FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT – GET ALLOYS SCRAP ALUMINIUM FOUNDRY ON REMAINDER OF PORTION 1 OF FARM DRIEFONTEIN NO. 87-IR, GERMISTON

April 2022

GDARD Reference Number: Gaut 002/21-22/I0002

Enviroprac Reference Number: GETA Germiston

The Environmental Practice

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Executive Summary

i. Introduction

GeT Alloys (Pty) Ltd plans to develop a foundry for the production of aluminium alloy and copper from scrap. on the site identified for the development is a developed industrial facility situated on the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR ("the proposed property") in Shaft Road, Germiston Knights industrial area, Gauteng. GeT Alloys' plan is to install the infrastructure needed for the foundry. This will include furnaces and other machinery to produce 2000 tons of aluminium alloy per month. Other activities will include upgrading the buildings on site as well as constructing new buildings. A second phase of development (anticipated at this stage to occur between 2022 and 2023) will include installing furnaces for the melting of scrap brass and copper to produce 100 tons of copper per month.

Figure 1: Site Location

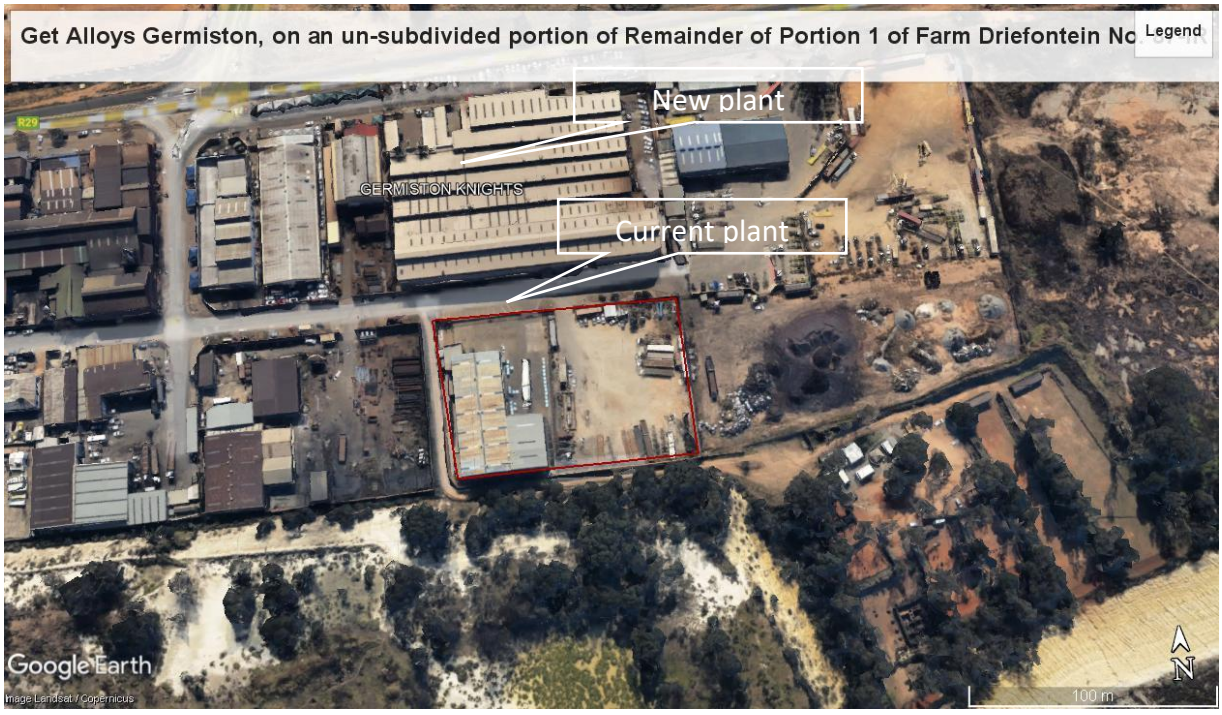

Image courtesy of Google Earth 2021

ii. Terms of reference

Given that the scrap aluminium and copper will be melted in combustion-furnaces and of a significant throughput capacity, the new foundry has the potential to emit significant emissions to atmosphere, thereby impacting ambient air quality. As such, an Atmospheric Emissions Licence (AEL) with emissions standards is required to manage operations at the facility in terms of the National Environmental Management: Air Quality Act, Act No. 39 of 2004, as amended (NEMAQA).

Any new development which requires an AEL, is also required to apply for Environmental Authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended (NEMA). The NEMA EIA Regulations govern such an application. In particular,

Chapter 4, Part 5 of the EIA Regulations published in GN No. 326 of 2017, govern this application, which is a scoping/EIA - type application.

iii. Purpose of this EIA Report

The purpose of the EIA phase of the scoping / EIA process is to assess the impacts associated with the alternatives identified as feasible and reasonable for the new foundry, during the preceding scoping phase. The EIA phase will establish which alternatives would have the most benefit and/or cause the least harm to the receiving environment.

The impacts associated with the proposed facility have been assessed in detail against their parameters, such as extent, duration, intensity, probability, and the reversibility of the impact. The overall significance of impacts has then been determined, based on these parameters in combination with other factors such as stakeholder concern around the identified impact.

For the purposes of this application, **activity**, **process** and furnace and emissions abatement system **technologies** were considered by the development team. This is due to the need to produce a high-specification aluminium alloy; the market demand for aluminium alloy; and the potentially significant air quality impacts associated with a foundry.

iv. Public participation

Per the requirements of the environmental legislation which governs the scoping/EIA process, public participation is conducted at various stages of the application process. The purpose of public participation is to inform potentially affected communities surrounding the development site of the proposal and to obtain their feedback on the proposal. Any significant concerns or queries will need to be addressed in the scoping/EIA process, through additional information supplied to affected parties, additional investigations were undertaken into the possible impacts of the activity, and where appropriate, by an amendment of the development proposal.

The environmental authorities and other organs of state with jurisdiction over the activity, have been included in the public participation process.

To date, the pre-application Draft Scoping Report, the Draft Scoping Report and the Draft EIA Report have been distributed to registered stakeholders for a commenting period of 30 days. **Annexure E** contains a record of public participation, including a comments and responses report. Issues and concerns raised have been addressed in the comments and response report and where required, in this Final EIA Report (EIAr).

v. Potentially significant impacts identified

<u>The following risks have been identified as associated with the proposed foundry activity on a portion of remainder of portion 1 of farm Driefontein 87-Ir, Germiston:</u>

1) Increased combustion emissions, as well as pollutant emission from burning the coatings off the scrap and from the additives used in the melt. These include sulphur dioxide, nitrogen dioxide and particulate matter, which are all considered as criteria air pollutants

for their potential to adversely impact air quality. Poor air quality has well-documented negative impacts on human and environmental health.
2) Increased fugitive dust emissions from material handling at the site. Dust fall similarly has the potential to impact air quality adversely.
3) The foundry will have associated additional trucks on the road, transporting scrap aluminium and copper to the plant while also transporting alloy to customers. There will be associated exhaust emissions and contribution to road congestion.
4) The new foundry will be associated with bulk fuel storage tanks. If the tank bunding, tanks, fuel lines and other associated infrastructure are not monitored and maintained regularly, and if fuel storage and handling is not managed appropriately, infrastructure failure and unnecessary leaks and spills could cause soil or groundwater contamination.
5) The foundry has significant associated risks in terms of health and safety of workers (working with extreme temperature machinery and molten metal; furnace emissions in the workplace; handling hazardous dross (corrosive; skin and lung irritant; potential for harmful and explosive fumes when wet).

The above list of possible adverse impacts associated with the foundry can reasonably be expected to occur with any industrial development. The impacts can all be readily managed with adherence to statutory air quality standards and best practice management measures. And additional heavy traffic on the roads serving the industrial area is a roads authority challenge that needs to be addressed during road planning in order to support necessary industrial development.

<u>The following potential benefits associated with the proposed foundry activity on a portion of Remainder of portion 1 of Farm Driefontein 87-Ir, Germiston:</u>

1) GeT Alloys will increase their market share and profitability. Not only will there be knock-on benefits for Get Alloys staff in terms of job and income security, and benefits to the owners of GeT Alloys, but the new plant will require the employment of potentially 50 new staff members.
2) GeT Alloys provides a service to downstream production and construction industries. These are essential industries which support human activities.
3) It can be argued that successful businesses in the Germiston Knights industrial area, could attract additional investment into the area: businesses which provide goods and services to GeT Alloys, the scrap providers (companies and individuals), and construction-related businesses which use GeT Alloys' aluminium alloy and copper in their manufacturing and construction processes.
4) An expanded and financially stable and profitable industry generates tax revenue for the government, which is an essential aspect of the economy.
5) The metal recovery process has significant benefits in terms of the waste-to-value chain and diversion of waste from landfill and avoiding the impacts associated with mining and processing of virgin materials.

From the above investigation, GeT Alloys has determined that investigating other activities is not necessary for the purposes of this application. This activity has therefore been included in the development proposal for assessment in the EIA phase.

vi. Alternatives identified and investigated

The EIA process requires that the development team investigates various means of achieving the general purpose and requirements of the development, in order to identify the lowest-impact alternatives which can be implemented, which are financially beneficial for the applicant. When identifying whether possible alternatives for implementation are both reasonable and feasible the team should consider (a) the general purpose and requirements of the activity; (b) need and desirability; (c) opportunity costs; (d) the need to avoid negative impact altogether; (e) the need to minimise unavoidable negative impacts; (f) the need to maximise benefits; and (g) the need for equitable distributional consequences (DEA 2014, p. 16).

A development team can investigate various types of alternatives, such as:

- Different sites on which to locate a development, especially if any of the sites investigated are identified as sensitive from a land use or natural or cultural resources perspective.
- Different development layouts in order to avoid any identified sensitive areas or receptors on or nearby a site.
- Technology alternatives, where some technologies may lead to excessive impacts such as air emissions, whilst other technologies may be ideal for minimizing such impacts.
- Activity alternatives, such as whether to smelt aluminium or whether to undertake an entirely different activity, depending on the market demand identified, the skills and resources of the developing entity, etc.

For the purposes of this application, **activity**, **process** and furnace and emissions abatement system **technologies** were considered by the development team. This is due to the need to produce a high-specification aluminium alloy; the market demand for aluminium alloy; and the potentially significant air quality impacts associated with a foundry.

Please refer to **Annexure J** for a comprehensive breakdown of the alternatives assessed as part of the proposed development of a foundry on the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR.

In summary, the development proposal includes:

1) A foundry that will enable GeT Alloys to develop their operation in response to market demand.
2) The plant will be situated on industrial-zoned *un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR*, Shaft Road, Germiston Knights industrial area.
3) The furnaces to be installed include two reverberatory furnaces and one vortex pump furnace, including scrap pre-treatment process, for aluminium melting, and one furnace for copper melting.
4) The emissions abatement technology will be a bag filter system as described.

vii. Environmental impact statement

The development proposal (including the **activity**, **process** and furnace and emissions abatement system **technologies** alternatives that were found on investigation to be the best practicable options for the minimisation of health, safety, and environmental risks) was assessed against the no-go option, which is the option of not proceeding with the development.

SUMMARY OF IMPACTS ASSOCIATED WITH THE DEVELOPMENT PROPOSAL
CONSTRUCTION PHASE IMPACTS

1. ***Waste management***

General construction waste – managed in accordance with the measures contained in appendix K resulting in a low negative significance.

2. ***Ambient air quality***

PM_{10} such as dust and smoke as a result of construction and vehicle emissions may result in poor health due to potential cumulative impacts on the ambient air quality. A low negative significance with mitigation measures implemented.

3. ***Noise***

Construction noise will result in a temporary nuisance for the duration of construction relate activities. A low significance impact is expected with mitigation measures implemented.

4. ***Geological***

No dolomite formations underlying the development site. However, due to past subsurface mining activities cognisance of the possibility of subsidence should be considered in the engineering design. Care should also be taken in ensuring adequate protection from acidic water draining from mine dumps in the surrounding area. A low significance impact is expected with mitigations implemented.

5. ***Soil and groundwater contamination***

Handling and storage of hydrocarbons, as well as fuel and refuelling activities to be done in accordance with standard operating procedures will result in a low significance impact with mitigation.

6. ***Heritage resources***

No Impact expected.

7. ***Biophysical (terrestrial and aquatic)***

No impact expected.

8. ***Socio-economic***

A low positive significance is expected as a result of temporary jobs and employment resulting in temporary improved living conditions.

OPERATIONAL PHASE IMPACTS

9. Impacts on air quality / pollutants

Increased particulate matter and gaseous emissions may occur from aluminium scrap pre-heating and oil-fired furnaces, resulting in poor ambient air quality. At sufficiently high concentrations, these pollutants may result in potential health, nuisance, dust, and odour impacts without mitigation. Regional air quality may be negatively affected as a result of the cumulative impacts associated with these emissions which may lead to a potentially more widespread negative impact for residents within proximity to the facility. A low significance impact is expected with mitigation.

10. Increase traffic and congestion – nuisance

The foundry will have associated additional trucks on the road, transporting scrap aluminium and copper to the plant while also transporting alloy to customers. Which will add to the cumulative impacts associated with the movement of heavy vehicle within the industrial area and localised surrounds. Effects are likely to only be felt on a localised level resulting in a low significance impact with mitigation.

11. Potential risk of soil, groundwater, and surface water contamination (Indirect)

Refer to construction phase impacts.

12. Adverse occupational health effects on staff due to significant levels and periods of exposure

The foundry has significant associated risks in terms of health and safety of workers (working with extreme temperature machinery and molten metal; furnace emissions in the workplace; handling hazardous dross (corrosive; skin and lung irritant; potential for harmful and explosive fumes when wet). The facility needs to be designed and operated in such a way as to effectively avoid and manage health and safety risks.

Get Alloys will need to prepare standard operating procedures for the various foundry processes (e.g., furnace charging, tapping, casting, dross handling and storage), as well as prepare preventative maintenance plans for all infrastructure associated with the foundry activities, in order to ensure that best-practice health and safety measures are implemented, and that infrastructure does not become derelict and unsafe to operate. With mitigations as included implemented the impact is expected to result in a low negative significance.

13. Noise resulting in nuisance factors / potential complaints

Potential noise impact related to the operation of the facility. This may be significant at start up and shut sown procedures but is compatible with the existing land use planning objectives for the property (zoned for industrial use).

14. Waste impacts

The operation of the foundry will generate only small quantities of general waste such as office and some kitchen waste. This will be disposed of in the municipal waste stream [normal solid waste collection services as provided by the Municipality in the area]. Therefore, no increase expected on the current municipal solid waste capacity.

15. Socio-economic benefits

The components making up the socio-economic benefits are highlighted below – the result of the associated impacts is expected to a have a medium positive impact.

16. Impact on natural resources (positive)

The operation of the facility will result in a positive impact on the use of natural resources:

Both aluminium and copper are non-renewable / finite natural resources. The proposed development thus addresses this through the smelting and moulding of scrap aluminium and copper, thereby reducing the demand for mining of these metals. Recovering aluminium and copper from scrap is commonly known to have a smaller carbon footprint and to be less energy intensive than mining these virgin ores.

In addition, scrap metal will be diverted from landfill, thereby saving on scarce landfill airspace. The foundry will therefore have environmental benefits.

In addition, scrap metal will be diverted from landfill, thereby saving on scarce landfill airspace. The foundry will therefore have environmental benefits.

Also, the furnaces to be installed shall use fossil fuel, such as low sulphur oil (LSO) or natural gas. The consideration of replacing hydrocarbon furnace oil or natural gas with a biofuel, provided that the quality, performance, competitive costs, and security of supply can be assured, has been assured by the Applicant.

17. Socio-economic (employment opportunities)

GeT Alloys will increase their market share and profitability. Not only will there be knock-on benefits for Get Alloys staff in terms of job and income security, and benefits to the owners of GeT Alloys, but the new plant will require the employment of potentially 50 new staff members. GETA please confirm?

18. Socio-economic (contribution to capital investment)

GeT Alloys provides a service to downstream production and construction industries. These are essential industries which support human activities.

It can be argued that successful businesses in the Germiston Knights industrial area, could attract additional investment into the area: businesses which provide goods and services to GeT Alloys, the scrap providers (companies and individuals), and construction-related businesses which use GeT Alloys' aluminium alloy and copper in their manufacturing and construction processes.

19. Socio-economic (contribution to the economy)

An expanded and financially stable and profitable industry generates tax revenue for the government, which is an essential aspect of the economy.

20. Contribution to green economy and national waste diversion from landfill objectives and targets

The metal recovery process has significant benefits in terms of the waste-to-value chain and diversion of waste from landfill and avoiding the impacts associated with mining and processing of virgin materials.

A summary of the findings of the impact assessment is contained in Table A and Table B. It has been found that any negative impacts associated with establishing and operating the proposed foundry can be avoided altogether or can be reduced to acceptable levels through appropriate mitigation. All of the negative impacts are of **low significance**.

The identified benefits associated with the proposed foundry were found to be of **low benefit** (construction phase) and **medium benefit** (operational phase).

The activity proposal has been assessed against the no-go option, which is the option of not establishing the proposed foundry. The no-go option has thus provided a baseline against which to assess the benefits and drawbacks of the proposed foundry.

With the no-go option, no benefits of sufficient significance were identified to warrant not establishing the foundry.

