ANGLO AFRICAN METALS ZERO WASTE RECOVERY SOLUTION NEAR KWA-GUQA, MPUMALANGA PROVINCE

Environmental Impact Assessment Report

May 2021

DFFE Reference: 14/12/16/3/3/3/401

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PROJECT DETAILS

Title	:	Environmental Impact Assessment Process: Environmental Impact Assessment Report for the Anglo African Metals Zero Waste Recovery Solution and Associated Infrastructure near Kwa-Guqa Mpumalanga Province
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Client	:	Anglo African Metals (Pty) Ltd
Report Status	:	Final Environmental Impact Assessment Report
Date	:	May 2021

When used as a reference this report should be cited as: Savannah Environmental (2021), Environmental Impact Assessment Report for the Anglo African Metals Zero Waste Recovery Solution and Associated Infrastructure near Kwa-Guqa Mpumalanga Province.

PURPOSE OF THE EIA REPORT AND INVITATION TO COMMENT

Anglo African Metals (Pty) Ltd, the South African registered company of Fodere Titanium, has developed a disruptive technology for the economic extraction of valuable minerals from mining ore and waste materials. The process offers solutions for simultaneously extracting both vanadium and titanium oxides from slag materials. The technology developed by Anglo African Metals is also demonstrated to extract aluminium as aluminium oxide (Al_2O_3), magnesium as magnesium oxide (MgO) and calcium as calcium sulphate/gypsum ($CaSO_4$). The project is known as the Anglo African Metals Zero Waste Recovery Solution.

The waste recovery plant is proposed to be located on Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the property subdivision and consolidated process), approximately 17 km west of eMalahleni town in the eMalahleni Local Municipality (LM) within the Nkangala District Municipality (DM) in Mpumalanga (refer to **Figure 1**). The development area is approximately 4 ha in extent and is contained within the EVRAZ Highveld Steel and Vanadium property[1]. The site is accessible directly off the R104, from the N4 turnoff near Kwa-Guqa informal settlement.

Anglo African Metals appointed Savannah Environmental as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) process for the proposed project. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations, as amended, promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This EIA Report contains the following chapters:

- **Chapter 1** provides background to the proposed project and the environmental impact assessment process.
- **Chapter 2** provides a description of the Zero Waste Recovery Solution Project and technology, including feasible alternatives identified and considered for the project.
- **Chapter 3** outlines the strategic legal context for waste planning in South Africa, as well an overview of the policy and legislative context within which the Zero Waste Recovery Solution Project is proposed.
- **Chapter 4** describes the need and desirability of the project.
- **Chapter 5** outlines the process which was followed during the EIA Phase of the EIA Process.
- **Chapter 6** describes the existing biophysical and socio-economic environment affected by the proposed project.
- **Chapter 7** provides a description and assessment of the potential issues and impacts associated with the proposed project, including potential cumulative impacts.
- **Chapter 8** presents the conclusions of the EIA Report.
- **Chapter 9** provides a list of all references used in the compilation of the EIA Report.

The EIA Report was made available for review from **Friday 16 April 2021 to Tuesday 18 May 2021** at https://www.savannahsa.com/public-documents/other/. All comments received and recorded during the 30-day review and comment period of the EIA Report have been included, considered and addressed within this final EIA Report (refer to Comments and Responses Report in Appendix C8) for the consideration

[1] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

of the National Department of Forestry, Fisheries and the Environment (DFFE). Changes made in this EIA Report for submission have been underlined for ease of reference.

EXECUTIVE SUMMARY

Anglo African Metals (Pty) Ltd, the South African registered company of Fodere Titanium, has developed a disruptive technology for the economic extraction of valuable minerals from mining ore and waste materials. The process offers solutions for simultaneously extracting both vanadium and titanium oxides from slag materials. The technology developed by Anglo African Metals is also demonstrated to extract aluminium as aluminium oxide (Al_2O_3), magnesium as magnesium oxide (MgO) and calcium as calcium sulphate/gypsum ($CaSO_4$). The project is known as the Anglo African Metals Zero Waste Recovery Solution.

Anglo African Metals has identified a suitable tailings/slag resource which can be processed using their developed technology at EVRAZ Highveld Steel and Vanadium located between Balmoral and eMalahleni in Mpumalanga. The waste recovery plant is proposed to be located on Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process), approximately 17 km west of eMalahleni town in the eMalahleni Local Municipality (LM) within the Nkangala District Municipality (DM) in the Mpumalanga Province. The development area is approximately 4ha in extent (it is assumed that100% of the 4ha development area will be cleared for the establishment of the zero waste recovery plant and associated infrastructure) and is contained within the Highveld Steel property. The site is accessible directly off the R104, from the N4 turnoff near Kwa-Guqa informal settlement.

The main infrastructure associated with the facility includes the following (refer to **Figure 1**):

- Chemical plant area, where all process chemicals including acid are produced, stored and handled as required by the waste recovery process.
- Substation and plant utility unit as interface and controlling unit for the electricity utilised by the plant during operation.
- Slag stockpile.
- Crushing plant.
- Mill.
- Product area for storage of the various products produced through the recovery process.
- Reagent area, for the storage and handling of reactants utilised in the waste recovery process.
- Fuel storage area with a fuel storage tank (or tanks, as required) of up to 70m^3 for the bulk storage of gas (LPG or similar) utilised in the waste recovery process.
- A security area.
- Parking lot.
- Admin and control room including offices and ablutions for staff.

The plant will be developed to process 2000 tonnes of tailings/slag per month, approximately 3 tons per day and will be primarily fuelled by LPG and Sasol gas brought into site by dedicated transport truck deliveries.

Operation of the plant is anticipated for 24 hours per day, 365 per year (i.e. non-stop operation) and will utilise the slag produced by the Highveld Steel operations.

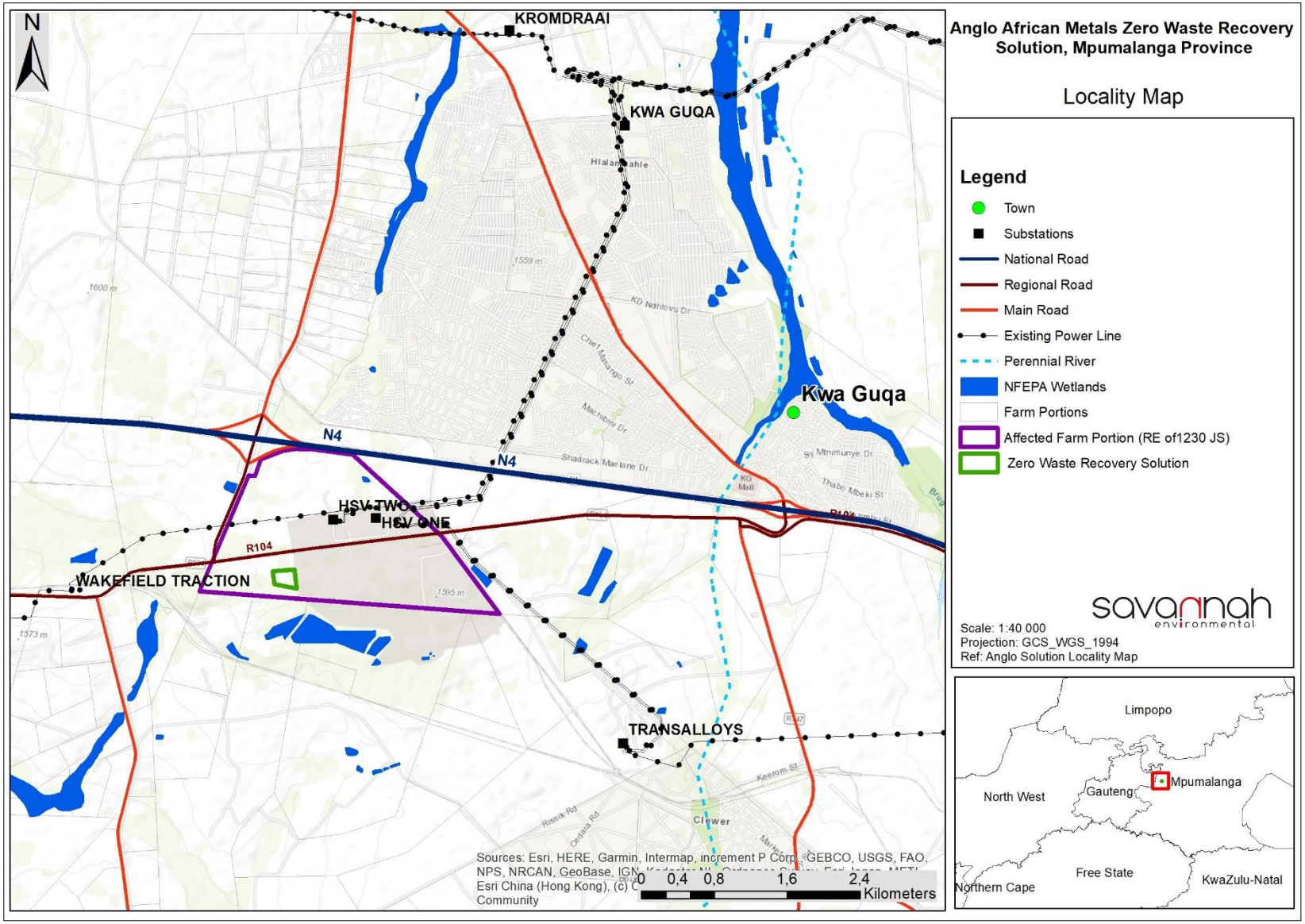

Figure 1: Locality map showing the area proposed for the establishment of the Anglo African Metals Zero Waste Recovery Solution

1. Environmental Permitting Requirements

The Anglo African Metals Zero Waste Recovery Solution triggers the need for the following environmental permits:

- **Environmental Authorisation (EA)** from the National Department of Forestry, Fisheries and the Environment (DFFE), in consultation with the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs, in accordance with the requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (GNR 326).
- A **Waste Management License (WML)**, from the DFFE for the recovery of waste, as is proposed as part of the Zero Waste Recovery Solution, as well as the construction of the infrastructure for this purpose trigger such activities, in accordance with the National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA), and the List of Waste Management Activities (GNR 921).
- An **Atmospheric Emission License (AEL)**, from the Nkangala District Municipality, in accordance with the National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA), and List of Activities resulting in Atmospheric Emissions published in GNR 893.

Anglo African Metals appointed Savannah Environmental as the independent environmental consulting company to undertake the Scoping and EIA process in accordance with the NEMA and Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326) in support of an integrated application for Environmental Authorisation (EA) and a Waste Management License (WML). The S&EIA process will also support the future application for an Atmospheric Emission License (AEL).

The EIA process undertaken for the proposed Anglo African Metals Zero Waste Recovery Solution comprised two phases – i.e. Scoping and Impact Assessment - and involved the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in these two phases is as follows:

- The **Scoping Phase** included the identification and description of potential impacts associated with the proposed project through a desktop study and consultation with affected parties and key stakeholders. This phase considered the broader project area in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. Following the public review period of the Scoping Report, this phase culminated in the submission of a Final Scoping Report and Plan of Study for EIA to the competent authority for acceptance and approval to continue with the EIA phase of the process. The Final Scoping Report and Plan of Study for the EIA for the Anglo African Metals Zero Waste Recovery Solution was submitted to the DFFE on **08 January 2021**, and acceptance was received on **18 February 2021,** therefore marking the start of the EIA Phase.
- The **EIA Phase** involved a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considered a proposed development footprint and included detailed specialist investigations (including field surveys), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following a review of the EIA report and EMPr by stakeholders, this phase culminates in the submission of a final EIA Report (this report) and EMPr to the competent authority for review and decision-making.

2. Potential Impacts Identified

No environmental fatal flaws were identified in the detailed specialist studies conducted. It is recommended that mitigation measures are implemented to reduce impacts to acceptable levels. The potential environmental impacts associated with the zero waste recovery plant identified and assessed through the EIA process include:

» Impacts on Heritage Resources (including Palaeontology)
» Impacts on Air Quality
» Socio-Economic Impacts

2.1 Impacts on Heritage Resources (including Palaeontology)

The desktop assessment and field survey conducted on 5 March 2021 as part of the Heritage Impact Assessment (**Appendix E**) indicated no heritage resources within the overall project site and development footprint due to the extensive disturbance of the footprint by industrial activity.

The SAHRIS palaeontological sensitivity map rates the study as underlain by geological strata with a Very High palaeontological significance. However, the palaeontological desktop assessment (**Appendix E**), supported by the fieldwork concluded by the heritage specialist, has considered the potential impact and, due to the disturbed nature of the site, has concluded that no further fieldwork will be required, but that a chance finds protocol must be implemented.

From a heritage perspective, it is the specialist's opinion that the overall impact on heritage resources will be Low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved.

2.2 Impacts on Air Quality

The Air Quality Impact Assessment (**Appendix D**) assessed baseline air quality data for the SAWS managed eMalahleni Station (located approximately 12.3km northeast of the proposed project location) for thoracic particulates (with a diameter less than 10 µm – PM10), inhalable particulates (with an aerodynamic diameter less than 2.5 µm – $PM_{2.5}$), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) using baseline data for the period 2020. Impacts are expected during the construction, operational and decommissioning phases.

Construction (and decommissioning) activities associated with the zero waste facility are likely to result in emissions of particulate and gaseous pollutants due to civil and building work and from vehicle traffic. The nature of emissions from construction activities is highly variable in terms of temporal and spatial distribution and is also transient. Increased ambient concentrations of fine particulates and gaseous pollutants may result in negative human health impacts. Increased nuisance dustfall is likely as a result of wind-blown dust emissions from the working areas. Increased nuisance dustfall rates will likely result in negative impact on dustfall in the immediate vicinity of the construction area. Unmitigated particulate emissions could result in higher particulate concentrations and dust fallout in the immediate vicinity of the plant, but are unlikely to result in any noticeable impact any identified sensitive receptor locations. The impact of gaseous pollutants is likely to minor.

The operational phase of the zero waste recovery plant will result in elevated ambient concentrations of particulate and gaseous atmospheric pollutants, including SO_2, NO_2 and PM. Increased ambient concentrations may result in negative human health impacts, as well as negative impacts on vegetation and animals within the surrounding area. No exceedances were however recorded at any of the identified sensitive receptors.

The findings from the Air Quality Impact Assessment are summarised as follows:

- The extent of incremental impacts due to the Zero-Waste Recovery Plant are expected to be localised to the vicinity of the operations, with possible exceedances of the SA NAAQS simulated outside the property boundary, but simulated impacts are negligible at all sensitive receptor locations.
- The duration of the impacts is expected to be long-term (for the life of the project) while the magnitude of impacts is expected to be medium for particulate emissions, low to medium for gaseous pollutants (SO_2 and NO_2), and low for dust fallout. If all fugitive sources are properly managed, no residual impact is expected post closure.
- Impacts during the construction phase are expected to be transient and highly variable from day to day, depending on the construction activities being performed. For this reason, construction phase impacts are expected to be low.
- Given that particulate concentrations in the study area are already elevated, it is possible that cumulative impacts could be high in magnitude.

From an air quality perspective, it is the opinion of the specialist that the project be authorised and licensed to operate, on condition that:

- The plant is designed to comply with the Subcategory 4.20 Minimum Emission Standards.
- A Fugitive Dust Management Plan is implemented, inclusive of the following mitigation measures aimed at controlling fugitive dust emissions from the operations and minimize the impact of particulate emissions on the receiving environment:
  - Paving of all on-site roads. While the surface moisture content of unpaved roads can be increased with water bowsers, it is much easier to control the silt loading on paved roads.
  - Regular sweeping of on-site paved roads to reduce silt loading on the road surface, higher silt loading results in higher vehicle entrainment emissions.
  - Clean-up of all spillages to avoid re-entrainment by vehicles.
  - Implementation of strict on-site speed limits.
  - Mitigation of crushing plant emissions, either by water sprays or enclosure with dust extraction.
  - Control of dust emissions from stockpiles during periods of high wind speeds, either by increasing moisture content of material with water sprays, or by decreasing wind speeds using enclosures or bund walls
- Stack testing is conducted as indicated in the AEL for the operations.
- Dust fallout sampling is conducted on the facility boundary in the four cardinal wind direction.

2.3 Socio-Economic Impacts

The Socio-Economic Impact Assessment (**Appendix F**) identified both positive and negative impacts to be associated with both the construction and operational phases of the project.

During the construction phase, the positive impacts expected to occur include increase production, increase in the provincial GDP, increase in employment opportunities, skills development, increase in government revenue and improvements of household income and standard of living. The significance of the positive construction phase impacts ranges from medium to low, following the implementation of the recommended enhancement measures.

Negative impacts expected to occur during construction include an increase in pressure on services and social and local infrastructure, as well as an increase in demand for housing, which may contribute to increased levels of competition in the temporary housing market. The significance of the negative construction phase impacts is expected to be low, following implementation of the recommended mitigation measures. No negative impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the operational phase, the positive impacts expected to occur include increase production, increase in the provincial GDP, increase in employment opportunities, skills development, improved household income and standard of living, and increase in government revenue. The significance of the positive construction phase impacts is expected to be medium, following implementation of the recommended enhancement measures.

Negative impacts expected to occur during the operational phase include a temporary increase in pressure on services and social and local infrastructure, as well as potential health risks due to cumulative air emissions of existing industry and the proposed facility. The impacts are expected to be of medium to low significance, after implementation of mitigation measures.

Overall, numerous positive socio-economic impacts will occur as a result of the zero waste recovery plant and these positive impacts far outweigh any potential negative impacts that might occur. Considering the numerous positive socio-economic impacts associated with the proposed project, it is the specialist's opinion the establishment of the proposed waste recovery facility be continued, provided mitigation measures are implemented to address the identified externalities or negative effects.

2.4 Assessment of Cumulative Impacts

Cumulative impacts are expected to occur with the development of the proposed facility throughout all phases of the project life cycle. The main aim for the assessment of cumulative impacts is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The assessment of the cumulative impacts was undertaken through the consideration of impacts in isolation and compared to the cumulative impacts of the proposed facility in combination with other known or proposed industrial developments within the area. The significance of the cumulative impacts associated with the development of the facility is expected to be medium to low. There are no impacts or risks identified to be considered as unacceptable with the development of the zero waste recovery facility when considered together with other developments within the surrounding area. In addition, no impacts which will result in whole-scale change are expected.

The limited potential for cumulative impacts and risks makes the location of this project within the identified site of the EVRAZ Highveld Steel and Vanadium property[2] a desirable location for the proposed project, provided that environmental impacts are mitigated to suitable standards as recommended within this EIA Report.

[2] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

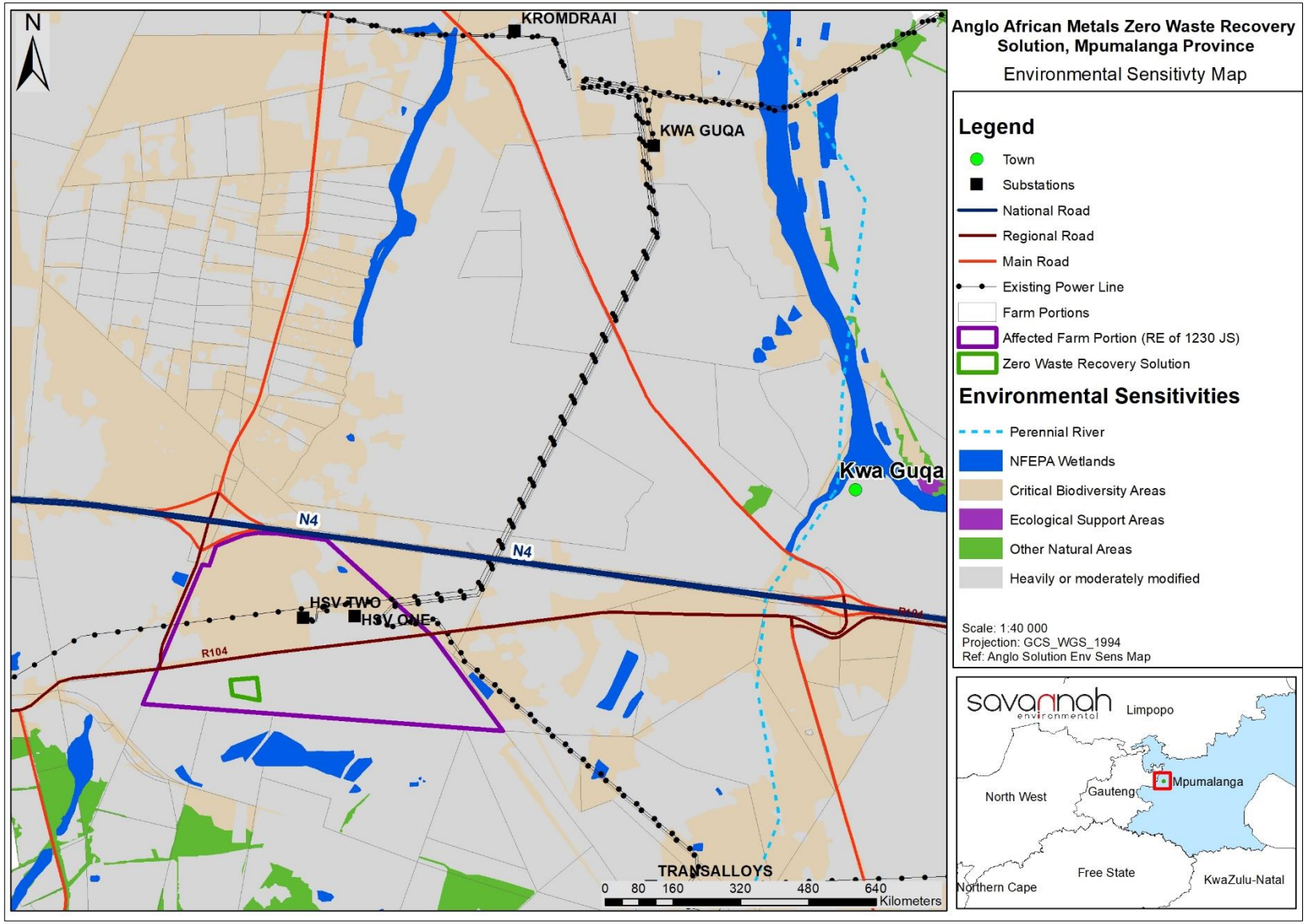

Figure 2: Environmental Sensitivity Map for the Anglo African Metals Zero Waste Recovery Solution

2.5 Overall Conclusion (Impact Statement)

The construction and operation of the zero waste recovery plant on Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process) within jurisdiction of the eMalahleni Local Municipality and the Nkangala District Municipality has been proposed by Anglo African Metals (Pty) Ltd. A technically viable project site and development footprint was proposed by the developer and assessed as part of the EIA process. The environmental assessment of the development footprint within the project site was undertaken by independent specialists, and their findings have informed the results of this EIA Report.

Through a review of relevant policy and planning documentation, it was concluded that the proposed project is in alignment with the local and provincial developmental policies and spatial frameworks. The project is also expected to make a contribution towards the achievement of the national developmental objectives related to industrialisation, mineral beneficiation and waste management. In addition, it is in line with the principles of e NEM: WA and the NWMS with regards to the implementation of the waste management hierarchy by reducing waste material for disposal and recovering materials from waste.

The developer has proposed a technically viable and suitable layout for the project and associated infrastructure which has been assessed as part of the independent specialist studies. The specialist findings have indicated that there are no identified environmental fatal flaws or areas of sensitivity associated with the zero waste recovery plant. All impacts associated with the project can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures.

The layout map (including all associated infrastructure) provided in this EIA Report is considered to be the preferred layout of the zero waste recovery plant for implementation. The design and layout thereof are determined by the footprint of the existing infrastructure and slag resource situated on the property, as well as the specific requirements of Highveld Steel, the landowner.

Through the assessment of the development of the zero waste recovery plant within the project site, it can be concluded that the development of the facility is environmentally acceptable (subject to the implementation of the recommended mitigation measures).

2.6 Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development footprint proposed, and the position of the proposed plant within an area that has been completely transformed due to the industrial activities within the site, it is the reasoned opinion of the EAP that the development of the zero waste recovery plant is acceptable within the landscape and can reasonably be authorised (**Figure 3**). The recommended validity period of the environmental authorisation is 10 years.

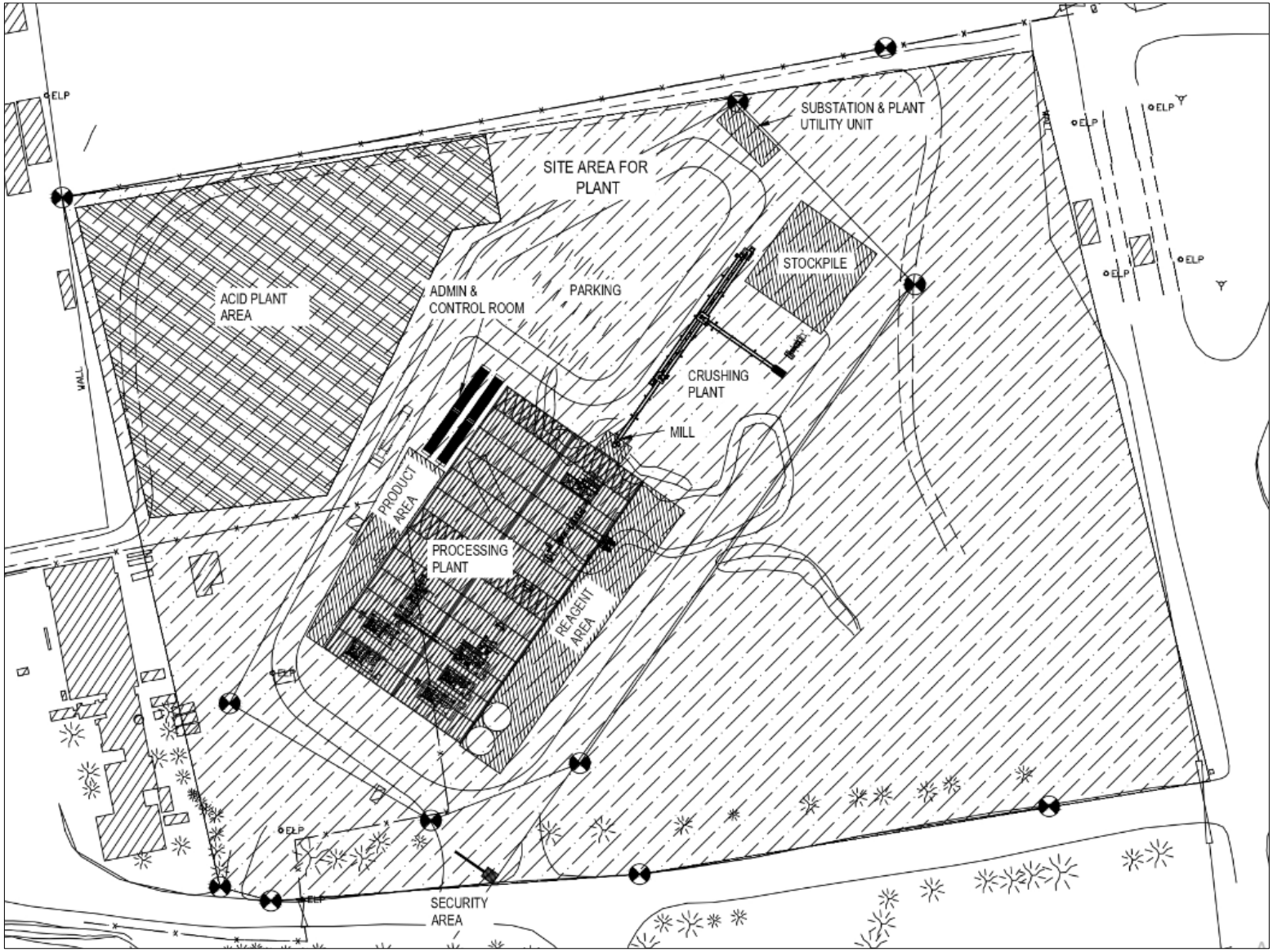

Figure 3: Layout map of the preferred development footprint for the zero waste recovery plant, as was assessed as part of the EIA process

The authorisation should include the approval of the layout reflected in **Figure 3**, which includes the following main infrastructure:

- Chemical plant area, where all process chemicals including acid are produced, stored and handled as required by the waste recovery process.
- Substation and plant utility unit as interface and controlling unit for the electricity utilised by the plant during operation.
- Slag stockpile.
- Crushing plant.
- Mill.
- Product area for storage of the various products produced through the recovery process.
- Reagent area, for the storage and handling of reactants utilised in the waste recovery process.
- Fuel storage area with a fuel storage tank (or tanks, as required) of up to 70m^3 for the bulk storage of gas (LPG or similar) utilised in the waste recovery process.
- A security area.
- Parking lot.
- Admin and control room including offices and ablutions for staff.

The following key conditions would be required to be included within an authorisation issued for the zero waste recovery plant.

- The zero waste recovery plant must be located on the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS.
- All mitigation measures detailed within this EIA Report, as well as the specialist reports contained within **Appendices D to F**, are to be implemented.
- The EMPr as contained within **Appendix K** of this EIA Report should form part of the contract with the Contractors appointed to construct and operate the zero waste recovery plant in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the project is considered key in achieving the appropriate environmental management standards as detailed for this project.
- Obtain all other mandatory and environmental permits for the project, as required.
- The Fugitive Dust Management Plan as contained within **Appendix D** of the EIA Report must be implemented.
- Dust fallout sampling must be conducted on the facility boundary in the four cardinal wind directions.
- The design of the zero waste recovery plant must comply with Subcategory 4.20 Minimum Emission Standards.

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APPENDICES LIST

CHAPTER 1 INTRODUCTION

Anglo African Metals (Pty) Ltd, the South African registered company of Fodere Titanium, has developed a disruptive technology for the economic extraction of valuable minerals from mining ore and waste materials. The process offers solutions for simultaneously extracting both vanadium and titanium oxides from slag materials. The technology developed by Anglo African Metals is also demonstrated to extract aluminium as aluminium oxide (Al_2O_3), magnesium as magnesium oxide (MgO) and calcium as calcium sulphate/gypsum ($CaSO_4$). The project is known as the Anglo African Metals Zero Waste Recovery Solution.

The waste recovery plant is proposed to be located on Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process), approximately 17 km west of eMalahleni town in the eMalahleni Local Municipality (LM) within the Nkangala District Municipality (DM) in the Mpumalanga Province (refer to **Figure 1.1)**. The development area is approximately 4 ha in extent and is contained within the EVRAZ Highveld Steel and Vanadium (Highveld) property[3]. The site is accessible directly off the R104, from the N4 turnoff near Kwa-Guqa informal settlement.

