV (the Construction Engineers) to conduct an EIA for the proposed development. The activities that we believe will be triggered by the proposed development are listed in the application and the Background Information Document (BID) that is attached to this letter.
- A public meeting will be held to present the project and to give the public an opportunity to comment on the proposed development. You will be notified of the date, time and venue for the public meeting accordingly.
- CES would highly appreciate it if you could **confirm** your **receipt** of this notification via email, fax, phone or post. For more information, please feel free to contact me at the CES Port Elizabeth office numbers shown below.

Yours sincerely,

Roberto Almanza
Environmental Consultant
r.almanza@cesnet.co.za or roberto.almanza@eoh.co.za

Proof of Notification: Raymond Lund



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Datumstempel van aflewering

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Paraaf van aflewingsbeampte

REGISTERED LETTER
GEREGISTREERDE BRIEF
(with an insurance option/met 'n verskeringsopsie)

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Post Office

Addressed to/Geadresseer aan

Raymond Lund
142 Burman Rd
Deal Party

Postcode / Poskode: 6 0 0

FINAL/FINAAL

Signature of recipient
Handtekening van ontvanger

REGISTERED LETTER
RC 054 079 975 ZA
CUSTOMER COPY

Track-en-Spoor
Volg-en-Spoor

Date stamp of delivery

Datumstempel van aflewering

TELLER 4

Initial of receiving officer
Paraaf van ontvangsbeampte

Official proof of indentification essential
Amptelike bewys van identifikasie noodsaaklik

Please collet at
Haal asseblief af by ____________ Post Office, counter No / Poskantoor, toonbanknr ________

within 30 days of date received at delivery office/
binne 30 dae vanaf datum ontvang by afleweringskantoor

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