However, the no-go option has the drawback of constraining GeT Alloy's service offering to the construction industry, as well as their profitability. The no-go option also represents the loss of potential investment, income, job opportunities, service to downstream industries and significant injection into the circular economy, which could be realised with the establishment of the new proposed facility.

Table A - Summary of construction and decommissioning phase impacts associated with the GeT Germiston Alloys' foundry

GeT Alloys' Germiston foundry (including all preferred activity, process, furnace, and emissions abatement system technology alternatives)		
Impact	**Before mitigation**	**After mitigation**
Waste management	Low (-ve)	Low (-ve)
Ambient air quality	Medium (-ve)	Low (-ve)
Noise	Medium (-ve)	Low (-ve)
Geological	Low (-ve)	Low (-ve)
Soil and groundwater contamination	Medium (-ve)	Low (-ve)
Heritage resources	No impact	
Biophysical (terrestrial and aquatic)	No impact	
Socio-economic	Low (+ve)	

Table B Summary of operational phase impacts associated with the GeT Alloys' Germiston foundry

GeT Alloys' Germiston foundry (including all preferred activity, process, furnace, and emissions abatement system technology alternatives)		
Impact	**Before mitigation**	**After mitigation**
Ambient air quality	Medium (-ve)	Low (-ve)
Traffic	Low (-ve)	Low (-ve)
Soil and groundwater contamination	Medium (-ve)	Low (-ve)
Fire explosion; health and safety risk	High (-ve)	Low (-ve)
Noise	Medium (-ve)	Low (-ve)
Waste management	Medium (-ve)	Low (-ve)
Geological		

Table C: Summary of no-go option [advantages vs disadvantages] associated with the GeT Alloys' Germiston foundry

ADVANTAGES	DISADVANTAGES
ENVIRONMENTAL ATTRIBUTES	
The additional air emissions and possible fugitive dust emissions associated with the proposed foundry would not occur associated with the no-go option. The proposed development design, including appropriate process and abatement technology, as well as dust control measures, however, are expected to reduce emissions to within statutory and therefore acceptable limits. This benefit is not considered significant enough to warrant not developing the plant. The waterbodies and vegetation situated in close proximity to the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR would remain unharmed. According to the need and desirability assessment and site sensitivity verification report that has been undertaken, however, the freshwater and vegetation sensitivity of most of the site is considered to be low to negligible. There is no natural vegetation in close proximity to the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR. The wetlands are also heavily transformed and more than 380 and 750m away from the site.	Impacts resulting from proceeding with the development proposal will impact negatively on the air emissions quality, however through effective mitigation, monitoring and management the effects are not significant enough to warrant not developing. Increased pressure on the aluminium industry for the continued mining of aluminium at the detriment of the environment and natural stocks. From the investigation of the need and desirability of the development that has been undertaken in section 7, the no-go option does not support the regional planning imperatives for the Germiston Knights and greater Ekurhuleni area in terms of investment in Germiston. The no-go option does not represent any contribution to the circular (waste-to-value) economy and to diversion of scrap metal from landfill.
SOCIO-ECONOMIC ASPECTS	
The identified health and safety risks associated with operating a foundry would not occur. But these impacts can be readily avoided with standard, best-practice measures and adherence to statutory requirements contained in the Occupational Health and Safety Act. This benefit is therefore not considered significant enough to warrant not developing the foundry.	**Employment opportunities:** The no-go option does not represent jobs and associated income, to the benefit of the surrounding Germiston community. **Economic growth:** There is market demand from the construction and manufacturing sectors for GeT Alloys' product, namely recycled aluminium alloy and copper. The no-go option would mean that necessary support for these sectors would not be realised. **Industry investment:** The South African scrap aluminium recovery industry would not receive much-needed investment and growth with the establishment of a technologically advanced foundry. The scrap could potentially need to be transported to other countries for processing. **Market viability:** The no-go option could curtail the profitability and therefore financial stability of GeT Alloys.

Recommendations from the EAP and recommended conditions to be included in the environmental authorisation:

The Environmental Practice recommends that the proposed development of an aluminium and copper foundry on the un-subdivided portion of remainder of portion 1 of farm Driefontein no. 87-IR be authorized. This recommendation is based on the outcome of the

impact assessment process, which has been informed by Enviroprac's professional experience in environmental management as well as on specialist input and detailed process information provided by the applicant. In addition, during public participation, no objections to the facility were raised – only requirements for the adequate management of emissions and other environmental risks associated with the facility.

The facility should be designed and operated with the implementation of all the mitigation measures recommended by the specialists and required by the commenting authorities. All of these measures are contained in the EMPr, which is attached as **Annexure K** The implementation of the EMPr should therefore be the condition of the environmental authorisation.

Once the foundry is operational, all ongoing emissions monitoring and other ongoing management measures contained in the EMPr should be reported on to GDARD and the Ekurhuleni Metropolitans' air quality branch by the applicant on a basis reflected in the environmental authorisation. On a five-yearly basis, the facility should be audited against the conditions of the EMPr by an independent Environmental Control Officer (ECO). These audit reports should be submitted to the GDARD and the Ekurhuleni Metropolitans' air quality branch for their record-keeping purposes.

These recommendations for monitoring and auditing of operations against the EMPr are contained in the EMPr and should therefore be a condition of authorisation.

viii. Report structure

Section 1 provides an introduction to the development application.

Section 2 provides the terms of reference for the scoping/EIA application process for environmental authorisation and an atmospheric emissions licence.

Section 3 provides the details of the report author, being the environmental assessment practitioner (EAP).

Section 4 provides detail on the proposed development site.

Section 5 provides more detail on the development activity and specifies the EIA- and air quality-listed activities for which authorisation is being applied with this scoping/EIA process.

Section 6 provides the environmental planning policy and legislation that applies to the application.

Section 7 provides a summary of the need and desirability of the development proposal. For a comprehensive breakdown of the need & desirability related to the proposed new foundry, please refer to **Annexure I.**

Section 8 provides a summary of the alternatives investigated as part of the environmental impact assessment process. For a comprehensive breakdown of the investigation of alternatives related to the proposed new foundry, please refer to **Annexure J.**

Section 9 gives detail on the public participation process that will be undertaken for the application. For a detailed breakdown of the public participation process, please refer to **Annexure E**.

Section 10 contains a discussion of the impacts identified as potentially associated with the proposed new foundry.

Section 11 contains an assessment of identified impacts.

Annexures contain required supporting maps, plans, specialist reports, and other supporting information.

ix. Uncertainties, assumptions, and gaps in knowledge

The following uncertainties, assumptions and gaps in knowledge pertain to this impact assessment:

- It has been assumed that the specialist findings are accurate and impartial; that mapping data from sources including Google Earth and the Council for Geosciences is accurate, and that information on all aspects of the proposed foundry provided by the applicant is accurate.
- Besides the above, there are no assumptions, uncertainties or gaps in knowledge that are material to this application.

x. EIA report content requirements in terms of appendix 3 of the EIA Regulations, 2014 as amended

Requirement	Relevant Section in Report
Details of the EAP who prepared the report	Section 3
The expertise of the EAP including a Curriculum Vitae	Annexure F1
The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report	Section 4
The 21-digit Surveyor General code of each cadastral land parcel	Section 4
Where available the physical address and farm name	Section 4
The coordinates of the boundary of the property or properties	Section 4
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 -	Annexure A1-A2
A linear Activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken	N/A
On land where the property has not been defined, the coordinates within which the activity is to be undertaken	N/A
A description of the scope of the proposed activity, including -	Section 5.1
All listed and specified activities triggered and being applied for, and	Section 5.2
A description of the associated structures and infrastructure related to the development	Section 5.1
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	Section 6
A motivation 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	Section 7, Annexure I

Requirement	Relevant Section in Report
A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report	Section 8, Annexure J
A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including -	Section 8, Annexure J
Details of the development footprint alternatives considered	Section 8, Annexure J
Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs	Section 9, Annexure E
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	Section 9.2.1
The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Annexures B & J
The impacts and risks identified including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts -	Section 10
(aa) can be reversed	Section 11.2
(bb) may cause irreplaceable loss of resources, and	Section 11.2
(cc) can be avoided, managed or mitigated	Section 11.2
The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks	Section 11.1
Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 11.3
The possible mitigation measures that could be applied and level of residual risk	Section 11.3.3, Annexure K
If no alternative development footprints for the activity were investigated, the motivation for not considering such alternative	Annexure J
Concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report	Annexure J
Full description of the process undertaken to identify assess and rank the impacts the activity and associated structures and infrastructure will pose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including -	Sections 10, 11.1 & 11.2
A description of all environmental issues and risks that were identified during the environmental impact assessment process	Sections 10 & 11.2 Annexure J
An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures	Section 11.2
An assessment of each identified potentially significant impact and risk, including -	Section 11.2
Cumulative impacts	Section 11.2
The nature, significance and consequences of the impact and risk	Section 11.2
The extent and duration of the impact and risk	Section 11.2
The probability of the impact and risk occurring	Section 11.2
The degree to which the impact and risk can be reversed	Section 11.2
The degree to which the impact and risk may cause irreplaceable loss of resources	Section 11.2
The degree to which the impact and risk van be mitigated	Section 11.2
Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment Report	Section 11.3.3, Annexure K
An environmental impact statement which contains -	Section 11.3
A summary of the key findings of the environmental impact assessment	Section 11.3.1
A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating the areas that should be avoided, including buffers	Annexure B1 – B2

Requirement	Relevant Section in Report
A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	Section 11.3.1
Based on the assessment and where applicable, recommendations from the specialists' reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusions as conditions of authorisation	Section 11.3.3, Annexure K
The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment	Section 11.3.3, Annexure J
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	Section 11.3.3
A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	Section 11.3.2
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	Section 11.3.3
Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised	N/A
An undertaking under oath of affirmation by the EAP in relation to -	Section 12
The correctness of the information provided in the reports	Section 12
The inclusion of comments and inputs from stakeholders and I&APs	Section 12
The inclusion of inputs and recommendations from the specialist reports where relevant	Section 12
Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties	Annexure E
Where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	N/A
An indication of any deviation from the approved scoping report, including the plan of study, including -	N/A
Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	N/A
A motivation for the deviation	N/A
Any specific information that may be required by the competent authority; and	Annexure G
Any other matters required in terms of section 24(4)(a) and (b) of the Act	N/A

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Annexure B	1) Initial Site Sensitivity Investigation Report February 2022 2) DEFF Screening Tool Report
Annexure C	1) Freshwater Opinion – **No** Section 21 (c) and (i) water uses. Confluent Environmental, July 2021. 2) Atmospheric Impact Report. Soundscape Consulting (Pty) Ltd. November 2021. 3) Heritage Screener. CTS Heritage. January 2022. 4) Geological Review. Rock & Stock Investments. February 2022.
Annexure D	1) Proof of heritage submission to SAHRA. January 2022 2) Response to Heritage Notice of Intent to Develop. SAHRA (still outstanding as of February 2022)
Annexure E	Record of public participation: 1) Public Participation summary 2) Registered stakeholder table 3) Comments & Responses Report 4) Proof of notification: initial notification and Pre-Application Draft Scoping Report distribution 5) Comments and responses received and sent initial notification and Pre-Application Draft Scoping Report 6) Proof of notification: Draft Scoping Report distribution 7) Comments and responses received and sent: Draft Scoping Report 8) Proof of notification: Draft EIA Report distribution 9) Comments and responses received and sent: Draft EIA Report
Annexure F	1) Curriculum Vitae of EAP 2) EAPASA Registration
Annexure G	Draft Atmospheric Emissions Licence Application Form
Annexure H	Photos of Development Proposal Site, January 2021
Annexure I	Need & Desirability of Development Proposal
Annexure J	Investigation of Alternatives associated with Development Proposal
Annexure K	1) Environmental Management Plan (EMPr) 2) Appendix H to EMPr – Section 30 Incident Report Template

1 INTRODUCTION

GeT Alloys (Pty) Ltd plans to develop a foundry for the production of aluminium alloy and copper from scrap. The site identified for the development is a developed industrial facility situated on un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR ("the proposed property"), Shaft Road, Germiston Knights industrial area, Gauteng. Get Alloys' plan is to install the infrastructure needed for the foundry. This will include furnaces and other machinery to produce 2000 tons of aluminium alloy per month.

Other activities will include upgrading the buildings on site and constructing new buildings. A second phase of development (anticipated at this stage to occur between 2022 and 2023) will include installing furnaces for the melting of scrap brass and copper to produce 100 tons of copper per month.

Figure 2: The un-subdivided portion of Remainder of Portion 1 of farm Driefontein No. 87-IR: Site Locality

Image courtesy of Google Earth 2021

2 TERMS OF REFERENCE

Given that the scrap aluminium and copper will be melted in combustion-furnaces and of a significant throughput capacity, the new foundry has the potential to emit significant emissions to atmosphere, thereby impacting ambient air quality. As such, an Atmospheric Emissions Licence (AEL) with emissions standards is required to manage operations at the facility in terms of the National Environmental Management: Air Quality Act, Act No. 39 of 2004, as amended (NEMAQA).

Any new development which requires an AEL, is also required to apply for Environmental Authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998 (NEMA). The NEMA EIA Regulations, published in Government Notice No's 324, 325, 326 and

327 of 2017, govern such an application. In particular, Chapter 4, Part 5 of the EIA Regulations govern this application, which is a scoping/EIA-type application.

Given that *scrap* metal will be processed, the proposed foundry also requires a Waste Licence in terms of the National Environmental Management: Waste Act, Act No. 59 of 2008, as amended (NEMWA). This is because scrap metal is defined as general waste, and the foundry will entail the recycling, recovery, and treatment of the metal to produce alloys. In terms of the One Environmental Management System which prevails in South Africa, the licensing authority, being the Gauteng Department of Agriculture and Rural Development (GDARD) will issue an Integrated Environmental Authorisation in terms of both the NEMA and NEMWA requirements.

The purpose of this EIA Report is to assess the potential impacts associated with the foundry development, which were identified in the preliminary, Scoping phase of the application, and to determine whether the development should go ahead given the determined significance of the identified impacts.

This report is the third report that has been compiled in fulfilment of the requirements contained in Chapter 4, Part 3 of the EIA Regulations. The contents of this report have been guided by the requirements contained in Appendix 2 of the EIA Regulations relating to the EIA phase.

3 DETAILS, EXPERIENCE & INDEPENDENCE STATEMENT OF THE EAP

The report has been compiled by Colleen McCreadie of The Environmental Practice. Enviroprac is an independent consultancy with no financial interest in the development and operation of the sand a new aluminium alloy and copper scrap foundry, other than remuneration for work performed in terms of the NEMA and the NEMAQA; and does not have and will not have any vested interest in the outcome of this EIA application process.

Colleen has fifteen years' experience in environmental management. Colleen is a registered environmental assessment practitioner with the Environmental Assessment Practitioners Association of South Africa (Reg. No. 2018/166); has an Economics Honours degree from the University of Cape Town; and is a member of good standing with the International Association of Impact Assessment, the National Association for Clean Air, and the Institute of Waste Management in Southern Africa.

Please see EAP Curriculum Vitae attached in **Annexure F1**.

4 SITE DESCRIPTION

GeT Alloys' new foundry is to be situated on the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR, which is located in Shaft Road in Germiston Knights industrial area. See Figure 1 for the site location.

The Surveyor General's 21-digit codes for these erven are:

The un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR	Q330 0000 00000087 00001

The approximate co-ordinates of the site boundaries are:

	Latitude	Longitude
North-west corner	26°11'47.24"S	28°10'56.85"E
North-east corner	26°11'46.85"S	28°11'4.75"E
South-west corner	26°11'49.65"S	28°10'57.02"E
South-east corner	26°11'49.25"S	28°11'4.83"E

The new foundry, including parking and storage areas and new buildings, will cover the entire site, which is already heavily impacted by prior industrial development. Thus, the development footprint co-ordinates can be considered the same as the site boundary co-ordinates.

Please see a basic site layout plan attached in **Annexure A3**.

Please refer to the site sensitivity verification report attached in **Annexure B1**, which provides a detailed description of the site attributes, and an investigation of the potential sensitivity of the site and surrounds to the impacts associated with developing the proposed new foundry.

5 ACTIVITY DESCRIPTION AND EIA LISTED ACTIVITIES

5.1 Activity description

5.1.1 Summary overview of development proposal

The proposed new foundry will entail the following infrastructure and activities:

- Renovation of an existing building to house the foundry.
- Installation of a scrap pre-treatment system (sorting, separating, shredding, pre-heating)
- Installation of two 8 tonne reverberatory furnaces, each with a 10-tonne holding furnace, as well as one Vortex pump furnace with a 10-tonne holding furnace for scrap aluminium melting. 2000 tonnes per month of aluminium alloy will be produced from approximately 2400 tonnes of scrap. This will also involve a more targeted extraction of emissions.
- Aluminium alloy casting will use a belt conveyor mould system.
- Construction of a building on the eastern portion of the property for the recovery and storage of dross[1]. Approximately 10 - 15 % of the residual aluminium in the dross will be recovered and returned to the alloying process. The remaining, unusable dross is then further processed off-site before being disposed of.
- The dross recovery system will entail milling, screening, and magnetic separation.
- A pollutant emissions abatement system will be installed. The system will include localized hood extraction above each of the furnaces, as well as an apex extraction system to extract fumes within the foundry building. The extracted fumes will pass through a bag filter before discharging via a stack of appropriate height to atmosphere.