This EIA Report consists of the following chapters:

- **Chapter 1** provides background to the proposed project and the environmental impact assessment process.
- **Chapter 2** provides a description of the Zero Waste Recovery Solution Project and technology, including feasible alternatives identified and considered for the project.
- **Chapter 3** outlines the strategic legal context for waste planning in South Africa, as well an overview of the policy and legislative context within which the Zero Waste Recovery Solution Project is proposed.
- **Chapter 4** describes the need and desirability of the project.
- **Chapter 5** outlines the process which was followed during the EIA Phase of the EIA Process.
- **Chapter 6** describes the existing biophysical and socio-economic environment affected by the proposed project.
- **Chapter 7** provides a description and assessment of the potential issues and impacts associated with the proposed project, including potential cumulative impacts.
- **Chapter 8** presents the conclusions of the EIA Report.
- **Chapter 9** provides a list of all references used in the compilation of the EIA Report

[3] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

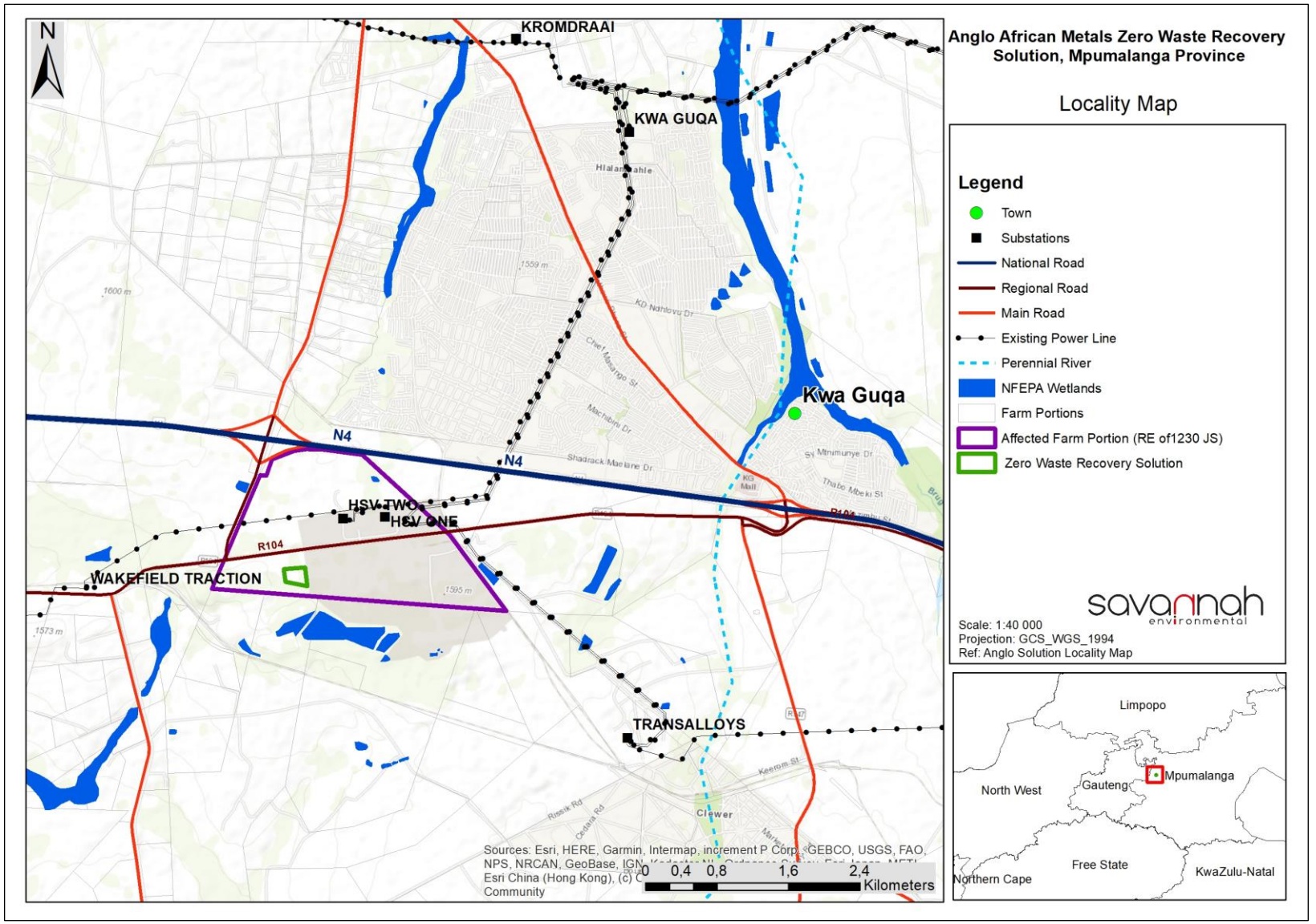

Figure 1.1: Locality map showing the area proposed for establishment of the Anglo African Metals Zero Waste Recovery Solution (Appendix G)

1.1 Legal Requirements as per the EIA Regulations for the undertaking of an Environmental Impact Assessment Report, 2014 (as amended)

This EIA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (and amended on 07 April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(a) details of (i) the EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae	The details of the EAP and the expertise of the EAP have been included in **Section 1.5.1** and **Appendix A**.
(b) the location of the activity, including (i) the 21digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	The location of the project site proposed for the development of the Zero Waste Recovery Solution is included as **Figure 1.1** and in **Appendix G**. The details of the affected property including the property name and number, as well as the SG-codes are included in **Table 1.1**.
(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	The locality of the project site is illustrated on a locality map included as **Figure 1.1** and in **Appendix G**. The corner point co-ordinates of the project site are included in **Appendix G**.

1.2 Project Overview

Anglo African Metals has identified a suitable tailings/slag resource which can be processed using their developed technology at Highveld Steel located between Balmoral and eMalahleni in Mpumalanga. A site for a small-scale industrial plant has been identified within the Highveld Steel property in close proximity to the slag stockpile.

Table 1.1 provides a summary of the affected property associated with the proposed Anglo African Metals Zero Waste Recovery Solution. A comprehensive description of the key infrastructure components associated with the development of the Anglo African Metals Zero Waste Recovery Solution, as well as an overview of the processing technology is provided in **Chapter 2** of this EIA Report.

Table 1.1: Summary of the preferred project site identified for the development of the Anglo African Metals Zero Waste Recovery Solution

Province	**Mpumalanga**
District Municipality	Nkangala District Municipality
Local Municipality	eMalahleni Local Municipality
Ward number(s)	22
Nearest town(s)	Approximately 17km west of eMalahleni town, near Kwa-Guqa informal settlement
Farm name(s) and number(s)	Portion 48 of the Farm Elandsfontein 309JS (T0JS0000000030900048)

	(to be referred to as the Remaining Extent of the Farm Highveld Industrial Part No. 1230 JS (T0JS00000000123000000) upon finalisation of the subdivision and consolidation process).
Current zoning	Industrial Use
Current land use	General Industrial

1.3 Requirement for an Environmental Impact Assessment Process

The Anglo African Metals Zero Waste Recovery Solution triggers the need for the following environmental permits:

- **Environmental Authorisation (EA)** from the National Department of Forestry, Fisheries and the Environment (DFFE), in consultation with the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs, in accordance with the requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations (GNR 326).
- A **Waste Management License (WML)**, from the DFFE for the recovery of waste, as is proposed as part of the Zero Waste Recovery Solution, as well as the construction of the infrastructure for this purpose trigger such activities, in accordance with the National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA), and the List of Waste Management Activities (GNR 921).
- An **Atmospheric Emission License (AEL)**, from the Nkangala District Municipality, in accordance with the National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA), and List of Activities resulting in Atmospheric Emissions published in GNR 893.

Anglo African Metals appointed Savannah Environmental as the independent environmental consulting company to undertake the Scoping and EIA process in accordance with the NEMA and Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326) in support of an integrated application for Environmental Authorisation (EA) and a Waste Management License (WML). The S&EIA process will also support the future application for an Atmospheric Emission License (AEL).

1.4 Overview of the Environmental Impact Assessment Process

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be fore-warned of potential environmental issues, and allows for the resolution of issues reported on in the Scoping and EIA Reports as well as a dialogue with interested and affected parties (I&APs). Comprehensive, independent environmental specialist studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. The EIA process undertaken for the proposed Anglo African Metals Zero Waste Recovery Solution comprised two phases – i.e. Scoping and EIA Phase - and involved the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in these two phases is as follows:

- The **Scoping Phase** included the identification and description of potential impacts associated with the proposed project through a desktop study and consultation with affected parties and key stakeholders. This phase considered the broader project area in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. Following the public review period of the Scoping Report, this

phase culminated in the submission of a Final Scoping Report and Plan of Study for EIA to the competent authority for acceptance and approval to continue with the EIA phase of the process. The Final Scoping Report and Plan of Study for the EIA for the Anglo African Metals Zero Waste Recovery Solution was submitted to the DFFE on **08 January 2021**, and acceptance was received on **18 February 2021,** therefore marking the start of the EIA Phase.

» The **EIA Phase** involved a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considered a proposed development footprint and included detailed specialist investigations (including field surveys), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following a review of the EIA report and EMPr by stakeholders, this phase culminates in the submission of a Final EIA Report (this report) and EMPr to the competent authority for review and decision-making.

1.5 Appointment of an Independent Environmental Assessment Practitioner (EAP)

In accordance with Regulation 12 of the 2014 EIA Regulations (GN R326), Anglo African Metals has appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent environmental consultant to undertake the Scoping and EIA process for the Anglo African Metals Zero Waste Recovery Solution and its associated infrastructure.

Neither Savannah Environmental nor any of its specialists are subsidiaries of/or are affiliated to Anglo African Metals (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed Anglo African Metals Zero Waste Recovery Solution.

1.5.1 Details and Expertise of the Environmental Assessment Practitioner (EAP)

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned) and is rated as a Level 2 Broad-Based Black Economic Empowerment (B-BBEE) Contributor. The company was established in 2006 with a clear objective to provide services to the infrastructure development sector. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of infrastructure development projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management and has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa.

The Savannah Environmental team comprises:

» **Mmakoena Mmola:** holds a BSc Honours in Geochemistry from the University of the Witwatersrand and is currently completing a BSc Honours in Environmental Management with the University of South Africa. She has 3.5 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, environmental permitting and authorisations, compliance auditing, public participation and environmental management programmes. She is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748.

» **Gideon Raath:** holds an MSc (Geography and Environmental Management; SU), a BSc Honours (Ecology and Environmental Studies - Cum laude; Wits) and a BSc (Geography and Environmental Management; UJ). His MSc thesis focused on the hydrological impact on the spatial distribution of invasive Eucalyptus trees along the Breede River; while his honours thesis evaluated ethnobotanical relationships around the Rio Tinto copper mine in Phalaborwa. Gideon's experience includes EIA permitting for ~72 different projects, ranging from infrastructure, mining, energy, housing, renewable energy and the conservation industries. These include Environmental Authorisations (BAR, S&EIR), Water Use Licencing, Waste Licencing, Environmental Compliance Officer compliance auditing, GIS studies and MPRDA permitting. He therefore has wide ranging experience in NEMA, NHRA, NEM:WA, NEM:BA, MPRDA and NWA regulations, having applied them for numerous private and public sector clients across various industries, for small, medium and large projects. Gideon is also an experienced Ecological & Wetland Specialist having conducted ~21 specialist studies, accredited with SACNASP as a professional natural scientist (Pr.Sci.Nat) since 2017. Gideon also has experience beyond the permitting sphere through numerous screening assessments for potential developers, including fatal flaw screenings, regulatory and permitting approval screening as well as ecological and hydrological sensitivity screening. Gideon has also served in an advisory role for various infrastructure and mining projects, assisting with environmental due diligence, bankable feasibility study input and assistance towards financial close.

» **Jo-Anne Thomas:** holds a Master of Science Degree in Botany (M.S.c Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with SACNASP and a registered Environmental Assessment Practitioner (EAP) with EAPASA (2019/726). She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs and is also well versed in the management and leadership of teams of specialist consultants, and dynamic stakeholders. She has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPrs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

» **Nicolene Venter.** She is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of

public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

Curricula Vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided in **Appendix A**.

1.5.2 Details of the Independent Specialist Team

A number of independent specialist consultants have been appointed as part of the EIA project team in order to adequately identify and assess potential impacts associated with the project (refer to **Table 1.2**). The specialist consultants have provided input into this EIA Report as well as the EMPr (refer to **Appendix D - F**).

Table 1.2: Specialist Consultants which form part of the EIA project team

Specialist Study	Specialist Company	Specialist Name
Heritage (including Archaeology & Palaeontology)	PGS Heritage	Wouter Fourie
Air Quality	AirShed Planning Professionals	Nick Grobler
Socio-economic	Urban Econ Development Economists	Elena Broughton

CVs detailing the independent specialist consultants, including details of their expertise and relevant experience are included in the respective specialist reports (refer to **Appendix D – F** this EIA Report).

CHAPTER 2 PROJECT DESCRIPTION

This chapter provides an overview of the project and technology proposed by Anglo African Metals, as well as a description of alternatives considered for the project. It should be noted that the project description presented in this Chapter is subject to change to some extent based on the final design prior to implementation and other technical studies, the findings and recommendations of the EIA and supporting specialist studies; as well as licencing, permitting and legislative requirements.

2.1 Legal Requirements as per the EIA Regulations for the undertaking of an EIA Report, 2014 (as amended)

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
3(d) a description of the scope of the proposed activity, including (ii) a description of the associated structures and infrastructure related to the development.	A description of the activities to be undertaken with the development of the proposed project is included in **Section 2.2**.
3(g) a motivation for the preferred site.	The alternatives considered for the Anglo African Metals Zero Waste Recovery Solution included in **Section 2.4**.
3(h)(i) details of the alternatives considered.	
3(h)(ix) if no alternatives, including alternative locations for the activity were investigation, the motivation for not considering such.	

2.2 Description of the Proposed Project

Anglo African Metals has identified a suitable tailings/slag resource which can be processed using their developed technology at Highveld Steel located between Balmoral and eMalahleni in Mpumalanga Province. The waste recovery plant is proposed to be located on Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process), approximately 17km west of eMalahleni town in the eMalahleni Local Municipality (LM) within the Nkangala District Municipality (DM) in the Mpumalanga Province. The development area is approximately 4 ha in extent and is contained within the EVRAZ Highveld Steel and Vanadium property[4]. The site is accessible directly off the R104, from the N4 turnoff near Kwa-Guqa informal settlement.

The main infrastructure associated with the facility includes the following:

- Chemical plant area, where all process chemicals including acid are produced, stored and handled as required by the waste recovery process.
- Substation and plant utility unit as interface and controlling unit for the electricity utilised by the plant during operation.
- Slag stockpile.
- Crushing plant.

[4] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

- Mill.
- Product area for storage of the various products produced through the recovery process.
- Reagent area, for the storage and handling of reactants utilised in the waste recovery process.
- Fuel storage area with a fuel storage tank (or tanks, as required) of up to 70m^3 for the bulk storage of gas (LPG or similar) utilised in the waste recovery process.
- A security area.
- Parking lot.
- Admin and control room including offices and ablutions for staff.

A summary of the planned infrastructure proposed as part of the Anglo African Metals Zero Waste Recovery Solution (including the infrastructure dimensions) is provided in **Table 2.1** (refer to **Figure 2.1** for an indicative layout[5]):

Table 2.1: Planned infrastructure for the proposed Anglo African Metals Zero Waste Recovery Solution

Infrastructure	Dimensions/Details

Extent of the project development footprint	- Approximately 4ha – includes the following:
	  - Internal roads
	  - Air and gas pipelines
	  - Control and electrical buildings (including a central control room)
	  - Administrative buildings
	  - Firefighting systems
	  - Bulk water storage
	  - Storage facilities for fuels, gas and chemicals
	  - Emergency back-up generators
	  - Effluent reticulation systems

Chemical plant	- To be utilised for the production, storage and handling of process chemicals required by the waste recovery process.
	- Process chemicals to be stored include:
	  - Coal stored in bin of up to 3 m^3
	  - Sodium carbonate stored in bin of up to 4 m^3
	  - Ammonium sulphate stored in bin of up to 4 m^3
	  - Sulphuric acid in 2 tanks of up to 30 m^3 (60 m^3)
	  - Lime is slurried in a tank of up 6 m^3
	  - Sodium hydroxide into solution stored in tank of up to 20 m^3
	  - A fuel storage tank (or multiple tanks, as required) of up to 70 m^3 for the bulk storage of gas (LPG or similar type) utilised in the waste recovery process
	All storage areas will be bunded.

Proposed technology	- Pyrometallurgical and hydrometallurgical patented extraction process for high-purity Titanium Dioxide production as well as Vanadium, Aluminium and Magnesium
Processing capacity	2 000 tons of tailings/slag per month, 3 tons per hours, 72 tons per day x 28 days x 12 months
Stack dimensions (Site elevation: 155 m above mean sea)	- Stack 1: 20 m above ground - Stack 2: 13 m above ground
Substation and plant utility unit	- Interface and controlling unit for the electricity utilised by the plant during operation. - Control Room: Length: 12m, Width: 3m, Height: 2.6m, Area: 36m^2

[5] Note that this layout is indicative at this stage and is subject to change following final design

<table>
<tr><th>Infrastructure</th><th>Dimensions/Details</th></tr>
<tr><td></td><td>» Server Room: Length: 6m, Width: 2.4m, Height: 2.5m, Area: 14.4m^2
» Substation: Length: 12m, Width: 3m, Height: 2.6m, Area: 36m^2</td></tr>
<tr><td>Crushing plant</td><td>» Operating hours are split into two categories, namely milling and hydrometallurgy, as indicated below:
<table>
<tr><th>Operating Hours (milling/crushing)</th><th>(h/d)</th><th>9</th></tr>
<tr><td>Operating Hours (hydrometallurgy)</td><td>(h/d)</td><td>24</td></tr>
</table></td></tr>
<tr><td>Mill</td><td>The mill will be housed in the main facility building and will operate 9 hours per day.</td></tr>
<tr><td>Product area</td><td>» To be utilised for the storage of the various products produced through the recovery process.
» Approximately 36m^2</td></tr>
<tr><td>Reagent area</td><td>» To be utilised for the storage and handling of reactants utilised in the water recovery process.
» Approximately 96m^2</td></tr>
<tr><td>Security area</td><td>Approximately 14.4m^2</td></tr>
<tr><td>Admin and control room, including offices and ablutions for staff.</td><td>Estimated surface area: 187.2m^2</td></tr>
<tr><td>Supporting Infrastructure</td><td>» Internal water, air and gas pipelines
» Control and electrical buildings, including a central control room
» Administrative buildings
» Firefighting systems
» Bulk water storage
» Emergency back-up generators
» Effluent reticulation systems - i.e. 1) sanitary wastewater system 2) storm water and rainwater collection system</td></tr>
<tr><td>Access road</td><td>» Main access to the project site will be via the existing access from the R104 to Highveld Steel</td></tr>
<tr><td>Raw/Process-Water Storage Reservoir</td><td>» Process water stored on site in a tank of 20 000 m^3. Process water will be recycled, and no process water effluent will be discharged
» Potable water is to be stored in 2 tanks of 5 m^3 each, one at ablution block and one at the admin offices
» Water for fire-fighting purposes will be located on site in a 20 000 m^3 tanks</td></tr>
<tr><td>Services required</td><td>» Services agreements for refuse disposal, water, and electricity have been entered into with Highveld Steel in terms of the lease agreement
» Sanitation waste generated in septic tanks system will be emptied as required by a licensed service provider for disposal</td></tr>
</table>

Figure 2.1: Proposed layout of the plant

The plant will be developed to process 2000 tonnes of tailings/slag per month, approximately 3 tons per hour, 72 tons per day x 28 days x 12 months, and will be primarily fuelled by LPG and Sasol gas brought into site by dedicated transport truck deliveries.

Operation of the plant is anticipated for 24 hours per day, 365 per year (i.e. non-stop operation) and will utilise the slag produced by the Highveld Steel operations. Operating hours are split into two categories, namely, milling and hydrometallurgy, as indicated below:

Operating Hours (milling)	(h/d)	9
Operating Hours (hydrometallurgy)	(h/d)	24

Table 2.2 provides details of the proposed project.

Table 2.1: Details of the proposed Anglo African Metals Zero Waste Recovery Solution, near Kwa-Guqa

Location of the site	Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Part No. 1230 JS upon finalisation of the subdivision and consolidation process)

Landowner	EVRAZ Highveld Steel and Vanadium[6]
Municipal Jurisdiction	Nkangala District Municipality and eMalahleni Local Municipality
Extent of preferred project site	Approximately 350 ha
Extent of the project development footprint	Approximately 4 ha
Coordinates of the development footprint	The following development footprint coordinates are proposed:

Latitude	Longitude
25°52'58.26"S	29° 4'47.58"E
25°52'56.83"S	29° 4'55.73"E
25°53'2.34"S	29° 4'57.16"E
25°53'3.63"S	29° 4'48.86"E

2.3 Overview of the Technology

The technology developed by Anglo African Metals includes the following approximate process[7]:

- Crushing and milling of titanium dioxide (TiO_2) slag to the appropriate size for further treatment.
- Magnetic separation of entrained metallic iron from the crushed slag, which is used to separate ferroalloy production process.
- Alkali roasting of the remaining feedstock using a gas fired kiln. Off-gases from the kiln is a combination of mainly carbon monoxide (CO), and carbon dioxide and, a very small concentration of sulphur dioxide. These off gases are passed through the off-gas scrubber to remove SO_2 and the remaining CO_2 and CO is reused in the kiln to supply part of the required heat.
- The material produced during alkali roasting from the kiln is then leached in water to dissolve vanadium and alumina.
- A further process produces vanadium pentoxide and recovers aluminium oxide from the leached products in the steps above.
- The remaining solid or residue after extracting vanadium is treated via leaching and curing sulphuric acid. The SO_2 gases or fumes given out during leaching or roasting are scrubbed off.
- Iron, magnesium and TiO_2 are recovered from solution via precipitation steps.
- Precipitated TiO_2 is heated to remove water.
- The leach solution is neutralised with lime to form calcium sulphate and respective sulphates. The mixture of sulphates is heated in the furnace to produce sulphuric acid which is then used in the leaching step. The solid material after heating in the furnace is mainly calcium silicate which is used for cement production and construction.
- The remaining material after leaching of titanium, magnesium, aluminium oxide etc. is mainly silica sand which is also used for construction. Metals may also be produced from the precipitation processes above, intended for third party resale.

This process therefore recovers vanadium and titanium oxide from slag materials, with water, carbon monoxide and carbon dioxide, gypsum, various metals and synthetic rutile produced at the various stages. These materials are all useful in other processes and are planned to be collected and sold to third parties.

[6] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

[7] Note that due to intellectual property and commercial sensitivity of this process, only a high-level summary is provided providing an understanding of the main components of the process

The process itself therefore results in no further waste production, while simultaneously utilising a common waste type – i.e. slag.

2.4 Alternatives Considered during the EIA Process

In accordance with the requirements of Appendix 3 of the 2014 EIA Regulations (GNR 326), an EIA Report must contain a consideration of alternatives including site (i.e. development footprint), activity, technology and site access alternatives, as well as the "do-nothing" alternative. Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors.

The DEA Guideline for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be "practicable", "feasible", "relevant", "reasonable" and "viable". Essentially there are two types of alternatives:

» Incrementally different (modifications) alternatives to the project.
» Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to the Anglo African Metals Zero Waste Recovery Solution.

2.4.1 Consideration of Fundamentally Different Alternatives

Fundamentally, different alternatives are usually assessed at a strategic level and, as a result, project-specific EIAs are therefore limited in scope and ability to address fundamentally different alternatives. Therefore, fundamentally different alternatives to the proposed project are not considered within this EIA process.

2.4.2 Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

» The property on which, or location where the activity is proposed to be undertaken.
» The type of activity to be undertaken.
» The design or layout of the activity.
» The technology to be used in the activity.

In addition, the option of not implementing the activity (i.e. the "do-nothing" alternative) must also be considered.

These alternatives are discussed under the respective subheadings below.

2.4.2.1 Location Alternatives

The project proponent has identified the preferred site within the Highveld Steel Industrial Park due to:

» it being located in a large existing industrialised area surrounded by several heavy industries and mining operations. It is a brownfields site that has already undergone extensive transformation.

- feedstock (i.e. slag materials) for the recovery process is readily available from from the slag resource located next to the preferred site limiting material transport cost and implications.
- utility services for potable water, electricity, and refuse removal is provided by Highveld Steel.
- a railway siding is located adjacent to the project site which may be beneficial for transporting products and materials from the facility in future.

Based on these considerations, the proposed site is highly preferred and therefore no feasible alternative sites have been identified for assessment within this EIA Report.

2.4.2.2 Design and Layout Alternatives

The proposed project infrastructure will have a development footprint of approximately 4 ha, to be located within the greater Highveld Steel property of approximately 350 ha. The design and layout thereof are determined by the footprint of the existing infrastructure and slag resource situated on the property, as well as the specific requirements of Highveld Steel, the landowner. No feasible design or layout alternatives were identified for the proposed project.

2.4.2.3 Activity Alternatives

No activity alternatives are associated with the development of the proposed project due to the specific requirements for the zero-waste recovery solution facility.

2.4.2.4 Technology Alternatives

No technology alternatives for similar zero waste recovery solutions as proposed by the project proponent exist. Although, other methods of recovery from titanium-bearing minerals are practiced, they are either not suitable for treating titanium dioxide (TiO_2) slag or are not capable of recovering both titanium and vanadium oxides. Also, the project proponent has developed a proprietary process to extract titanium from steel slag and refine titanium and other industrial minerals and chemicals with a lower carbon footprint than existing processes, which they intend to implement for this proposed project. As such, the selected technology is regarded the most suitable and appropriate for this development type, and no technology alternatives are assessed for the project as part of this EIA process.

2.4.2.5 The "Do-Nothing" Alternative

The 'do-nothing' alternative is the option of the project proponent not constructing the proposed facility. This would result in no environmental or social impacts (positive or negative) as a result of the development of the proposed project. However, the benefits associated with the processing and recovery of various products from the slag resource would also be foregone. This alternative has been assessed as part of the assessment of the project within **Chapter 7** of this EIA Report).

CHAPTER 3 STRATEGIC CONTEXT AND POLICY

This Chapter provides an overview of the policy and legislative context within which the development of a waste recovery plant such as that being considered in this report is proposed. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project.

3.1 Legal Requirements as per the EIA Regulations for the undertaking of an EIA Report, 2014 (as amended)

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.	The policy and legislative context for the development of the Anglo African Metals Zero Waste Recovery Solution and associated infrastructure has been considered throughout this chapter on a national, provincial and local level.

3.2 National policies and strategic documents

The following national policies are considered to be relevant to the development of the Anglo African Metals Zero Waste Recovery Solution.

3.2.1 National Environmental Management: Waste Act (Act 59 of 2008)

The National Environmental Management: Waste Act (Act 59 of 2008) (NEM: WA) is the primary piece of legislation which regulates waste management in South Africa.

The main objectives of the NEM: WA are as follows:

- Promote an integrated approach in dealing with waste which focuses on prevention, minimization and responsible disposal of waste.
- Ensure that waste is properly managed in order to minimise its potential to cause damage to the socio-economic and bio-physical environments.
- To build capacity and assist the South African industrial sector to properly manage waste by requiring provinces and municipalities to develop integrated waste management plans that are co-ordinated and aligned with the relevant integrated development plans and other plans and programmes of provincial and national government.
- To provide guidance to regulatory authorities.
- To assist the industrial sector in moving to improved waste management practices.
- To provide for industry waste management plans at a national level for industries that cross provincial boundaries as well as at a provincial level for industry specific to a particular province.
- To ensure that a National Waste Management Strategy is established within two years of the Act coming into effect, in order to realize the Republic's obligations in terms of relevant international agreements.

» To ensure alignment of provincial and national waste management standards.
» To promote the principles of reduce, re-use, recover, recycle.
» To ensure responsible waste disposal.
» To prevent pollution and ecological degradation.

The objectives of the NEM: WA promote the principles of the waste hierarchy, which is an international and best practice waste management approach that informs waste management in South Africa. The waste management hierarchy consists of options for waste management during the lifecycle of waste, arranged in descending order of priority. All stakeholders must apply the waste management hierarchy in making decisions on how to manage waste (**Figure 3.1**).

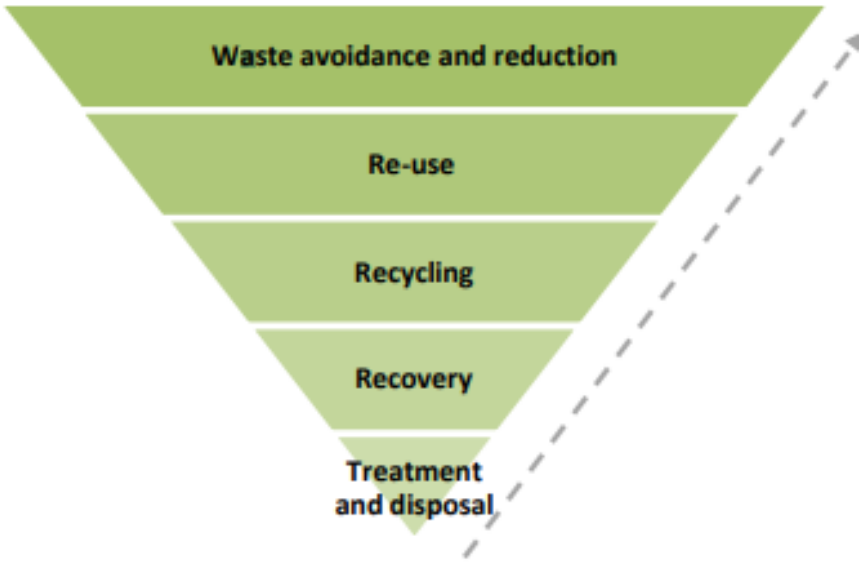

Figure 3.1: Waste Management Hierarchy (source: NWMS, 2018)

Since the promulgation of the NEM: WA, several regulations and standards regarding waste management have been developed to improve the waste management legal framework and governance. The pertinent regulations are listed below:

» List of Waste Management Activities that have or are likely to have a Detrimental Effect on the Environment (GN. R 921 of 2013).
» National Norms and Standards for the Storage of Waste (GN 926 of 2013).
» National Norms and Standards for Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste (GN 1093 of 2017).

3.2.2 National Waste Management Strategy (NWMS, 2018)

The National Waste Management Strategy (NWMS) is a legislative requirement of the NEM: WA. The overall purpose of the NWMS is to give effect to the objectives of the NEM:WA. The NWMS provides a plan to give practical effect to the NEM:WA, and as such it seeks to ensure that the responsibility for waste management is properly allocated.

The 8 strategic goals of the NWMS are as follows:

Goal 1: Promote waste minimisation, re-use, recycling and recovery of waste.

Goal 2: Ensure the effective and efficient delivery of waste services.
Goal 3: Grow the contribution of the waste sector to the green economy.
Goal 4: Ensure that people are aware of the impact of waste on their health, wellbeing and the environment.
Goal 5: Achieve integrated waste management planning.
Goal 6: Ensure sound budgeting and financial management for waste services.
Goal 7: Provide measures to remediate contaminated land.
Goal 8: Establish effective compliance with and enforcement of the Waste Act.

3.2.3 The White Paper on Integrated Pollution and Waste Management for South Africa, 2000

The White Paper places emphasis on preventative strategies which aims to minimise waste and prevent pollution. The White Paper recognises the crucial role which the private sector and civil society plays along with the government to ensure sustainable and effective pollution and waste management in South Africa. One of the fundamental approaches of this policy is to prevent pollution, minimise waste, and to control and remediate impacts. According to the White Paper, management of waste will be implemented in a holistic and integrated manner, and will extend over the entire waste cycle, from "cradle to grave", including the generation, storage, collection, transportation, treatment, and final disposal of waste.

Through the implementation of the White Paper, the government aims to:

» Encourage the prevention and minimisation of waste generation and thus pollution at source.
» Encourage the management and minimisation of the impact of unavoidable waste from its generation to its final disposal.
» Ensure the integrity and sustained "fitness for use" of all environmental media , i.e. air, water and land.
» Ensure that any pollution of the environment is remediated by holding the responsible parties accountable.
» Ensure environmental justice by integrating environmental considerations with the social, political and development needs and rights of all sectors, communities and individuals.
» Prosecute non-compliance with authorisations and legislation.