[1] Dross is a by-product of the metal melting process, which can be defined as the oxidized metal impurities that are formed on the top of the aluminium melt. As dross is not pure enough to be cast with the rest of the melt, the dross is skimmed off the top of the melt and then disposed of as a waste.

- A 4-tonne furnace for melting scrap copper will be installed. 250 tonnes per month of scrap will be melted in order to produce 200 tonnes per month of copper.
- Weatherproof storage areas for the raw material, product, and cool dross.
- A cooling tower to cool the water used to release the ingots from the moulds. This water is continuously reused in a closed loop.
- A weighbridge and scale for weighing receiving raw material.

In terms of engineering services (water supply, stormwater management, electricity supply, sewerage reticulation), the facility will utilize existing municipal services and the existing site access points from Shaft Road.

5.1.2 Detailed process description [as set out in the Draft AIR, Soundscape, January 2022]:

Scrap aluminium (2 400 tons per month) and copper (250 tons per month) arrives on site via truck. Aluminium scrap arrives as bales, briquettes, hammered, shredded, or loose, and may contain plastic, oils, grease, dust, and/or laminates. Copper scrap is from industrial and domestic used. Scrap is sorted manually. Some aluminium scrap may require pre-heating in an oil-fired pre-heater. Copper scrap will not require pre-heating.

Aluminium scrap is fed to one of three oil fired melting furnaces (two 8-ton reverberatory and one 10-ton vortex pump furnace) in batches using charging machines. Molten aluminium is tapped from the furnaces into one of three oil fired 10-ton holding furnaces. Alloy is then cast into moulds via one of two casting machines and cooled to form ingots. The plant will produce 2 000 tons of aluminium alloy per month.

The 4-ton box type oil fired furnace is charged with copper scrap in a batch process. Copper alloy is tapped and cast into moulds on a mould trolley and allowed to cool to form copper ingots. The plant will produce 200 tons of copper alloy per month. Both aluminium and copper alloy ingots are packed and dispatched via truck.

Note: The pre-heater and all furnaces may also be fired with natural gas. For this application, the use of low sulphur fuel oil, with higher sulphur and PM content, is assumed.

All furnaces are fitted with fume extraction, both from the furnaces itself and via hoods to capture fumes during charging and/or tapping. Fugitive emissions are furthermore be extracted from the building roof at its apex. All extracted fumes/air (30 000 Nm^3/h) are mixed to lower the temperature of the off gas before it passes through a bag filter to reduce the PM load. It is then vented to atmosphere 30 m above ground level. Bag filter dust is bagged and disposed of by a waste disposal contractor.

Dross (450 tons per month) from the aluminium furnaces is tapped or skimmed from the molten material surface and cooled in the dross recovery plant. Aluminium is recovered from dross by a cold process at a 10% recovery rate. Cooled dross is passed through a vibratory screen, and, depending on size, passed through a ball mill or pulveriser. Aluminium is separated from other metals in the dross with a magnetic drum. Recovered aluminium is returned to the melting process. Materials remaining after the recovery of aluminium (approximately 405 tons per month) is bagged and disposed of by a waste disposal contractor. The entire dross recovery process takes place within an enclosed building.

The dross recovery plant ball mill and pulveriser are fitted with dust extraction. Extracted dust laden air will be passed through a bag filter to reduce the particulate matter load before being vented to atmosphere via a stack at 24 m above ground level. Bag filter dust will be bagged disposed of by a waste disposal contractor.

The plant will operate 24 hours per day, 365 days per year.

The unit processes [particular step in production process] and their respective functions as described above, are set out in the table provided by Soundscape below:

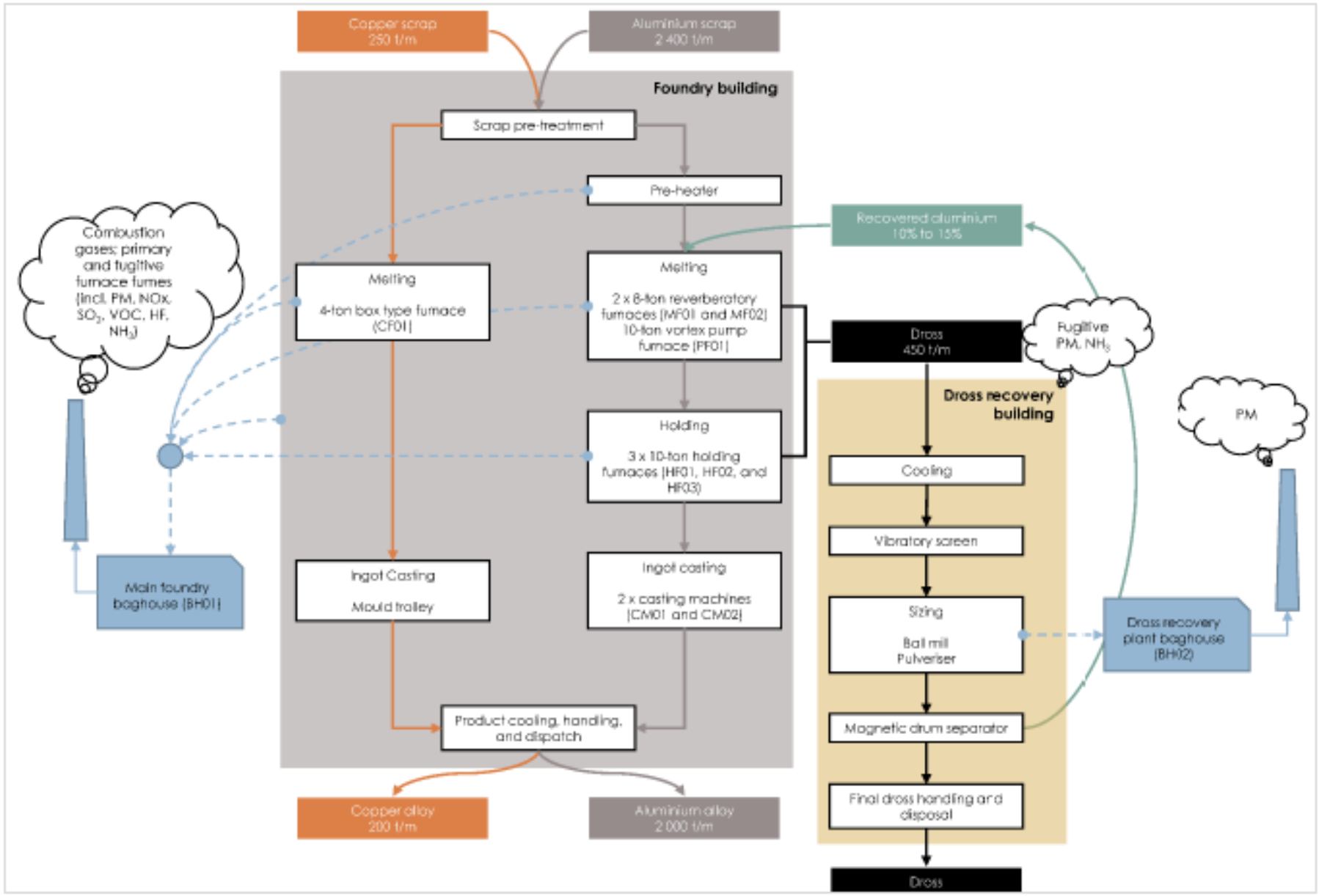
Table D: Unit processes and functions

Name of unit process	Unit process function	Batch or continuous process
Scrap pre-treatment	Manual cleaning, sizing, and sorting of aluminium and copper scrap metal	Batch
Scrap pre-heater	Pre-heating of aluminium scrap before charging to furnace	Batch
8-ton reverberatory melting furnace (MF01)	Melting of aluminium scrap	Batch
8-ton reverberatory melting furnace (MF02)	Melting of aluminium scrap	Batch
10-ton vortex pump furnace (PF01)	Melting of aluminium scrap	Batch
10-ton holding furnace (HF01)	Holding of molten alloy before casting	Batch
10-ton holding furnace (HF02)	Holding of molten alloy before casting	Batch
10-ton holding furnace (HF03)	Holding of molten alloy before casting	Batch
4-ton box-type melting furnace (CF01)	Melting of copper scrap	Batch
Casting machine (CM01)	Casting and cooling of aluminium alloy ingots	Batch
Casting machine (CM02)	Casting and cooling of aluminium alloy ingots	Batch
Casting mould trolley	Casting and cooling of copper alloy ingots	Batch
Product handling and dispatch	Packing and loading of aluminium and copper ingots for dispatch	Batch
Cooling	Cooling of dross prior to cold processing and recovery	Batch
Vibrating screen	Screening of cooled dross into various size fractions	Batch
Ball mill	Sizing of dross to recover aluminium	Batch
Pulveriser	Sizing of dross to recover aluminium	Batch
Magnetic drum separator	Separating aluminium from other metallics	Batch
Waste handling and disposal	Bagging and loading of waste and baghouse dust for disposal b contractor	Batch

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

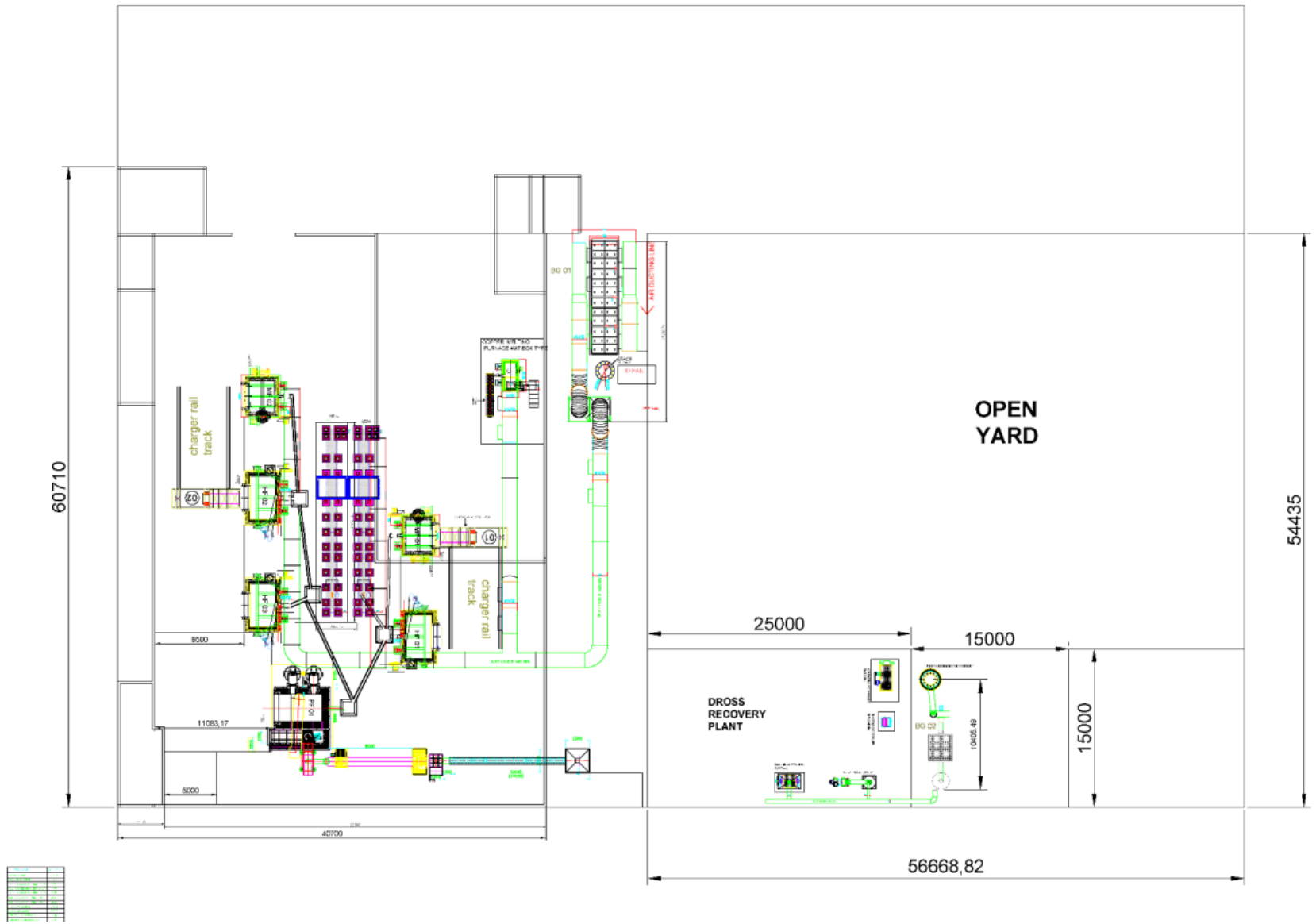
A simplified description summarizing the proposed operational process flow is provided in the below schematic:

Figure 3: A diagram of the process indicating operations, inputs, outputs, and points of emissions



Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Figure 4: Indicative site layout of the proposed development (Get Alloys, 2021)



refer to Annexure A3 for full scale map

Figure 5: Photos of the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR, Germiston Knights

Street view of the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR, 51 Shaft Road, Germiston Knights.

Site entrance to the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR, 51 Shaft Road looking southwest towards factory. The existing factory is secured by 2m high palisades and electric fencing.

The entrance to the reception.

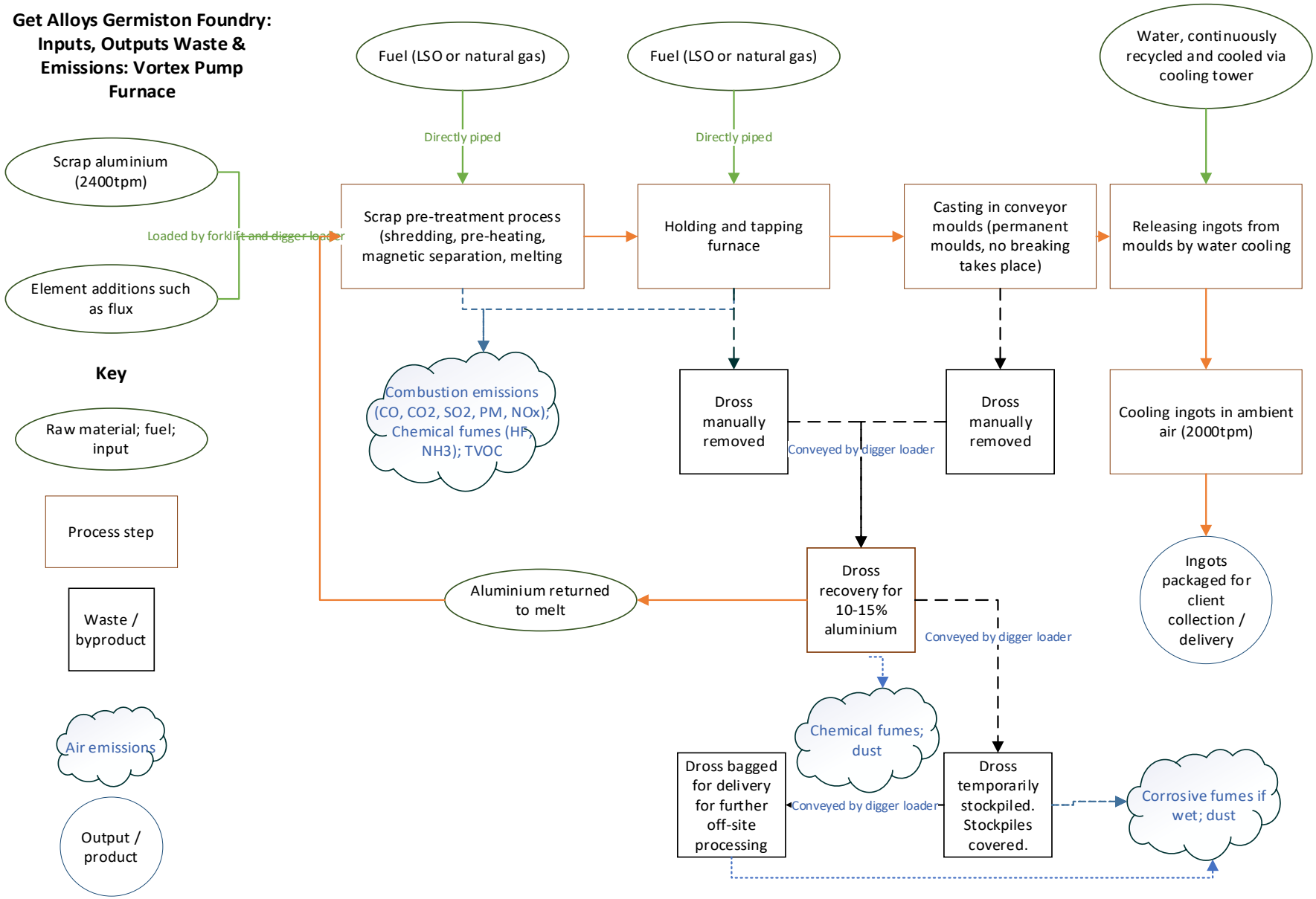
The whole site is already paved.

Bunding area for fuel storage already in place. Needs to be signed off for impermeability and capacity.

Existing factory facing from the street entrance.