3.2.4 New Growth Path Framework, 2010

The New Growth Path Framework (NGPF) (2011) was developed to ensure that economic policy in South Africa reflects the importance of job creation to address the key issues the country faces, such as joblessness, poverty and inequality. The aim of the NGPF is to restructure the economy of South Africa to improve its performance not only in composition and growth rates, but also in terms of labour absorption.

One of the identified means of achieving this objective is through the increase in local processing of South Africa's natural resources. As one of the key sectors in which employment is created, the manufacturing sector has been targeted to create 350 000 jobs by 2020 by the NGPF. The NGPF therefore supports and promotes the investment into the mineral beneficiation and manufacturing sectors to encourage activities that may lead to large-scale employment generation. The NGPF further emphasises the importance of job creation in the green economy.
The Anglo African Metals Zero Waste Recovery Solution will provide employment opportunities which could assist in addressing poverty issues.

3.2.5 National Development Plan (NDP), 2030

Informed by the objectives outlined by the NGPF, the National Development Plan (NDP) 2030 aims to eliminate poverty and reduce inequality by 2030 through the identification of different sectors that play a pivotal role in its effective implementation. The manufacturing sector has been identified as one of the key sectors in which job creation may be promoted and the NDP encourages the development of local manufacturing.

The importance of stimulating business activity, such as labour-intensive manufacturing, close to dense townships has been highlighted in the NDP to encourage job creation in areas in which unemployment is prevalent. Another goal outlined in the NDP is South Africa's transition to an environmentally sustainable, climate-change resilient, low carbon-economy, which is envisaged through a zero-waste society. The NDP highlights the importance of recognising major opportunities in the manufacturing sector, such as waste reutilisation, and aims to promote the technical capacity of clean technologies that may provide the country with growth opportunities in the carbon-constrained global economy. The NDP emphasises the need for industrial manufacturing to move towards greener industries over time.

The Anglo African Metals Zero Waste Recovery Solution will provide employment opportunities which could assist in addressing poverty issues.

3.2.6 Beneficiation Strategy for the Minerals Industry of South Africa (2011)

The development of the Beneficiation Strategy for the Minerals Industry of South Africa (2011) was informed by the NGPF's identification of mineral beneficiation being one of the priority areas in which employment opportunities may be created. The Beneficiation Strategy aims to create a competitive advantage in the mineral sector on the basis of the existing comparative advantage associated with the mineral resource endowments in the country. The Beneficiation Strategy aligns itself with other national industrialisation programmes that aim to improve the quantity and quality of exports, promote the creation of decent employment and diversify the economy.

Given the low levels of mineral beneficiation in the country, the aim of the Beneficiation Strategy is to place focus on developing mineral value chains in South Africa to facilitate the expansion of beneficiation initiatives in the country. Although the country has seen some expansion in value-addition facilities such as manufacturing and mineral processing, the Strategy seeks to further increase South Africa's capacity to export goods that are not only ores or semi-processed goods.

The Anglo African Metals Zero Waste Recovery Solution will assist in meeting the objectives of this strategy through provision of in value-addition facilities for mineral beneficiation in the country.

3.2.7 Industrial Policy Action Plan (IPAP) 2018/19-2020/21

The Industrial Policy Action Plan (IPAP) 2018/19-2020/21 is guided by government's overall policy objectives to promote economic and industrial growth and address the key challenges identified therein, such as poverty, inequality and unemployment. The objective of the IPAP is to promote long-term industrialisation and industrial diversification in South Africa in the midst of a global deindustrialisation. The IPAP therefore aims to reindustrialise the South African economy to double exports through a number of interventions to support transformation within the industry. This radical economic transformation is guided by its objective of creating sustainable jobs, particularly for the marginalised and most vulnerable in society.

The manufacturing sector has been identified as a priority area to lead the way for IPAP's objectives. Furthermore, greater waste management has been pinpointed to be vital in the meeting of these objectives and the IPAP promotes the recycling of manufacturing by-products to meet South Africa's objective of becoming a zero-waste society.

3.2.8 Operation Phakisa

Operation Phakisa is an initiative of the South African government. This initiative was designed to fast track the implementation of solutions on critical development issues. This is a unique initiative to address issues highlighted in the National Development Plan (NDP) 2030 such as poverty, unemployment and inequality. Through Operation Phakisa, Government aims to implement priority programmes better, faster and more effectively.

The Chemical and Waste Economy is one of Operation Phakisa's seven labs. The overall goal in this regard is "*how can the contribution of the chemicals and waste economy be increased to reach the MTSF and NDP targets on GDP and job creation, while reducing the negative environmental and health impact of chemicals and waste*".

Slag (beneficiation opportunity) is identified as one of the waste areas identified for prioritisation.

3.2.9 Highveld Priority Area Air Quality Management Plan

The Highveld area in South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occur due to the concentration of industrial and non-industrial sources. The Highveld Priority Area (HPA) was declared in terms of Section 18 of the National Environmental Management: Air Quality Act 39 of 2004 by the then Minister of Environmental Affairs in terms of Government Notice No1123 dated 13 November 2007.

The priority area covers 31 106 km^2 (refer **Figure 3.2**), including parts of Gauteng and Mpumalanga Provinces, with a single metropolitan municipality, three district municipalities, and nine local municipalities, as follows:

- Ekurhuleni Metro, Lesedi LM (Sedibeng DM) in Gauteng Province.
- Govan Mbeki LM, Dipaleseng LM, Lekwa LM, Msukalekwa LM and Pixly ka Seme LM in Gert Sibande DM in Mpumalanga Province.
- Victor Khanye LM, Emalahleni LM & Steve Tshwete LM in Nkangala DM in Mpumalanga Province.

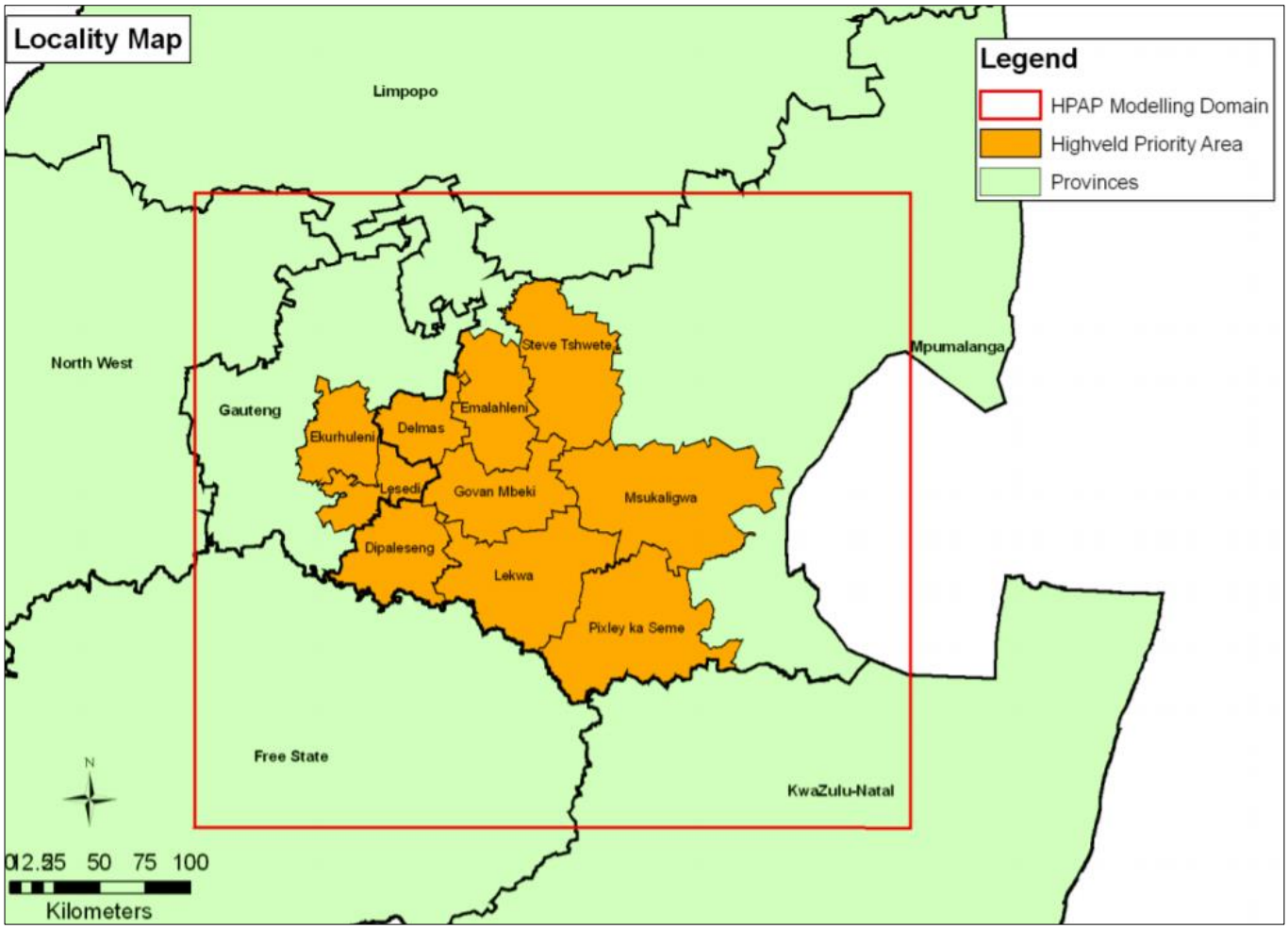

Figure 3.2: Map of the Highveld Priority Area Source

As the area overlaps provincial boundaries, the Department of Environmental Affairs (DEA) functions as the lead agent in the management of the priority area and is required in terms of Section 19(1) of the National Environmental Management: Air Quality Act (Act 39 of 2004) (AQA) to develop an Air Quality Management Plan (AQMP) for the priority area.

The baseline assessment for the HPA provides a succinct presentation of the major issues to be addressed, specifically highlighting the geographical areas of concern within the HPA where dedicated Air Quality Management (AQM) interventions are to be focused. The HPA Air Quality Management plan (AQMP) was developed and gazetted on 02 March 2012 in GNR144. The primary motivation of the priority area AQMP is to achieve and maintain compliance with the ambient air quality standards across the HPA, using the Constitutional principle of progressive realisation of air quality improvements. The AQMP for the HPA provides the framework for implementing departments and industry to include AQM in business planning to ensure effective implementation and monitoring.

The plan has been designed at a strategic level, indicating high-level tasks for responsible parties. The specific planning at an operational level, such as budgeting, human resource allocation, and detailed activity planning, has been excluded from the plan. This is to allow parties to tailor their implementation activities to their specific context, particularly organisational constraints, while still achieving the overall objective of the AQMP. The activities listed in the plan must be unpacked further by responsible parties into organisation-specific activity and intervention plans, and captured in the policy and strategic documents,

such as business and investment plans, Integrated Development Plans (IDPs), and Environmental Implementation Plans (EIPs).
Included in this management plan are seven goals, each of which has a further list of objectives that have to be met. The goals for the Highveld Priority area are as follows:

» Goal 1: By 2015, organisational capacity in government is optimised to efficiently and effectively maintain, monitor and enforce compliance with ambient air quality standards.
» Goal 2: By 2020, industrial emissions are equitably reduced to achieve compliance with ambient air quality standards and dust fallout limit values.
» Goal 3: By 2020, air quality in all low-income settlements is in full compliance with ambient air quality standards.
» Goal 4: By 2020, all vehicles comply with the requirements of the National Vehicle Emission Strategy.
» Goal 5: By 2020, a measurable increase in awareness and knowledge of air quality exists.
» Goal 6: By 2020, biomass burning and agricultural emissions will be 30% less than current.
» Goal 7: By 2020, emissions from waste management are 40% less than current.

Goal 2 applies directly to the project. The objectives associated with this goal (as well as the activities applicable to industries for each objective) include:

» Emissions are quantified from all sources;
    • Establish and maintain a site emissions inventory that includes all point and diffuse sources for all significant pollutants.
    • Submit emissions inventory report as per emission reporting regulations.
» Gaseous and particulate emissions are reduced;
    • Submit AIR report using a regulated modelling approach.
    • Develop and implement a maintenance plan for each plant.
    • Schedule and conduct repairs to coincide with plant offline times.
    • Incorporate equipment changes into the maintenance schedule.
    • Operate plants with minimum disruption e.g. back-up plan for energy consumption/generation.
» Fugitive emissions are minimised;
    • Develop fugitive emission management plan.
    • Implement appropriate interventions, e.g. a leak detection and repair program.
» Emissions from dust generating activities are reduced;
    • Develop and implement dust reduction programmes in line with industry best practice, considering technology and management interventions.
    • Investigate feasibility of using alternative means for haulage, e.g. conveyors, rail.
    • Plan and carry out regular fleet maintenance.
    • Investigate opportunities to market waste as raw material inputs to other industries.
» Greenhouse gas emissions are reduced;
    • Include greenhouse gas emissions in site emissions inventory.
    • Develop and implement a site energy efficiency plan.
    • Consider climate change implications in air quality management (AQM) decision making.
    • Investigate opportunities for co-generation.
    • Investigate feasibility of renewable energy
» Incidences of spontaneous combustion are reduced;
» Abatement technology is appropriate and operational;
    • Install and/or maintain appropriate air pollution abatement technology compliant with requirements of AEL and achieving Section 21 emission standards.

- Train operators to ensure optimal operation of abatement equipment.

» Industrial Air Quality Management (AQM) decision making is robust and well-informed, with necessary information available;
- Establish sector information sharing fora.
- Conduct international benchmarking within the sectors.
- Make sector emission performance information available for company benchmarking.

» Clean technologies and processes are implemented;
- Investigate feasibility of introducing clean technologies on plant-specific basis.
- Implement feasible technology options on plant-specific basis.
- Investigate possibility of switching to clean fuels at times of poor dispersion.
- Investigate alternative design and process options to improve plume dispersion.
- Implement feasible alternative design and process options.

» Adequate resources are available for AQM in industry;
- Revise organograms to create air quality structure and designation, where needed.
- Optimise environmental management resource availability to accommodate air quality function.
- Fill AQM posts with appropriately skilled staff, where needed.
- Input into financial planning to implement emission abatement and measurement requirements of AEL and Section 21 emission standards.
- Investigate the possible use of offset programs to reduce financial investments.

» Ambient air quality standard and dust fallout limit value exceedances as a result of industrial emissions are assessed; and,
- Conduct ambient air quality monitoring in accordance with AEL requirements.
- Conduct dust fallout monitoring in accordance with legislative requirements, and consider advances in monitoring technology.
- Report ambient monitoring results to relevant AQO and publish on SAAQIS.
- Update AIR submissions.

» A line of communication exists between industry and communities.
- Conduct quarterly consultative community meetings.

3.3 Provincial policies and strategic documents

Fostering economic growth that creates jobs and reduces poverty and inequality in the Mpumalanga province is the main goal of the Mpumalanga Economic Growth and Development Path (MEGDP) (2011). The Provincial Government of Mpumalanga has set to achieve the following between 2011 and 2021 (Mpumalanga Provincial Government, 2011):

» Reduce the unemployment rate from 28% in 2011 to 15% in 2021 through the creation of approximately 719 000 jobs
» Increase the income level of 620 000 individuals above the poverty line
» Increase the Human Development Index (HDI) from 0.50 by increasing literacy levels from 40 000 individuals per annum to 63 000 individuals per annum and life expectancies from 51 years to 62 years
» Reduce the Gini-coefficient from 0.65 to 0.55 by 2020
» Increase the economic growth rate to between 5 and 7 percent per annum to achieve the targets listed above.

The MEGDP outlines the importance of the manufacturing industries in the Mpumalanga Province as one of the largest contributors to the provincial economy and one of the biggest absorbers of employment

(Mpumalanga Provincial Government, 2011). The manufacturing sector is therefore considered critical to the economic growth and job creation objectives set out in the province. The Provincial Government of Mpumalanga has targeted the creation of 47 000 jobs in the manufacturing sector and intends to target sectors that ensure beneficiation, invest in industrial infrastructure to encourage enterprise development, and recruit technology and skills from outside the borders of Mpumalanga, amongst others.
In the MEGDP, the Mpumalanga Provincial Government also highlights the importance of its transition to a green economy and has placed its focus on developing a Clean and Green Development Strategy to fulfil Mpumalanga's contribution to transitioning South Africa to a low-carbon economy.

In 2016, Mpumalanga drafted a **Green Economy Sector Plan**, which identified four core implementation pillars. One of these pillars related to green towns and urban centres and focused on expansion of recycling activities and waste beneficiation. Although the proposed project is not directly linked to the priorities identified in the Draft Green Economy Plan, it does support the overall vision of transition towards a green economy.

A greater emphasis on the industrialisation activities is articulated in the **Mpumalanga Industrial Development Plan (2016)**, which sets "a clear commitment towards industrialisation by the Provincial Government, through enabling infrastructure development and resource allocation, among others". The plan proposes the establishment of the Mining and Metals Industrial Centre of Competence in the region of eMalahleni and Middleburg, where the proposed project is to be located. The Centre of Competence is envisaged to be situated in a technology park, which is likely to be situated outside the location of the proposed project. Nonetheless, these plans emphasise the concentration of mining and mineral activities, knowledge and technologies that the area, where the proposed project is located, currently possess. This suggests that the proposed development is generally in line with the provincial industrial vision for the area.

3.4 Local policies and strategic documents

3.4.1 Nkangala District Municipality

i) Integrated Development Plan

The developmental objectives set in the **Nkangala District Municipality Integrated Development Plan (NDMIDP) 2017/18-2021/22** include the alleviation of poverty, promotion of infrastructural development, and creation of employment opportunities by developing the physical, socio-economic and institutional environment in the district. As manufacturing is one of the sectors which dominates the economic base of the district, the NDMIDP targets further diversification of manufacturing activities as a key source of achieving the objectives of the NDMIDP.

The development plan specifically emphasises that industrial areas such as Columbus Steel in Steve Tshwete and Highveld Steel in eMalahleni should be maintained and enhanced through service maintenance and upgrading programmes. Furthermore, the NDMIDP recommends that developmental focus be placed on these areas, which already contain industrial infrastructure for future manufacturing and industrialisation. The NDMIDP also calls for development and mainstreaming of the green economy and as such, the development of green jobs.

ii) Air Quality Management Plan

Section 15(2) of the NEM:AQA requires each municipality to include an Air Quality Management Plan (AQMPs) in its Integrated Development Plan contemplated in Chapter 5 of the Municipal Systems Act (No. 32 of 2000). The NDM in partnership and consultation with DEA, DARDLEA and its Highveld Priority Area – Implementation Task Team (HPA-ITT) partners developed and adopted an Air Quality Management Plan (AQMP) in June 2015.
The main elements of the NDM AQMP includes:

- Local Government Capacity Goal: By 2017-18 NDM undertake organisational capacity review and developed Air Quality Management structures, have provided adequate budgets and human resources and a measurable increase in awareness and knowledge of air quality exists.
- Industrial Emission Reduction Goals that includes meeting Minimum Emission Standards, the emissions standards for controlled emitters, Ferroalloy sector , Clay Brick sector, Power generation sector, and any emissions standards.
- Household Fuel Combustion Emission Reduction Goal: By 2018 fuel usage by households have been quantified, local emission factors determined and impact to air quality assessed; undertaken of household emission reduction options and Health risk assessments conducted.
- Mining Emission Reduction Goal: By 2018 emissions from open cast and underground mining operations as well as underground fires and burning of discard coal have been quantified and impact to air quality assessed;.
- Transport Emission Reduction Goal: By 2017 all local authorities undertake vehicle emissions testing, developed public transport plans and integrate into IDPs Veld Burning Emission Reduction Goal: By 2018 veld burning emissions have been quantified spatially and temporally to allow impact to air quality assessed and veld burning emission reduction action plans developed.

3.4.2 eMalahleni Local Municipality

The **eMalahleni Local Municipality Integrated Development Plan (ELMIDP) 2017/18-2021/22** sets out to empower the communities within the municipality by facilitating an environment which fosters sustainable economic development and social transformation. The eMalahleni LM aims to provide spatial transformation and social cohesion, sustainable and affordable services, clean administration and good governance, financial viability and socio-economic growth and a safe environment.

The municipality has identified comparative advantages in the mining, manufacturing and utilities sectors, and has placed substantial focus on the development of projects and skills in these sectors. The ELMIDP also provides for the strong support of existing industrial and manufacturing activities and recommends that new industrial development be consolidated along the N4 and N12 Development Corridors, which is the area where the proposed project is to be developed.

The **eMalahleni Spatial Development Framework (SDF) (2015)** provides for further insight into the developmental and land zoning objectives for the area, where the proposed project is to be developed. As indicated in **Figure 3.3**, the SDF shows that the project is to be located within the area that is zoned for heavy industrial land use. Considering the nature of the project, its location is in direct alignment with the current spatial development vision for the area.

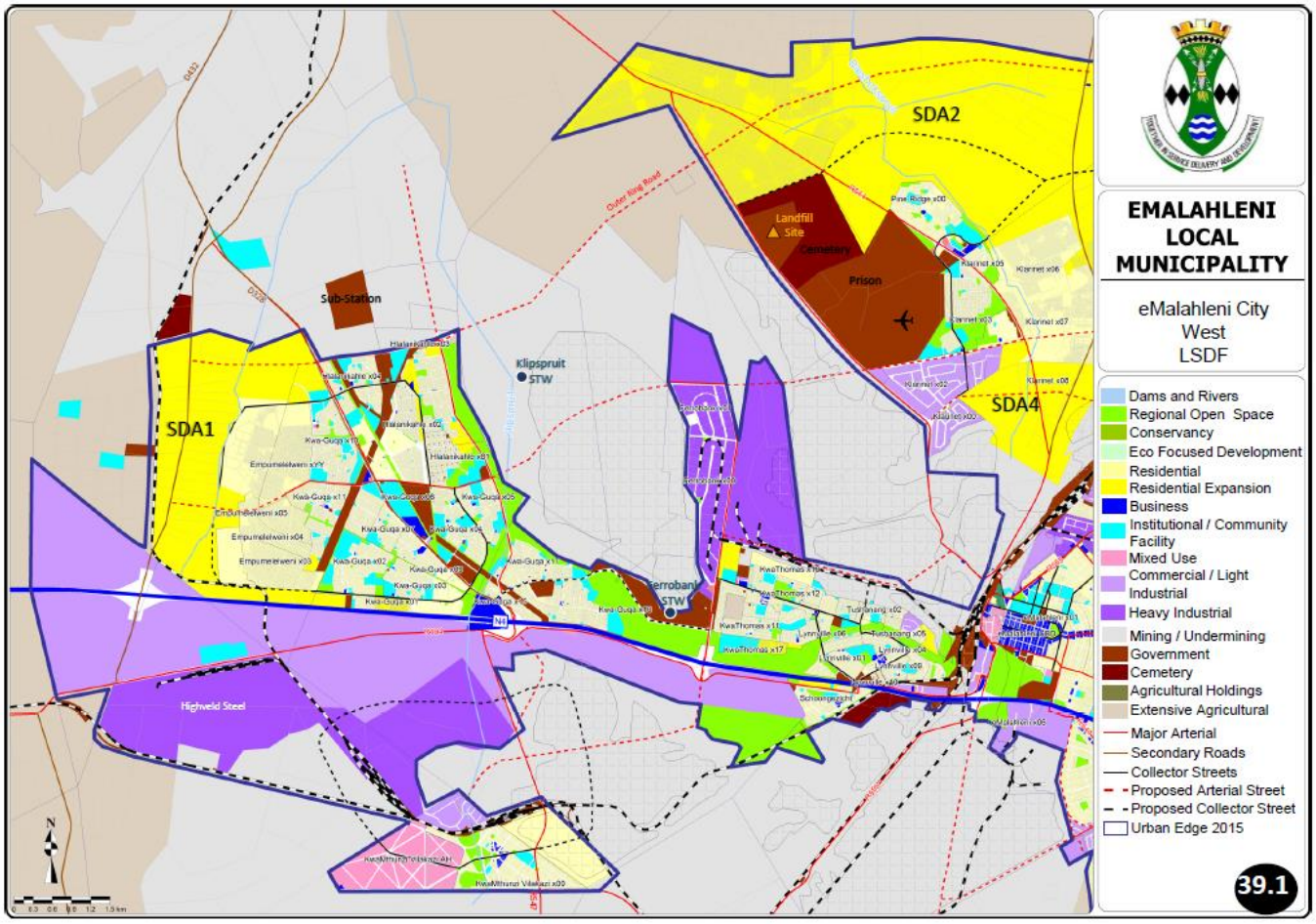

Figure 3.3: Local SDF (Emalahleni LM, 2015)

3.5 Conclusion

Overall, it can be concluded that the proposed project is in alignment with the local and provincial developmental policies and spatial frameworks. The project is also expected to make a contribution toward the achievement of the national developmental objectives related to industrialisation, mineral beneficiation and waste management.

CHAPTER 4 NEED AND DESIRABILITY

One of the objectives of the EIA process is to motivate for "*the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted Scoping Report*", as per Appendix 3 of the 2014 EIA Regulations, as amended. The need and desirability of a development needs to consider whether it is the right time and right place for locating the type of land-use / activity being proposed. Need and desirability is therefore equated to the wise use of land, and should be able to answer the question of what the most sustainable use of land is.

This Chapter provides an overview of the need and desirability of the Anglo African Metals Zero Waste Recovery Solution being developed at the preferred location from a national, regional and local perspective.

4.1 Legal Requirements as per the EIA Regulations for the undertaking of an EIA Report, 2014 (as amended)

This chapter of the Draft EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
3 (f) a motivation for the need and desirability of the proposed development, including the need and desirability of the activity in the context of the preferred location.	The need and desirability for the development of the proposed Anglo African Metals Zero Waste Recovery Solution is included in **Sections 4.2 and 4.3**.

4.2 Need and Desirability from a National and Regional Perspective

The presence of waste slag material and slag resources generated by the steel industry has various environmental impacts on water resources, soils, air quality and general aesthetic of an area. It is estimated that 52% of unclassified waste generated in South Africa during 2017 consisted of slag (DEA, 2018). Waste recovery from slag materials has however become an economically viable option for the re-use of by-products from the steel industry. The re-use options for recovered slag materials range from building and road construction, cement manufacturing, aggregates, and as liming agent in agricultural soils (IISI and UNEP, 1997).

As detailed in Chapter 3, Operation Phakisa is a national initiative designed to fast-track the implementation of solutions on critical development issues as highlighted in the National Development Plan (DEA, 2018). Slag waste and its associated beneficiation opportunities have been identified as a priority waste area in terms of Operation Phakisa.

The Anglo African Metals Zero Waste Recovery Solution aims to develop a saleable product (i.e. vanadium and titanium oxides) from a waste source (i.e. slag materials). The waste recovery solution process of the project will deliver maximum benefits from waste slag materials, which aids in the reduction of slag waste disposed of at slag waste disposal areas by Highveld Steel. This process contributes towards achieving the objectives of the NEM: WA and the NWMS through implementation of the waste management hierarchy by reducing waste material for disposal and recovering materials from waste. In addition, given that the

proposed project consists of a zero-waste recovery solution, no process waste will be generated which is also in line with the objectives of the NEM: WA and NWMS.

The overall manufacturing process of the proposed facility will be a first of its kind due to its ability to recover materials, specifically titanium, from low quality slag feedstock. Given that the state-of-the-art facility will be located in South Africa, great benefits can be obtained from the project through the utilisation of its environmentally and socially responsible technology.

4.2.1 Receptiveness of the proposed project site to development of the Zero Waste Recovery Solution Project

The project proponent has identified the preferred site within the Highveld Steel Industrial Park due to:

- It being located in a large existing industrialised area surrounded by several heavy industries and mining operations. It is a brownfields site that has already undergone extensive transformation.
- Feedstock (i.e. slag materials) for the recovery process is readily available from from the slag resource located next to the preferred site limiting material transport cost and implications.
- Utility services for potable water, electricity, and refuse removal is provided by Highveld Steel.
- A railway siding is located adjacent to the project site which may be beneficial for transporting products and materials from the facility in future.

Based on the consideration of various technical aspects explored in the sections below, the selected site was deemed suitable for the project.

Extent of the site: The zero-waste recovery plant and its associated infrastructure requires an area of land that is approximately 4 ha in extent. The affected property is approximately 350 ha, which is sufficient to accommodate the proposed project while still allowing for the avoidance of environmental sensitivities.

Site access: Access to the site is obtained via the existing access points at the Highveld Industrial Park entrance from the R104, from the N4 turnoff.

Current land use considerations: The property is located within the Highveld Industrial Park and is zoned for industrial use. The proposed development is therefore considered to be compatible with the surrounding land use.

Environmental sensitivity of the site: The site is located within an area which has already undergone extensive transformation and therefore no environmental sensitivities are anticipated to limit the development within the identified site.

Integrated Environmental management: The project within the proposed site complies with the objective of integrated environmental management and the principles of sustainable development taking into account economic, social and environmental factors.

CHAPTER 5 APPROACH TO UNDERTAKING THE EIA PROCESS

An Environmental Impact Assessment (EIA) process refers to that process (in line with the 2014 EIA Regulations, as amended (GNR 326)) which involves the identification of and assessment of direct, indirect, and cumulative, environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e. **Scoping** and the **EIA Phase**. The EIA process culminates in the preparation and submission of a Final EIA Report (including an EMPr) to the competent authority for decision-making.

The EIA process is illustrated below in **Figure 5.1.**

Figure 5.1: The Phases of an Environmental Impact Assessment (EIA) Process

The EIA Phase for the Zero Waste Recovery Solution Project was undertaken in accordance with Section 24 (5) of the National Environmental Management Act (No. 107 of 1998) (NEMA). In terms of the 2014 EIA Regulations (GNR 326) and Listing Notices 1 to 3 (GNR 327, 325 and 324), and the List of Waste Management Activities (GNR 982) published in terms of the National Environmental Management: Waste Act (No. 58 of 2002) (NEM:WA), a full Scoping and EIA (S&EIA) process is required to be undertaken in support of an application for Environmental Authorisation (EA) and Waste Management License (WML) for the project.

The EIA Phase aims to provide a detailed assessment of the potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This was achieved through undertaking detailed specialist investigations, as well as a consultation process with Interested and Affected Parties (I&APs), including the decision-making authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant organs of state departments, ward councillors and other key stakeholders. This chapter serves to outline the process which was followed during the EIA process.

5.1 Legal Requirements as per the EIA Regulations for the undertaking of an EIA Report, 2014 (as amended)

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
3 (d) a description of the scope of the proposed activity, including (i) all listed and specified activities triggered and (ii) a description of the associated structures and infrastructure related to the development.	All relevant listed activities triggered by the development of the Zero Waste Recovery Solution Project and a description of the activities which form part of the development have been included in **Section 5.2, Table 5.5**.1**and Table 5.5**.2**.**
3 (e) a description of the policy and legislative context within which the development is proposed and an explanation of how the proposed development complies with and responds to the legislation and policy context.	The specific environmental legislation and policies applicable to the development are considered in **Table 5.8.**
3 (h) a full description of the process followed to reach the proposed development footprint including (ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The details of the public participation process undertaken as part of the EIA process for the Zero Waste Recovery Solution Project has been described and is included in **Section 5.4** and copies of the supporting documents and inputs are included in **Appendix C**.
3 (h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	The main issues raised through the undertaking of the public participation process, including consultation with I&APs, are included in the Comments and Responses Report in **Appendix C8**.

5.2 Relevant legislative permitting requirements

5.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(5) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA.

The need to comply with the requirements of the EIA Regulations published under the NEMA ensures that proponents are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project and Application for Environmental Authorisation.

The EIA process being conducted for the Zero Waste Recovery Solution is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for Environmental Authorisation, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

In terms of the EIA Regulations, 2014, of GN R324, GN R325 and GN R327, the following 'listed activities' are triggered by the proposed facility:

Table 5.5.1: Listed activities identified in terms of the Listing Notices (GNR 327, GNR 325 and GNR 324) published under NEMA on 08 December 2014 (as amended in April 2017)

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) of April 2017	14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. ***Storage facilities for fuels, gas and chemicals will be required and will have a combined capacity of less than 500m³.***
Listing Notice 2 (GNR 325) of April 2017	6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent. ***An Atmospheric Emissions License (AEL) is required under the NEM: AQA for the processing or recovery of metallurgical slag by the application of heat (Sub-category 4.20 of GNR893 published on 22 November 2013 under the National Environmental Management: Air Quality Act, No 39 of 2004).***

5.2.2 National Environmental Management: Waste Act (No. 58 of 2008) (NEM: WA)

Waste Management Activities are activities identified in terms of Section 19(2) of the National Environmental Management: Waste Act (No. 58 of 2008) (NEM:WA) that have, or are likely to have, a detrimental effect on the environment; and in respect of which a Waste Management License (WML) is required in accordance with Section 20(B) of NEM:WA. An EA process, as contemplated in the EIA Regulations (GNR 326) must be conducted in support of any WML applications.

Waste Management Activities are divided into 3 categories, namely: Category A, Category B and Category C. Waste Management Activities listed under Category A, require that a BA process be conducted while Category B activities require a full S&EIA process be conducted in support of the WML Application. Activities listed under Category C require compliance with the relevant requirements or standards, as determined by the Minister of Environmental Affairs.

In terms of the listed activities defined under the National Environmental Management: Waste Act (GNR 921), the following 'listed activities' are triggered by the development of the project, and for which a Waste Management License (WML) has been applied.

Table 5.5.2: Listed activities identified in terms of the Listed Activities (GNR921) published under NEM: WA on 29 November 2013 (as amended by GG 37604 dated 2 May 2014 and GG 39020 dated 24 July 2015)

Notice Number	Activity Number	Description of listed activity
GN 921 of 29 November 2013, as amended	Category B 3	The recovery[8] of waste including the refining, utilisation, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 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 plant will be developed to process 2000 tonnes of tailings/slag per month, approximately 3 tons per day.***
GN 921 of 29 November 2013, as amended	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 technology proposed to process the waste will utilise pyrometallurgical and hydrometallurgical patented extraction process for high-purity titanium dioxide production as well as vanadium, aluminium and magnesium.***
GN 921 of 29 November 2013, as amended	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). ***A plant of approximately 4 ha in extent will be developed to process the waste.***

5.2.3 National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM: AQA)

In accordance with the National Environmental: Air Quality Act (No. 39 of 2004) (NEM: AQA) and the associated Listed Activities (GNR 893 of November 2013), an Air Emissions License (AEL) is required for activities identified as having a potential significant detrimental effect on the environment, including health, social conditions, economic conditions and ecological conditions or cultural heritage. The processing and recovery of metallurgical slag by the application of heat will be conducted at the operations, which is classified as a listed activity in terms of Section 21 of the NEM: AQA. Emissions from the plant will be required to comply with the new plant Minimum Emission Standards (MES). The applicable listed activities categories are detailed in **Table 5.3**.

[8] "recovery" means the controlled extraction of a material or the retrieval of energy from waste to produce a product

Table 5.3: Listed activities in terms of NEM: AQA triggered by the Anglo African Metals Zero Waste Recovery Solution

Activity No(s):	Listed activities as set out in GN 893, 2013 of the NEMAQA.	Describe the portion of the proposed project to which the applicable listed activity relates.
4. Metallurgical Industry **4.20. Slag processes**	The processing or recovery of metallurgical slag by the application of heat	Applicable to all slag processing installations using heat. ***The proposed project involves the processing of slag through the application of heat.***

5.2.4 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

- *a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *b. the construction of a bridge or similar structure exceeding 50m in length;*
- *c. any development or other activity which will change the character of a site –*
  - *i). exceeding 5 000m² in extent; or*
  - *ii). involving three or more existing erven or subdivisions thereof; or*
  - *iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
  - *iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

5.3 Overview of the Scoping Process undertaken for the project

The Scoping Phase of the EIA process refers to the process of identifying potential issues associated with the proposed project, and defining the extent of studies required during the EIA Phase. This was achieved through an evaluation of the proposed project, involving the project proponent, specialists with relevant experience, and a public consultation process with key stakeholders (including government authorities) and Interested and Affected Parties (I&APs).

The Scoping process undertaken aimed to:

- Identify, describe and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed facility (including design, construction, operation and decommissioning) within the site through a desk-top review of existing baseline data and desk-top specialist studies.
- Identify potentially sensitive environmental features and areas in order to inform the preliminary design process of the facility.
- Define the scope of studies to be undertaken within the EIA process.
- Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

Within this context, the objectives of this Scoping Phase were to, through a consultative process:

- Identify the policies and legislation relevant to the project.
- Motivate the need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred location.
- Identify and confirm the preferred project alternatives.
- Identify and confirm the preferred site.
- Identify the key issues to be addressed in the EIA phase.
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the project will impose on the preferred site through the life of the project, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site.
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Key tasks undertaken within the Scoping Phase included:

- Consultation with the National Department of Forestry, Fisheries and the Environment (DFFE), the Competent Authority for this project, and the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs.
- Submission of the completed Integrated Application for Environmental Authorisation (EA) and Waste Management License (WML) to the competent authority (i.e. the National DFFE) in terms of Regulations 5 and 16 of the EIA Regulations 2014, as amended in April 2017 (GNR326).
- Undertaking a public participation process throughout the Scoping phase in accordance with Chapter 6 of GNR326 in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of GNR326 and relevant specialist protocols as appropriate.

- Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of GN R326.
- Preparation of a Comments and Responses Report detailing key issues raised by I&APs as part of the Scoping phase.

Table 5.4 provides a summary of the public participation process undertaken during the Scoping Phase.

Table 5.4: Summary of the Public Participation Process undertaken during the Scoping Phase

Activity	Date
The EIA process and availability of the Scoping Report was advertised in the Witbank News.	13 November 2020
Placement of site notices, on-site and in public places.	11 November 2020
Distribution of process notification letters and background information documents to organs of state departments, ward councillors, landowners within the study area, neighbouring landowners and stakeholder groups.	13 November 2020
Distribution of notification letters for the availability of the Scoping Report to organs of state departments, ward councillors, landowners within the study area, neighbouring landowners and stakeholder groups.	13 November 2020
30-day review and comment period of the Scoping Report.	13 November – 13 December 2020
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners. » Authorities and stakeholders (including Organs of State, local municipality and official representatives of community-based organisations).	A virtual Focus Group Meetings was undertaken with various stakeholder groups on 11 December 2020. The meeting held included: » Co-operative Governance & Traditional Affairs. » Federation for a Sustainable Environment.
On-going consultation (i.e. telephone liaison, e-mail communication) with all I&APs.	Throughout the Scoping Phase

The preparation and release of the Scoping Report for a 30-day review period provided stakeholders and I&APs with an opportunity to verify that the issues they had raised during the Scoping Phase had been captured and adequately considered, and provided a further opportunity for additional key issues to be raised for consideration. The Final Scoping Report incorporated all issues and responses raised during the Scoping Phase prior to submission to the DFFE. The Final Scoping Report was accepted by the DFFE on **18 February 2021** (refer to **Appendix C6**). In addition, amendments and additional information requested by the DFFE in acceptance of the Scoping Report and the location of the amendments and requested information in this EIA Report is detailed in **Table 5.5.**

Table 5.5: DFFE amendments and requirements, as well as reference to Section in the EIA Report

DFFE amendments and requirements for EIA	Response / Location in this EIA Report
(a) Air Quality (i) Atmospheric Emission License: » According to the information provided the Atmospheric Emission License will be a new licence for the facility, which must comply with	The EAP acknowledges the comment from the DFFE. The Zero Waste Recovery Plant will be designed to comply with Subcategory 4.20 Minimum Emission Standards.

DFFE amendments and requirements for EIA	Response / Location in this EIA Report
new plant Minimum Emission Standards (MESs) as per AQA for facilities operating in Air Priority Areas. » Kindly note that these are the preliminary findings, based on the information provided. Therefore, the facility will have an opportunity to make representations on the AEL type during processing of the AEL application.	
(ii) Air Quality Dispersion Modelling: » Air dispersion modelling exercise must be done in accordance with the Regulations regarding Air Quality Dispersion Modelling – Regulation No. 533 of July 2014, issued in terms of the NEM: AQA.	An air dispersion modelling exercise has been conducted and is included in the Atmospheric Impact Report (refer to **Appendix D** of the EIAr). The Regulations regarding Air Quality Dispersion Modelling (Gazette No 37804 published 11 July 2014) (DEA, 2014) was referenced for the dispersion model selection. Three levels of assessments are defined in the Regulations regarding Air Dispersion Modelling, namely, Level 1, Level 2 and Level 3. A Level 2 assessment was considered to be suitable for the Anglo African Metals Zero Waste Recovery Solution. For this study, the AERMOD model was selected on the basis that this Gaussian plume model is well suited to simulate dispersion where transport distances are likely to be less than 50km.
» The dispersion modelling can provide reliable information, if for example, the 1st case considers baseline for all current emitters in the surrounding environment (excluding proposed development); the 2nd vase considers the proposed development in isolation of the current emitters; and the 3rd case to combine the baseline plus proposed development (cumulative). The study should have more noticeable impacts.	As per this requirement, the dispersion modelling considered baseline air quality monitoring data measured at the SAWS managed eMalahleni station (located approximately 12.3 km northeast of the proposed project location). The dispersion modelling also considered the proposed development in isolation of the current emitters as expected routine emissions from the Zero Waste Recovery Plant were simulated. The baseline pollutant concentrations, together with the simulated concentrations, were used to assess the cumulative impacts from the Zero Waste Recovery Plant.
(iii) Emission Control Technology: » Detailed information on air pollution abatement equipment to be used in order to comply, including its performance, efficiency, availability and the expected emission concentration in mg/Nm^3 (under normal condition of 273k, 101.3 kPa, dry gas) for pollutants such as NO_x, PM, SO_2, and some metals depending on reactions in terms of Section 21 of NEM: AQA (Act 39 of 2004) listed activities.	The following emission control technologies are proposed for the plant: » Baghouse system for dust extraction at hoppers, silos and bulk material transfer points; » Off-gas scrubber mainly for the kiln process; and » General Scrubbers for other smaller amounts of gasses from selected processes like calcining.
(iv) Health Impact Assessment (Sensitive Receptor focussed): » The Health Impact Assessment must be conducted and amongst others must provide of the details: o Methodology; o Exposure assessment; and	The Atmospheric Impact Report (**Appendix D** of the EIAr) includes a section on the analysis of the emissions' impact on human health (**Section 7.1** of the Air Quality Impact Assessment). As per this requirement, the health impact assessment provides details of the methodology used, an exposure assessment and a dose exposure assessment.

DFFE amendments and requirements for EIA	Response / Location in this EIA Report
o Dose exposure assessment.	
(v) Compliance: » Dust emission is anticipated from both the line and area source, as such the facility should commit to control of dust in terms of section 32 (a); (b) and (c) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) and the National Dust Control Regulations 2013.	Mitigation measures to control dust during the construction and operational phases are included in the Atmospheric Impact Report (**Appendix D** of the EIAr) and the EMPr (**Appendix K** of the EIAr).
» It is recommended that a Fugitive Emission Management Plan for the anticipated fugitive emissions that might occur onsite must be developed.	A Fugitive Emission Management Plan will be developed for the plant, as recommended in the Air Quality Impact Assessment (**Appendix D** of the EIAr). As per the Air Quality Impact Assessment, the plan must include, *inter alia*, the following mitigation measures: » Paving of all on-site roads. While the surface moisture content of unpaved roads can be increased with water bowsers, it is much easier to control the silt loading on paved roads. » Regular sweeping of on-site paved roads to reduce silt loading on the road surface, higher silt loading results in higher vehicle entrainment emissions. » Clean-up of all spillages to avoid re-entrainment by vehicles. » Implementation of strict on site speed limits. » Mitigation of crushing plant emissions. The design of the plant includes dust extraction and abatement with a bag house. » Control of dust emissions from stockpiles during periods of high wind speeds, either by increasing moisture content of material with water sprays, or by decreasing wind speeds using enclosures or bund walls.
(b) <u>Public Participation</u> » Please ensure that comments from all relevant stakeholders are submitted to the Department with the EIAr. This includes but is not limited to the provincial Department of Agriculture, SANRAL, eMalahleni Local Municipality, the Nkangala District Municipality, the Department of Water and Sanitation (DWS), the South African Heritage Resources Agency (SAHRA), the Department of Mineral Resources, the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs, the Department of Rural Development of Land Reform, and the Department of Forestry, Fisheries and the Environment: Directorate Biodiversity and Conservation should be submitted via e-mail: BCAdmin@environment.gov.za for attention of Mr Seoka Lekota.	Copies of written comments received to date on the project are included in **Appendix C6** of the EIAr. Comments received from I&APs, including the stakeholders referenced in the DFFE's letter dated 18 February 2021, during the 30-day review and comment period of the EIAr <u>have been</u> captured in the C&RR (included in **Appendix C8** of the final EIAR) and included in **Appendix C6** of the final EIAr.

DFFE amendments and requirements for EIA	Response / Location in this EIA Report
» Public participation process should be carried out in compliance with section 57 (1) (2) (3) (4) of the act.	Section 57 of the National Environment Management: Air Quality Act 39 of 2004 is applicable to the MEC's exercising powers and not to application processes. The AEL application process has not been initiated. However, as per Section 38(3) of the Act, relevant organs of state, interested and affected parties and the public have been notified of the applicant's intent to apply for an AEL. The public participation process for this project is being undertaken in accordance with Chapter 6 of the NEMA 2014 EIA Regulations, as amended and Section 38 (3) of NEM: AQA.
» It is also advised that the complaint register at the local authority be perused for any air quality related complaints in the vicinity of the proposed project.	The complaints register at the local authority will be perused for air quality related complaints in the vicinity of the proposed project. The Atmospheric Emissions Licence process will be followed and the local air quality official at the local authority will be contacted as part of the pre-application process for the AEL once the process commences.
» The public participation process documents related to Air Quality for review and queries should be submitted to the Directorate: Climate Change & Air Quality Management - Email: MNgobo@ environment.gov.za for attention Mr Mthobisi Ngobo.	The DFFE's Directorate: Climate Change & Air Quality is a stakeholder on the project database and has been requested, in writing, to comment on the EIAr and the AIR which is included as **Appendix D** of the EIAr. A WeTransfer folder containing the draft EIAr and appendices, for review by the Directorate, was shared with the Directorate on 20 April 2021.
» Please ensure that all issues raised and comments received during the circulation of the draft SR and draft EIAr from registered I&APs and organs of state which have jurisdiction in respect of the proposed activity are adequately addressed in the final EIAr. Proof of correspondence with the various stakeholders must be included in the final EIAr. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments.	All comments received during the circulation of the draft SR have been captured and addressed in the C&RR (refer to **Appendix C8** of the EIAr). All comments received during the circulation of the draft EIAr from registered I&APs and organs of state have been included in this final EIAr, and will be addressed as required.
» A Comments and Responses trail report (C&R) must be submitted with the final EIAr. The C&R report must incorporate all comments for this development. The C&R must be a separate document from the main report and the format must be in the table format as indicated in Appendix 1 of this comments letter. Please refrain from summarising comments made by I&APs. All comments from I&APs must be copied verbatim and responded to clearly. Please note that a response such as "noted" is not regarded as an adequate response to I&AP's comments.	A C&RR with comments received to date on the project is included as **Appendix C8** of the draft EIAr. The C&RR will be updated to include comments received during the 30-day review and comment period of the draft EIAr, and submitted with the final EIAr. Comments received to date have been captured verbatim and have not been summarised. Appropriate responses have been provided for all comments.
» Comments from I&APs must not be split and arranged in categories. Comments from each submission must be responded to individually.	Comments received from I&APs to date have not been split and arranged in categories, and comments from each submission have been

DFFE amendments and requirements for EIA	Response / Location in this EIA Report
	responded to individually, and not collectively (refer to **Appendix C8).**
» The public participation process must be conducted in terms of Regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations, 2014, as amended	The public participation process to date has been conducted in terms of Regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations 2014, as amended (GNR 326), as well as in accordance with the approved Public Participation Plan (refer to **Appendix C9** of the EIAr). Details of the public participation process undertaken to date is included in detail in **Chapter 5** of the EIAr.
» The EAP is requested to contact the Department to make necessary arrangements to conduct a site inspection prior to submission of the final EIAr.	Necessary arrangements to conduct a site inspection prior to submission of the final EIAr were made with the Department during the 30-day draft EIAr comment and review period. The Case Officer appointed for the project indicated that a site inspection would not been necessary, and that final communication in this regard would be provided once the final EIAr has been submitted to the Department.
General » The EIAr must provide the technical details for the proposed facility in table format as well as their description and/or dimensions. A sample for the minimum information required is listed under Annexure 2.	The minimum information required as listed in Annexure 2 of the Scoping Acceptance dated 18 February 2021 is applicable to a solar PV project. The proposed project is a zero-waste recovery plant, and the technical details for the proposed facility are provided in table format, as well as their description and/or dimensions under **Chapter 2** of the EIAr, **Table 2.1**.
» Details of the future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies must be indicated.	As detailed in **Section 9** of the Environmental Management Programme (**Appendix K** of the EIAr) the lifespan of the proposed facility will depend on the availability of the slag resource, which is currently envisaged to be approximately 25 years and potentially longer. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life or if it is no longer required. An assessment will be undertaken prior to the end of the lifecycle of the plant to determine whether the plant should be decommissioned or whether the operation of the plant should continue.
» Should a Water Use License be required, proof of application for a license needs to be submitted.	No Section 21 water uses have been triggered by the proposed project, and therefore, a Water Use License is not required.
» The EAP must provide landowner consent for all farm portions affected by the proposed project, whether the project component is linear or not, i.e. all farm portions where the Zero Waste Recovery Plan and associated infrastructure is to be located.	Landowner consent for the farm portion affected by the proposed project (Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process)) has been included as **Appendix L** to the EIAr.

DFFE amendments and requirements for EIA	Response / Location in this EIA Report
» A construction and operational phase EMPr that includes mitigation and monitoring measures must be submitted with the final EIAr.	A construction and operational phase EMPr that includes mitigation and monitoring measures as been included as **Appendix K** to the EIAr. The EMPr will be updated following the 30-day draft EIAr comment and review period (if necessary), and submitted with the final EIAr.

5.4 Overview of the EIA Phase of the Process

As per the EIA Regulations (GNR 326), the objectives of the EIA Phase are to, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context.
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted Scoping Report.
- Identify the location of the development footprint within the approved site as contemplated in the accepted Scoping Report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment.
- Determine the:
  - Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
  - Degree to which these impacts:
    - Can be reversed
    - May cause irreplaceable loss of resources
    - Can be avoided, managed or mitigated
- Identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted Scoping Report based on the lowest level of environmental sensitivity identified during the assessment.
- Identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted Scoping Report through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts.
- Identify residual risks that need to be managed and monitored.

This EIA Report assesses potential positive and negative, direct, indirect, and cumulative impacts associated with all phases of the project life cycle including pre-construction, construction, operation and decommissioning. In this regard, the EIA Report aims to provide the relevant authorities with sufficient information to make an informed decision regarding the proposed project.

Key tasks undertaken during the EIA Phase include:

- Consultation with the National Department of Forestry, Fisheries and the Environment (DFFE), the Competent Authority for this project, and the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs.

- Undertaking a public participation process throughout the EIA process in accordance with the requirements of Regulations 39 to 44 of the 2014 EIA Regulations (GNR 326) in order to identify any additional issues and concerns associated with the proposed project.
- Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process (in accordance with the requirements of Regulation 44 of the 2014 EIA Regulations (GNR 326).
- Undertaking independent specialist studies in accordance with the requirements of Regulation 23(5) and Appendix 6 of the 2014 EIA Regulations (GNR 326).
- Preparation of an EIA Report in accordance with the requirements of Regulation 23 and Appendix 3 of the 2014 EIA Regulations (GNR 326).

The following subsections outline the activities undertaken as part of the EIA Phase.

5.4.1 Authority Consultation

The National DFFE is the competent authority for this application. A record of all authority consultation undertaken is included in this EIA Report. Consultation with the regulating authorities (i.e. DFFE and MDARDLEA) has continued throughout the EIA process.

The following steps were undertaken as part of the EIA Phase:

- Make the EIA Report available for a 30-day public and authority review period.
- Notification and consultation with stakeholders, I&APs and Organs of State that may have jurisdiction over the project, including provincial and local government departments, and State Owned Enterprises.
- Incorporating comments received during the 30-day public review period to prepare a Final EIA Report.
- Submission of the Final EIA Report to the DFFE for decision-making.

A record of all authority correspondence undertaken during the EIA process is included in **Appendix C4 and Appendix C5**.

5.4.2 Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations under NEMA, specifically the EIA Regulations. The sharing of information forms the basis of the public participation process and offers the opportunity to Interested and Affected Parties (I&APs) to become actively involved in the EIA Process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to achieve the following:

During the Scoping Phase

- Identify issues of concern and suggestions for enhanced benefits;
- Verify that their issues have been recorded;
- Assist in identifying reasonable alternatives; and
- Contribute relevant local information and knowledge to the environmental assessment.

During the EIA Phase

- Contribute relevant local information and knowledge to the environmental assessment;
- Verify that their issues have been considered in the environmental investigations; and
- Comment on the findings of the environmental assessments.

During the decision-making phase:

- To advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:

- Information that contains all the relevant facts in respect of the application is made available to I&APs for review.
- Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
- Adequate review periods are provided for I&APs to comment on the findings of the Scoping and EIA Reports.

The restrictions enforced in terms of Government Gazette 43096 which placed the country in a national state of disaster limiting the movement of people to curb the spread of the COVID-19 virus has placed some limitations on the commencement and continuation of the public consultation as part of the EIA process. Considering these limitations, a public participation plan **(Appendix C9**) and consultation process has been designed by Savannah Environmental and approved by DFFE to cater for the undertaking of the public participation process which includes I&APs, the competent authority, directly impacted landowners/ occupiers, adjacent landowners/occupiers, relevant Organs of State departments, Municipalities, ward councillors and other key stakeholders.

The traditional means and opportunities available for the undertaking of public participation will still be covered and implemented as part of the public participation plan considering the current limitations. Alternative means of undertaking consultation have been designed and will be implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to raise comments on the project through an interactive web-based platform readily available and accessible to any person illustrating interest in the project and enables the public participation process to be undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014, as amended.

This online stakeholder engagement platform allows the EAP to visually present details regarding the project and our consultation documentation, including project maps and plans, presentations and posters regarding the project, and reports available for review. The use of online tools enables stakeholders and I&APs to explore the project- specific content in their own time, and allow them to participate in a meaningful way in the consultation process. The online platform allows for feedback and comments to be submitted by I&APs, in so doing saving time for the stakeholder and also giving the assurance that their comments have been submitted for inclusion in the project reporting. The online stakeholder engagement platform considered the limitations applied by the Disaster Management Act Regulations prohibiting the gathering of people, as well as limitations which certain I&APs may have in terms of access to computers and internet as well as access to public spaces not open for operation or which have restricted access.

Key tasks that <u>were</u> undertaken during the EIA Phase include the following:

- Release of the EIA Report for a 30-day review period from **16 April 2021** to **18 May 2021**. The availability of the report was advertised in the Witbank News on**15 April 2021**, and all registered I&APs were notified in writing.
- Live reads on Moutse Community Radio were done on Monday, 19 April 2021 and Monday, 10 May 2021 (refer to **Appendix C2** of the final EIAr for proof)
- Comments received from I&APs during this period have been captured within a Comments and Reponses Report, which is included within this Final EIA Report, for submission to the DFFE for their decision-making.
- On-going consultation with all registered I&APs regarding the progress in the EIA process through stakeholder consultation via notification letters, telephone calls, sms's, whatsapp, 'please call me' and consultation meetings or virtual focus group meetings.
- Virtual Focus Group Meetings with the Local Municipality, District Municipality, affected wards and key stakeholders were held during the 30-day public review period.

The following sections detail the tasks which were undertaken as part of the public participation process within the EIA Phase.

i. Adverts and Notifications

The EIA Phase, and the availability of the EIA Report for comment was announced as follows:

- A letter advising registered parties of the Acceptance of Scoping received from the DFFE and the commencement of the EIA Phase distributed on **14 April 2021**.
- Notification letter distributed to all registered parties advising them of the availability of the EIA Report, inclusive of the Air Quality Impact Assessment in support of the future application for an AEL in terms of NEM:AQA, for review and comment on **14 April 2021**.
- An advertisement announcing the availability of and inviting comment on the EIA Report in the Witbank News on **15 April 2021**. The tear sheets of the newspaper advert will be included in **Appendix C2** of the final EIA Report.
- Live reads on Moutse Community Radio were done on Monday, 19 April 2021 and Monday, 10 May 2021 (refer to **Appendix C2** of the final EIAr for proof)
- I&APs were encouraged to view the EIA Report and submit written comment. The EIA Report was circulated to Organs of State via CD or electronic transfer (Dropbox, WeTransfer, etc), as per individual request. The evidence of distribution of the EIA Report has been included in this EIA Report (refer to **Appendix C**)

ii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities were provided in the EIA Phase to I&APs to note their issues and comments. I&APs were consulted through the following means:

- Opportunity for review of the EIA Report, inclusive of the Air Quality Impact Assessment in support of the future application for an AEL, for a 30-day period from **16 April 2021** to **18 May 2021**. Comments received during this review period have been captured within the C&RR, which is included within this final EIA Report.
- **Focus group meetings**: Virtual focus group meetings were held with key government departments, stakeholders and landowners during the EIA Phase of the process. The purpose of these focus group

meetings was to provide an overview of the findings of the EIA studies to facilitate comments on the EIA process and EIA Report, as well as to record any issue or concerns raised by stakeholders regarding the project. As per the approved public participation plan, these meetings were held via virtual platform. The minutes of these meetings have been included in this Final EIA Report for review and acceptance by the DFFE.

» **Telephonic** consultation sessions.
» Written, faxed or e-mail correspondence.

All comments received during the 30-day review period have been included in **Appendix C6** and minutes of all meetings held during the review period have been included in **Appendix C7** of this final EIA Report.

Table 5.6: Summary of Public Participation Process (EIA Phase)

Activity	Date
Notice of acceptance of scoping and commencement of the EIA Phase circulated to registered I&APs.	14 April 2021
The availability of the EIA Report was advertised in the Witbank News.	15 April 2021
Live reads on Moutse Community Radio	19 April 2021 10 May 2021
Distribution of notification letters for the availability of the EIA Report to organs of state departments, ward councillors, landowners within the study area, neighbouring landowners and stakeholder groups.	14 April 2021
Distribution of EIA Report	16 April 2021
30-day review period for the EIA Report for public comment.	16 April 2021 – 18 May 2021
Virtual meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners. » Authorities and stakeholders (including Organs of State, local municipality and official representatives of community-based organisations).	. Virtual Focus Group Meetings were held with various key stakeholder groups. The meetings held include: » eMalahleni Local Municipality Officials Focus Group Meeting: 05 May 2021 » Key stakeholder workshop: 06 May 2021 » Wards 09 and 29 Focus Group Meeting: 06 May 2021 » Nkangala District Municipality Officials Focus Group Meeting: 17 May 2021
On-going consultation (i.e. telephone liaison, e-mail communication) with all I&APs.	Throughout the EIA Phase

iii. Identification and Recording of Issues and Concerns

A Comments and Responses Report has been compiled to include all comments received. Comments received during the EIA phase 30-day review period, have been included in the Comments and Responses Report within this final EIA Report. The Comments and Responses Report, including all comments received to date is included as **Appendix C8**.

5.5 Review of the EIA Report

The EIA Report was made available for review from **16 April 2021** to **18 May 2021**. In accordance with the approved Public Participation Plan, the report was made available for download from the Savannah Environmental website, https://www.savannahsa.com/public-documents/other/ and sent via other electronic means such as WeTransfer, Dropbox or CD at the request of stakeholders.

5.6 Assessment of Issues Identified as part of the EIA Process

Issues which required investigation during the EIA Phase, as well as the specialists involved in the assessment of these impacts are indicated in **Table 5.7.**

Table 5.7: Specialist consultants appointed to evaluate the potential impacts associated with the Anglo African Metals Zero Waste Recovery Solution

Issue	Specialist	Refer Appendix
Air Quality	AirShed Planning Professionals	Appendix D
Heritage (including Archaeology & Palaeontology)	PGS Heritage	Appendix E
Socio-Economic	Urban Econ Development Economists	Appendix F

Specialist studies considered direct, indirect, and cumulative environmental impacts associated with the development of the zero-waste recovery plant. Identified impacts were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high)
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2
  - Medium-term (5–15 years) – assigned a score of 3
  - Long term (> 15 years) - assigned a score of 4
  - Permanent - assigned a score of 5
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment
  - 2 is minor and will not result in an impact on processes
  - 4 is low and will cause a slight impact on processes
  - 6 is moderate and will result in processes continuing but in a modified way
  - 8 is high (processes are altered to the extent that they temporarily cease)
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes
- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen)
  - Assigned a score of 2 is improbable (some possibility, but low likelihood)
  - Assigned a score of 3 is probable (distinct possibility)

- Assigned a score of 4 is highly probable (most likely)
- Assigned a score of 5 is definite (impact will occur regardless of any prevention measures)

» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high
» The **status**, which is described as either positive, negative or neutral
» The degree to which the impact can be reversed
» The degree to which the impact may cause irreplaceable loss of resources
» The degree to which the impact can be mitigated

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) P; where
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

» **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
» **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
» **60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area)

Specialist studies are considered cumulative impacts associated with similar developments within the surrounds of the proposed project. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact0. In this regard, the specialist studies considered whether the construction and operation of the proposed development will result in:

» Unacceptable risk
» Unacceptable loss
» Complete or whole-scale changes to the environment or sense of place
» Unacceptable increase in impact

As the developer has the responsibility to avoid or minimise impacts and plan for their management (in terms of the requirements of NEMA and the 2014 EIA Regulations (GNR 326)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. An EMPr has been prepared for the project and is attached as **Appendix K** to this EIA Report.

5.7 Assumptions and Limitations of the EIA Process

The following assumptions and limitations are applicable to the studies undertaken within this EIA Phase:

- It is assumed that the project site identified represents a technically suitable site for the establishment of the Zero Waste Recovery Solution project and associated infrastructure (i.e. based on the surrounding land use, access to the site, access to infrastructure etc.)
- Conclusions of specialist studies undertaken and this overall Impact Assessment assume that any potential impacts on the environment associated with the proposed development will be avoided, mitigated, or offset.

Refer also to the specialist studies contained in **Appendices D-F** for limitations specific to the independent specialist studies.