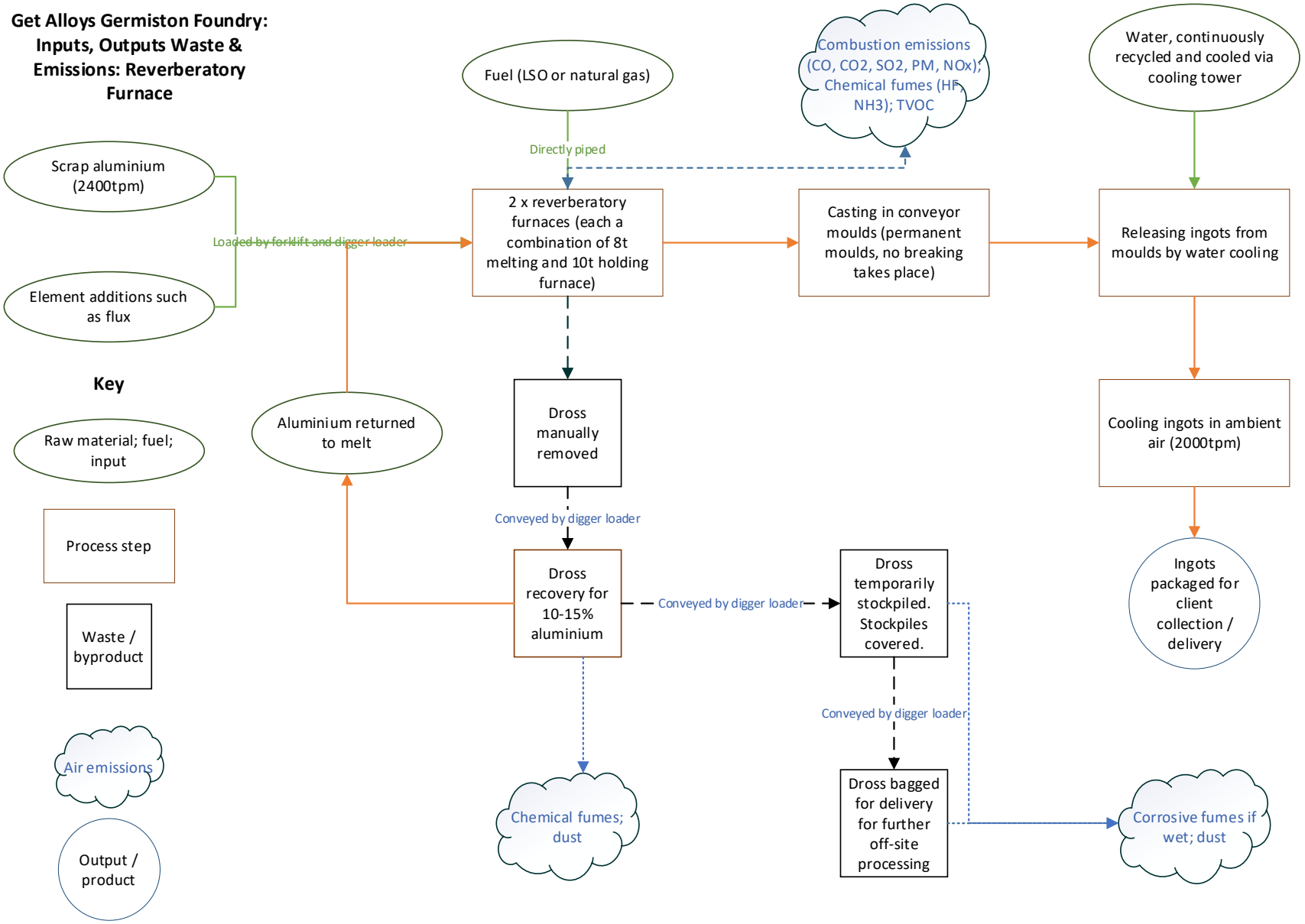
Entrance to the transporters yard (where the dross recovery facility will be constructed)

Figure 6: Overview process flow diagram with inputs, outputs, and emissions: vortex pump furnace



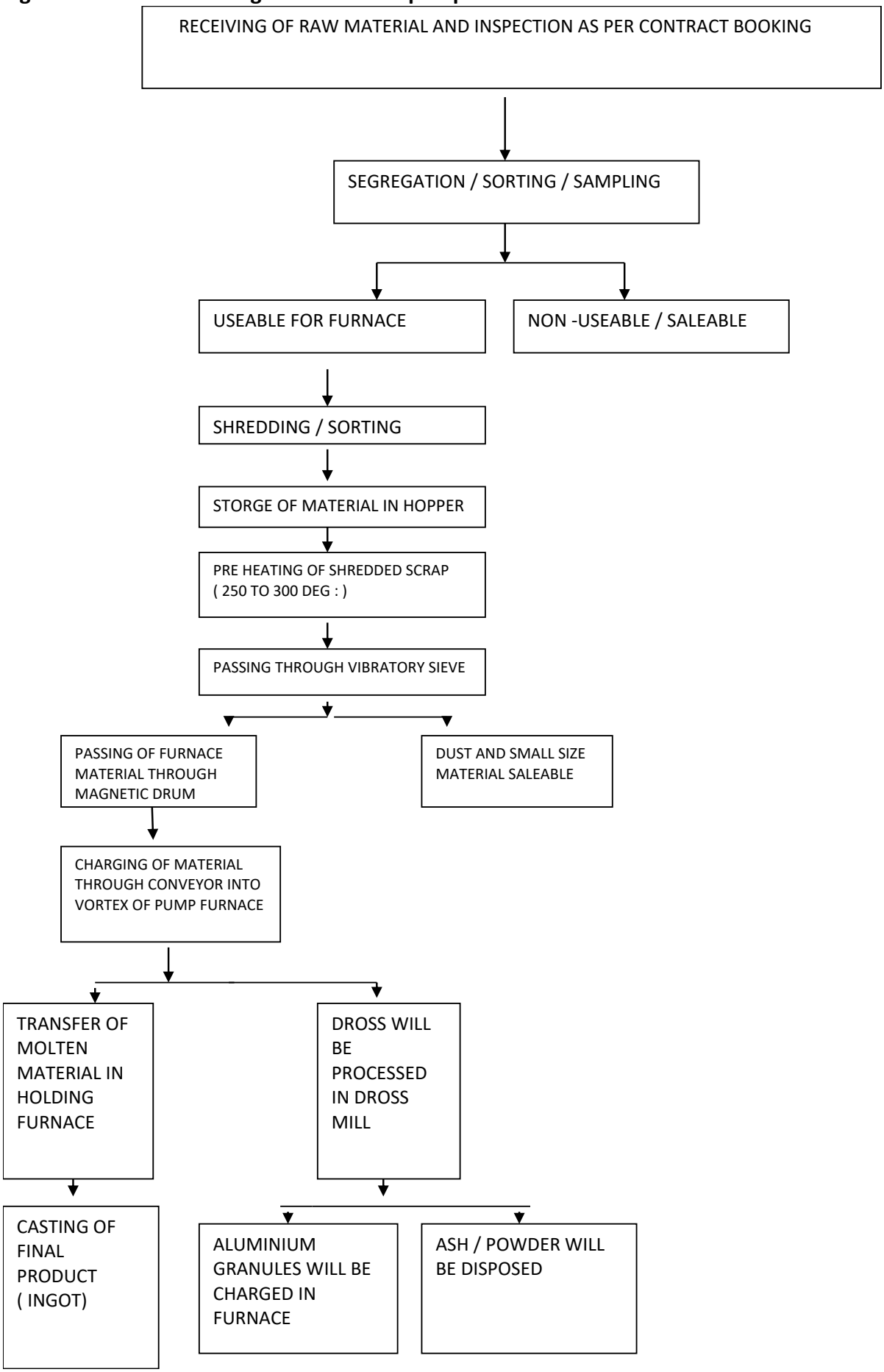
Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Figure 7: Overview process flow diagram with inputs, outputs, and emissions: reverberatory furnaces



Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Figure 8: Process flow diagram for vortex pump furnace



Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

5.1.3 Technical specifications of installed equipment and facility operations

The tables hereunder set out the technical specifications (***preferred alternatives***) for all the installed equipment, appliances, as well as operational specifications (including product inputs and outputs) of the facility.

Table E: Raw materials – inputs

Raw material type	Design consumption rate	Units
Aluminium scrap	2 400	Tons per month
Copper scrap	250	Tons per month

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Table F: Appliance abatement equipment control technology

Appliance name	Appliance type/description	Appliance function/purpose
Main foundry baghouse	Baghouse	For the removal of PM captured and extracted fumes from furnaces and the foundry building.
Dross recovery plant baghouse	Baghouse	For the removal of PM captured and extracted from ball mill and pulveriser at dross recovery plant.

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Table G: Operational hours

Unit process	Operating hours per day	Number of operational days per year
All unit processes (batch)	24	365

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Table H: Production rates

Product type	Design production rate	Units
Aluminium alloy	2 000	Tons per month
Copper alloy	200	Tons per month

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Table I: Materials used as energy sources

Material for energy	Sulphur content (%)	Ash content (%)	Design consumption rate	Units
Fuel oil	1%	Not applicable	3 000	Litres per day

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Table J: Atmospheric emissions – point source parameters

Point source number	Point source name	Point source coordinates	Elev. (m)	Height of release above ground (m)	Height above nearby building	Diameter at stack tip (m)	Actual gas exit temperature (°C)	Volumetric flow rate at 273 K and 101.3 kPa (Nm³/hour)	Actual gas volumetric flow rate (m³/hour)	Actual gas exit velocity (m/s)	Type of emission
S01	Main foundry baghouse stack	26°11'47.84" S 28°11'2.74" E	1 658	30	Approx. 10 m	1.2	100[a]	30 000	50 074[a]	12.3	Continuous
S02	Dross recovery plant baghouse stack	26°11'48.75" S 28°11'3.97" E	1 658	24	Approx. 10 m	0.4	Ambient[b]	3 480	4 524[b]	10[b]	Continuous

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Table K: Point source maximum emissions under normal working conditions

Point source number	Point source name	Pollutant name	Maximum emissions under normal operating conditions				Duration of emissions
			MES (mg/Nm³)[a]	Averaging period[a]	Emission rate (g/s)	Emission rate (t/a)[b]	
S01	Main foundry baghouse stack	PM[c]	30	Daily average	0.250	7.82	Continuous
		SO_2[c]	500	Daily average	4.17	130	Continuous
		NOx as NO_2	500	Daily average	4.17	130	Continuous
		F as HF	1	Daily average	0.00833	0.261	Continuous
		TVOC	40	Daily average	0.333	10.4	Continuous
		NH_3	30	Daily average	0.250	7.82	Continuous
S02	Dross recovery plant baghouse stack	PM[c]	30	Daily average	0.0290	0.908	Continuous

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

5.2 EIA listed activities

Applicable listed activities under NEMA: EIA Regulations, 2014 as amended:

The activities listed in the EIA Regulations published in government notice no's 982 – 985 of 2014, as amended, for which the new foundry requires authorisation, are:

> ***Listing Notice 2, Activity 6:*** *The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution, or effluent.*

Applicable listed activities under NEMAQA: Minimum Emissions Standards, 2013 as amended:

Listed activities, as published in the Minimum Emissions Standards published in terms of the National Environmental Management: Air Quality Act (NEMAQA) (Act no. 39 of 2004), are Subcategory 4.2 (combustion installations), and Subcategory 4.4 (secondary aluminium production):

Table L: Applicable listed activities - excerpt from AIR

Table 4: Listed activities

Category of listed activity	Sub-category of listed activity	Description of listed activity	Application
4. Metallurgical industry	4.2: Combustion installations	Combustion installations not used primarily for steam raising and electricity generation (except drying).	All combustion installations (except test or experimental)
4. Metallurgical industry	4.4 Secondary aluminium production	Secondary aluminium production and alloying through the application of heat (excluding metal recovery).	All installations

Table 5: MES for subcategory 4.2 (combustion installations)

Description	Combustion installations not used primarily for steam raising and electricity generation (except drying).		
Application	All combustion installations (except test or experimental).		
Substance or mixture of substances		Plant status	mg/Nm³ under normal conditions of 273 K and 101.3 kPa
Common name	Chemical symbol		
Particulate matter (PM)	Not applicable	New	50
Sulphur dioxide	SO_2	New	500
Oxides of nitrogen	NOx expressed as NO_2	New	500

Table 6: MES for subcategory 4.4 (secondary aluminium production)

Description	Secondary aluminium production and alloying through the application of heat (excluding metal recovery).		
Application	All installations.		
Substance or mixture of substances		Plant status	mg/Nm³ under normal conditions of 273 K and 101.3 kPa
Common name	Chemical symbol		
Particulate matter	Not applicable	New	30
Total fluorides measured as hydrogen fluoride	F as HF	New	1
Total volatile organic compounds (TVOC)	Not applicable	New	40
Ammonia	NH_3	New	30

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

The requirement to obtain authorization in terms of ***Subcategory 4.2, Combustion Installations:*** *Combustion installations not used for primarily for steam raising and electricity generation,* is because the activity will involve the operation of combustion-heated furnaces. Fuel oil or natural gas will be used to fuel the furnaces.

The requirement to obtain authorization in terms of ***Subcategory 4.4, Secondary Aluminium Production:*** *Secondary aluminium production and alloying through the application of heat,* is because the activity will involve the installation of a foundry and its related machinery for the recovery of aluminium from scrap to create aluminium alloy.

<u>Applicable Listed Activities under NEMWA:</u>

The activities listed in the 2013 list of waste management activities published in GN No. 921 in terms of the National Environmental Management: Waste Act, Act No. 59 of 2008, as amended (NEMWA), for which the new *scrap metal* foundry requires authorisation, are:

Category A, Activity 5: *The recovery of waste… at a facility that processes in excess of 10 tons but less than 100 tons of general waste per day* – the development proposal is for the

production of ±2000 tons of aluminium and ±100 tons of copper per month, from ±2400 tons per month of scrap (i.e., ±34 tons per day); and

Category A, Activity 12: *The construction of a facility for conducting a Category A activity* - whilst the site is already fully developed for industrial purposes, the establishment of the foundry will entail the installation of infrastructure such as furnaces, ducting, etc., as well as building renovations, which are specific to the foundry. A new building to house the dross recovery process will also be constructed. The establishment of the foundry can therefore be considered as construction.

6 POLICY AND LEGISLATIVE CONTEXT

The foundry is an industrial activity with the potential for significant impacts on the environment, e.g., from dust emissions, combustion emissions, contamination associated with fuel handling, nuisance impacts on nearby residences, health, and safety risks to staff, etc. The activity is thus regulated by land use planning and environmental legislation and should be informed by planning and environmental management policies applicable to the region.

In this regard, it can be noted as follows:

a) The development requires an environmental authorisation in terms of the National Environmental Management Act and the EIA Regulations.
b) The development requires an Atmospheric Emissions Licence in terms of the National Environmental Management: Air Quality Act and associated minimum emissions standards.
c) The development requires a Waste Management Licence in terms of the National Environmental Management: Waste Act since the raw material is scrap metal (general waste).
d) The National Dust Control Regulations need to be adhered to during all phases of the development life cycle.
e) The National Ambient Air Quality Standards will apply to the operational phase of the development, when fuel combustion and scrap metal processing will emit criteria pollutants such as particulate matter (PM_{10}), sulphur dioxide, nitrogen dioxide and carbon monoxide.
f) The land use of the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR needs to align with the approved land use in terms of the Ekurhuleni Metropolitan's integrated zoning scheme. The land use should also align with the broader planning imperatives for the region, which are contained in the Ekurhuleni town planning scheme and the regional spatial development framework strategic environmental assessment report.
g) The foundry entails the recovery of aluminium from scrap, which is general waste. The facility will therefore need to be designed, constructed, and operated in accordance with the national norms and standards for the storage of waste. And the scrap pre-treatment process, which includes shredding the scrap, will need to be designed, constructed, and operated in accordance with the national norms and standards for the sorting, shredding, grinding, crushing, screening, or baling of general Waste.

7 NEED AND DESIRABILITY OF THE PROJECT

The EIA Regulations require that an EIA application investigates the need and desirability of a development proposal. This relates to how sustainable the proposed new land use will be if the development proposal goes ahead.

According to the Department of Environmental Affairs and Development Planning's March *Guideline on Need and Desirability*, the need for a facility relates to whether the facility is needed at this point; whilst the desirability of the facility relates to the location or the receiving environment in which the facility is situated; i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed (2013, p. 11)?

To investigate the need and desirability of the proposed new foundry, reference has been made to the Ekurhuleni's town planning scheme, 2014, their integrated development plan, 2017, their spatial development concept report, 2012 and the regional spatial development framework strategic environmental assessment report, 2012.

Specialist input obtained to date, as well as the EAP's professional opinion based on experience with similar projects, has also informed the investigation. This section attempts to address all the issues raised in the DEA's 2014 guideline on need and desirability. In so doing, this section addresses how the development complies with the principles set out in section 2 of NEMA and meets the requirements of sustainable development.

Please refer to **Annexure I** for a comprehensive breakdown of the need and desirability related to the proposed new foundry.

8 INVESTIGATION OF ALTERNATIVES

A scoping/EIA application process requires that the development team investigates various means of achieving the general purpose and requirements of the development, to identify the lowest-impact alternatives which can be implemented, which are financially beneficial for the applicant. When identifying whether possible alternatives for implementation are both reasonable and feasible the team considered:

- The general purpose and requirements of the activity
- Need and desirability
- Opportunity costs
- The need to avoid negative impacts altogether
- The need to minimise unavoidable negative impacts
- The need to maximise benefits

A development team can investigate various types of alternatives, such as:

- Different sites on which to locate a development, especially if any of the sites investigated are identified as sensitive from a land-use or natural or cultural resources perspective.
- Different development layouts to avoid any identified sensitive areas or receptors on or nearby a site.
- Technology alternatives, where some technologies may lead to excessive impacts such as air emissions, whilst other technologies may be ideal for minimizing such impacts.