5.8 Legislation and Guidelines that have informed the preparation of this EIA Report

The following legislation and guidelines have informed the scope and content of this EIA Report:

- National Environmental Management Act (Act No. 107 of 1998).
- EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended in GNR R326 in Government Gazette No 40772 of April 2017).
- Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations.
- International guidelines – the Equator Principles and the International Finance Corporation and World Bank Guidelines.

Several other Acts, standards or guidelines have also informed the project process and the scope of issues addressed and assessed in this EIA Report. A listing of relevant legislation is provided in **Table 5.8.**

Table 5.8: Relevant environmental policies, legislation, guidelines and standards applicable to the Zero Waste Recovery Solution Project

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (Act No. 108 of 1996)	» Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32) » Right to just administrative action (S33) » Recognition of international agreements (S231)	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right (Section 24) however implies that environmental impacts associated with proposed developments are considered separately and cumulatively.
National Environmental Management Act (Act No. 107 of 1998)	» National environmental principles (S2), providing strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment » NEMA EIA Regulations (GN 324 – 327 of December 2014, as amended in April 2017) » The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority (S24 – Environmental Authorisations) » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment	DFFE – Competent Authority Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs – Commenting Authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project. The Scoping and EIA process will culminate in the submission of a Final EIA Report to the competent and commenting authority in support of the application for EA.

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
	» Procedures to be followed in the event of an emergency incident which may impact on the environment (S30) » Appeals against decisions made by authorities (S43)		
National Environmental Management: Waste Act (Act No. 59 of 2008)	» The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. » In terms of the regulations published in terms of this Act (GN 921 of November 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities in support of an application for Waste Management Licenses. » The storage of waste must be undertaken in terms of the relevant norms and standards.	DFFE – hazardous waste Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs – general waste	The waste management activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project. The Scoping and EIA process will culminate in the submission of a Final EIA Report to the competent authority and commenting authority in support of the application for a WML.
Environment Conservation Act (Act No. 73 of 1989)	» National Noise Control Regulations (GN R154 dated 10 January 1992) » In terms of Section 25 of the ECA, the national noise-control regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. » Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Provincial Noise Control Regulations exist in the Free State, Western Cape and Gauteng provinces.	DFFE Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs eMalahleni Local Municipality	The proposed development site is located in a large existing industrialised area surrounded by several heavy industries and mining operations. Therefore, no noise impacts are expected to be associated with the project and there is no requirement for a noise permit in terms of the legislation.

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
National Heritage Resources Act (Act No. 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7) » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35) » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36) » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38) » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)	SAHRA Mpumalanga Provincial Heritage Authority	A full HIA (with field work) has been undertaken as part of the EIA Phase (refer to **Appendix E**) In terms of palaeontological heritage, the proposed project site is underlain by Undifferentiated Ecca Group (Pe)(Vryheid Formation). According to the PalaeoMap on the South African Heritage Resources Information System (SAHRIS) database, the Palaeontological Sensitivity of the Vryheid Formation is Very High. However, the proposed development is only 4,10ha in extent and photographs obtained by PGS indicates that the proposed development site has previously been disturbed. Due to the disturbed nature of the site, the palaeontological desktop assessment has concluded that no further fieldwork will be required, but that a chance finds protocol must be implemented. The fieldwork undertaken as part of the HIA indicated that the site has no heritage resources and therefore, has no heritage significance. Due to the level of disturbance of the area, no heritage resource is envisaged.
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657.	DFFE Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	Under NEM: BA; a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species. The proposed development site is located in a large existing industrialised area surrounded by

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
	» Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). » This Act also regulates alien and invader species (GN 37886 of August 2014).		several heavy industries and mining operations. It is a brownfield site that has already undergone extensive transformation. No Natural vegetation remains on site. Therefore, no Ecological Impact Assessment has been undertaken.
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	» Government Gazette 37054 of 22 November 2013 provides a list of activities which require an Air Emissions License and provides the emission thresholds that need to be complied with. » Government Notice 1210 in Government Gazette 32816 dated 24 December 2009 details the National Ambient Air Quality Standards (Commencement date: 24 December 2009). » S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas".	Nkangala District Municipality Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	The construction and operation of the Zero Waste Recovery Plant has the potential to lead to elevated ambient concentrations of particulate and gaseous atmospheric pollutants. A full ambient air quality assessment has been undertaken as part of the EIA Phase (refer to **Appendix E**). The ambient air quality study indicates that the extent of incremental impacts due to the Zero-Waste Recovery Plant are expected to be localised to the vicinity of

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
	» Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. » The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act. » Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan. » Regulations regarding Air Dispersion Modelling were promulgated in Government Gazette No. 37804 and recommend a suite of dispersion models to be applied for regulatory practices as well as guidance on modelling input requirements, protocols and procedures to be followed. The Regulations Regarding Air Dispersion Modelling are applicable: a) in the development of an air quality management plan, as contemplated in Chapter 3 of the AQA; b) in the development of a priority area air quality management plan, as contemplated in Section 19 of the AQA; c) in the development of an atmospheric impact report, as contemplated in Section 30 of the AQA; and, d) in the development of a specialist air quality impact assessment study, as contemplated in Chapter 5 of the AQA. » Specific requirements of the Highveld Priority Area Air Quality Management Plan are applicable.		the operations, with possible exceedances of the SA NAAQS simulated outside the property boundary, but simulated impacts are negligible at all sensitive receptor locations. The duration of the impacts is expected to be long-term (for the life of the project) while the magnitude of impacts is expected to be medium for particulate emissions, low to medium for gaseous pollutants (SO_2 and NO_2), and low for dust fallout. If all fugitive sources are properly managed, no residual impact is expected post closure. Impacts during the construction phase are expected to be transient and highly variable from day to day, depending on the construction activities being performed. For this reason, construction phase impacts are expected to be low. Given that particulate concentrations in the study area are already elevated, it is possible that cumulative impacts could be high in magnitude An Atmospheric Emissions License (AEL), from the Nkangala District Municipality, is required under the NEM: AQA for the processing or recovery of metallurgical slag by the application of heat (Sub-category 4.20 of GNR893 published on 22 November 2013 under the National Environmental Management: Air Quality Act, No 39 of 2004).

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	» Prohibition of the spreading of weeds (S5). » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur. » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).	Department of Agriculture, Forestry and Fisheries	The proposed development site is located in a large existing industrialised area surrounded by several heavy industries and mining operations. It is a brownfield site that has already undergone extensive transformation. No agricultural activities are therefore present on the site or in the vicinity. It is not anticipated weed control will be required for this project.
National Water Act (Act No. 36 of 1998)	» Under S21 of the Act, water uses must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation. » In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of the project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring. » National Government is the public trustee of the Nation's water resources (S3) » Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire-fighting and recreational use, as set out in Schedule 1 » Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20) » Definition of water use (S21) » Requirements for registration of water use (S26 and S34) » Definition of offences in terms of the Act (S151)	Regional DHSWS	No Section 21 water uses have been triggered by the proposed project. Should any Section 21 water uses be triggered, the project proponent would need to apply for a WUL or register for a GA with the DHSWS.

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
	» GNR 509 of 2016 provides the requirements for General Authorisation relating to impeding or diverting the flow of water in a watercourse (section 21(c)) or altering the bed, banks, course or characteristics of a watercourse (section 21(i)) » GNR 267 of 2017 provides Regulations regarding the Procedural Requirements for Water Use Licence Applications and Appeals'.		
The Hazardous Substances Act No. 15 of 1973	» This Act was promulgated to provide for the control of substances which may cause injury or ill-health to, or death of, humans by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature. » The Hazardous Substances Act also provides for matters concerning the division of such substances or products into groups in relation to the degree of danger, the prohibition and control of the importation, manufacture, sale, use, operation, application and disposal of such substances and products.	Department of Health	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the Department of Health (DoH).
Provincial Legislation			
Mpumalanga Biodiversity Sector Plan (MBSP, 2015)	» The process of conservation planning involves extensive mapping of vegetation types, transformation, species data, ecological processes and threats.	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs	The proposed development site is located in a large existing industrialised area surrounded by several heavy industries and mining operations. It is a brownfield site that has already undergone extensive transformation. No Natural vegetation remains on site. Therefore, no Ecological Impact Assessment has been undertaken.

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
Nkangala District Municipality Final Integrated Development Plan (2017/18 – 2021/2022)	» The IDP identifies key issues which have to be focused on by the municipality and the public. » Development strategies need to be established for addressing the key issues	Nkangala District Municipality	The developmental objectives set in the Nkangala District Municipality Integrated Development Plan (NDMIDP) 2017/18-2021/22 include the alleviation of poverty, promotion of infrastructural development, and creation of employment opportunities by developing the physical, socio-economic and institutional environment in the district. It is anticipated that the proposed development will lead to an increase in job creation, skills development, as well as an improved standard of living; thereby contributing to the alleviation of poverty and creation of employment opportunities in the Nkangala District Municipality.
eMalahleni Local Municipality Spatial Development Framework (SDF) (2020)	» A SDF is a statutory document which divides the municipality into zones on order to guide and manage development. » The objectives of a scheme can be summarized as follows: * To enable the comprehensive management of all erven (both private and public sector) within the Municipality; * To promote and implement the applicable planning and development legislation and principles as adopted by the relevant National, Provincial and Municipal spheres of government from time to time; * To promote and implement the Vision and Strategies of the Integrated Development Plan in the realization of quality environments	eMalahleni Local Municipality	The eMalahleni Spatial Development Framework (SDF) provides for further insight into the developmental and land zoning objectives for the area, where the proposed project is to be developed. The SDF shows that the project is to be located within the area that is zoned for heavy industrial land use. Considering the nature of the project, its location is in direct alignment with the current spatial development vision for the area.

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
	* To manage land-use rights, to provide facilitation over use rights, to manage urban growth and development and to manage conservation of the natural environment in order to: » Achieve co-ordinated and harmonious development in a way that will efficiently promote public safety, health, order, convenience and to protect the general welfare of the inhabitants of the Municipality; » Promote integrated and sustainable development through-out the area of jurisdiction; » Promote sustainable environmental management, conserve and protect environmentally sensitive areas. » Promote all forms of development and growth through sound planning principles that would support a mix of land-uses managed in an appropriate manner.		
Guideline Documents / Standards / Plans			
South African National Standard (SANS) 10328, Methods for environmental noise impact assessments in terms of NEMA No. 107 of 1998	» Prediction of impact that noise emanating from a proposed development would have on occupants of surrounding land by determining the rating level. » Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103.	DFFE Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs eMalahleni Local Municipality	The proposed development site is located in a large existing industrialised area surrounded by several heavy industries and mining operations. Therefore, no noise impacts are expected to be associated with the proposed project, and no noise impact assessment has been undertaken as part of the EIA Phase.
SANS 69 - South African National Standard - Framework for setting & implementing national ambient air quality	» The South African Bureau of Standards (SABS), through a technical committee, developed ambient air quality limits based on international best practice for particulate matter less than 10 µm in aerodynamic diameter (PM10), dust fallout,	Nkangala District Municipality	The construction and operation of the Zero Waste Recovery Plant has the potential to lead to elevated ambient concentrations of particulate and gaseous atmospheric pollutants. A full ambient air quality assessment

Legislation/ Policy/Guideline	Applicable Sections	Relevant Authority	Compliance Requirements
standards, SANS 1929 - South African National Standard - Ambient Air Quality - Limits for common pollutants.	sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, lead and benzene. » These ambient limits were derived from international best practice and what was regarded to be achievable in the South African context, taking both the natural environment and socio-economic status into account. The SANS limits informed the newly promulgated SA Standards		has been undertaken as part of the EIA Phase (refer to **Appendix E**). The ambient air quality study indicates that while simulated ground level particulate emissions result in an increase in particulate concentrations (which baseline measurements indicate are in exceedance of the SA NAAQS) in the immediate vicinity of the plant, the impact at all identified sensitive receptor locations is negligible. Simulated ground level SO2 and NO2 concentrations, both cumulative and incremental, are in compliance with the SA NAAQS, with possible exceedances of the SA NAAQS for SO2 to the immediate northwest of the plant because of high background SO2 concentrations.

CHAPTER 6 DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment (biophysical, social and economic) that may be affected by the proposed Zero Waste Recovery Plant. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which project is proposed to be developed. This information has been sourced from existing information available for the area and on-site specialist investigations conducted as part of the EIA, and aims to provide the context within which this EIA is being conducted. The full impact assessments undertaken by the independent specialists are attached as **Appendices D to F** of this EIA Report.

6.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of an Environmental Impact Assessment Report

This chapter includes the following information required in terms of Appendix 3: Scope of Assessment and Content of Environmental Impact Assessment Report:

Requirement	Relevant Section
(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	The environmental attributes associated with the development of the Anglo African Metals Zero Waste Recovery Solution are included as a whole within this chapter. The environmental attributes that are described within this chapter includes the following: » The regional setting of the broader study area and the project site indicates the geographical aspects associated with the Anglo African Metals Zero Waste Recovery Solution. This is included in **Section 6.2.** » The climatic conditions for the project area have been included in **Section 6.3.** » Topographical profile is described in **Section 6.4.** » The air quality profile and details of potential sensitive receptors are included in **Section 6.5.** » An overview of geology and soils in the region is provided in **Section 6.6.** » The ecological characteristics of the project site and the surrounding areas are described in **Section 6.7.** » Visual aspects of the study area are described in **Section 6.8.** » The heritage and cultural aspects (including archaeology and palaeontology) has been included in **Section 6.9.** » The social and socio-economic characteristics associated with the broader study area and the project site has been included in **Section 6.10.**

6.2 Regional Setting: Description of the Broader Study Area

6.2.1 Spatial context and regional linkages

The zero waste recovery plant is proposed to be located on Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process), approximately 17 km west of eMalahleni town in the eMalahleni Local Municipality (LM) within the Nkangala District Municipality (DM) in Mpumalanga. The development area is approximately 4 ha in extent and is contained within the Highveld Steel property and Highveld Industrial Park operational boundary. The site is accessible directly off the R104, from the N4 turnoff near Kwa-Guqa informal settlement.

The Mpumalanga Province is located north of the Kwazulu-Natal Province, sharing borders with Swaziland and Mozambique in the east (Mpumalanga Provincial Government, 2017). The Mpumalanga Province is the second smallest province in South Africa at 76 495 km^2, comprising 6.5% of South Africa's total land area (Global African Network, 2017). With a population of approximately 442 867, Mpumalanga is South Africa's third most densely populated province after Kwazulu-Natal and Gauteng, with approximately 60 people per square kilometre (Quantec, 2020f). The Mpumalanga Province is divided into three district municipalities (DMs) – Ehlanzeni DM, Gert Sibande DM and Nkangala DM – which contain 18 local municipalities collectively.

The Nkangala District comprises six local municipalities, namely Victor Khanye LM, eMalahleni LM, Steve Tshwete LM, Emekhazeni LM, Thembisile Hani LM, and Dr J S Moroka LM (**Figure 6.1**). Covering a total area of 16 756 km^2, the Nkangala DM makes up 22% of the Mpumalanga Province's land mass and has a population of approximately 1 572 051 (Nkangala District Municipality, 2017b; Quantec, 2020d). The Nkangala DM is abundant with minerals and natural resources and is said to be at the economic hub of the Mpumalanga Province. The Nkangala DM is host to the Maputo Corridor, which brings further opportunity for its economic growth (Nkangala District Municipality, 2017b). The economy of the Nkangala DM is driven by electricity, manufacturing and mining (Nkangala District Municipality, 2017b).

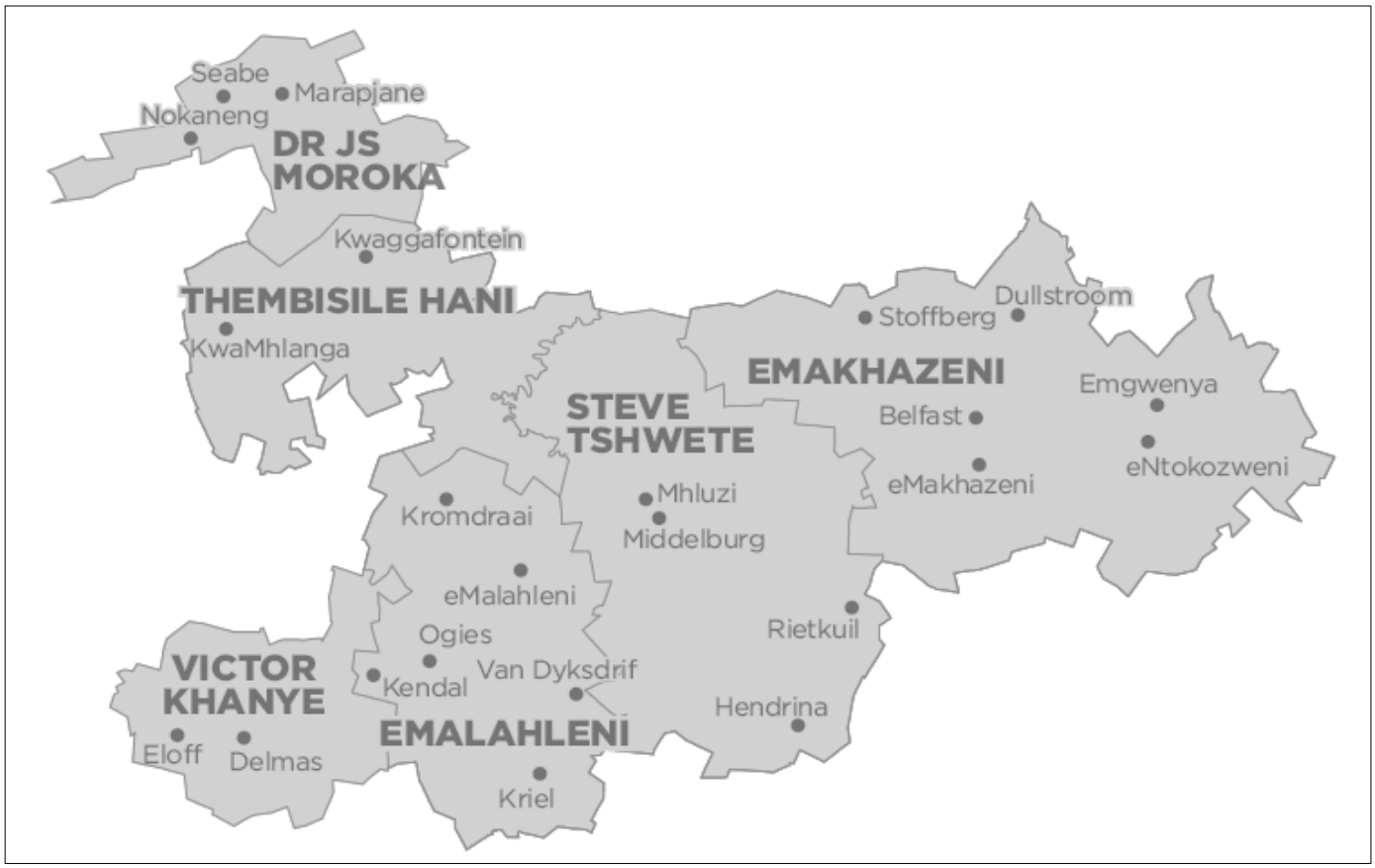

Figure 6.1: The six municipalities located in the Nkangala District Municipality (Municipalities of South Africa, 2018)

The eMalahleni LM has a geographical area of approximately 2 677 km^2 and consists of a number of towns, including Balmoral, Clewer, Coalville, Hlalanikahle, Kendal, Kriel, KwaGuqa, Lynnville, Matla, Minnaar, New Largo, Ogies, Paxton, Phola, Rietspruit, Thubelihe, Van Dyks Drif, Wilge, and eMalahleni (Nkangala District Municipality, 2017a). The eMalahleni LM contains one of the major urban concentrations in the Nkangala DM and the Municipality Province as a whole (Nkangala District Municipality, 2017a).

Predominantly an industrial area, the eMalahleni LM contains 27 economic hubs consisting of 883 businesses with main sectors such as manufacturing, trade, transport, finance and community services (Nkangala District Municipality, 2017a). Further aiding its economic development, the eMalahleni LM is located close to Gauteng with the N4 and N12 national roads facilitating transportation of goods manufactured in the municipality (Nkangala District Municipality, 2017a). The eMalahleni LM is considered a "gateway municipality" into the province for all but one of the nine provinces in South Africa (Emalahleni Local Municipality, 2016).

The site falls within Zone A: The Highveld/energy hub area as defined in the Environmental Management Framework for the Olifants and Letaba Rivers Catchment Areas (OLEMF). The zone represents the current powerhouse of South Africa with extensive coal fields that cover almost all of the area, numerous large coal mines, 6 coal fired power stations (soon to be 7), several major industries and towns that are located in the area.

6.2.2 Major towns and settlements

The proposed zero waste recovery plant is to be located within the Highveld Industrial Park. The closest towns to the park are Empumelelweni, KwaGuqa and KwaMthunzi Vilakazi (formerly known Clewer), which are approximately 3.9 km, 5.9 km and 7 km from the proposed site, respectively.

- Empumelelweni and KwaGuqa are townships located north of the proposed project site and separated from it by an open space and the N4 national road.
- KwaMthunzi Vilakazi is a settlement comprising agricultural holdings and a township, which is older than the town of eMalahleni itself. It is located close to the Kusile and Kendal Power Stations and is surrounded by a number of collieries and mines.

6.2.3 Locational Factors and Major Tourism attractions

Featuring mainly underground and opencast mines, the eMalahleni LM is considered to be the most industrialised LM in the Nkangala DM (eMalahleni Local Municipality, 2016). The eMalahleni LM possesses the largest concentration of power stations in the country and is thought to be the "energy heartbeat" of South Africa (eMalahleni Local Municipality, 2016).

While eMalahleni is known for its coal mines and power stations, the municipality is in the process of rebranding itself as the tourist destination by taking advantage of its tourism resources, such as the Witbank Nature Reserve and the Ezemvelo Nature Reserve, which are currently weekend tourist attractions for Gauteng residents (eMalahleni Local Municipality, 2016).

6.3 Climatic Conditions

The study area is situated in the Mpumalanga Highveld Region in the summer rainfall region of southern Africa. The climate is temperate with warm summers and cold, dry winters. Precipitation usually occurs in summer, as mist, rain and hail; convectional thunderstorms are common and the source of most precipitation. Hail can be expected to occur an average of 6 days per year. The average annual rainfall is between 624 mm and 713 mm with 85% of this falling in the high rainfall months between October and March. The highest rainfall in 24 hours was 129 mm, recorded at Ogies on 19 December 1986.

Average monthly temperature trends for the study area are presented in **Figure 6.2**. Average temperatures range between 11.3°C and 20.7°C. The highest temperatures occur in January and the lowest in June/July. During the day, temperatures increase to reach maximum at round 15:00 in the afternoon. Ambient air temperature decreases to reach a minimum at around 05:00, i.e., just before sunrise.

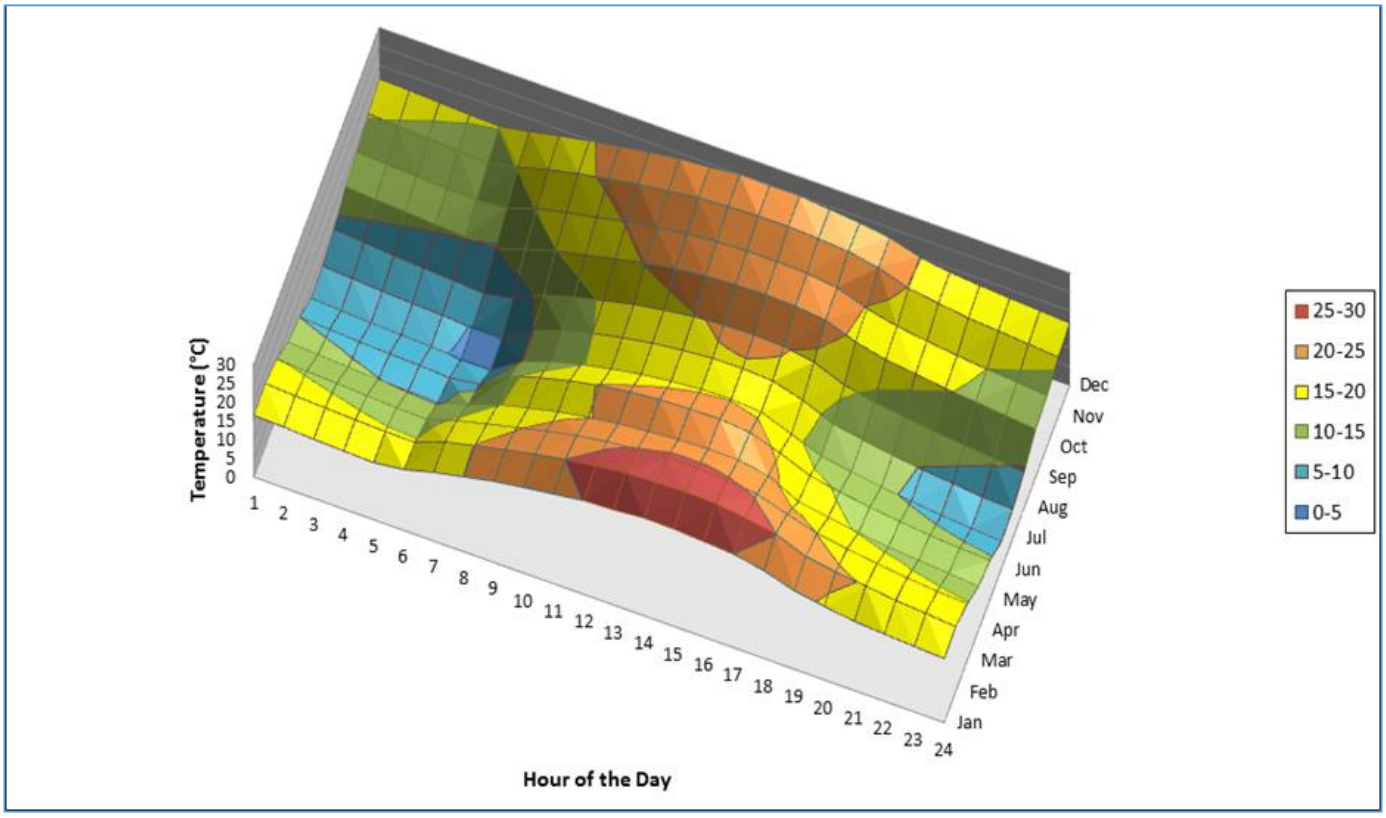

Figure 6.2: Monthly average temperature profile for SAWS eMalahleni (source: Airshed (2021))

Wind roses for the project site (refer to Figure X) indicate the predominance of the northerly, easterly and east-south-easterly winds with wind speeds of greater than 5 m/s, especially during the day. Winds from the north-westerly sector winds are also predominant during the day, albeit at slightly lower overall windrose speed. The night-time wind rose shows a decrease in the northerly and the north-westerly winds and an increase in the easterly and east-south-easterly winds. The night-time is also characterised by an increase in the frequency of calm wind conditions.

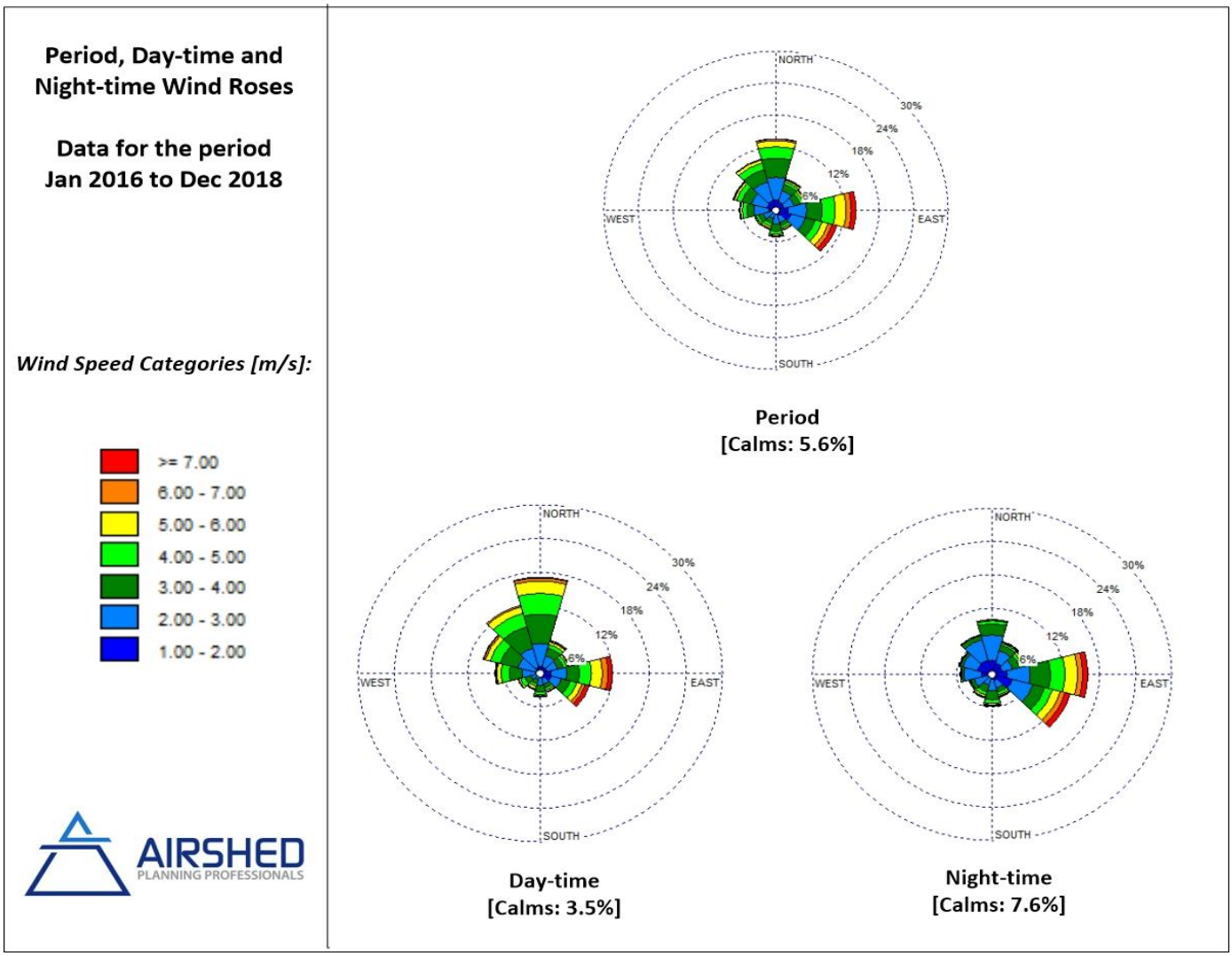

Figure 6.3: Period, day-and-night-time wind rose for eMalahleni for the period 2016 – 2018 (source: Airshed (2021))

6.4 Topographical profile

The proposed project site lies at an altitude between 1 480 and 1 560 metres above sea level (masl). In general, the topography of the site slopes downwards from north to south at a gradient of approximately 1m per 70 m and from west to east at a gradient of approximately 1m per 30 m.

6.5 Air quality profile

The project area is located within the Highveld Priority Area (HPA). The Highveld Airshed was the second priority area declared by the minister. This required that an Air Quality Management Plan for the area be developed. The plan includes the establishment of emissions reduction strategies and intervention programmes based on the findings of a baseline characterisation of the area. The implication of this is that all contributing sources in the area will be assessed to determine the emission reduction targets to be achieved over the following few years.