- Activity alternatives, such as whether to dry sand or whether to undertake an entirely different activity such as producing tile adhesive or cement or bricks, depending on the market demand identified, the skills and resources of the developing entity, etc.

For the purposes of this application, **activity**, **process** and furnace and emissions abatement system **technologies** were considered by the development team. This is due to the need to produce a high-specification aluminium alloy; the market demand for aluminium alloy; and the potentially significant air quality impacts associated with a foundry.

Please refer to **Annexure J** for a comprehensive breakdown of the alternatives assessed as part of the development proposal.

In summary, the development proposal includes:

1) A foundry that will enable GeT Alloys to develop their operation in response to market demand.
2) The plant will be situated on industrial 1-zoned the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR, Shaft Road, Germiston Knights industrial area.
3) The furnaces to be installed include two reverberatory furnaces and one vortex pump furnace, including scrap pre-treatment process, for aluminium melting, and one furnace for copper melting.
4) The emissions abatement technology will be a bag filter system as described.

9 PUBLIC PARTICIPATION PROCESS

Chapter 6 of the NEMA EIA Regulations, read together with section 38 (3) of the Air Quality Act, prescribes the public participation process that must be undertaken to bring the development proposal to the attention of certain stakeholders and of the public, and to allow stakeholders and the public an opportunity for appropriate input into the development proposal.

9.1 Initial stakeholder notification and pre-application draft scoping report review phase

The public participation process for this application has to date entailed the following:

1) Notification of identified stakeholders and the public of the development proposal, by means of advertisements in the *Germiston City News* newspaper on 20/08/2021 and in *The Germiston Star* newspaper on 18/08/2021.
2) Notices advising of the development proposal were placed on the site boundary with Shaft Road on 23/08/2021. Notification letters to neighbours without postal addresses were also hand delivered on 23/08/2021.
3) Letters to neighbouring landowners and identified community and business representative bodies in the Germiston area were posted on 17/08/2021.
4) Emails to identified community and business representative bodies in the Germiston area were sent on 21/08/2021 and 23/08/2021; and
5) Emails to identified organs of state with jurisdiction over the development proposal, as well as to the competent authority, were sent on 21/08/2021.

The content of all notices complied with the requirements of the EIA Regulations, 2014 as amended and indicated that stakeholders may access the pre-application draft scoping report and the draft atmospheric emissions licence application Form on the Enviroprac website for review and comment for a period of 30 days[2].

9.1.1 Key issues and concerns

No issues or concerns were raised during the comment period. One objection, with no motivation given, was received from a neighbour.

These issues and concerns were addressed in the comments and responses report contained in **Annexure E;** the site sensitivity verification report contained in **Annexure B**; as well as in this subsequent draft scoping report and the specialist studies as required.

9.2 Draft scoping report review phase

Organs of state and registered stakeholders were notified by email on 11/11/2021 of the opportunity to review and comment on the draft scoping report. The report was published on the Enviroprac website for review, and hard and soft copies of the report were submitted to the GDARD for their review. A 30-day comment period was allocated, from 12/11/ 2021 – 15/12/2021.

9.2.1 Key issues and concerns

A single response was received from the GDARD, noting the following key issues:

1) Heritage specialist input is needed in order to inform the EIA Report.
2) A dolomite feasibility investigation and a geotechnical investigation are needed to inform the EIA Report.
3) A facility-specific Environmental Management Programme is needed, which must address *inter alia* dust control, pollution prevention measures, and measures to avoid risks associated with dross spills.

The requirements communicated by the GDARD will be adhered to.

9.3 Draft EIA Report review phase

Organs of state and registered stakeholders were notified by email on 03/03/2022 of the opportunity to review and comment on the Draft EIA Report. The report was published on the Enviroprac website for review, and hard and soft copies of the report were submitted to the GDARD for their review. A 30-day comment period was allocated, from 07/03/2022 – 08/04/2022.

[2] No stakeholders have to date indicated that they are unable to download reports from the Enviroprac website due to lack of access to the internet. If such challenges are communicated to Enviroprac by stakeholders, alternative arrangements will be made to make reports available, e.g., a hard copy will be sent to the chairman of a community representative organisation.

9.3.1 Key issues and concerns

Two responses were received:

1) The GDARD noted agreement with the assessment of possible impacts of the foundry on the natural and cultural-historical environment, made by the EAP and specialists. GDARD also noted their agreement with the listed activities being applied for in terms of the NEMA, and of the EIA application process being followed. Lastly, the GDARD stipulated that all mitigation measures contained in the EIA Report and EMPr must be adhered to.
2) The Ekurhuleni Municipality's Air Quality Management Directorate noted that they have no objection, in principle, to the proposed foundry. The municipality also stipulated that the recommendations of the EAP and of the air quality specialist must be implemented. Further, the municipality noted the need for the foundry to adhere to the noise limits specified in the Gauteng Noise Control Regulations, and to conduct no activities which have the potential to be detrimental to human health and the environment.

Please see **Annexure E** for a full record of public participation undertaken to date, including copies of comments and responses received and sent, and a comprehensive summary of issues raised in a comments and responses report.

9.4 Notification of the decision by the competent authority

Once the GDARD has issued a decision on the application, registered stakeholders will be notified utilizing direct email or mail of the decision. The notification will advise that the decision is available on the Enviroprac website for review. The notification will also advise stakeholders of their right to appeal the decision in terms of the National Appeal Regulations and include detail on the required format of the appeal, appeal timeframes, and where to submit the appeal.

10 IMPACTS IDENTIFIED AS POTENTIALLY ASSOCIATED WITH THE NEW GET ALLOY GERMISTON FOUNDRY

The potential impact of an activity on the receiving environment where the activity is proposed to be undertaken is dependent on the nature of the activity, together with the nature of the receiving environment

10.1 Construction and decommissioning phases

Whilst the site is already fully developed for industrial purposes, the establishment of the foundry will entail the installation of infrastructure such as furnaces, ducting, etc., as well as building renovations, which are specific to the foundry. A new building to house the dross recovery process will also be constructed. The establishment of the foundry can therefore be considered as construction.

In terms of construction and decommissioning phase impacts associated with the proposed foundry, these will entail standard construction-type impacts of which the following may be considered potentially significant:

10.1.1 Waste management

During the construction phase, general and/or hazardous waste will be stored and managed separately and disposed of at licensed landfill sites. The type of waste that will be generated will entail construction-related waste, including rubble and excess concrete; empty cement bags; etc.

During the decommissioning phase, any remaining waste from the foundry will need to be managed accordingly. Accepted, best-practice waste management measures have been included in the EMPr contained in **Annexure K.**

10.1.2 Ambient air quality

During the construction and decommissioning phases, particulate matter and vehicle exhaust emissions from equipment installation and building construction will be generated. Impacts and risks associated with exposure to particulate matter [PM_{10}[3]] and vehicle exhaust emissions include potential adverse health impacts. The coarse (bigger) particles which constitutes PM_{10} can irritate eyes, nose and throat. Health impacts can range from coughing and wheezing to asthma attacks and bronchitis to high blood pressure, heart attack and premature death. with inhalable and respirable Particulate Matter. The proposed activity will occur in the industrial area of Germiston Knights where similar dust-generating activities occur. However, the cumulative impact to current air quality at sensitive receptors such as residences is expected to be minimal.

Therefore standardized, proven construction industry methods for dust suppression can be implemented during the construction and decommissioning phases of the proposed activity, that will adequately mitigate dust impacts. Such measures are included in the EMPr contained in **Annexure K.**

10.1.3 Noise impacts

The construction and decommissioning phase of the proposed foundry will entail the use of heavy vehicles and machinery to construct/erect/dismantle buildings, dig excavations, pour concrete, etc. These activities will generate noise which can potentially be a nuisance to the surrounding areas.

Germiston Knights is an established industrial area situated about 1km from any residential areas. The type of disturbing noise associated with construction activities, is to be expected in an industrial area and is not anticipated to impact negatively on residential receptors.

Additionally, this potential impact can be mitigated by implementing appropriate noise reduction and management measures, such as using modern equipment, which produces the

[3] Particulate Matter (PM) The collective name for fine solid or liquid particles added to the atmosphere by processes at the earth's surface, and includes dust, smoke, soot, pollen, and soil particles. Particulate matter can be principally characterised as discrete particles spanning several orders of magnitude in size, with inhalable particles falling into the following general size fractions. PM_{10} - generally defined as all particles equal to and less than 10 microns in aerodynamic diameter; particles larger than this are not generally deposited in the lung. *Source: State of Environment Outlook Report for the Western Cape Province, 2018*

least noise; and locating any unavoidably noisy equipment/machinery in areas where the impact will be least significant. These and other noise reduction measures have been included in the EMPr contained in **Annexure K.**

10.1.4 Geological impacts

The site is situated in an area which has the potential of intercepting with dolomite formations within the underlying geology. The underlying dolomite formations creates an attendant risk of sinkholes occurring. Headroom Initiative together with their strategic partner, Rock and Stock Investments, have provided a geological review of the development site. The review aims to determine the probability of development site intercepting underlain dolomite formations and the potential impacts and risk factors it may have on the development proposal.

The Geological Review (***Rock and Stock, 2022 in Annexure*** *C4*) concludes:

"*The site is not affected by dolomite. The site is underlain by quartzites of the Johannesburg Subgroup of the Central Rand Group. At the 350m to 400m depths indicated by the BGC plan, there should be no building restrictions (Brink, 1979), unless specifically imposed by authorities. The shaft indicated on the BGC plan could be of concern should it be a surface shaft which was capped in the past (though this seems less likely than a sub-level shaft). Furthermore, notwithstanding the general absence of specific restrictions due to the mining being at intermediate depths, engineering design should take cognisance of the possibility of differential subsidence on the site related to closures at depth. As a final note, the site is surrounded by old mine dumps, which due to oxidation of contained pyrite, result in acidic (sulphuric) waters draining from them. Adequate protection must be provided for concrete in contact with soils on the site."*

10.1.5 Soil and groundwater contamination

The construction and decommissioning phase of the proposed foundry will entail active construction activities which will include the use of construction machinery and/or plant which might have the possibility of contaminating soil and groundwater, with toxicants (hydrocarbons) as a result of operation and refuelling of construction vehicles. As the property is already developed with hard standing surfaces, leaks, or spills of fuel into the surrounding environment should be minimised. Also, no natural sensitivities such as watercourses or valuable indigenous vegetation, have been identified on or near the site. As such, the impact on sensitive receptors is deemed to be negligible given adequate implementation of appropriate construction management measures part of the EMPr contained in **Annexure K.**

10.1.6 Impacts on heritage resources

According to Dr Jonathan Kaplan of the Agency for Cultural Resource Management (ACRM) and Jenna Lavin of CTS Heritage, the Screening Tool found the site to be of very high sensitivity in terms of heritage due to its location about 3,9km northeast driving distance from the Victoria Street bridge and St Andrew's Presbyterian Church. The bridge was built between the 1880's and 1900's and forms part of the Nederlandsche Zuid-Afrikaansche Spoorweg-

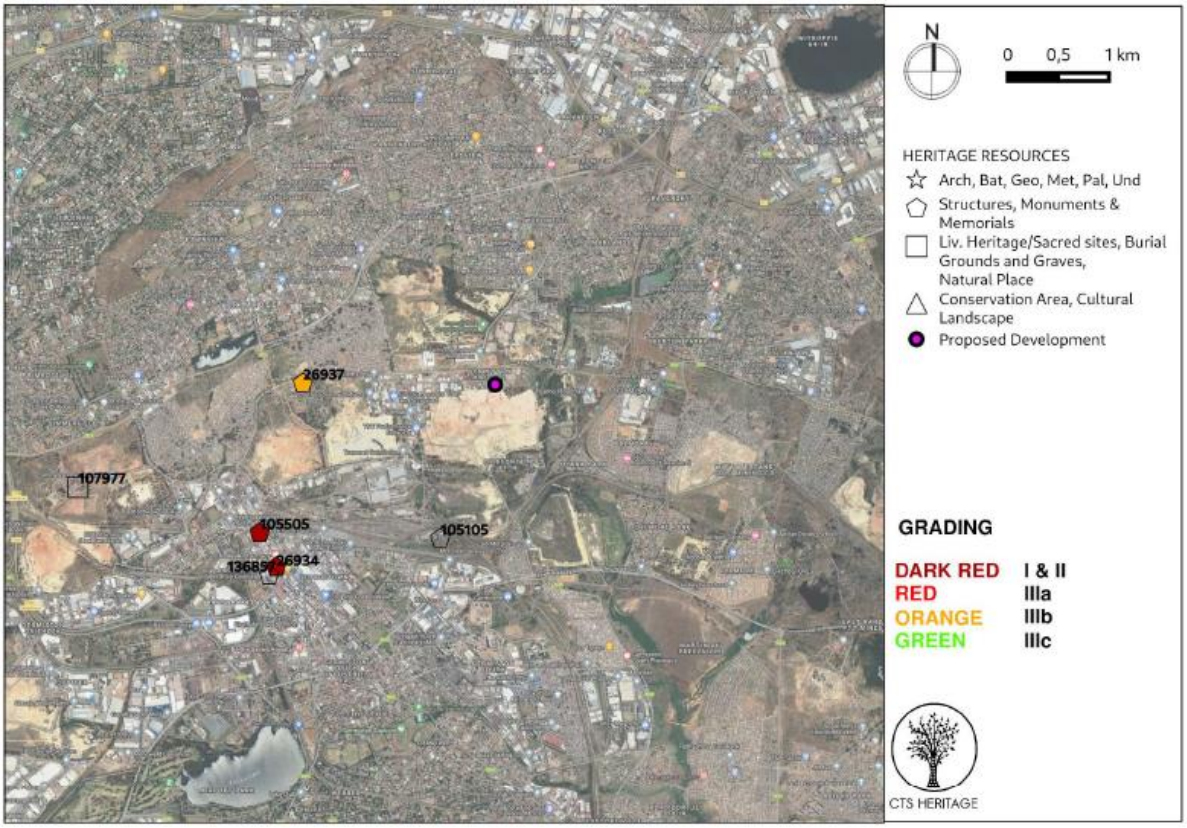
Maatschappij. The church was built in 1890. Both these sites are Grade 2 heritage sites, and both are still in use.

Two other sites have also been flagged – the Germiston Cenotaph / Theatre, opposite the St Andrew's church and the Simmer and Jack Mine House buildings in Main Reef Road, about 2km to the west of the remainder of portion 1 of farm Driefontein No. 87-IR.

As these heritage sites are more than two kilometres away, the development is not expected to have any impact on these structures; and the site is also not situated within the historic core of the Germiston town. The site is therefore not deemed to be at all sensitive from a heritage perspective. As such a screening level heritage study has therefore been deemed suitable to inform this EIA phase report submitted for this application.

The heritage screening report compiled by CTS Heritage, January 2022, describes the heritage character of the development area – which includes a depiction of the known identified heritage resources located in relation to the development site (see figure 10 below).

Figure 9: Location of know identified heritage resources in relation to the Development area



Source: CTS Heritage, 2022 [Annexure C3]

The expected impacts on heritage resources are summarized as follows:

- Potential impact on the **built environment heritage and cultural landscape: -** Although Germiston has a number of heritage buildings, none of the known significant architecture from Germiston is located near to the area proposed for development

and *no negative impact is anticipated* to any significant built environment heritage resources or any significant cultural landscapes.

- Potential impact on **archaeology: -** although numerous archaeologically significant finds have been identified in proximity to the development area. Based on the already transformed nature of the area proposed for development, and considering that no additional excavation is anticipated, it is *not expected that any significant archaeological* heritage will be impacted by the proposed development.
- Potential impact on **palaeontology:** - according to the SAHRIS palaeo-sensitivity map, the area proposed for development is underlain by sediments of low palaeontological sensitivity. Based on the information available, and considering that no additional excavation is anticipated, it is *not expected that any significant palaeontological heritage will be impacted* by the proposed development.

The heritage impact statement concludes, based on the available information and due to the nature of the application (no planned excavations required), that it is *unlikely* that the proposed development will impact on significant heritage resources.

10.1.7 Biophysical impacts (terrestrial & aquatic biodiversity)

The proposed development will not negatively impact on any terrestrial or aquatic biodiversity. The site sensitivity verification report contained in **Annexure B** provides more detail in this regard, but in summary: this is due to the built up and established nature of the existing facility, together with the absence of any sensitive natural features on or nearby the site. The entire site is paved, thereby further reducing potential negative impacts on the receiving environment / remaining natural areas. Further investigation and assessment of such impacts are therefore not required in terms of this application and any subsequent reports.

10.1.8 Socio-economic impacts (benefits)

The socio-economic aspects pertaining to the overall development proposal have been extensively covered in **section 7** and **Annexure I** of the report which deals with the need and desirability of the development proposal.

Based on a review of the City's SDP and EMF, the development of the site for industrial purposes is supported by the City's regional planning policies. Developing a potentially noxious industry in an area that is zoned for such a land use, is the environmentally responsible option. Compliance with legislated emissions standards and dust fall limits will ensure that the facility aligns with the City's management priorities.

Economic and social benefits (scrap metal recovery and diversion from landfill; service to the construction and manufacturing industries; investment in Germiston), are associated with this development, but not at the expense of the receiving environment.