6.5.1 Sensitive Receptors

Sensitive receptors within a 10 km radius of the proposed operations (refer to **Figure 6.4)** include the residential areas of Kwa-Guqa, eMumelelweni and Hlalanikahle to the north, the residential areas of Ackerville, Thushanang, Schoongezicht and Lynnville to the east and Clewer to the south. KwaGuqa is a township west of the industrial town of eMalahleni and is the largest populated area within close proximity to the proposed development site (approximately 1 500 m north of the proposed development site at its closest point). There are also numerous schools, clinics and hospitals in the nearby residential areas. There are a large number of operations within a 50km radius that are sources of major emissions, including seven power stations and numerous mines.

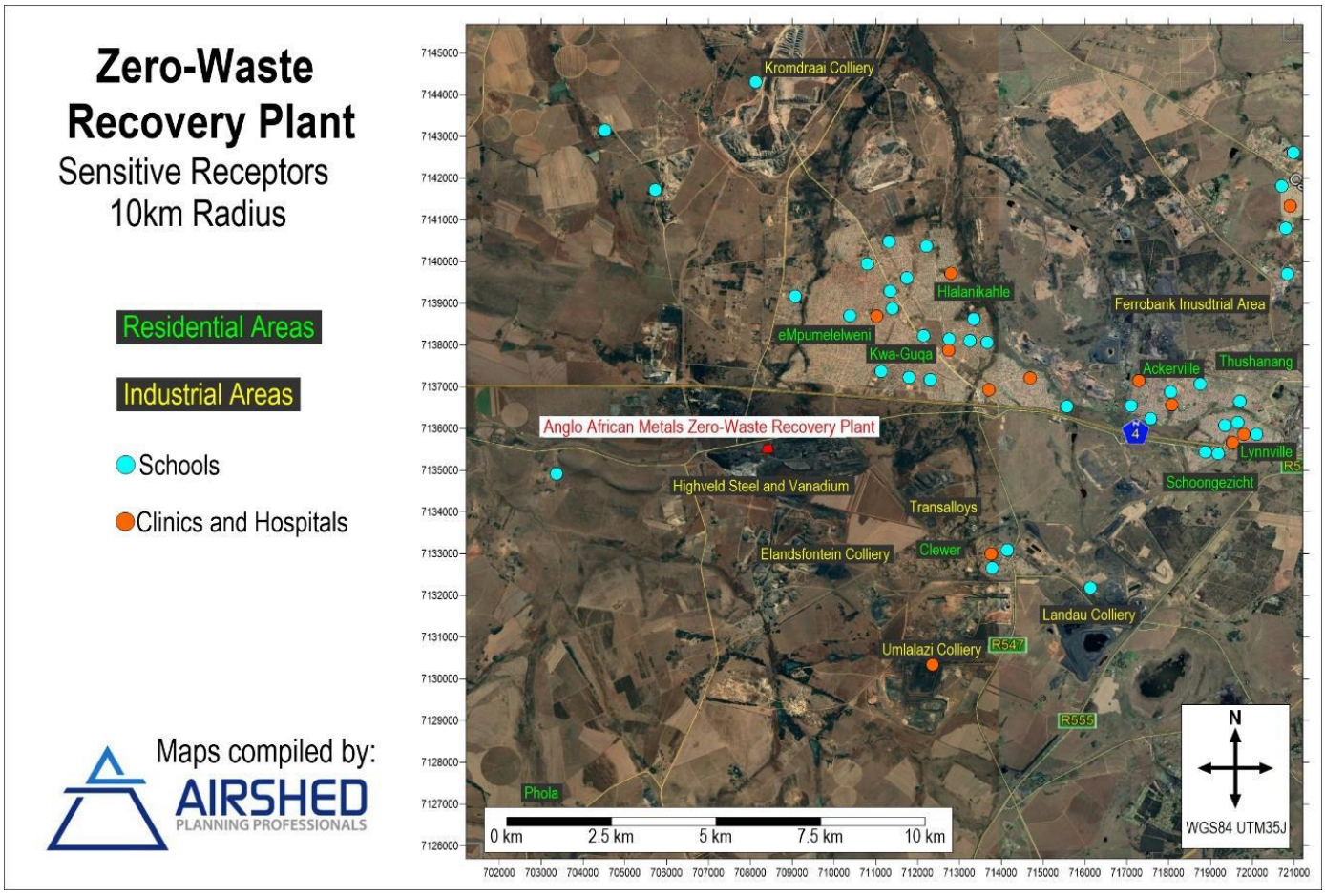

Figure 6.4: Sensitive receptors within 10km of the project site

6.5.2 Baseline Air Quality Monitoring Data

Ambient air quality data is measured at the Department of Forestry, Fisheries and the Environment (DFFE)-managed Witbank station (located approximately 9 km east of the proposed project location). A summary of ambient data measured at the SAWS managed eMalahleni station (located approximately 12.3 km northeast of the proposed project location) for the period 2020 is provided in **Table 6.1** (with exceedances of the NAAQS shown in red).

Table 6.1: Summary of the ambient measurements at eMalahleni for 2021 (units: µg/m³) (source: Airshed (2021))

Period	Availability	Maximum	Annual Average	No of recorded hourly exceedances
Hourly Concentrations				
NO_2				
2020	64%	122.7	23.2	0-
SO_2				
2020	95%	730.3	34.6	38
Daily Concentrations				
SO_2				
2020	100%	166.2	34.6	9
PM_{10}				
2020	37%	199.5	52.1	28
$PM_{2.5}$				
2020	48%	103.5	23.7	28

During 2020, the hourly 99th percentiles for SO_2 and NO_2 were below the limit values of 350 µg/m³ and 2020 µg/m³ respectively, but daily SO_2 concentrations exceeded the limit value of 125 µg/m³ on 9 occasions, while only 4 exceedances are allowed by the NAAQS.

The daily 99th percentiles for PM_{10} during 2020 exceeded the limit value (75 µg/m³). The daily 99th percentiles for $PM_{2.5}$ exceeded also the limit value (40 µg/m³). While the SO_2 and NO_2 annual averages were below the NAAQS, the PM_{10} and $PM_{2.5}$ annual averages exceeded the limit value of 40 µg/m³ and 20 µg/m³ respectively for 2020 at the SAWS eMalahleni monitoring station.

6.6 Geology and Soils

The proposed Anglo African Metals Zero Waste Recovery Solution is depicted on the 1: 250 000 2528 Pretoria Geological Map (1978) (Council for Geosciences, Pretoria) (**Figure 6.4**). The proposed development is underlain by the Undifferentiated Ecca Group (Pe) (Vryheid Formation). West of the proposed development is a large area underlain by the Dwyka Group (Pd) as well as basalt (di) and formations of the Pretoria Group (Transvaal Supergroup). Sedimentary rocks of the Dwyka and Pretoria Groups in and near the study area are intruded, and locally metamorphosed, by sills of diabase (di, green in **Figure 6.4**).

The soils are of the plinthic catena: dystrophic (rich in organic matter, usually in the form of suspended plant colloids, but of a low nutrient content) and/or mesotrophic (intermediate levels of primary productivity, with intermediate levels of mineral nutrients required by plants).

Figure 6.4: Extract of the 1:250 000 2528 Pretoria Geological Map (1978) (Council of Geoscience) indicating the surface geology of the proposed development.

6.7 Ecological Profile of the Study Area and the Development Area

The study area is situated within the Grassland Biome and within the Mesic Highveld Grassland Bioregion. The proposed development site is located in a large existing industrialised area surrounded by several heavy industries and mining operations. It is a brownfields site that has already undergone extensive transformation. No natural vegetation remains on the site.

The study area falls within an area that is currently not protected. The study area is not situated within close proximity (within 10km) of an Important Bird Area (IBA). According to SAPAD (Q1, 2019), the John Cairns Private Nature Reserve is situated ± 9.5 km southeast of the study area. There are no other protected or conservation areas situated within 10 km of the study area (Scientific Terrestrial Services CC, 2019). No sensitive areas fall within the site (refer to **Figure 6.5**).

6.8 Visual Aspects

The region within which the study area is situated is characterised by gently rolling topography with no prominent natural landforms. The vegetation cover consists mainly of grazing and cropland, interspersed with clumps of exotic trees, mainly Eucalyptus and wattle.

The area to the west is characterised by relatively low levels of development (with the exception of the Kusile Power Station). A number of large industrial and mining complexes are located to the north, east and south of the Highveld Steel property. In these areas, the pre-existing visual landscape has been significantly altered by expansive infrastructure and landforms that contrast with their surroundings due to their geometric shapes and are generally dark colours. The proposed development site falls within the Highveld Steel property, which has been transformed to industrial uses.

6.9 Heritage Profile

Established in 1903, the town of eMalahleni (Witbank) was named after a ridge of white rock located near the present railway station, which was a halting place for transport wagons and a place of trading (eMalahleni LM, 2015). The principal language in the eMalahleni LM is Zulu, followed by Afrikaans and Northern Sotho.

The LM's concentration of industrial activities is reflected in its heritage places that exhibit a rich historical background, specifically industrial and military history, architectural and engineering sites and historical gravesites (eMalahleni Local Municipality, 2016). The town has a number of cultural heritage sites, such as the Battle of Bakenlaagte site, Clewer railway station and the Roodebloem farmstead.

The town of KwaGuqa is host to a number a valuable heritage resources including historical church buildings and houses, the Indian Cemetery and structures associated with mining activities (eMalahleni LM, 2015). The conservation and protection of these heritage places, especially those around the town of eMalahleni and KwaGuqa, have been identified as a priority for government (eMmalahleni Local Municipality, 2016).

The proposed plant falls within the boundaries of the existing Highveld Industrial Park and is completely transformed due to the industrial activities within the site. No heritage sensitive features were identified in the study area during the desktop heritage study undertaken for the proposed project.

A controlled surface survey was conducted on foot and vehicle by an archaeologist from PGS on 5 March 2021. No heritage resources were identified in the study area during the field survey.

The SAHRIS palaeontological sensitivity map rates the study as underlain by geological strata with a Very High palaeontological significance. However, the palaeontological desktop assessment has considered the potential impact and due to the disturbed nature of the site has concluded that no further fieldwork will be required but that a change finds protocol must be implemented as provided in the palaeontological desktop assessment (Butler, 2021).

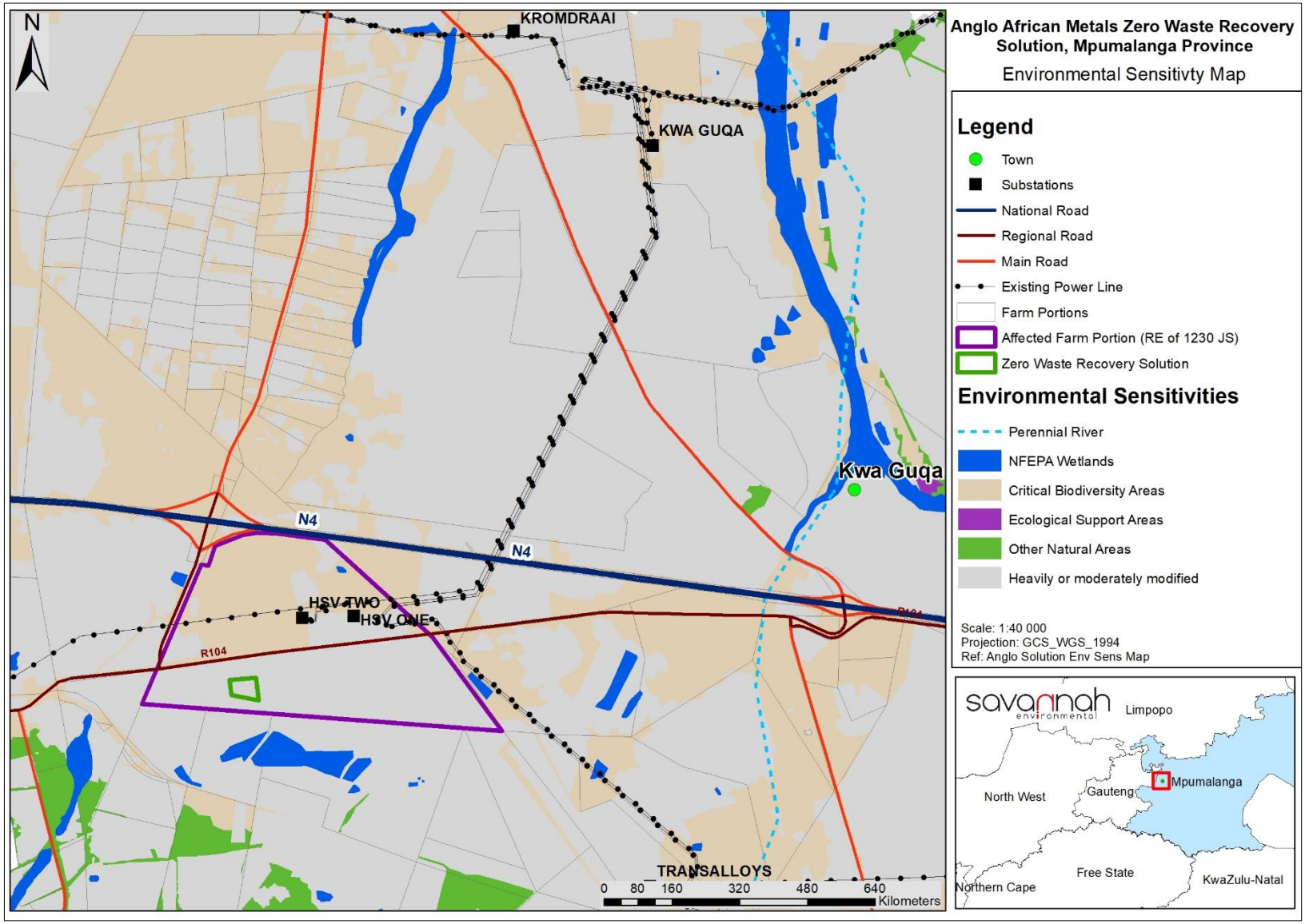

Figure 6.5: Environmental Sensitivity Map for the Anglo African Metals Zero Waste Recovery Solution

6.10 Social Context

6.10.1 Demographic Profile

Population Demographics

In 2019, the eMalahleni LM had a population of approximately 477 938 people comprising of 145 605 households (Quantec, 2020f). The average household size of in the region was approximately 3.3 people during the year (Quantec, 2020f). The eMalahleni LM has the second largest population concentration in the Mpumalanga Province and accounts for the largest proportion of population in the Nkangala District, as well as the highest population growth in the District (Emalahleni Local Municipality, 2016; Quantec, 2020d).

Of the total population, 84.9% are Black African and 12.7% are White, with the remaining 2.4% being Coloured, Indian or Asian (Quantec, 2020f). The majority of residents in the municipality fall in the 30 to 44 age category (30.0%), followed closely by the 15 to 29 age category (27.0%) (Quantec, 2020e). The male population exceeds that of the female population by approximately 9.2 percentage points (Quantec, 2020e).

The demographic profile in the eMalahleni LM is indicative of the economic structure of the municipality and its historical development, which was dependent on the establishment of the mining and electricity generation sectors. Areas that have a relatively large presence of the mining sector, tend to have a higher proportion of male population and population within a working age group due to the settlement structures designed to accommodate a single-living, working male population employed in the mining sector.

Income Levels

According to the Census 2011[9], nearly half of households (46.0%) in the eMalahleni LM earned between R0 and R3 200 a month, with over 9 161 households (6.5%) having no source of income (Stats SA, 2011). In 2012, the average annual household income in the eMalahleni LM was ranked third after Steve Tshwete and Govern Mbeki (Emalahleni Local Municipality, 2016). However, it could be argued that due to the proximity of the location of the municipality relatively to the economic hubs of Ekurhuleni and Johannesburg, many of the higher income groups of households who have members working in the municipality reside outside the eMalahleni LM.

Education Levels

Approximately 5.5% of adults aged 20 and above in the eMalahleni LM have no formal schooling whatsoever as of 2019 (Quantec, 2020d). Approximately 9.0% of adults have some primary schooling; 4.1 per cent of adults have completed only primary schooling (Quantec, 2020d).

The majority of adults in the region have at least some secondary schooling (35.5%), while 30.1% of the adult population have obtained a matric certificate. Approximately 13.3% of adults aged 20 and above in the eMalahleni LM have obtained a higher education qualification, with 10.8% having obtained a diploma or certificate and 2.5% having obtained at least a Bachelor's degree.

The low to moderate levels of education correlates with the types of industries which comprise the economic base of the municipality, such as the mining industry that is known to have many low- to semi-skilled workers.

[9] The use of 2011 data is due to the unavailability of the more recent data on income levels at a local municipality level.

6.10.2 The Economy

In 2019, the eMalahleni LM's economy was valued at R45 826 million (in current prices), contributing 13.4% to Mpumalanga Province's total economy's gross value added (GVA) (Quantec, 2020g). Accounting for nearly half of this value (47%), the mining and quarrying sector was by far the biggest contributor to the municipality's economy in 2019. The sector with the highest economic growth rate, though, was the construction sector with a Compounded Annual Growth Rate (CAGR) of 4.3% between 2010 and 2019. Over the same period, the manufacturing and electricity, water and gas sectors contracted by 0.4% and 0.5%, respectively.

6.10.3 Labour Force and Employment Structure

Labour Force Composition

Of the total working age population in the eMalahleni LM, approximately 47.7% were employed in 2019 (Quantec, 2020c). However, as 110 264 individuals were not economically active (NEA)[10], the municipality had an unemployment rate of 30.3% during the year.

The unemployment rate in 2019 was slightly lower in the Nkangala District and the Mpumalanga Province with unemployment rates of 33.3% and 30%, respectively. The labour participation rate of the eMalahleni LM was approximately 10 percentage points higher than that in the Nkangala DM and Mpumalanga Province during the year. These findings are in line with eMalahleni LM being the "economic hub" of the province.

Employment Structure

The mining and quarrying sector accounted for the largest percentage of jobs created in the eMalahleni LM in 2019, with 29% of the employed population in the municipality being absorbed by this sector (Quantec, 2020a). The next highest contributor to employment during the year was the wholesale and retail trade, catering and accommodation sector, accounting for 16% of total jobs in the region. The agriculture, forestry and fishing sector was the eMalahleni LM's smallest contributor to employment in 2019 at 2%.

Approximately 20% of the employed in the eMalahleni LM were active in the informal sector in 2019. Of the remaining 80% employed in the formal sector, approximately 17% were considered skilled workers, while the majority of workers (62%) in eMalahleni LM were classified as semi-skilled. Low-skilled workers accounted for approximately 21% of employment in the municipality in 2019.

6.10.4 Status of infrastructure and basic service delivery

Basic service delivery

In 2019, 72.8% of households in the eMalahleni LM had access to electricity. Of the households who did not have access to electricity, 23.9% utilised candles for lighting while the remaining households made use of paraffin, gas, solar and other unspecified sources for lighting (Quantec, 2020b).

The majority of the population (88.3%) in the eMalahleni LM had access to piped water within 200m of their dwelling in 2019, with 53.9% and 25.0% having access to piped water inside their dwelling and inside their yard, respectively. Approximately 8.6% of individuals who did not have access in their dwelling or yard had access to piped water within 200m of their dwelling; 6.1% of households had access to piped water beyond

[10] NEA persons are those who are not actively seeking employment due to various reasons including being discouraged to look for employment opportunities.

200m from their dwelling. The remaining 5.4% made use of other water sources, such as boreholes, rainwater tanks, wells, water-carriers, water vendors and other unspecified sources.

In 2019, 68.0% of the eMalahleni population had refuse removal done by their local authority, with approximately 66.6% having their refuse removed by the local authority at least once a week. Other means of refuse removal in the municipality included the use of their own rubbish dump (21.3%) and communal refuse dumps and other unspecified means (3.8%). The remaining 7.0% of residents in eMalahleni LM did not have access to refuse removal.

Approximately 70.7% of households in the eMalahleni LM had access to a flush or chemical toilet in 2019. The other toilet facilities, pit latrine and bucket latrines, were used by 24.7% of households in eMalahleni. Approximately 4.6% of the population in the region had no toilet facilities in 2019. This may be an indication of a sanitation problem in the municipality.

Status of Social Facilities

The eMalahleni LM boasts a number of healthcare facilities. The municipality has six hospitals, 15 fixed clinics and three mobile clinics (Emalahleni LM, 2020). There is at least one clinic in every town. It has been suggested, however, that due to the population size in Lynnville, KwaGuqa and Hlalanikahle, there may be a need for the development of more clinics.

In terms of safety, the municipality has a total of five police stations in eMalahleni, Kriel, Phola, Vosman and Ogies (Emalahleni LM, 2019). However, safety remains a matter of concern in the municipality as there is a high prevalence of crime due to a large number of unemployed youth and drug abuse in the community. The establishment of satellite police stations have been identified as a need in many communities in the region (Emalahleni LM, 2020).

As of 2015, the eMalahleni LM has 34 preschools, 58 primary schools and 19 secondary schools, with an identified lack of education facilities in Hlalanikahle (Emalahleni LM, 2015). In terms of higher education, there are four tertiary facilities in the municipality, namely the Tshwane University of Technology, Pretoria University, UNISA and eMalahleni College (Emalahleni LM, 2015). The municipality also has other tertiary institutions such as the Mpondozankomo Technical College in Ackerville and the Coal Training College in Klipfontein. The development of additional adult basic education and training (ABET) and other skills training facilities in the municipality has been identified to be necessary to improve the socio-economic status of the population given the low literacy and employment levels.

6.10.5 Site related information: zone of influence baseline

The site-related information section investigates the various dynamics of the proposed site. As of 2015, the eMalahleni LM has six major industrial areas, which consist of approximately 591 developed and 279 vacant industrial erven (Emalahleni Local Municipality, 2015). The proposed waste recovery plant is planned to be located in one of the existing industrial areas, the Highveld Industrial Park.

The Highveld Industrial Park is approximately 10km west from the CBD and has an estimated area of 1 700ha (Emalahleni Local Municipality, 2015). The two nearest towns to the Highveld Industrial Park are the KwaGuqa township, which is located approximately 5.9km from the complex, and the small town of Clewer, which is located approximately 7.0km away from the complex. The Highveld industrial Park is leasing infrastructure and property, which previously formed park of the Integrated Steelworks operation of Highveld Steel, to tenants operating industrial processes. The proposed waste recovery plant will therefore be situated

in an area which is already cordoned off for manufacturing purposes. Subsequently, it is expected that the proposed plant will have very little additional effect on the surrounding areas.

CHAPTER 7 ASSESSMENT OF IMPACTS

This chapter serves to assess the significance of the positive and negative environmental impacts (direct, indirect and cumulative) expected to be associated with the proposed project. This assessment has considered the construction and operation of a zero waste recovery plant within a development footprint of approximately 4ha in extent (it is assumed that100% of the 4ha development area will be cleared for the establishment of the zero waste recovery plant and associated infrastructure) within the EVRAZ Highveld Steel and Vanadium Property[11]. The main infrastructure associated with the facility includes the following:

- Chemical plant area, where all process chemicals including acid are produced, stored and handled as required by the waste recovery process.
- Substation and plant utility unit as interface and controlling unit for the electricity utilised by the plant during operation.
- Slag stockpile.
- Crushing plant.
- Mill.
- Product area for storage of the various products produced through the recovery process.
- Reagent area, for the storage and handling of reactants utilised in the waste recovery process.
- Fuel storage area with a fuel storage tank (or tanks, as required) of up to 70m^3 for the bulk storage of gas (LPG or similar) utilised in the waste recovery process.
- A security area.
- Parking lot.
- Admin and control room including offices and ablutions for staff.

The full extent of the project site was considered through the EIA process by the independent specialists and the EAP. A development footprint for the zero waste recovery plant within the project site was proposed by the developer. Since the full extent of the project site, including the development footprint, has undergone extensive transformation, no sensitive environmental features were identified through the EIA process.

A layout for the zero waste recovery plant was designed within the development footprint. The layout/development footprint of the plant is considered most suitable due to its proximity to the slag resource situated on the property.

[11] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

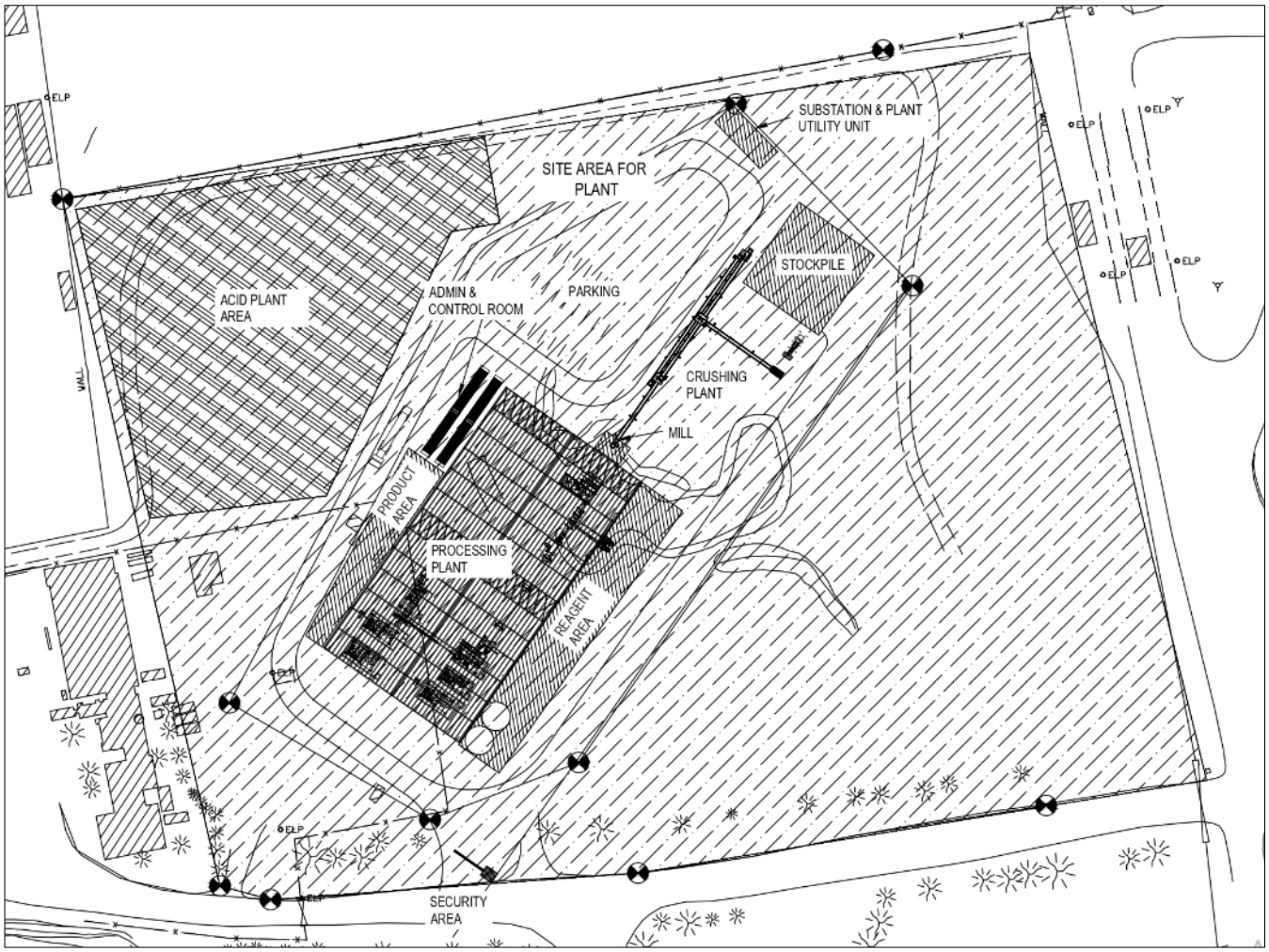

Figure 7.1: Layout considered for the Zero Waste Recovery Plant

7.1 Potential impacts identified during the Scoping Study

Impacts/ issues identified through the Scoping process requiring assessment in the EIA Phase, as detailed in the Plan of Study, include the following:

» Impacts on Heritage & Palaeontology
» Impacts on Air Quality
» Socio-Economic impacts

7.2 Quantification of Areas of Disturbance on the Site

The project development footprint being assessed for the Anglo African Metals Zero Waste Recovery Solution requires an area of approximately 4ha (equivalent to just over 1% of the broader site). Supporting infrastructure included within the 4ha area includes internal roads, internal water, air and gas pipelines, control and electrical buildings (including a central control room), administrative buildings, firefighting systems, bulk water storage, storage facilities for fuels, gas and chemicals, emergency back-up generators, and effluent reticulation systems. Existing access roads to the broader site will be used during the construction and operational phases.

7.3 Assessment of Impacts on Heritage Resources

The proposed zero waste recovery plant will have a projected minimal impact on heritage resources within the project area due to extensive historical disturbance of the footprint by industrial activity. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E** for more details).

7.3.1 Results of the Heritage Impact Assessment (including palaeontology desktop assessment)

No heritage resources were identified within the study area through the desktop study, and during the fieldwork survey conducted on 5 March 2021. The SAHRIS palaeontological sensitivity map rates the study area as underlain by geological strata with a Very High palaeontological significance. However, the palaeontological desktop assessment has considered the potential impact and due to the disturbed nature of the site has concluded that no further fieldwork will be required, but that a chance finds protocol must be implemented as provided in the palaeontological desktop assessment (Butler, 2021).

7.3.2 Description of the Heritage Impacts

Due to the level of disturbance of the area, no impact on heritage resources is envisaged. The proposed development will however have a potential negative impact on fossil heritage.

7.3.3 Impact tables summarising the significance of impacts on heritage related to the Zero Waste Recovery Plant and associated infrastructure during construction (with and without mitigation)

Nature: *Impact on Palaeontological Heritage*

The excavations and clearing of vegetation during the construction phase consist of digging into the superficial sediment cover as well as underlying deeper bedrock. These excavations will change the existing topography and may possibly damage, destroy or even permanently close-in fossils at or below the surface of the ground. These fossils will then be lost for research.

Impacts on Palaeontological Heritage are likely to happen only within the construction phase. No impacts are expected to occur during the operation phase.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term/Permanent (5)	Long-term/Permanent (5)
Magnitude	High (8)	Moderate (1)
Probability	Highly Probable (4)	Improbable (1)
Significance	**Medium (42)**	**Low (7)**
Status (positive or negative)	Negative	Neutral
Reversibility	Irreversible	
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation procedure:

Chance Find Procedure

» If a chance find is made the person responsible for the find must immediately stop working and all work must cease in the immediate vicinity of the find.
» The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the Environmental Officer (EO) (if appointed) or site manager. The EO

must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) and the local heritage authority. The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.

» A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
» Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the EO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

» The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
» In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the EO (or site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
» Once Heritage Agency has issued the written authorization, the developer may continue with the development.

Residual Impacts:
Loss of fossil heritage.

7.3.4 Implications for Project Implementation

Due to the level of disturbance of the area, no impact on heritage resources is envisaged. The impact on palaeontological heritage was also determined to be of Medium significance due to the disturbed character of the area. For this reason, it is unlikely that the proposed project will lead to detrimental impacts on the palaeontological resources of the area. To ensure that impacts on palaeontological resources remain of low significance during the construction phase, it is recommended that a chance find procedure be implemented.

From a heritage perspective, it is the specialist's opinion that the overall impact on heritage resources will be low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved.

7.4 Assessment of Impacts on Air Quality

Impacts on air quality associated with the development are expected to occur during the construction, operational and decommissioning phases. Potential impacts and the relative significance of impacts are summarised below (refer to **Appendix D** for mor details).

7.4.1 Results of the Air Quality Impact Assessment

The project area is located within the Highveld Priority Area (HPA). Sensitive receptors within a 10 km radius of the proposed operations (refer to **Figure 7.2)** include the residential areas of Kwa-Guqa, eMumelelweni and Hlalanikahle to the north, the residential areas of Ackerville, Thushanang, Schoongezicht and Lynnville to the east and Clewer to the south. KwaGuqa is a township west of the industrial town of eMalahleni and is the largest populated area within close proximity to the proposed development site (approximately 1 500m

north of the proposed development site at its closest point). There are also numerous schools, clinics and hospitals in the nearby residential areas. There are a large number of operations within a 50km radius that are sources of major emissions, including seven power stations and numerous mines.

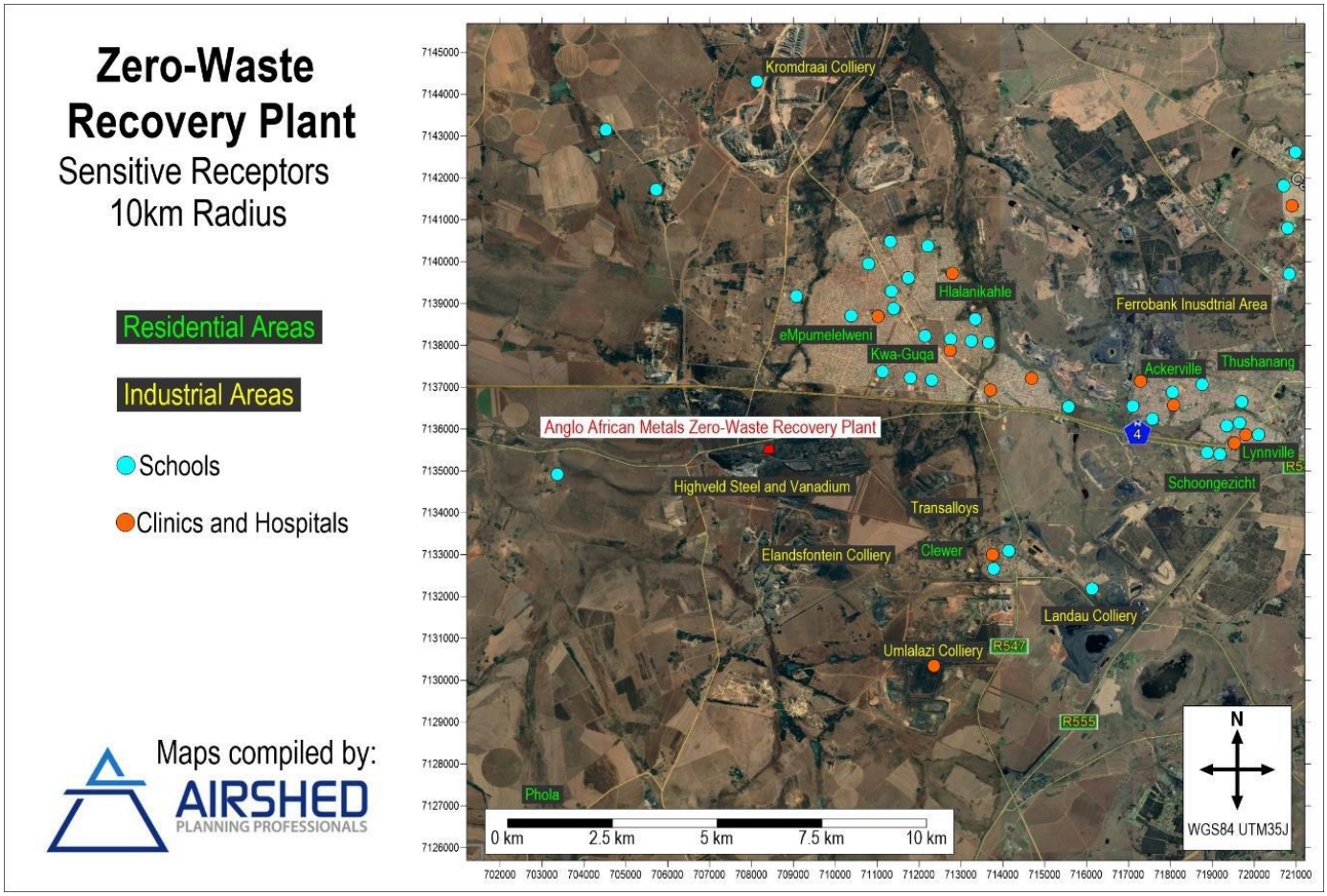

Figure 7.2: Sensitive receptors within 10km of the project site

7.4.2 Description of Potential Air Quality Impacts

The impact of the project on ambient air quality was simulated using the AERMOD model. Simulated meteorological data for the eMalahleni area was acquired for the period January 2016 to December 2018. The wind field showed the predominance of northerly, easterly and east-south easterly winds. The assessment of the impact of the project assumed that all pint sources from the operations will comply within the minimum emission standards (MES)for processing or recovery of metallurgical slag as required by legislation. Simulated pollutant concentrations were compared against the NAAQS. Simulated nuisance dust-fall rates were compared against the National Dust Control Regulations (NDCR) for non-residential and residential areas.

The following key issue has been identified and assessed during the air quality impact assessment:

» Elevated ambient concentrations of particulate and gaseous atmospheric pollutants.

7.4.3 Impact tables summarising the significance of impacts on air quality during construction and operation (with and without mitigation)

Nature: *Impact on air quality during construction and decommissioning*

Construction (and decommissioning) activities are likely to result in emissions of particulate and gaseous pollutants due to civil and building work and from vehicle traffic. The nature of emissions from construction activities is highly variable in terms of temporal and spatial distribution and is also transient. Increased ambient concentrations of fine particulates and gaseous pollutants may result in negative human health impacts. Increased nuisance dustfall is likely as a result of wind-blown dust emissions from the working areas. Increased nuisance dustfall rates will likely result in negative impact on dustfall in the immediate vicinity of the construction area.

Unmitigated particulate emissions could result in higher particulate concentrations and dust fallout in the immediate vicinity of the plant, but are unlikely to result in any noticeable impact any identified sensitive receptor locations. The impact of gaseous pollutants is likely to minor.

	Without mitigation	**With mitigation**
Extent	Low (1)	Low (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	Possible	Possible
Can impacts be mitigated?	Yes, with minimum control efficiency of 50%.	

Proposed mitigation measures:

» Wet suppression at key handling points or cleared areas, and on unpaved roads.
» Trucks to be restricted to specified roads and using the most direct route
» Reduce unnecessary traffic.
» Strict on-site speed control.
» Reduction of extent of open areas to minimised the time between clearing and infrastructure construction, and/or use of wind breaks and water suppression to reduce emissions from open areas.
» Restriction of disturbance to periods of low wind speeds (less than 5 m/s).
» Stabilisation of disturbed soil (for example, chemical, rock cladding, or vegetation).
» Re-vegetation of cleared areas as soon as practically feasible.

Residual impacts:
Expected to be low if mitigation measures are properly implemented.

Nature: *Incremental potential impact associated with the operational phase*

Elevated ambient concentrations of particulate and gaseous atmospheric pollutants as a result of Zero-Waste Recovery Plant operational activities as described in the Atmospheric Impact Report included in Appendix D.

	Without mitigation	**With mitigation**
Extent	Low-Medium (2)	Low-Medium (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (30)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes

Can impacts be mitigated?	Yes	Yes
Mitigation: » The Zero-Waste Recovery plant must be designed and suitable abatement technologies implemented to ensure that point source emissions comply with the Subcategory 4.20 MES. » Best available technology mitigation measures are recommended for fugitive dust sources, these include: o Paving of all on-site roads. o Regular sweeping of on-site paved roads. o Clean-up of all spillages to avoid re-entrainment. o Implementation of strict on-site speed limits. o Mitigation of crushing plant emissions, either by water sprays or enclosure with dust extraction. o Control of dust emissions from stockpiles during periods of high wind speeds.		
Residual Risks: If all fugitive dust sources are properly managed, no residual impact is expected post closure.		

7.4.4 Implications for Project Implementation

The extent of incremental impacts during the operational phase of the zero waste recovery plant are expected to be localised to the vicinity of the operations, with possible exceedances of the SA NAAQA simulated outside the property boundary, but simulated impacts are negligible to all sensitive receptor locations. The duration of the impacts is expected to be long-term (for the life of the project), while the magnitude of impacts is expected to be medium for particulate emission, low to medium for gaseous pollutants (SO_2 and NO_2), and low for dust fallout.

Impacts during the construction phase are expected to be transient and highly variable from day to day, depending on the construction activities being performed.

From an air quality perspective, it is the opinion of the specialist that the zero waste recovery plant be authorised and licensed to operation, on condition that:

» Emissions comply with the subcategory 4.20 minimum emission standards.
» The following mitigation measures be implemented to control fugitive dust emissions from operations and minimise the impact of particulate emissions on the receiving environment:
  o Paving of all on-site roads. While the surface moisture content of unpaved roads can be increased with water bowsers, it is much easier to control the silt loading on paved roads.
  o Regular sweeping of on-site paved roads to reduce silt loading on the road surface, higher silt loading results in higher vehicle entrainment emissions.
  o Clean-up of all spillages to avoid re-entrainment by vehicles.
  o Implementation of strict on-site speed limits.
  o Mitigation of crushing plant emissions, either by water sprays or enclosure with dust extraction.
  o Control of dust emissions from stockpiles during periods of high wind speeds, either by increasing moisture content of material with water sprays, or by decreasing wind speeds using enclosures or bund walls
» Stack testing needs to be conducted as indicated on the AEL for the operations.
» Dust fallout sampling be conducted on the facility boundary in the four cardinal wind direction.

7.5 Assessment of Socio-Economic Impacts

Impacts on the socio-economic environment associated with the development are expected to occur during both the construction and operation phases of the project. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix F** for more details).

7.5.1 Results of the Socio-Economic Impact Assessment

The review of key national, provincial, and local policy documents indicates that the development of the plant is supported at all levels from a socio-economic perspective. The promotion of the manufacturing sector has been identified as a key area of priority across the documents which were assessed. Furthermore, the creation of jobs due to the development of the plant and the contribution of the plant to a zero-waste society is directly in line with the identified policy documents. After considering the reviewed documentation, no fatal flaws or contraventions from a socio-economic policy perspective exist for the implementation of the proposed project.

The eMalahleni LM is considered to be the economic hub of the Mpumalanga Province and contributes substantially to the province's GDP-R. As the CAGR indicates that the manufacturing sector in the eMalahleni LM has experienced a contraction of 0.4% between 2010 and 2019, the development of the proposed facility may contribute to the revitalisation of the sector and contribute to improved living standards among local households and a reduction in the region's unemployment rate. The economic implications of the proposed waste recovery facility can therefore be summarised as follows:

- Firstly, the project is expected to contribute to the provincial economic capacity in terms of production and GDP-R arising from capital expenditure during both the construction and operations phases.
- Secondly, the development of the proposed facility is likely to contribute to the alleviation of the municipality's unemployment rate and the transference and accumulation of skills in the local labour force. Skills transfers during both the construction and operations phases will improve the marketability of local labourers and enhance their employability. Furthermore, an increase in the number of employed individuals will contribute to elevated household expenditure and standards of living.
- Thirdly, increased capital expenditure, labour employment, household spending and improved economic capacity will contribute to government revenue streams via direct and indirect tax collections. An increase in government revenue allows the public sector to maintain the existing infrastructure and improve on its service delivery.
- Lastly, the development of the waste recovery facility will broadly contribute to the derivation of value from existing industrial waste.

The above suggests that the economy can utilise the investment to diversify its economic base and lead to the improvement of standards of living among local households through the increased income levels and access to improved services, which can be achieved by raising the LM's revenue base through taxes and rates paid by new businesses. The proposed project is therefore likely to create a positive impact on the local economic development and the socio-economic environment in the municipality in general. The table below summarises the socio-economic impacts. Overall, numerous positive socio-economic impacts will ensue as a result of the facility.

7.5.2 Description of Socio-Economic Impacts

Impacts during the Construction Phase

Positive impacts during the construction phase will include an increase in economic production, an increase in the country's gross domestic product (GDP), an increase in employment opportunities and skills development, increased household incomes, leading to improved standard of living, as well as an increase in government revenue. The biggest negative impacts will be on local service delivery and economic infrastructure in the local municipality, as well as the availability of housing.

Impacts during the Operational Phase

In terms of the operational phase, the negative impacts will be limited to heightened pressure on local service delivery and economic infrastructure, as well as potential health risks due to cumulative impacts of existing industry and the proposed facility.

Similar to the construction phase, the positive impacts during the operational phase will include an increase in economic production, and increase in the country's GDP, creation of employment opportunities, skills development, increased household incomes and standard of living, as well as an increase in government revenue.

7.5.3 Impact tables summarising the significance of socio-economic impacts during the construction and operation phases (with and without mitigation measures)

Impacts during the Construction Phase

i) Economic Impacts

The economic impact resulting from the initial investment will be experienced throughout the economy with windfall effects contributing to related sectors of the economy. The effect is defined according to the direct, indirect and induced impacts, culminating into the "multiplier effect". The various impacts or spill-over effects advance throughout the economy, contributing to augmented production levels. The initial investment spend will bring about a production effect where manufactures and suppliers of goods and services would encounter a need to increase current production levels by increasing labour absorption and operational capacity. Downstream effects will produce a consumption-induced effect on the wider economy – as employment remuneration increases and consumer expenditure rises – thereby raising the sales of goods and services in the surrounding economy.

Table 7.1 and **Table 7.2** illustrate the economic impact during the construction phase of the project. It illustrates the impact during the construction phase and the contribution it will have on the economy in terms of production, GDP, employment and income.

Table 7.1: Economic Impacts during Construction (Rand million, 2017 prices)

Impact of the Capex	Direct	Indirect	Induced	Total Production
Impact: Production Rand	R62,14	R95,15	R28,02	**R185,31**
Impact: GDP Rand	R15,87	R37,34	R11,93	**R65,14**

Impact: Income Rand	R27,00	R18,69	R5,68	**R34,61**

Table 7.2: Impact on employment during construction (numbers)

Impact of the Capex	Direct	Indirect	Induced	Total
Impact: Employment	300	249	58	**607**

Nature: *Temporary increase in production during construction*

The construction of the proposed waste recovery plant will include activities such as engineering and design, infrastructure and location development, construction of facilities, installation of equipment and machinery, and other commercial activities affiliated with the construction of the plant.

The initial construction-affiliated activities required for the proposed waste recovery facility will occur over one year, as the construction of the facility is not expected to exceed 12 months. The investment in the development of the waste recovery facility is valued at R62,14 million in 2017 current prices. This is forecast to amount to a total impact on provincial production of R185,31 million (2017 prices). This denotes that every R1 invested during the construction phase of the facility will generate R2.98 of new commercial sales throughout the economy.

The impact takes place due to the investment on the project that will be spent in the province. Besides the direct impact, it involves the indirect and induced effects that are created when either suppliers of goods and services to the project experience an increase in demand, or when businesses servicing households experience an increase in demand for their products.

	Without enhancement	**With enhancement**
Extent	Regional (4)	Regional (4)
Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Minor (2)
Probability	High (4)	Highly (4)
Significance	**Low (28)**	**Low (28)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» The impact is positive; measures to maximise the stimulation of the economy may include procurement of goods and services from local businesses where feasible.

Residual Impact:

Short term economic injection into the local and regional economy.

Nature: *Temporary increase in provincial GDP-R during construction*

A country's gross domestic product (GDP) is the total value of all "final" goods and services produced within its borders in a one-year period. The predominant approach of expanding GDP levels is by means of investment in infrastructure and enterprises that generate goods and services. Investment into the production of new and improved goods and services foster elevated levels of value added within the economy.

The establishment of the proposed waste recovery facility is anticipated to cost R62,14 million (2017 prices) and will generate R65,14 million of value added throughout the economy, of which the biggest portion will be generated through production-induced effects (or indirect impacts). Industries that will experience the largest temporary growth in value added will include the building and construction, manufacturing, and real estate and business services sectors.

The impact is generated through capital expenditure that heightens activity in the economy. It results in growth of sectors that include businesses supplying goods and services necessary for the development of the waste recovery facility and businesses that benefit from the increased consumer expenditure.

	Without enhancement	**With enhancement**
Extent	Regional (4)	Regional (4)
Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Minor (2)
Probability	High (4)	High (4)
Significance	**Low (28)**	**Low (28)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» Recruit local labour.
» Sub-contract to local construction companies.
» Use local suppliers where viable and arrange with local SMMEs to provide transport, catering and other services for the construction crew.

Residual Impact:
Short term economic injection into the local and regional economy.

Nature: *Temporary increase in employment opportunities during construction*

The unemployment rate in the eMalahleni LM stood at 30.3% in 2019 and the number of employed individuals has been increasing for the past 16 years (Urban-Econ Calculations based on Quantec, 2020c). The establishment of the proposed plant is expected to create 607 jobs over the construction period with the building and construction sector expected to incur the highest increase in labour.

The impact is generated through capital expenditure that shock the economy. It involves the creation of direct new job opportunities related to the construction of the proposed facility and employment opportunities that will be indirectly created through increased expenditure in sectors supplying goods and services for the construction of the waste recovery facility and in sectors benefitting from the increase in consumer expenditure.

	Without enhancement	**With enhancement**
Extent	Regional (4)	Regional (4)
Duration	Short-term (1)	Short-term (1)
Magnitude	Low (4)	Low (4)
Probability	High (4)	High (4)
Significance	**Medium (36)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» Utilise labour intensive construction methods where feasible.
» Sub-contract to local construction companies.
» Use local suppliers.
» Set-up a skills desk at the local municipal office and in the nearby communities to identify skills available in the community and assist in recurring labour during the construction phase.

Residual Impact:
No residual impacts are applicable.

Nature: *Skills development during construction*

Skills are imperative for satisfying job requirements and adequately performing tasks that ultimately boost the economy. The construction of the plant requires a variation of skill sets ranging from semi-skilled construction workers to highly skilled engineers. Employees who are new to the market will develop and attain new skills, whilst workers adept in particular skills will sharpen their abilities. It is envisaged that 300 jobs will be created at the construction site itself. From this, around 60 jobs are for highly skilled employees such as supervisors, 120 jobs are for skilled employees such as machine operators and 90 jobs are for semi-skilled or unskilled employees.

In addition, a total of 90 jobs will be created within the Mpumalanga Province which includes the local community. From this, 18 jobs are for highly skilled employees, 36 jobs are for skilled employees and 36 jobs are for semi-skilled or unskilled employees. The employment opportunities are for a short-term period of around one year; however, the skills attained will be beneficial for a long-term period as these individuals will be able to increase their marketability for future employment.

The impact takes place during the creation of new employment opportunities, and unlike the actual employment created, is sustainable.

	Without enhancement	**With enhancement**
Extent	Local Municipality (3)	Local Municipality (3)
Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Minor (2)
Probability	Distinct possibility (3)	High (4)
Significance	**Low (18)**	**Low (24)**
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» Ensure that the main contractor shares knowledge with the sub-contracting companies during the construction period.
» Encourage the main contractor to offer internships and learnerships, especially to those coming from the local communities.

Residual Impact:
Skills developed during the project can be utilised in future.

Nature: *Temporary increase in household income and improved standard of living*

Nearly half of the population of the eMalahleni LM are classified as low-income earners. The employment creation during the construction period will temporarily increase affected households' income to the value of R34,61 million in 2017 prices.

Employed individuals will increase the income of their respective households and therefore improve their standard of living for a period of one year. In addition, increased household income facilitates increased expenditure on goods and services in the economy. In the context of the proposed waste recovery plant, workers employed in the construction phase as well as their households can expect an improvement in their quality of life and standard of living. Households supplying inputs to the plant's construction are expected to benefit indirectly to the tune of R18,69 million.

Household income will increase due to jobs created through direct, indirect, and induced effects.

	Without enhancement	**With enhancement**
Extent	Regional (4)	Regional (4)

Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Minor (2)
Probability	High (4)	High (4)
Significance	**Low (28)**	**Low (28)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» Employ labour intensive methods in construction.
» Sub-contract to local companies.
» Use local suppliers where feasible and arrange with local SMMEs to provide transport, catering and other services for the construction crew.

Residual Impact:
No residual impacts are applicable.

Nature: *Temporary increase in government revenue during construction*

The construction phase of the proposed waste recovery facility will span for a period of less than one year. However, capital equipment will be purchased during the construction phase. Regardless of the duration of the construction phase, companies will be generating revenue and employ individuals due to the construction-related capital expenditure. From this, companies are obligated to pay government income taxes and payroll taxes. In addition, increased spending power will result in more purchases, which would increase the Value Added Tax (VAT) base for government. The various taxes received by government improves the government's ability to deliver services and will contribute to an increase in the national fiscus.

The impact will occur due to local expenditure on construction and will be acquired by government through direct and indirect taxes.

	Without enhancement	**With enhancement**
Extent	National (5)	National (5)
Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Low (2)
Probability	High (4)	High (4)
Significance	**Low (32)**	**Low (32)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes

Enhancement:

» No enhancement.

Residual Impact:
No residual impacts are applicable.

ii) Social Impacts

Nature: *Temporary increase in pressure on services and social and local infrastructure during construction*

During the construction phase, a heightened pressure on local service delivery and economic infrastructure should occur. However, as the development of the waste recovery facility is limited to within an already existing industrial complex, the added pressure on service delivery and economic infrastructure should not be as pronounced.

The impact will occur due to added pressure on basic service delivery and economic infrastructure in the local municipality.		
	Without mitigation	**With mitigation**
Extent	Local Municipality (3)	Local Municipality (3)
Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (-2)	Improbable (-2)
Significance	**Low (18)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » No enhancement.		
Residual Impacts: No residual impacts are applicable.		

Nature: *Temporary increase in demand for housing during construction* Construction labourers are expected to be sourced from surrounding communities within the LM. However, the external sourcing of construction labour into the local community as the local community may not be able to provide some of the skills necessary for the construction of the facility, may contribute to a minor increase in the demand for housing to accommodate labourers. The impact will occur due to added pressure on the availability of housing located in the local community. This may contribute to increased levels of competition in the temporary housing market.		
	Without mitigation	**With mitigation**
Extent	Local Municipality (3)	Local Municipality (3)
Duration	Short-term (1)	Short-term (1)
Magnitude	Low (4)	Minor (2)
Probability	Distinct possibility (-3)	Low (2)
Significance	**Low (24)**	**Low (12)**
Status (positive or negative)	Negative	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » Provide onsite accommodation for outsourced construction workers.		
Residual Impacts: No residual impacts are applicable.		

Impacts during the Operation Phase

i) Economic Impacts

The economic impact during the operational phase of the zero waste recovery plant is illustrated in

Table 7.3: Economic Impacts during Operation (Rand million, 2017 prices)

Impact of the Capex	Direct	Indirect	Induced	Total Production

Impact: Production Rand	R56,22	R17,17	R18,78	**R92,16**
Impact: GDP Rand	R47,42	R7,60	R7,97	**R63,00**
Impact: Income Rand	R35,62	R3,19	R3,79	**R22,19**

Table 7.4: Impact on employment during operation (numbers)

Impact of the Capex	Direct	Indirect	Induced	Total
Impact: Employment	59	19	38	**116**

Nature: *Temporary increase in production during operations*

Once operational, it is estimated that the proposed plant will stimulate production to the value of around R56,22 million. Due to the backward linkages and the multiplier effect associated with the consumption induced impacts, for every R1 of revenue generated by the plant directly, it will create an additional R1,64 in the rest of the provincial economy. Therefore, the total annual impact on the production in the country will amount to R92,16 million per annum.

As the waste recovery facility will be located in the eMalahleni LM and assuming that the entire production value will be accounted as part of the output of the LM, the size of the eMalahleni LM's economy is expected to increase.

The impact occurs due to the sustainable production of the waste recovery facility, as well as procurement of goods and services for its operations and creation of employment opportunities through direct and indirect effects.

	Without enhancement	**With enhancement**
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	High (4)	High (4)
Significance	**Medium (48)**	**Medium (48)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» Procurement of goods and services from local businesses where feasible, will increase benefits to the local economy but will not change the rating.

Residual Impact:

No residual impacts are applicable.

Nature: *Temporary increase in provincial GDP-R during operations*

Once operational, it is estimated that the proposed plant will stimulate production to the value of around R56,22 million. Due to the backward linkages and the multiplier effect associated with the consumption induced impacts, for every R1 of revenue generated by the plant directly, it will create an additional R1,64 in the rest of the provincial economy. Therefore, the total annual impact on the production in the country will amount to R92,16 million per annum.

As the waste recovery facility will be located in the eMalahleni LM and assuming that the entire production value will be accounted as part of the output of the LM, the size of the eMalahleni LM's economy is expected to increase.

The impact occurs due to the sustainable production of the waste recovery facility, as well as procurement of goods and services for its operations and creation of employment opportunities through direct and indirect effects.

	Without enhancement	With enhancement
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	High (4)	High (4)
Significance	**Medium (48)**	**Medium (48)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes
Enhancement: » Explore local procurement alternatives.		
Residual Impact: No residual impacts are applicable.		

Nature: *Creation of employment opportunities during operations*

The proposed waste recovery plant will create around 59 employment opportunities. Of the total direct employment opportunities created, 90.0% will be sourced from local communities whilst the remaining 10.0% will be sourced from external locations. The current labour participation rate is 68.4% in the eMalahleni LM. The operations of the plant will therefore increase the number of employed working age individuals, thus slightly reducing local unemployment.

In addition to the direct jobs created on site, the waste recovery plant will also stimulate the creation of 57 sustainable employment opportunities through production and consumption induced impacts. Overall, a total contribution of the project towards sustainable employment creation in South Africa will be 116 jobs that will be supported. Jobs created during operations through multiplier effects will be distributed among all economic sectors. The largest number of jobs will be created in the water, agriculture, and real estate and business services sectors.

The impact takes place throughout the operational phase and is translated into the creation of new employment opportunities at the waste recovery facility and businesses that are affected through indirect and induced effects.

	Without enhancement	With enhancement
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	High (4)	High (4)
Significance	**Medium (40)**	**Medium (40)**
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes
Enhancement: » Employ local labour to increase the benefits of the local community.		
Residual Impact: No residual impacts are applicable.		

Nature: *Skills development during operations*

The speciality of the waste recovery plant requires and creates scarce skills that will be essential in the long run if other waste recovery plants are to be developed. In all, 59 jobs are expected to be created for the operations of the plant. From this, 12 jobs are to be allocated to highly skilled workers, 33 jobs are allocated to skilled workers and the remaining 14 are dedicated to semi-skilled or unskilled employees.

The employment opportunities are for a long-term period of 25 years and the sustainability thereof will have a positive impact on skills to the benefit of employees. In addition, as production and consumption effects filter through the economy creating increased demand for more labour, human resources will be trained and skilled within aligned industries. As a result, the plant's operations will result in enhanced skills through training and experience in the wider national economy.

The impact results from the investment in skills development of the local communities and the waste recovery facility's employees during its operations.

	Without enhancement	**With enhancement**
Extent	Local Municipality (3)	Local Municipality (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	High (4)
Significance	**Low (27)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» Ensure that the plant owner provides for knowledge-sharing opportunities during the operations of the project.
» Encourage the project owner to offer internships and learnerships, especially to those coming from the local communities.

Residual Impact:
Skills obtained during employment could be used in future.

Nature: *Increase in household income and standard of living*

For a period of 25 years, 59 individuals will be employed at the waste recovery plant. As a result, the benefiting individuals and their respective households will experience an improvement in their standard of living due to the income earned. The income earned will contribute to increased purchasing power in the local community, given that a significant proportion of the employed individuals will be based in the local municipality. As a result, the local business will experience improved business activity and the local economy will experience a boost.

The employment creation during the operations period will increase affected households' income to the value of R22,19 million in 2017 prices. Furthermore, businesses supplying inputs to the plant's operations are expected to benefit indirectly to the tune of R3,19 million. Household income as relating to all sectors across the province will realise increases; however, households associated with the water, electricity, and manufacturing sectors are anticipated to experience the greatest gains. Lastly, due to an increase in household consumption induced through the creation of direct and indirect employment opportunities, an additional R3,79 million will be earned by households.

Household income will be earned due to jobs created through direct, indirect and induced effects; this will allow some of the beneficiaries to improve their living standards.

	Without enhancement	**With enhancement**
Extent	Local Municipality (3)	Local Municipality (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	High (4)	High (4)
Significance	**Medium (36)**	**Medium (36)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium

Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» Investigate opportunities to increase local procurement and localise the facility's expenditure.
» Explore opportunities to employ as many people form the local communities as possible.

Residual Impact:
No residual impacts are applicable.

Nature: *Increase in government revenue during operations*

A significant proportion of government revenue will be derived from payments of income taxes due to an increased number of employed individuals, and increased VAT collection due to increased household expenditure. The main source of the increase in government revenue will mainly be personal income taxes. An increase in government revenue allows the public sector to maintain the existing infrastructure and improve on its service delivery.

The impact takes place mostly with payment of income taxes and corporate taxes, as well because of the payment of salaries and wages and declaration of dividends.

	Without enhancement	**With enhancement**
Extent	National (5)	National (5)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	High (4)	High (4)
Significance	**Medium (44)**	**Medium (44)**
Status (positive or negative)	Positive	Positive
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes (enhance)	Yes

Enhancement:

» No mitigation.

Residual Impact:
No residual impacts are applicable.

ii) Social Impacts

Nature: *Temporary increase in pressure on services and social and local infrastructure*

During the operational phase, a heightened pressure on local service delivery and economic infrastructure should occur. However, as the development of the wate recovery facility is limited to within an already existing industrial complex, the added pressure on service delivery and economic infrastructure should not be as pronounced.

The impact will occur due to added pressure on basic service delivery and economic infrastructure in the local municipality.

	Without enhancement	**With enhancement**
Extent	Local Municipality (3)	Local Municipality (3)
Duration	Short-term (1)	Short-term (1)
Magnitude	Minor (2)	Minor (2)
Probability	Low (-2)	Low (-2)
Significance	**Low (12)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources?	No	No

Can impacts be mitigated?	No	No
Mitigation: » No enhancement.		
Residual Impacts: No residual impacts are applicable.		

Nature: *Potential health risks due to cumulative air emissions of existing industry and the proposed facility* During the operational phase, potential health risks due to cumulative air emissions of industry and the proposed facility may occur. This table summarises and rates the expected cumulative effects in terms of existing air emissions in the region and the contribution of the proposed facility to overall emissions:	
	Cumulative contribution of proposed project
Extent	Local Municipality (3)
Duration	Long term (4)
Magnitude	Low (4)
Probability	High (-4)
Significance	**Medium (44)**
Status (positive or negative)	Negative
Reversibility	Medium
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Mitigation: » Adhere to air specialist's recommendations.	
Residual Impacts: No residual impacts are applicable.	

7.5.4 Implications for Project Implementation

Overall, numerous positive socio-economic impacts will occur as a result of the zero waste recovery plant and these positive impacts far outweigh any potential negative impacts that might occur. Considering the numerous positive socio-economic impacts associated with the proposed project, it is the specialist's opinion the establishment of the proposed waste recovery facility be continued, provided mitigation measures are implemented to address the identified externalities or negative effects.

7.6 Assessment of Potential Cumulative Impacts Associated with the Project

The zero waste recovery plant may have effects (positive and negative) on natural resources, the social environment and on the people living in the project area. The preceding impact assessment sections have reported on the assessment of impacts associated with the zero waste recovery plant largely in isolation (from other similar developments).