Construction phase socio-economic impacts generally are temporary, the effects of which tend to cease as soon as construction has concluded or shortly thereafter. Some of the socio-economic impacts that may result from the proposed development include:

- Temporary / short term contract-based employment for semi-skilled, unskilled (labourers) and artisans limited to the duration of the construction phase of the development.
- Benefits to downstream production and construction industries for the supply, fabrication and installation of the equipment and infrastructure required by the foundry.

The knock-on effects of the development would result in the short-term increase in revenue or earning potential of the service providers and contractors engaged in the construction phase. as well as the potential to attract similar and related business to the area.

10.2 Operational phase

Metals such as aluminium and copper are in high demand both in the local and in international construction and production industries. Producing these metals through a process of diverting scrap metal from landfill and adding to the waste-to-value chain, is a significant benefit for the environment. It is accepted that the carbon footprint of recycling metals is lower than the footprint associated with mining and processing the virgin metals.

GeT Alloys has identified a need in the market for recovery facilities. The foundry is aimed at meeting that need. GeT Alloys has also identified operational efficiencies and cost savings for their business relating to establishing multiple facilities across South Africa. A detailed description of the operational process at the facility is included in **Section 5.1.2** of this report. As such, activities associated with the plant which have been identified as possibly impacting on the surrounding environment (social, economic, and bio-physical) include:

10.2.1 Impacts on air quality / pollutants

The results of the dispersion modelling undertaken by the Air Quality specialist (pgs. 34 – 35 of the AIR, Soundscape, 2021 Annexure C2) are provided hereunder:

Dispersion simulation results for criteria (incl. dust fall) and non-criteria pollutants are presented in Table 33 and Table 34 respectively. Table 33 includes both incremental (GeT Alloys project only) and cumulative (with background) ground level concentrations as calculated by the dispersion model.

The proposed GeT Alloys facility is shown to result in 1-year and 24-hour average PM10 and PM2.5 concentrations which exceed NAAQS at the plant boundary and/or off-site. Exceedances are however limited to the immediate vicinity of the property boundary with concentrations at a fraction of NAAQS at nearby residential receptors (Figure 6 to Figure [4]9). Dust fall in exceedance of the NDCR is localised and limited to the plant boundary (Figure 10, page 40). Off-site NO2 and SO2 concentrations are within NAAQS. Incrementally, the project will generally contribute less than 1% to NAAQS at surrounding residential receptors. Atmospheric impact report for the proposed GeT Alloys aluminium and copper alloy production facility in Germiston Screening criteria for non-criteria pollutants (ammonia, hydrogen fluoride and VOC) will not be exceeded off-site. Increased lifetime cancer risk is expected to be low (less than one in 100 000). No off-site odour impacts are expected.

[4] Refer to figures 6 to 9 on pages 36 – 39 of the *Draft AIR, Soundscape, January 2022 [Annexure C2]*

Table M: Results of dispersion modelling - tables 33 and 34 (Soundscape, 2021)

Table 33: Maximum criteria air pollutant concentrations and dustfall rates occurring off-site

Pollutant	Averaging period	NAAQS limit value	Unit	Maximum off-site impact	
				Incremental, GeT Alloys Only	Cumulative, incl. background
NO_2	1-year	40	µg/m³	7.51	63.1[c]
	1-hour(a)	200	µg/m³	16.5	72.1
SO_2	1-year	50	µg/m³	8.34	32.2
	24-hour a)	125	µg/m³	25.2	49.1
	1-hour a)	350	µg/m³	44.8	68.7
PM_{10}	1-year	40	µg/m³	70.8[c] (Figure 6)	131[c]
	24-hour a)	75	µg/m³	142[c] (Figure 7)	202[c]
$PM_{2.5}$	1-year	20	µg/m³	25.8[c] (Figure 8)	53.6[c]
	24-hour a)	40	µg/m³	52[c] (Figure 9)	79.8[c]
Dustfall	1-month	1 200	mg/m²-day	1 980[c] (Figure 10)	n/d[b]

Notes:

a) 99th percentile of 24-hour or 1-hour values
b) n/d no data
c) Exceeds NAAQS or NDCR limit value

Table 34: Maximum concentrations of non-criteria pollutant occurring off-site

Pollutant	Impact assessed	Averaging period	Screening criteria	Unit	Maximum off-site impact Incremental, GeT Alloys Only
Ammonia, NH_3	Health, non-carcinogenic	1-year	500	µg/m³	0.5
		1-hour[a]	1 184	µg/m³	16
	Odour	1-hour[b]	3 500	µg/m³	2.55 (Less than 1 ou_E)
Hydrogen fluoride, HF	Health, non-carcinogenic	1-year	14	µg/m³	0.0167
		1-hour[a]	16.3	µg/m³	0.535
	Odour	1-hour[b]	33	µg/m³	0.085 (Less than 1 ou_E)
TVOCs (benzene as proxy)	Health, carcinogenic	1-year	1.7 for 'low risk', < 1 in 100 000 0.17 for 'very low risk', < 1 in 1 million	(µg/m³)	0.666 (Low risk)
	Health, non-carcinogenic	1-year	5	µg/m³	0.666
		1-hour[a]	28.8	µg/m³	21.4
	Odour	1-hour[b]	4 800	µg/m³	3.4 (Less than 1 ou_E)

Source: Draft AIR, Soundscape, January 2022 [Annexure C2]

Increased particulate matter and gaseous emissions may occur from aluminium scrap pre-heating and oil-fired furnaces, resulting in poor ambient air quality. At sufficiently high concentrations, these pollutants may result in potential health, nuisance, dust, and odour impacts without mitigation. Regional air quality may be negatively affected as a result of the cumulative impacts associated with these emissions which may lead to a potentially more widespread negative impact for residents within proximity to the facility.

Refer to *section 11* as well as *Annexure K* which determines the impact significance and the required monitoring, mitigation and management of impacts to within acceptable levels during all phases of the development.

10.2.2 Increase traffic and congestion – nuisance

The foundry will have associated additional trucks on the road, transporting scrap aluminium and copper to the plant while also transporting alloy to customers. There will be associated exhaust emissions and contribution to road congestion and increased traffic – nuisance factors to adjacent and surrounding landowners and users either during the construction or the operational phases. The surrounding road network is designed to accommodate heavy vehicles and is already accommodating heavy vehicle traffic. The foundry will add to the cumulative impacts associated with the movement of heavy vehicle within the industrial area and localised surrounds. Effects are likely to only be felt on a localised level.

The current facility has existing access roads and entrances, paved internal road network as well as paved parking area. Additional heavy traffic on the roads is a roads authority challenge that needs to be addressed during road planning in order to support necessary industrial development.

10.2.3 Potential risk of soil, groundwater, and surface water contamination (Indirect)

Potential contamination of the soil and groundwater resources exists due to handling and bulk storage of furnace oil. If the tank bunding, tanks, fuel lines and other associated infrastructure are not monitored and maintained regularly, and if fuel storage and handling is not managed appropriately, infrastructure failure and unnecessary leaks and spills could cause soil or groundwater contamination. Ineffective onsite stormwater management may also result in contaminants entering the municipal stormwater system or flowing off-site resulting in potential contamination of adjacent land / natural features to the extent that there may be any.

Negative impacts affecting downstream users and resources may arise. Potential impacts on water resources must be effectively managed and mitigated to ensure no significant adverse impacts on downstream users of the natural resources. The EMPr contained in Annexure K includes best-practice measures for the handling and storage of fuel.

10.2.4 Adverse occupational health effects on staff due to significant levels and periods of exposure

The foundry has significant associated risks in terms of health and safety of workers (working with extreme temperature machinery and molten metal; furnace emissions in the workplace; handling hazardous dross (corrosive; skin and lung irritant; potential for harmful and explosive fumes when wet). The facility needs to be designed and operated in such a way as to effectively avoid and manage health and safety risks.

Get Alloys will need to prepare standard operating procedures for the various foundry processes (e.g., furnace charging, tapping, casting, dross handling and storage), as well as prepare preventative maintenance plans for all infrastructure associated with the foundry activities, in order to ensure that best-practice health and safety measures are implemented, and that infrastructure does not become derelict and unsafe to operate. The EMPr contained in Annexure K includes conditions for the preparation of such SOP’s and maintenance plans.

10.2.5 Noise resulting in nuisance factors / potential complaints

Potential noise impact related to the operation of the facility. This may be significant at start up and shut sown procedures but is compatible with the existing land use planning objectives for the property (zoned for industrial use).

10.2.6 Waste impacts

The operation of the foundry will generate only small quantities of general waste such as office and some kitchen waste. This will be disposed of in the municipal waste stream [normal solid waste collection services as provided by the Municipality in the area]. Therefore, no increase expected on the current municipal solid waste capacity.

The following potential benefits are associated with the proposed foundry activity:

10.2.7 Impact on natural resources (positive)

The operation of the facility will result in a positive impact on the use of natural resources:

both aluminium and copper are non-renewable / finite natural resources. The proposed development thus addresses this through the smelting and moulding of scrap aluminium and copper, thereby reducing the demand for mining of these metals. Recovering aluminium and copper from scrap is commonly known to have a smaller carbon footprint and to be less energy intensive than mining these virgin ores.

In addition, scrap metal will be diverted from landfill, thereby saving on scarce landfill airspace. The foundry will therefore have environmental benefits.

In addition, scrap metal will be diverted from landfill, thereby saving on scarce landfill airspace. The foundry will therefore have environmental benefits.

Also, the furnaces to be installed shall use fossil fuel, such as low sulphur oil (LSO) or natural gas. The consideration of replacing hydrocarbon furnace oil or natural gas with a biofuel, provided that the quality, performance, competitive costs, and security of supply can be assured, has been assured by the Applicant.

10.2.8 Socio-economic (employment opportunities)

GeT Alloys will increase their market share and profitability. Not only will there be knock-on benefits for Get Alloys staff in terms of job and income security, and benefits to the owners of GeT Alloys, but the new plant will require the employment of potentially 50 new staff members.

10.2.9 Socio-economic (contribution to capital investment)

GeT Alloys provides a service to downstream production and construction industries. These are essential industries which support human activities.

It can be argued that successful businesses in the Germiston Knights industrial area, could attract additional investment into the area: businesses which provide goods and services to GeT Alloys, the scrap providers (companies and individuals), and construction-related businesses which use GeT Alloys' aluminium alloy and copper in their manufacturing and construction processes.

10.2.10 Socio-economic (contribution to the economy)

An expanded and financially stable and profitable industry generates tax revenue for the government, which is an essential aspect of the economy.

10.2.11 Contribution to green economy and national waste diversion from landfill objectives and targets

The metal recovery process has significant benefits in terms of the waste-to-value chain and diversion of waste from landfill and avoiding the impacts associated with mining and processing of virgin materials.

10.3 The No-Go Option

The no-go option is the alternative of not proceeding with the development, in this case the development of a foundry on the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR. The no-go option includes the in its current state – a vacant factory and trucking yard.

Benefits associated with the no-go option include:

- The additional air emissions and possible fugitive dust emissions associated with the proposed foundry would not occur. The proposed development design, including appropriate process and abatement technology, as well as dust control measures, however, are expected to reduce emissions to within statutory and therefore acceptable limits. This benefit is therefore not considered significant enough to warrant not developing the plant. The results of Air Quality Impact Assessment (Soundscape, 2021) support this finding.

- The identified health and safety risks associated with operating a foundry would not occur. But these impacts can be readily avoided with standard, best-practice measures and adherence to statutory requirements contained in the Occupational Health and Safety Act. This benefit is therefore not considered significant enough to warrant not developing the foundry.

- Whilst the foundry development *could* have significant impacts on sensitive natural resources such as conservation-worthy vegetation and wetlands, no such sensitive aspects have been identified on or in close proximity to the site. Therefore, there is no benefit associated with the no-go option in terms of conservation of sensitive vegetation or freshwater features.

Negative impacts associated with the no-go option include:

- From the investigation of the need and desirability of the development that has been

undertaken in **Annexure I**, the no-go option does not support the regional planning imperatives for the Germiston Knights and greater Ekurhuleni area in terms of investment in Germiston.
- The no-go option could curtail the profitability and therefore financial stability of GeT Alloys.
- The no-go option does not represent jobs and associated income, to the benefit of the surrounding Germiston community.
- The no-go option would mean that the production of aluminium and copper in order to meet market demand, would not take place.
- The South African scrap aluminium recovery industry would not receive much-needed investment and growth with the establishment of a technologically advanced foundry. The scrap could potentially need to be transported to other countries for processing.
- Increased pressure on the aluminium industry for the continued mining of aluminium at the detriment of the environment and natural stocks would occur.

There are thus no significant benefits associated with the no-go option, which would motivate for not proceeding with the proposed foundry.

11 IMPACT ASSESSMENT

11.1 Impact assessment methodology

Introduction

The assessment of the significance of predicted impacts associated with the new foundry is based on the Department of the Environment, Forestry and Fisheries' 1998 *Guideline on the Implementation of Sections 21, 22 & 26 of ECA*; on the DEFF's 2006 *Guideline on Assessing Impacts & Alternatives*; on the DEA&DP's 2005 *Guideline for Involving Biodiversity Specialists in EIA*; and on T Hacking's 1998 IAIA SA Conference Paper, *An Innovative Approach to Structuring EIA Reports*.

The impact assessment is based on specialist input where required, as well as on the EAP's research as required, and experience and professional judgement.

Nature of impact

The source of a potential impact needs to be clearly defined, as well as what particular aspect of the receiving environment would be impacted. The nature of the impact should also include whether the impact is positive or negative; to what degree the impact is reversible; during which phase of the development life cycle the impact will occur; and whether the impact is direct or indirect; and whether the impact is cumulative:

Table N: Nature of impact

Nature of Impact	
Source	Particular aspect of the development proposal that could give rise to the impact.
Aspect of environment impacted	▪ Socio-economic ▪ Biophysical (freshwater, geohydrological, botanical, etc.) ▪ Heritage and cultural – historical ▪ Visual and landscape

Nature of Impact	
	▪ Ambient noise levels ▪ Ambient air quality
Positive	An aspect of the receiving environment benefits.
Negative	An aspect of the receiving environment is adversely affected.
Degree of reversibility	The possibility or difficulty or impossibility of returning the affected aspect of the environment to its original state after an impact has occurred -either with or without human intervention.
Lifecycle phase in which impact will occur	▪ Planning and design phase* ▪ Construction phase ▪ Operational phase ▪ Decommissioning phase *It should be noted that impacts can arise during the construction and operational phases if the planning and design of the development does not adequately factor in required impact mitigation and management
Intermittent or continuous; immediate or delayed	An indication should be given of whether the impact will only occur intermittently; and whether the impact will be experienced immediately or on a delayed basis.
Direct	The impact is a direct result of development activities.
Indirect	Downstream, secondary or knock-on impacts resulting from a direct impact.
Cumulative	A cumulative impact adds to similar impacts already experienced in the receiving environment.

Parameters used to predict impact significance

In the methodology used here, impact significance is a function of consequence and probability of occurrence, where consequence considers the duration, spatial extent, and magnitude (or severity or intensity) of the identified impact.

The following rankings have been used for the parameters which factor into determining **Consequence:**

Table O: Parameters used to determine consequence

Consequence			
Parameter	**Ranking**		
	Low	**Medium**	**High**
Spatial extent	Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/national
Duration	Quickly reversible Less than the project life Short-term	Reversible over time Life of the project Medium-term	Permanent Beyond closure Long-term
Magnitude (or severity or intensity): negative	• Minor deterioration. • Nuisance or minor irritation. • Where the impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected.	• Moderate deterioration. • Discomfort. • Where the affected environment is altered by natural, cultural, and social functions and processes continue albeit in a modified way.	• Substantial deterioration. • Death, illness, or injury. • Where natural, cultural, or social functions or processes are altered to the extent that it will temporarily or permanently cease.

Magnitude (or severity or intensity): positive	Minor improvement.	Moderate improvement.	Substantial / significant improvement.

Once the parameters that determine an impact consequence have been ranked, the overall consequence of impacts can be determined as follows (from Hacking):

Table P: Overall consequence of impacts

Magnitude (or intensity or severity): Low			
Duration	**High**		
	Medium		
	Low		
	Severity/intensity	**Low**	**Medium**	**High**
		Spatial Extent		

Magnitude (or intensity or severity): Medium			
Duration	**High**		
	Medium		
	Low		
	Severity/intensity	**Low**	**Medium**	**High**
		Spatial Extent		

Magnitude (or intensity or severity): High			
Duration	**High**		
	Medium		
	Low		
	Severity/intensity	**Low**	**Medium**	**High**
		Spatial Extent		

The probability of an impact occurring is ranked as follows:

Table Q: Probability rankings

Probability	
Improbable	Where the possibility of the impact to materialise is very low either because of design or historic experience;
Probable	Where there is a distinct possibility that the impact will occur
Definite	Where the impact will occur regardless of any prevention measures.

Methodology for predicting impact significance

In the methodology used, predicted impact significance is a function of the impact *consequence* considered together with the *probability* of the impact occurring. Impact significance is ranked as follows:

Table R: Impact significance ranking

Impact significance	
Low	Will never exceed legislation or standards. Unlikely to cause significant negative impacts. Where it will not have an influence on the decision.
Medium	Has characteristics that could cause negative impacts.

Impact significance	
	Where it should have an influence on the decision unless it is mitigated.
High	Will always/often exceed legislation or standards. Has characteristics that could cause significant negative impacts. Where it would influence the decision regardless of any possible mitigation.