This section assesses the potential for the impacts associated with the project to become more significant when considered in combination with other known or proposed industrial developments within the area.

This assessment is based on information currently available, and considers impacts from similar industrial developments in the vicinity of the plant. The following potential impacts are considered:

- Cumulative impacts on heritage resources
- Cumulative impacts on air quality
- Cumulative socio-economic impacts

7.6.1 Cumulative Impact on Heritage Resources

The only potential cumulative impact predicted is on palaeontological resources, with no additional impacts that could add to the overall impact load on heritage resources.

Nature: *Impact on palaeontological resources*

The only potential cumulative impact predicted is on palaeontological resources, with no additional impacts that could add to the overall impact load on heritage resources.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the study area**
Extent	Local (1)	Local (1)
Duration	Long-term/permanent (5)	Long-term/permanent (5)
Magnitude	High (8)	Moderate (1)
Probability	Probable (3)	Improbable (1)
Significance	**Medium (42)**	**Low (7)**
Status (positive or negative)	Negative	Neutral
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately stop working and all work must cease in the immediate vicinity of the find.
- The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the Environmental Officer (EO) (if appointed) or site manager. The EO must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the EO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the EO (or site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.

» Once Heritage Agency has issued the written authorization, the developer may continue with the development.
Cumulative impacts: Impact on palaeontological resources.
Residual Risks: Loss of fossil heritage.

7.6.2 Cumulative Impact on Air Quality

Particulate emissions from the Zero-Waste Recovery Plant could result in an increase in PM_{10} concentrations of more than 100% from baseline concentrations in the immediate vicinity (<200 m) to the north, east and south of the plant. Further away from the plant, the increase from baseline concentrations is expected to be low, with a 10% increase from baseline concentrations simulated up to 1 km from the plant, and a negligible increase in PM_{10} at all identified sensitive receptor locations.

Simulated $PM_{2.5}$ emissions from the Zero-Waste Recovery Plant lead to a very low increase from baseline concentrations, with an increase of 10% simulated up to 200 m from the plant and a negligible increase from baseline concentrations at all sensitive receptor locations.

Simulated cumulative SO_2 and NO_2 concentrations are in compliance with the SA NAAQS at all sensitive receptor location for all averaging periods, but if the plant is operated at or above the Subcategory 4.20 Minimum Emission Standards, short-term (hourly and daily) cumulative SO_2 concentrations could exceed the SA NAAQS up to 250 m to the northwest of the plant due to fairly high background SO_2 concentrations.

Given that particulate concentrations in the study area are already elevated, it is possible that cumulative impacts could be high in magnitude. It is therefore recommended that best available technologies be employed to mitigate point source and fugitive particulate emissions.

Nature: *Cumulative potential impact associated with the construction and decommissioning phases of the Zero Waste Recovery Plant*

Construction (and decommissioning) activities are likely to result in emissions of particulate and gaseous pollutants due to civil and building work and from vehicle traffic. The nature of emissions from construction activities is highly variable in terms of temporal and spatial distribution and is also transient. Increased ambient concentrations of fine particulates and gaseous pollutants may result in negative human health impacts. Increased nuisance dustfall is likely as a result of wind-blown dust emissions from the working areas. Increased nuisance dustfall rates will likely result in negative impact on dustfall in the immediate vicinity of the construction area.

Unmitigated particulate emissions could result in higher particulate concentrations and dust fallout in the immediate vicinity of the plant. Although baseline particulate concentrations are already elevated, construction operations are still unlikely to result in any noticeable impact at any identified sensitive receptor locations. The impact of gaseous pollutants is likely to be minor.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the study area**
Extent	Low (1)	Low (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)

Significance	**Low (27)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	Possible	Possible
Can impacts be mitigated?	Yes, with minimum control efficiency of 50%.	

Mitigation:

- » Wet suppression at key handling points or cleared areas, and on unpaved roads.
- » Trucks to be restricted to specified roads and using the most direct route.
- » Reduce unnecessary traffic.
- » Strict on-site speed control.
- » Reduction of extent of open areas to minimised the time between clearing and infrastructure construction, and/or use of wind breaks and water suppression to reduce emissions from open areas.
- » Restriction of disturbance to periods of low wind speeds (less than 5 m/s).
- » Stabilisation of disturbed soil (for example, chemical, rock cladding, or vegetation).
- » Re-vegetation of cleared areas as soon as practically feasible.

Cumulative impacts:

Possible high cumulative impacts are expected due to the high baseline particulate concentrations in the area.

Residual Risks:

Expected to be low if mitigation measures are properly implemented.

Nature: *Cumulative potential impact associated with the operation phase of the Zero Waste Recovery Plant*

Elevated ambient concentrations of particulate and gaseous atmospheric pollutants as a result of Zero-Waste Recovery Plant operational activities.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the study area**
Extent	Low-Medium (2)	Low-Medium (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Medium (6)	High (10)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (48)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes

Mitigation:

- » The Zero-Waste Recovery plant must be designed and suitable abatement technologies implemented to ensure that point source emissions comply with the Subcategory 4.20 MES.
- » Best available technology mitigation measures are recommended for fugitive dust sources, these include:
  - o Paving of all on-site roads.
  - o Regular sweeping of on-site paved roads.
  - o Clean-up of all spillages to avoid re-entrainment.
  - o Implementation of strict on-site speed limits.
  - o Mitigation of crushing plant emissions, either by water sprays or enclosure with dust extraction.
  - o Control of dust emissions from stockpiles during periods of high wind speeds.

Cumulative impacts:

Possible high cumulative impacts are expected due to the high baseline particulate concentrations in the area.

Residual Risks:

If all fugitive dust sources are properly managed, no residual impact is expected post closure.

7.6.3 Cumulative Socio-Economic Impact

The following table summarises and rates the expected cumulative effects in terms of GDP-R contributions and employment creation:

Nature: *Increase in production and creation of employment opportunities* The impact is created through the continuous operation of the waste recovery facility. This stimulates economic activities of directly and indirectly affected business. As a result, production is increased, and value added is created. An additional value added is further created through household expenditure. In addition, an employment impact takes place throughout the operational phase and is translated into the creation of new employment opportunities at the waste recovery facility and businesses that are affected through indirect and induced effects.	
	Cumulative contribution of the proposed project
Extent	Regional (4)
Duration	Long-term (4)
Magnitude	Low (4)
Probability	High (4)
Significance	**Medium (48)**
Status (positive or negative)	Positive
Reversibility	Medium
Irreplaceable loss of resources?	No
Can impacts be mitigated?	Yes
Enhancement: » The local procurement of labour and services within the Province and Local Municipality will enhance the economic benefits derived during the operational phase.	
Cumulative impacts: Increase in production and creation of employment opportunities.	
Residual Risks: No residual impacts are applicable.	

7.6.4 Conclusion on Cumulative Impacts

Cumulative impacts are expected to occur with the development of the zero waste recovery plant throughout all phases of the project life cycle. The main aim for the assessment of cumulative impacts is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The assessment of the cumulative impacts was undertaken through the consideration of impacts in isolation and compared to the cumulative impacts of the proposed zero waste recovery plant and other industrial developments at a scale by each specialist.

The significance of the cumulative impacts associated with the proposed project is medium to low. A summary of the cumulative impacts as assessed in **Section 7.6** is included in Table X below.

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Heritage and Palaeontology	Medium	Low

Air Quality	Medium to Low	Medium to Low
Socio-Economic	Not assessed	Medium

The following can be concluded regarding the cumulative impacts of the zero waste recovery plant:

» **Heritage (including palaeontology):** The only potential cumulative impact predicted is on palaeontological resources, with no additional impacts that could add to the overall impact on heritage resources. The cumulative significance of impacts of the project and other projects in the area on palaeontological resources is expected to be of low significance.

» **Air Quality:** Impacts associated with the zero waste recovery plant could become more significant when considered in combination with the known or proposed industrial activities within the eMalahleni area. The addition of the zero waste recovery plant to the existing emissions baseline within the eMalahleni area is expected to result in impacts of medium to low significance.

» **Socio-economic:** Positive socio-economic impacts are expected to occur at a regional level. These impacts are expected to be of medium positive significance.

Based on the specialist cumulative assessment and findings, the development of the proposed facility, and other similar facilities within a 10km radius, it can be concluded that cumulative impacts will be of medium to significance. There are no impacts or risks identified as unacceptable with the development of the zero waste recovery plant when considered together with other developments within the surrounding area. In addition, no impacts which will result in a whole-scale change are expected.
The limited potential for cumulative impacts and risks makes the location of this project within the identified site of the EVRAZ Highveld Steel and Vanadium property[12] a desirable location for the proposed project, provided that environmental impacts are mitigated to suitable standards as recommended within this EIA Report.

7.7 Assessment of the 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of the project proponent not constructing the proposed facility.

7.7.1 Impacted anticipated with the implementation of the 'do-nothing' alternative

The following positive and negative impacts are anticipated with the implementation of the 'do-nothing' option:

» Continued potential for pollution of water resources, soils and air quality due to the presence of waste slag material and slag resources generated by Highveld Steel and stored on the EVRAZ Highveld Steel and Vanadium Property.
» Opportunity lost in terms of job creation, skills development and associated economic business opportunities for the local economy.
» No impact to the palaeontological heritage of the site.
» No impact on ambient concentrations of particulate and gaseous atmospheric pollutants from the waste recovery process.

[12] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with zero waste recovery plant. All impacts associated with the project can be mitigated to acceptable levels. If the facility is not developed, job creation from the construction and operational phases will not be realised, and the waste slag material and slag resources generated by Highveld Steel will remain on the site with the continued potential for pollution of water resources, soils and air quality. In addition, the contribution of the project towards achieving the objectives of the NEM: WA and the NWMS through implementation of the waste management hierarchy by reducing waste material for disposal and recovering materials from waste will be lost.

As detailed above, the 'do-nothing' alternative will result in a number of lost opportunities, as well as continued potential for pollution of the local environment due to the presence of the waste slag material. The 'do-nothing' alternative is therefore not preferred and no proposed to be implemented for the development of the zero waste recovery plant.

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

The Anglo African Metals Zero Waste Recovery Solution and associated infrastructure is located on Portion 48 of the Farm Elandsfontein 309JS (to be referred to as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process), approximately 17 km west of eMalahleni in the eMalahleni Local Municipality (LM) within the Nkangala District Municipality (DM) in Mpumalanga. The development area is approximately 4ha in extent (it is assumed that100% of the 4ha development area will be cleared for the establishment of the zero waste recovery plant and associated infrastructure) and is contained within the EVRAZ Highveld Steel and Vanadium property[13] and Highveld Industrial Park boundary. The site is accessible directly off the R104, from the N4 turnoff near Kwa-Guqa informal settlement.

The project site was identified by the project proponents as the preferred area for development due to the following:

- It being located in a large existing industrialised area surrounded by several heavy industries and mining operations. It is a brownfields site that has already undergone extensive transformation.
- Feedstock (i.e. slag materials) for the recovery process is readily available from the slag resource located next to the preferred site, limiting material transport cost and implications.
- Utility services for potable water, electricity, and refuse removal is provided by Highveld Steel.
- A railway siding is located adjacent to the project site which may be beneficial for transporting products and materials from the facility in future.

The main infrastructure associated with the facility includes the following:

- Chemical plant area, where all process chemicals including acid are produced, stored and handled as required by the waste recovery process.
- Substation and plant utility unit as interface and controlling unit for the electricity utilised by the plant during operation.
- Slag stockpile.
- Crushing plant.
- Mill.
- Product area for storage of the various products produced through the recovery process.
- Reagent area, for the storage and handling of reactants utilised in the waste recovery process.
- A security area.
- Parking lot.

8.1 Legal Requirements as per the EIA Regulations, 2014 (as amended) for the undertaking of an Impact Assessment Report

This chapter of the EIA Report includes the following information required in terms of Appendix 3: Scope of Assessment and Content of the Scoping Environmental Impact Assessment Report.

[13] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the zero waste recovery plant has been included in **Section 8.2**.
3(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.	An environmental impact statement containing the key findings of the environmental impacts of zero waste recovery plant has been included as **Section 8.4.** Sensitive environmental features located within the development area and its surrounds are in **Figure 8.1**. A summary of the positive and negative impacts associated with zero waste recovery plant has been included in **Section 8.2**.
h (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	A concluding statement indicating the preferred alternatives and the preferred location of the activity is included in **Section 8.4**.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation of the zero waste recovery plant have been included in **Section 8.5**.
3(p) 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.	A reasoned opinion as to whether the zero waste recovery plant should be authorised has been included in **Section 8.5**.

8.2 Evaluation of the Anglo African Metals Zero Waste Recovery Solution

The preceding chapters of this report together with the specialist studies contained within **Appendices D-F** provide a detailed assessment of the potential impacts that may result from the development of the proposed zero waste recovery plant. This chapter concludes the environmental assessment of the proposed project by providing a summary of the results and conclusions of the assessment of the development area. In so doing, it draws on the information gathered as part of the EIA process, the knowledge gained by the environmental specialists and the EAP and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws or areas of sensitivity were identified in the detailed specialist assessments conducted. It is recommended that mitigation measures are implemented to reduce impacts to acceptable levels. The potential environmental impacts associated with zero waste recovery plant identified and assessed through the EIA process include:

- Impacts on Heritage resources (including Palaeontology)
- Impacts on Air Quality
- Socio-Economic Impacts

8.2.1 Impacts on Heritage Resources (including Palaeontology)

The desktop assessment and field survey conducted on 5 March 2021 as part of the Heritage Impact Assessment (**Appendix E**) indicated no heritage resources within the overall project site and development footprint due to the extensive disturbance of the footprint by industrial activity.

The SAHRIS palaeontological sensitivity map rates the study as underlain by geological strata with a Very High palaeontological significance. However, the palaeontological desktop assessment (**Appendix E**), supported by the fieldwork concluded by the heritage specialist, has considered the potential impact and, due to the disturbed nature of the site, has concluded that no further fieldwork will be required, but that a chance finds protocol must be implemented.

From a heritage perspective, it is the specialist's opinion that the overall impact on heritage resources will be Low. Provided that the recommended mitigation measures are implemented, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved.

8.2.2 Impacts on Air Quality

The Air Quality Impact Assessment (**Appendix D**) assessed baseline air quality data for the SAWS managed eMalahleni Station (located approximately 12.3km northeast of the proposed project location) for thoracic particulates (with a diameter less than 10 µm – PM10), inhalable particulates (with an aerodynamic diameter less than 2.5 µm – $PM_{2.5}$), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) using baseline data for the period 2020. Impacts are expected during the construction, operational and decommissioning phases.

Construction (and decommissioning) activities associated with the zero waste facility are likely to result in emissions of particulate and gaseous pollutants due to civil and building work and from vehicle traffic. The nature of emissions from construction activities is highly variable in terms of temporal and spatial distribution and is also transient. Increased ambient concentrations of fine particulates and gaseous pollutants may result in negative human health impacts. Increased nuisance dustfall is likely as a result of wind-blown dust emissions from the working areas. Increased nuisance dustfall rates will likely result in negative impact on dustfall in the immediate vicinity of the construction area. Unmitigated particulate emissions could result in higher particulate concentrations and dust fallout in the immediate vicinity of the plant, but are unlikely to result in any noticeable impact any identified sensitive receptor locations. The impact of gaseous pollutants is likely to minor.

The operational phase of the zero waste recovery plant will result in elevated ambient concentrations of particulate and gaseous atmospheric pollutants, including SO_2, NO_2 and PM. Increased ambient concentrations may result in negative human health impacts, as well as negative impacts on vegetation and animals within the surrounding area. No exceedances were however recorded at any of the identified sensitive receptors.

The findings from the Air Quality Impact Assessment are summarised as follows:

» The extent of incremental impacts due to the Zero-Waste Recovery Plant are expected to be localised to the vicinity of the operations, with possible exceedances of the SA NAAQS simulated outside the property boundary, but simulated impacts are negligible at all sensitive receptor locations.

» The duration of the impacts is expected to be long-term (for the life of the project) while the magnitude of impacts is expected to be medium for particulate emissions, low to medium for gaseous pollutants (SO_2 and NO_2), and low for dust fallout. If all fugitive sources are properly managed, no residual impact is expected post closure.
» Impacts during the construction phase are expected to be transient and highly variable from day to day, depending on the construction activities being performed. For this reason, construction phase impacts are expected to be low.
» Given that particulate concentrations in the study area are already elevated, it is possible that cumulative impacts could be high in magnitude.

From an air quality perspective, it is the opinion of the specialist that the project be authorised and licensed to operate, on condition that:

» The plant is designed to comply with the Subcategory 4.20 Minimum Emission Standards.
» A Fugitive Dust Management Plan is implemented, inclusive of the following mitigation measures aimed at controlling fugitive dust emissions from the operations and minimize the impact of particulate emissions on the receiving environment:
  o Paving of all on-site roads. While the surface moisture content of unpaved roads can be increased with water bowsers, it is much easier to control the silt loading on paved roads.
  o Regular sweeping of on-site paved roads to reduce silt loading on the road surface, higher silt loading results in higher vehicle entrainment emissions.
  o Clean-up of all spillages to avoid re-entrainment by vehicles.
  o Implementation of strict on-site speed limits.
  o Mitigation of crushing plant emissions, either by water sprays or enclosure with dust extraction.
  o Control of dust emissions from stockpiles during periods of high wind speeds, either by increasing moisture content of material with water sprays, or by decreasing wind speeds using enclosures or bund walls
» Stack testing is conducted as indicated in the AEL for the operations.
» Dust fallout sampling is conducted on the facility boundary in the four cardinal wind direction.

8.2.3 Socio-Economic Impacts

The Socio-Economic Impact Assessment (**Appendix F**) identified both positive and negative impacts to be associated with both the construction and operational phases of the project.

During the construction phase, the positive impacts expected to occur include increase production, increase in the provincial GDP, increase in employment opportunities, skills development, increase in government revenue and improvements of household income and standard of living. The significance of the positive construction phase impacts ranges from medium to low, following the implementation of the recommended enhancement measures.

Negative impacts expected to occur during construction include an increase in pressure on services and social and local infrastructure, as well as an increase in demand for housing, which may contribute to increased levels of competition in the temporary housing market. The significance of the negative construction phase impacts is expected to be low, following implementation of the recommended mitigation measures. No negative impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the operational phase, the positive impacts expected to occur include increase production, increase in the provincial GDP, increase in employment opportunities, skills development, improved household income and standard of living, and increase in government revenue. The significance of the positive construction phase impacts is expected to be medium, following implementation of the recommended enhancement measures.

Negative impacts expected to occur during the operational phase include a temporary increase in pressure on services and social and local infrastructure, as well as potential health risks due to cumulative air emissions of existing industry and the proposed facility. The impacts are expected to be of medium to low significance, after implementation of mitigation measures.

Overall, numerous positive socio-economic impacts will occur as a result of the zero waste recovery plant and these positive impacts far outweigh any potential negative impacts that might occur. Considering the numerous positive socio-economic impacts associated with the proposed project, it is the specialist's opinion the establishment of the proposed waste recovery facility be continued, provided mitigation measures are implemented to address the identified externalities or negative effects.

8.2.4 Assessment of Cumulative Impact

Cumulative impacts are expected to occur with the development of the proposed facility throughout all phases of the project life cycle. The main aim for the assessment of cumulative impacts is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The assessment of the cumulative impacts was undertaken through the consideration of impacts in isolation and compared to the cumulative impacts of the proposed facility in combination with other known or proposed industrial developments within the area. The significance of the cumulative impacts associated with the development of the facility is expected to be medium to low. There are no impacts or risks identified to be considered as unacceptable with the development of the zero waste recovery facility when considered together with other developments within the surrounding area. In addition, no impacts which will result in whole-scale change are expected.

The limited potential for cumulative impacts and risks makes the location of this project within the identified site of the EVRAZ Highveld Steel and Vanadium property[14] a desirable location for the proposed project, provided that environmental impacts are mitigated to suitable standards as recommended within this EIA Report.

8.3 Environmental Sensitivity Mapping

Since the full extent of the project site, including the development footprint, has undergone extensive transformation, no sensitive environmental features were identified within the development footprint and project site through the EIA process (**Figure 8.1**).

[14] A sale process is underway to transfer the property to Highveld Industrial Park (Pty) Ltd

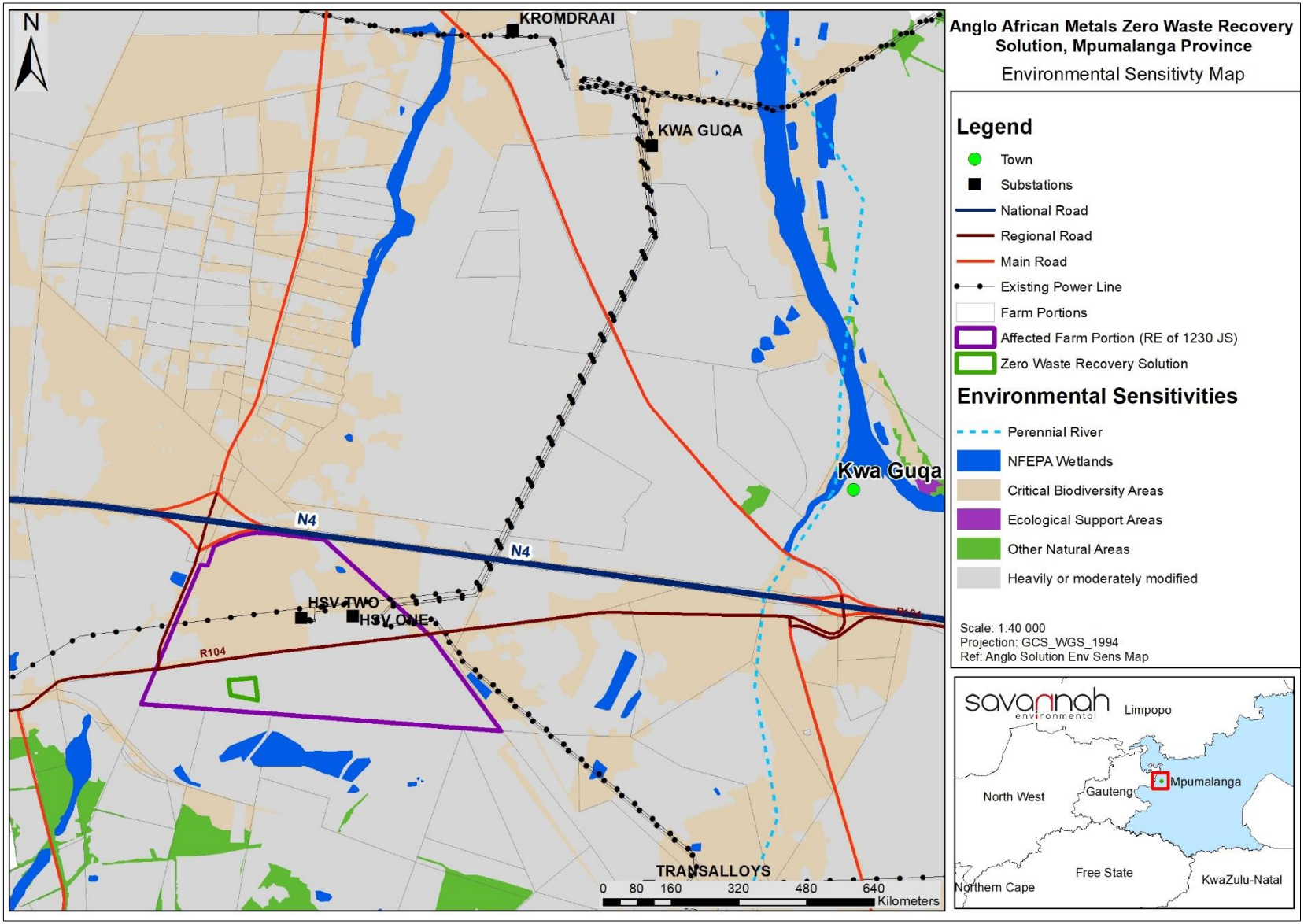

Figure 8.1: Environmental sensitivity map of the project site and development footprint

8.4 Overall Conclusion (Impact Statement)

The construction and operation of the zero waste recovery plant on Portion 48 of the Farm Elandsfontein 309JS (to be referred as the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS upon finalisation of the subdivision and consolidation process) within jurisdiction of the eMalahleni Local Municipality and the Nkangala District Municipality has been proposed by Anglo African Metals (Pty) Ltd. A technically viable project site and development footprint was proposed by the developer and assessed as part of the EIA process. The environmental assessment of the development footprint within the project site was undertaken by independent specialists, and their findings have informed the results of this EIA Report.

Through a review of relevant policy and planning documentation, it was concluded that the proposed project is in alignment with the local and provincial developmental policies and spatial frameworks. The project is also expected to make a contribution towards the achievement of the national developmental objectives related to industrialisation, mineral beneficiation and waste management. In addition, it is in line with the principles of e NEM: WA and the NWMS with regards to the implementation of the waste management hierarchy by reducing waste material for disposal and recovering materials from waste.

The developer has proposed a technically viable and suitable layout for the project and associated infrastructure which has been assessed as part of the independent specialist studies. The specialist findings have indicated that there are no identified environmental fatal flaws or areas of sensitivity associated with the zero waste recovery plant. All impacts associated with the project can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures.

The layout map (including all associated infrastructure) provided in this EIA Report is considered to be the preferred layout of the zero waste recovery plant for implementation. The design and layout thereof are determined by the footprint of the existing infrastructure and slag resource situated on the property, as well as the specific requirements of Highveld Steel, the landowner.

Through the assessment of the development of the zero waste recovery plant within the project site, it can be concluded that the development of the facility is environmentally acceptable (subject to the implementation of the recommended mitigation measures).

8.5 Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development footprint proposed, and the position of the proposed plant within an area that has been completely transformed due to the industrial activities within the site, it is the reasoned opinion of the EAP that the development of the zero waste recovery plant is acceptable within the landscape and can reasonably be authorised (**Figure 8.2**). The period for which the Environmental Authorisation is required to remain valid is 10 years from the date of authorisation, with a period of 5 years for the design, planning, construction and commissioning of the activity.

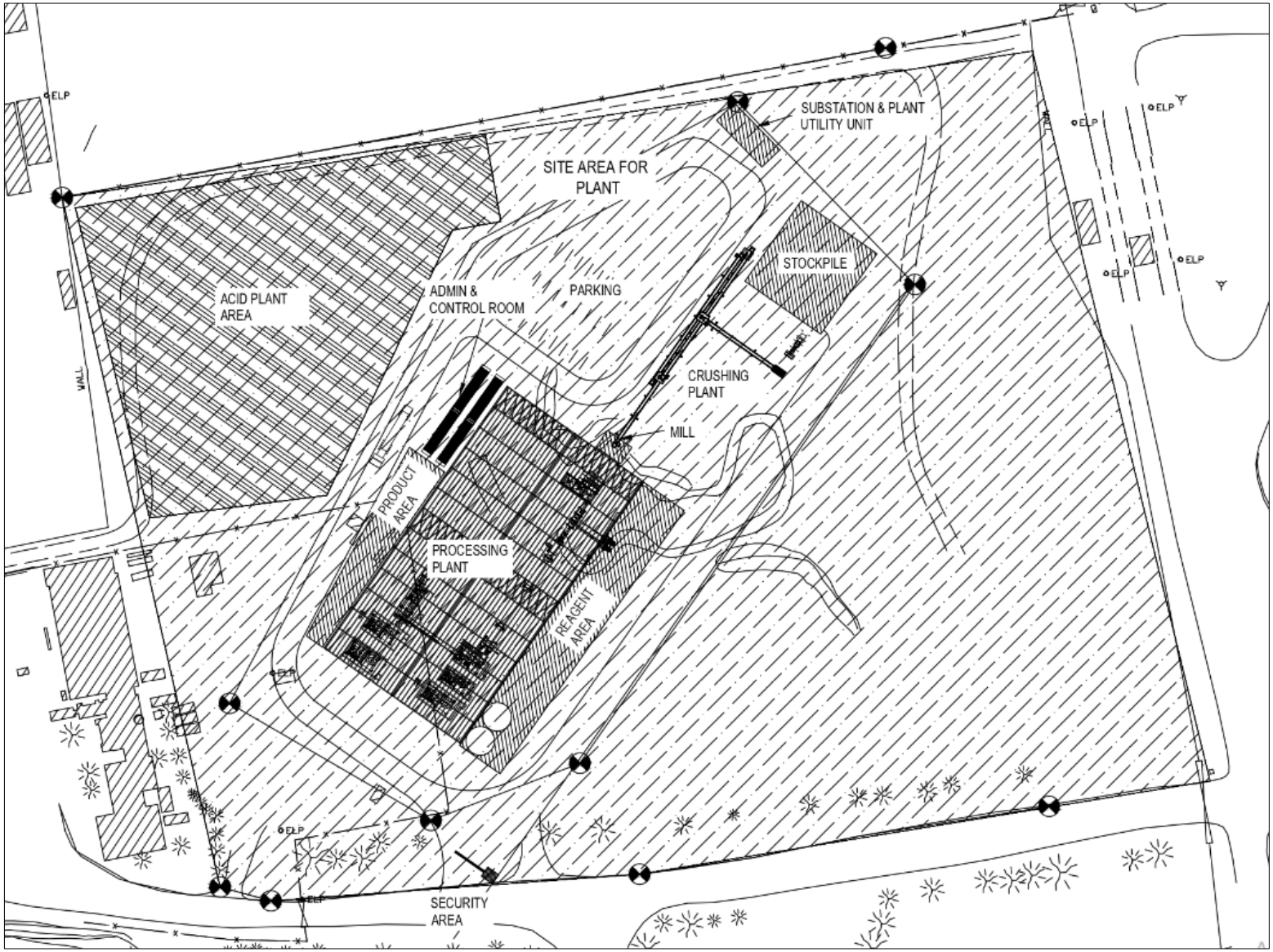

Figure 8.2: Layout map of the preferred development footprint for the zero waste recovery plant, as was assessed as part of the EIA process

The authorisation should include the approval of the layout reflected in Figure 8.2, which includes the following main infrastructure:

- Chemical plant area, where all process chemicals including acid are produced, stored and handled as required by the waste recovery process.
- Substation and plant utility unit as interface and controlling unit for the electricity utilised by the plant during operation.
- Slag stockpile.
- Crushing plant.
- Mill.
- Product area for storage of the various products produced through the recovery process.
- Reagent area, for the storage and handling of reactants utilised in the waste recovery process.
- Fuel storage area with a fuel storage tank (or tanks, as required) of up to 70m^3 for the bulk storage of gas (LPG or similar) utilised in the waste recovery process.
- A security area.
- Parking lot.
- Admin and control room including offices and ablutions for staff.

The following key conditions would be required to be included within an authorisation issued for the zero waste recovery plant.

- The zero waste recovery plant must be located on the Remaining Extent of the Farm Highveld Industrial Park No. 1230 JS.
- All mitigation measures detailed within this EIA Report, as well as the specialist reports contained within **Appendices D to F**, are to be implemented.
- The EMPr as contained within **Appendix K** of this EIA Report should form part of the contract with the Contractors appointed to construct and operate the zero waste recovery plant in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the project is considered key in achieving the appropriate environmental management standards as detailed for this project.
- Obtain all other mandatory and environmental permits for the project, as required.
- The Fugitive Dust Management Plan as contained within **Appendix D** of the EIA Report must be implemented.
- Dust fallout sampling must be conducted on the facility boundary in the four cardinal wind directions.
- The design of the zero waste recovery plant must comply with Subcategory 4.20 Minimum Emission Standards.

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