Impact significance, as a function of *consequence* and *probability,* is determined as follows:

Table S: Determination of impact significance

Probability	Definite			
	Probable			
	Unlikely			
		Low	Medium	High
		Consequence		

Degree of confidence

When predicting environmental impacts, the level of confidence of the practitioner in making the prediction should be provided. Confidence can be affected by the availability and quality of data and any assumptions that need to be made. Confidence is ranked as follows:

Table T: Confidence ranking

Degree of confidence	
Low	Where there is little confidence in the prediction, due to inherent uncertainty about the likely response of the receiving environment, or inadequate information.
Medium	Where there is a moderate level of confidence in the prediction.
High	Where the impact can be predicted with a high level of confidence.

Mitigation hierarchy

Once impacts have been identified associated with a development proposal, any significant negative impacts need to be mitigated in such a way as to reduce these impacts to acceptable levels.
The hierarchy of mitigation should be as follows, in order of priority:

Table U: Mitigation hierarchy

Mitigation hierarchy	
1	Avoiding or preventing the impact.
2	Mitigating (reducing or minimizing) negative impacts and enhancing (maximising) benefits, by considering alternatives.
3	Rectifying negative impacts by restoring the affected environment to its previous condition or rehabilitating it for a different land use.
4	Providing an offset to compensate for the residual negative impact, to ensure that there is 'no net losses of ecosystem resources / environmental attributes.

It can be noted that both avoiding and minimising negative impacts, should be factored into the consideration by the proponent of alternative means of achieving the development goals. In this way, the development proposal put before the authorities for their decision-making

purposes, should have the minimum possible residual (i.e., after-mitigation) impacts on the environment.

The investigation of alternatives that was undertaken during the development planning process, as far as possible considered avoiding and minimising adverse impacts associated with the new aluminium alloy and copper scrap foundry. Annexure J provides more detail on the investigation of alternatives in order to determine a low impact development proposal.

11.2 Impact assessment

11.2.1 Impact assessment - development proposal: planning and design phase

The design and planning of the proposed activity are critical for the avoidance and management of impacts that could occur during the operational phase. Therefore, the operational phase impact assessment tables should be referred to for mitigation measures that should be included in the design of the proposed activity.

During the design, planning and development phase, however, there are no activities that will take place that will have associated impacts.

The no-go option includes the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR remaining in its current state – a vacant factory. There is therefore no design phase applicable to the no-go option.

11.2.2 Impact assessment – development proposal: construction, decommissioning, and closure phase

With the impact assessment of construction and decommissioning and closure phase impacts, it should be noted that there is no plan at this stage to decommission the proposed foundry. However, should the plant be decommissioned in the future, the practical decommissioning would entail activities that are substantially like those that will take place during the construction phase (excavation; stockpiling of materials; operation of heavy vehicles and machinery; removal of cement and buildings that will be similarly noisy and dusty to the erection of the surfacing and buildings, etc.).

The mitigation measures recommended for the construction phase should therefore similarly apply to the decommissioning phase.

Once the site has been decommissioned or immediately before this, a focused baseline subsoil and groundwater assessment should be carried out to determine the contamination status of the site. This should focus on areas of likely impact and known historical spillage. Based on the findings of this assessment and any planned redevelopment of the site, appropriate recommendations should be made at that time in terms of any remedial actions. Appropriate licensing and authorisation as relevant at that time should be obtained.

As described above, the significant impacts associated with construction and possible decommissioning of the facility are limited to noise, dust, waste management and potential soil and groundwater contamination.

For the no-go option, which entails the maintenance of the status quo, no construction or decommissioning activities are applicable.

Section 7.3.1 of the Environmental Management Programme in **Annexure K** contains a full suite of industry-standard, best practice measures for minimisation of construction-related impacts.

Table V: Impact assessment – construction, decommissioning, and closure phase – waste management

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Waste management**
Nature of impact:	Management of construction phase waste (general, C&D waste, as well as hazardous waste)
Extent and Duration of impact:	Medium, beyond site boundary but local, without mitigation. Low, on-site, with mitigation. Short-term (construction phase) without mitigation. Short-term (construction phase) with mitigation.
Intensity / severity / magnitude	Low (minor deterioration) without mitigation. Low (minor deterioration) with mitigation.
Consequence of impact or risk:	Low without mitigation. Low with mitigation.
Probability of occurrence:	Definite without mitigation. Probable with mitigation.
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High
Indirect impacts:	Direct impacts: nuisance, health, and wellbeing of receptors. Indirect: Potential nuisance, odours, decreased visual aesthetic – resulting in unforeseen opportunity costs due to potential negative associations of the area. Financial loses to surrounding businesses land users.
Cumulative impact prior to mitigation:	Very Low
Significance rating of impact prior to mitigation	**Low**
Degree to which the impact can be avoided:	Medium
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	During the construction phase, general and/or hazardous waste will be stored and managed separately and disposed of at licensed landfill sites. During the decommissioning phase, any remaining waste from the foundry will need to be managed accordingly. The general waste management measures applicable have been included in the EMPr contained in ***Annexure K***.
Residual impacts:	None, if mitigation measures are effectively implemented in accordance with the approved EMPr.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table W: Impact assessment – construction, decommissioning, and closure phase – ambient air quality

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Ambient air quality impacts**
Nature of impact:	During the construction and decommissioning phases, particulate matter (*inhalable particulates* - PM_{10} such as dust and smoke) and vehicle exhaust emissions from equipment installation and building construction will be generated. Impacts and risks resulting from potential exposure and the health risks associated.
Extent and Duration of impact:	Medium, beyond site boundary but local, without mitigation. Low, on-site, with mitigation. Short-term (construction phase) without mitigation. Short-term (construction phase) with mitigation.
Intensity / severity / magnitude	Low (minor deterioration) without mitigation. Low (minor deterioration) with mitigation.
Consequence of impact or risk:	Low without mitigation. Low with mitigation.
Probability of occurrence:	Definite without mitigation. Probable with mitigation.
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	Medium
Indirect impacts:	Direct impacts: nuisance, poor health, and wellbeing of sensitive receptors. Indirect impacts: unforeseen opportunity costs (in-ability to work due to poor health), financial loses /downtime
Cumulative impact prior to mitigation:	Low. Impact will cease on completion of renovations and construction phase activities. Specialist determination: The contribution of the project to current ambient air quality at sensitive receptors is expected to be minimal.
Significance rating of impact prior to mitigation	**Medium**
Degree to which the impact can be avoided:	Low
Degree to which the impact can be managed:	Medium
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	• Minimise areas to be disturbed. • Erect shade netting around site fence line for very dusty operations. • Limit materials stockpiles to 2 m in height. • Dust control at materials stockpiles can include covering with shade cloth, wetting down, and application of chemical binders. • Non-potable water to be used for wetting down. • Enforce speed limits to reduce dust entrained from road surfaces. • Avoid unnecessary idling of vehicles on-site to reduce vehicle exhaust emissions. • Establish a complaint register. • Visual inspection of dust sources.
Residual impacts:	Some emissions are unavoidable even with the implementation of mitigation measures.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table X: Impact assessment – construction, decommissioning and closure phase – noise

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Noise**
Nature of impact:	Noise from on-site construction and decommissioning activities causing disturbance to sensitive receptors
Extent and duration of impact:	Medium, beyond site boundary but local, without mitigation. Low, on-site, with mitigation. Short-term (construction phase) without mitigation. Short-term (construction phase) with mitigation.
Intensity / severity / magnitude	Low (nuisance / disturbance) without mitigation. Low (nuisance / disturbance) with mitigation.
Consequence of impact or risk:	Low without mitigation. Low with mitigation.
Probability of occurrence:	Definite with /without mitigation
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High (noise will cease when operations cease)
Indirect impacts:	Direct impacts – noise disturbance and impact on receptor wellbeing. Indirect impacts – none.
Cumulative impact prior to mitigation:	The impact is cumulative since there are other sources of noise in the area (industrial, traffic, community).
Significance rating of impact prior to mitigation	**Medium**
Degree to which the impact can be avoided:	Low
Degree to which the impact can be managed:	Medium
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	• Developing a mechanism to record and respond to complaints • In the event of a compliant being lodged, investigate through specialist site visit and noise monitoring to determine cause, and implement any recommended remedial measures to resolve complaint. • Avoid unnecessary revving of engines and switch off equipment/vehicles/trucks when not required. • Managing the impact of reverse warning signals by removing the need for reversing by using drive through pathways. • Maintain internal road surfaces and avoid steep road gradients. • Avoid excessive use of exhaust brakes. • Maintain machinery and equipment to minimise noise. • The Gauteng Noise Control Regulations must be adhered to, i.e. noise from the foundry must not increase ambient noise levels beyond the measured baseline.
Residual impacts:	Minor, acceptable
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table Y: Impact assessment – construction, decommissioning and closure phase – geological

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Geological**
Nature of impact:	Site may be affected by mining related issues – most notably subsidence related to closure of underground excavations and tension cracking around mining created fulcrum points.
Extent and duration of impact:	Medium, beyond site boundary but local, without mitigation. Low, on-site, with mitigation. Short-term (construction phase) without mitigation. Short-term (construction phase) with mitigation.
Intensity / severity / magnitude	Medium (where the affected environment is altered by natural, cultural, and social functions and processes continue albeit in a modified way) without mitigation. Low (where the impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected) with mitigation.
Consequence of impact or risk:	The site is underlain by quartzites of the Johannesburg Subgroup of the Central Rand Group. At the 350m to 400m depths indicated by the BGC plan, there should be no building restrictions (Brink, 1979), unless specifically imposed by Authorities. The shaft indicated on the BGC plan could be of concern should it be a surface shaft which was capped in the past (though this seems less likely than a sub-level shaft). Furthermore notwithstanding the general absence of specific restrictions due to the mining being at intermediate depths, engineering design should take cognisance of the possibility of differential subsidence on the site related to closures at depth. As a final note, the site is surrounded by old mine dumps, which due to oxidation of contained pyrite, result in acidic (sulphuric) waters draining from them. Adequate protection must be provided for concrete in contact with soils on the site.
Probability of occurrence:	Probable without mitigation. Improbable with mitigation
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High
Indirect impacts:	Unforeseen loss due to additional geotechnical innovation to mitigate potential constraints. Imposition of restrictions by authorities due to subsurface mining.
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation	**Low**
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	The general absence of specific restrictions due to the mining being at intermediate depths, engineering design should take cognisance of the possibility of differential subsidence on the site related to closures at depth. Adequate protection must be provided for concrete in contact with soils on the site as the site is surrounded by old mine

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Geological**
	dumps, which due to oxidation of contained pyrite, result in acidic (sulphuric) waters draining from them.
Residual impacts:	None expected.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table Z: Impact assessment – construction, decommissioning and closure phase – biophysical – soil and groundwater contamination

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Soil and groundwater contamination**
Nature of impact:	Construction activities such as the use of chemical toilets; mixing cement; oil dispensing; storage and use of Hazchem's and waste handling; can cause contamination of soil and groundwater.
Extent and duration of impact:	Medium (beyond site boundary; local) without mitigation. Medium (beyond site boundary; local) with mitigation. Short-term without mitigation. Short-term with mitigation.
Intensity / severity / magnitude	Medium (where the affected environment is altered by natural, cultural, and social functions and processes continue albeit in a modified way) without mitigation. Low (where the impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected) with mitigation.
Consequence of impact or risk:	Medium without mitigation. Low with mitigation.
Probability of occurrence:	Probable without mitigation. Improbable with mitigation.
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High
Indirect impacts:	Direct impacts – contamination of municipal system, poor management of on-site run-off, contaminated stormwater allowed to run offsite Indirect impacts could be adverse impacts on aquatic resources and ecosystem such as organisms in wetlands / aquatic biodiversity and possibly on groundwater users in the area.
Cumulative impact prior to mitigation:	Medium
Significance rating of impact prior to mitigation	**Medium**
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	– During construction, the following water quality/quantity impacts may occur: – Hydrocarbon leaks from vehicles and equipment, as well as fuel spills/leaks during re-fuelling activities. – Litter and waste material entering the environment if not correctly disposed of. – All site runoff will be treated as dirty due to the suspended solids expected, as well as potential for hydrocarbons impacts. – These potential impacts can however be adequately mitigated by the implementation of standard

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Soil and groundwater contamination**
	construction industry measures, which include, for example: – Only small-scale cement mixing in bunded areas or suitable containers to take place on the concerned property. Large-scale cement pouring to be sourced from ready-mix concrete transported to site. – Secure, covered, and bunded storage areas to be established for paints, chemicals and/or fuels. – Appropriate Personal Protective Equipment to be worn at all times
Residual impacts:	Minor; acceptable
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table AA: Impact assessment – construction, decommissioning, and closure phase – biophysical – heritage and cultural

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Heritage & Cultural - Historical**
Nature of impact:	Potential impact on the **built environment heritage and cultural landscape: -** Although Germiston has a number of heritage buildings, none of the known significant architecture from Germiston is located near to the area proposed for development and *no negative impact is anticipated* to any significant built environment heritage resources or any significant cultural landscapes. Potential impact on **archaeology: -** Although numerous archaeologically significant finds have been identified in proximity to the development area. Based on the already transformed nature of the area proposed for development, and considering that no additional excavation is anticipated, it is *not expected that any significant archaeological* heritage will be impacted by the proposed development. Potential impact on **palaeontology:** - According to the SAHRIS palaeo-sensitivity map, the area proposed for development is underlain by sediments of low palaeontological sensitivity. Based on the information available, and considering that no additional excavation is anticipated, it is *not expected that any significant palaeontological heritage will be impacted* by the proposed development. The heritage impact statement concludes, based on the available information and due to the nature of the application (no planned excavations required), that it is *unlikely* that the proposed development will impact on significant heritage resources. Any potential impacts to heritage and cultural resources can be effectively mitigated and management through implementation of the measures included in the EMPr (**Annexure K**).

Table BB: Impact assessment – construction, decommissioning and closure phase – biophysical (terrestrial & aquatic)

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Biophysical impacts (terrestrial & aquatic biodiversity)**
Nature of impact:	The proposed development will not negatively impact on any terrestrial or aquatic biodiversity - refer to the Site Sensitivity Verification Report contained in ***Annexure B1***. In summary: - Ecological impacts as a result of the establishment of the foundry on the receiving environment (terrestrial and aquatic biodiversity) are negligible due to the absence of sensitive vegetation and freshwater features on or around the site; and due to the built up and established nature of the existing facility. The entire site is paved and therefore impermeable thus further reducing potential negative impacts on the receiving environment / remaining natural areas. Further investigation and assessment of such impacts are therefore not required in terms of this application and any subsequent reports.

Table CC: Impact assessment – construction, decommissioning and closure phase – socio-economic (benefits)

CONSTRUCTION, DECOMMISSIONING & CLOSURE PHASE	
Potential impact and risk:	**Socio-economic (benefits)**
Nature of impact:	- Temporary / short term contract-based employment for semi-skilled, unskilled (labourers) and artisans limited to the duration of the construction phase of the development. - Benefits to downstream production and construction industries for the supply, fabrication and installation of the equipment and infrastructure required by the foundry.
Extent and duration of impact:	Medium (beyond site boundary; local) without mitigation. Medium (beyond site boundary; local) with mitigation. Short-term without mitigation. Short-term with mitigation.
Intensity / severity / magnitude	Medium (positive)
Consequence of impact or risk:	Low (positive)
Probability of occurrence:	Probable
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Not applicable to benefit.
Degree to which the impact can be reversed:	
Indirect impacts:	
Cumulative impact prior to mitigation:	
Significance rating of impact prior to mitigation	**Low (positive)**
Degree to which the impact can be avoided:	Not applicable to benefit.
Degree to which the impact can be managed:	
Degree to which the impact can be mitigated:	
Proposed mitigation:	
Residual impacts:	
Cumulative impact post mitigation:	
Significance rating of impact after mitigation	

11.2.3 Impact assessment – development proposal: operational phase

Table DD: Impact assessment – operational phase – ambient air quality

OPERATIONAL PHASE	
Potential impact and risk:	**Ambient air quality** Particulate matter, gaseous and vehicle exhaust emissions resulting in potential health and nuisance dust and odour impacts.
Nature of impact:	Particulate matter and gaseous emissions from aluminium scrap pre-heating and oil-fired furnaces. Fugitive particulate matter emissions from dross handling. Vehicle exhaust emissions from on-site vehicles. Volatile organic emissions from fuel storage.
Extent and duration of impact:	Medium, beyond site boundary but local, without mitigation. Low, on-site, with mitigation. Medium-Term (lifetime of the project) without mitigation. Medium-Term (lifetime of the project) with mitigation.
Intensity / severity / magnitude	Low (minor deterioration) without mitigation. Low (minor deterioration) with mitigation.
Consequence of impact or risk:	Low without mitigation. Low with mitigation.
Probability of occurrence:	Definite without mitigation. Probable with mitigation.
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High
Indirect impacts:	Direct impacts: nuisance, health, and wellbeing of receptors. Indirect impacts: potential chronic health impacts, unforeseen opportunity loss / financial loss resulting from inability to work/health reasons
Cumulative impact prior to mitigation:	Indicative background NO_2 and SO_2 levels do not exceed NAAQS. Background PM_{10} and $PM_{2.5}$ concentrations are above NAAQS in the Germiston area. The contribution of the project to existing ambient air quality at sensitive receptors is however minimal.
Significance rating of impact prior to mitigation	**Medium**
Degree to which the impact can be avoided:	Low
Degree to which the impact can be managed:	Medium
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	<u>Measures to reduce emissions</u> • As per the planned Turnkey Modular air pollution control system design, all furnaces must be fitted with fume extraction, both from the furnaces itself and via hoods to capture fumes during charging and/or tapping. Fugitive emissions must furthermore be extracted from the building roof at its apex. The system design must ensure the PM concentration in the plume exiting the 30 m stack meets the MES of 30 mg/Nm3. • It is also recommended that the outlet PM concentration at the dross recovery baghouse meet the MES of 30 mg/Nm3 for secondary aluminium production processes.

OPERATIONAL PHASE	
Potential impact and risk:	**Ambient air quality** Particulate matter, gaseous and vehicle exhaust emissions resulting in potential health and nuisance dust and odour impacts.

	• Fugitive PM emissions should be minimised to avoid off-site exceedances of NAAQS and NDCR. Measures to be considered are:
	  ○ Good housekeeping, e.g., avoiding and cleaning up spillages of fine materials such as baghouse dust and dross.
	  ○ Keep vehicle driveways clean and free of dust to avoid entrainment.
	• Fugitive ammonia emissions must be avoided by keeping dross dry i.e., covered within the dross recovery building.
	• To reduce vehicle exhaust emissions, avoid unnecessary idling of vehicles on-site.
	<u>Emissions Monitoring</u>
	• In terms of c*ompliance monitoring*, the periodic compliance emissions monitoring will be required from GeT Alloys under section 21(1)(b) of NEMAQA. The requirements for periodic emissions monitoring are as follows:
	• The averaging period shall be expressed on an hourly average basis or as prescribed in the AEL.
	• Emission measurement must be conducted in accordance with the methods listed in Annexure A of section 21(1)(b) of NEMAQA.
	• Measurements shall take place on, at least, an annual basis unless otherwise prescribed in the AEL.
	• Sampling will take place under normal operating conditions using the permitted feed-stock or raw material.
	• All tests will be conducted by South African National Accreditation System (SANAS) accredited laboratories or laboratories accredited by similar foreign authorities.
	<u>Ambient air quality monitoring</u>
	• An **air quality monitoring** programme can confirm both baseline and project related air pollution levels and provide information useful in assessing the effectiveness of emissions management strategies. After careful consideration of the dispersion simulations, the following is recommended:
	• Visual inspection and reporting of dust emissions sources annually and in response to complaints. Photographic records can be useful.
	• Passive diffusive sampling of ammonia within the dross recovery building upon commencement of production to confirm assumptions with regards to the formation and emissions of ammonia. A specialist should be consulted in the methodology.
	<u>Air quality complaints register</u>
	• A register for complaints relating to air quality should be maintained. It must include the name, contact and affiliation details of the complainant, the date of the complaint, the date and time of the pollution incident, and a detailed description of the incident. In response

OPERATIONAL PHASE	
Potential impact and risk:	**Ambient air quality** Particulate matter, gaseous and vehicle exhaust emissions resulting in potential health and nuisance dust and odour impacts.
	to a complaint, GeT Alloys should investigate possible causes and if required make use of a specialist to determine the likely source through a site inspection. Remedial actions to prevent such events in future should then be taken.
Residual impacts:	Some fugitive emissions are unavoidable even with the implementation of mitigation measures.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table EE: Impact assessment – operational phase – traffic impacts

OPERATIONAL PHASE	
Potential impact and risk:	**Traffic impacts**
Nature of the impact	Increase in traffic of heavy vehicles due to deliveries of raw materials (inputs) and collection of finished product / waste etc. Possible traffic congestion, adverse impacts on road safety, and wear and tear on roads infrastructure. The roads infrastructure is designed to accommodate the surrounding industrial area.
Extent and Duration of the Impact	Medium (beyond site boundary; fairly widespread; local - surrounding road network) without mitigation. Medium (beyond site boundary; fairly widespread; local - surrounding road network) with mitigation. Medium-term (life of project) without mitigation. Medium-term (life of project) with mitigation.
Intensity/severity/magnitude	Low (minor deterioration) without mitigation. Low (minor deterioration) with mitigation.
Consequence of impact or risk	Low without mitigation. Low with mitigation.
Probability of occurrence:	Improbable without mitigation. Improbable with mitigation.
Confidence:	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High
Indirect Impact	Impacts associated with additional truck trips are all direct on the surrounding community and road network.
Cumulative impact prior to mitigation:	The truck routes to the site are observed to be well-trafficked routes servicing the industrial area and so the impact is cumulative.
Significance rating of impact prior to mitigation:	**Low**
Degree to which the impact can be avoided:	Low
Degree to which the impact can be managed:	Medium
Degree to which the impact can be mitigated:	Medium
Proposed Mitigation:	– No specific mitigation required.
Residual Impacts	None
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation:	**Low**

Table FF: Impact assessment – operational phase – soil and groundwater contamination

OPERATIONAL PHASE	
Potential impact and risk:	**Soil and groundwater contamination**
Nature of impact:	Hydrocarbons are toxic to aquatic systems. Contamination of natural resources could occur due to leaks and spills and failure of storage and handling infrastructure. Poor on-site stormwater management (clean and dirty pathways). Poor containment of dirty stormwater on-site – resulting in contamination of adjacent properties / environments. Pollution and contamination of the municipal stormwater system due to poor on-site stormwater management.
Extent and duration of impact:	Medium (beyond site boundary; local) without mitigation. Medium (beyond site boundary; local) with mitigation. Medium-term (reversible over time) without mitigation. Short-term (quickly reversible) with mitigation.
Intensity / severity / magnitude	Medium (Where the affected environment is altered by natural, cultural, and social functions and processes continue albeit in a modified way) without mitigation. Low (Where the impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected) with mitigation.
Consequence of impact or risk:	Medium without mitigation. Low with mitigation.
Probability of occurrence:	Probable without mitigation. Improbable with mitigation.
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Medium. Contamination can be remediated with rapid response.
Degree to which the impact can be reversed:	Medium. Impacts on soil, groundwater and freshwater from contamination can be reversed with rapid response.
Indirect impacts:	Direct impacts: contamination of soil, groundwater, water resources, and the municipal stormwater system. Indirect impacts: adverse impacts on aquatic organisms in the watercourses, on freshwater resources linked to the watercourses, and possibly on groundwater users in the area through contamination of the municipal stormwater systems. Impacts on downstream users may include financial losses, poor health, illness and potential death of human, livestock, and crops due to contaminated water resources.
Cumulative impact prior to mitigation:	The impact is cumulative: there are other sources of potential contamination in the surrounding industrial area.
Significance rating of impact prior to mitigation	**Medium**
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	The storage and handling of fuel will be done on an impermeable surface (area for fuel storage is paved). This inherently reduces the risk of soil and ground water contamination. However, the on-site management of clean and dirty stormwater must be effectively managed to ensure that the potential risk of contamination of the municipal system is prevent and mitigated effectively when necessary. In addition, all refuelling of machinery and related activities, as well as refuelling vehicles in an unbunded area

OPERATIONAL PHASE	
Potential impact and risk:	**Soil and groundwater contamination**
	or against refuelling procedures / methods also pose a risk of contamination, which should be minimized with the best-practice design and management of these areas, e.g.: ▪ Ensure that fuel storage tanks are adequately bunded and the installation complies with SANS 10131: Above-ground storage tanks for petroleum products. ▪ Designated refuelling areas and procedures to reduce spills, leaks, infrastructure failure. Educate employees in correct handling and refuelling procedures. ▪ A spill response kit appropriate to hydrocarbons will be available on site. Hydrocarbon contaminated material will be disposed of as hazardous waste ▪ A Standard Operating Procedure (SOP) for all activities relating to Fossil Fuel storage, refilling, handling and use in processing must be compiled to minimise associated health, safety, and environmental risks. ▪ Staff must be trained in the SOP, with records of staff competency retained
Residual impacts:	Minor, acceptable
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table GG: Impact assessment – operational phase – fire and explosion; health and safety risks

OPERATIONAL PHASE	
Potential impact and risk:	**Fire and explosion; health and safety risk**
Nature of impact:	Hydrocarbons are a flammable and so there are health and safety risks (toxic; aspiration hazard; skin irritant) and risk of fire and explosion associated with storage and handling of the hydrocarbons. Dross management – various health risks have been identified with the handling of dross, such as: in contact with water releases toxic and flammable gas; causes skin irritation; may cause breathing difficulties if inhaled; may form combustible dust concentrations in air.
Extent and duration of impact:	Medium (beyond site boundary; local) without mitigation. Medium (beyond site boundary; local) with mitigation. Medium-term (for the life of the project) without mitigation. Medium-term (for the life of the project) with mitigation.
Intensity / severity / magnitude	High (substantial deterioration) without mitigation. Low (minor deterioration) with mitigation.
Consequence of impact or risk:	High without mitigation. Low with mitigation.
Probability of occurrence:	Probable without mitigation. Improbable with mitigation.
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	High–serious injury and death can result.
Degree to which the impact can be reversed:	Low.
Indirect impacts:	Direct impacts: damage to property, injury, death.

OPERATIONAL PHASE	
Potential impact and risk:	**Fire and explosion; health and safety risk**
	Indirect impacts: unforeseen opportunity costs, potential loss of income, life or family as a result of exposure related illness.
Cumulative impact prior to mitigation:	The impact is cumulative: there are many other industrial facilities utilizing fuel and hazchems in bulk volumes nearby.
Significance rating of impact prior to mitigation	**High**
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	– The management and mitigation of the employees' exposure to these health and safety risk factors is through sound implementation and compliance to the requirements of the Occupational Health and Safety Act and applicable Regulations, as well as best practice management and mitigation measures to minimize these potential impacts. – The applicant should compile Standard Operating Procedures and Preventative Maintenance Plans for all aspects of the operation where significant health and safety risks are attendant, including a Dross Management Procedure to ensure adequate ventilation of dross-handling areas, weatherproofing of dross handling areas, etc. The Dross Management Procedure should address all hazards and risks identified in available Material Safety Data Sheets for dross.
Residual impacts:	Minor; acceptable
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table HH: Impact assessment – operational phase – noise

OPERATIONAL PHASE	
Potential impact and risk:	**Noise (wellbeing) impacts**
Nature of impact:	Noise from on-site activities causing disturbance to sensitive receptors
Extent and duration of impact:	Medium (beyond site boundary; local) without mitigation. Medium (beyond site boundary; local) with mitigation. Medium-term (lifetime of the project) without mitigation. Medium-term (lifetime of the project) with mitigation.
Intensity / severity / magnitude	Low (nuisance / disturbance) without mitigation. Low (nuisance / disturbance) with mitigation.
Consequence of impact or risk:	Low without mitigation. Low with mitigation.
Probability of occurrence:	Definite without mitigation. Improbable with mitigation.
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Low
Degree to which the impact can be reversed:	High (noise will cease when operations cease)
Indirect impacts:	Direct impacts – noise disturbance and impact on receptor wellbeing. Indirect impacts – none.

OPERATIONAL PHASE	
Potential impact and risk:	**Noise (wellbeing) impacts**
Cumulative impact prior to mitigation:	The impact is cumulative since there are other sources of noise in the area (industrial, traffic, community).
Significance rating of impact prior to mitigation	**Medium**
Degree to which the impact can be avoided:	Low
Degree to which the impact can be managed:	Medium
Degree to which the impact can be mitigated:	Medium
Proposed mitigation:	▪ Developing a mechanism to record and respond to complaints ▪ In the event of a compliant being lodged, investigate through specialist site visit and noise monitoring to determine cause, and implement any recommended remedial measures to resolve complaint. ▪ Avoid unnecessary revving of engines and switch off equipment/vehicles/trucks when not required. ▪ Managing the impact of reverse warning signals by removing the need for reversing by using drive through pathways. ▪ Maintain internal road surfaces and avoid steep road gradients. ▪ Avoid excessive use of exhaust brakes. ▪ Maintain machinery and equipment to minimise noise. ▪ The Gauteng Noise Control Regulations must be adhered to, i.e. noise from the foundry must not increase ambient noise levels beyond the measured baseline.
Residual impacts:	Minor; acceptable
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table II: Impact assessment – operational phase – waste management

OPERATIONAL PHASE	
Potential impact and risk:	**Waste management**
Nature of impact:	The operation of the foundry will generate only small quantities of general waste such as office and some kitchen waste. This will be disposed of in the municipal waste stream. The following aspects of the foundry operation are considered to be part of the waste-to-value chain, and to entail waste management activities: ▪ The activity itself is a general waste (scrap metal) recovery activity. Impacts associated with this waste recovery process have been discussed elsewhere and entail mainly air emissions and health and safety risks. These can be readily minimised by implementing fit-for-purpose emissions abatement and best practice health and safety operating protocols. ▪ A significant waste stream associated with the recovery of aluminium is a substance called dross. Dross is the unwanted material that forms on the surface of molten metal. Dross is considered hazardous, especially when it is wet as it releases high concentrations of hydrogen and ammonia.
Extent and Duration of impact:	Medium (beyond site boundary; local) without mitigation. Medium (beyond site boundary; local) with mitigation.

OPERATIONAL PHASE	
Potential impact and risk:	**Waste management**
	Medium-term (reversible over time) without mitigation. Short-term (quickly reversible) with mitigation.
Intensity / severity / magnitude	Medium (Where the affected environment is altered by natural, cultural, and social functions and processes continue albeit in a modified way) without mitigation. Low (Where the impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected) with mitigation.
Consequence of impact or risk:	Medium without mitigation. Low with mitigation.
Probability of occurrence:	Probable without mitigation. Improbable with mitigation.
Confidence	High
Degree to which the impact may cause irreplaceable loss of resources:	Medium
Degree to which the impact can be reversed:	Medium
Indirect impacts:	Unforeseen opportunity costs due to illness – loss of work / employment, poor health, potential death.
Cumulative impact prior to mitigation:	Refer to table hh: Fire and explosion; health and safety risk above.
Significance rating of impact prior to mitigation	**Medium**
Degree to which the impact can be avoided:	High
Degree to which the impact can be managed:	High
Degree to which the impact can be mitigated:	High
Proposed mitigation:	– Impacts associated with this waste recovery process have been discussed elsewhere and entail mainly air emissions and health and safety risks. These can be readily minimised by implementing fit-for-purpose emissions abatement and best practice health and safety operating protocols. – Weatherproofing of the dross and best practice health and safety operating protocols are essential for minimizing the impacts associated with this waste management activity. – The applicant should compile a dross management procedure and train staff accordingly.
Residual impacts:	Minor; acceptable
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation	**Low**

Table JJ: Impact assessment – operational phase – socio-economic benefits

OPERATIONAL PHASE	
Potential impact and risk:	**Socio-Economic Benefits**
Nature of impact:	– Germiston is known as an industrial and mining town. The area of Germiston Knights industrial area is thus designated as an industrial zone. According to the Gauteng Spatial Development Framework for 2020-2030, the area of Germiston is considered a focus area for economic prosperity and socio-economic integration and a large portion of the area is zoned for

	industrial and commercial use. This means that industrial development in this zone is generally supported. – industrial development in this area has therefore been recognised as beneficial for the region's economy. – Given the country's current economic position and its high unemployment rate, investment into a new industrial enterprise that will contribute to job creation is desirable. – The new foundry will entail the development of many jobs at GeT Alloys, approximately 50 – including general managers, furnace operators, maintenance staff and office staff. industrial development in the Germiston area, can therefore be considered a social benefit. – GeT Alloys will increase their market share and profitability. Not only will there be knock-on benefits for Get Alloys staff in terms of job and income security, and benefits to the owners of GeT Alloys, but the new plant will require the employment of potentially 50 new staff members. – GeT Alloys provides a service to downstream production and construction industries. These are essential industries which support human activities. – It can be argued that successful businesses in the Germiston Knights industrial area, could attract additional investment into the area: businesses which provide goods and services to GeT Alloys, the scrap providers (companies and individuals), and construction-related businesses which use GeT Alloys' aluminium alloy and copper in their manufacturing and construction processes. – An expanded and financially stable and profitable industry generates tax revenue for the government, which is an essential aspect of the economy. – The metal recovery process has significant benefits in terms of the waste-to-value chain and diversion of waste from landfill and avoiding the impacts associated with mining and processing of virgin materials. Refer in addition to Section 10.2.6.
Extent and duration of impact:	Extent: high (regional) Duration: long-term (life of the activity).
Intensity / severity / magnitude:	Medium (moderate improvement).
Consequence of impact or risk:	High
Probability of occurrence:	Definite
Confidence:	High
Degree to which the impact may cause irreplaceable loss of resources:	Not applicable to a benefit
Degree to which the impact can be reversed:	
Indirect impacts:	
Cumulative impact prior to mitigation:	
Significance rating of impact prior to mitigation	**Medium (positive)**
Degree to which the impact can be avoided:	Mitigation does not apply to a benefit.
Degree to which the impact can be managed:	
Degree to which the impact can be mitigated:	
Proposed mitigation:	
Residual impacts:	
Cumulative impact post mitigation:	

Significance rating of impact after mitigation	

11.2.4 Impact assessment – no-go option: operational phase

The no-go option is the alternative of not proceeding with the development, in this case the development of a foundry on the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR. The no-go option includes the site remaining in its current state – a vacant factory.

Table KK: Summary of no-go option [advantages vs disadvantages] associated with the GeT Alloys' Germiston foundry

ADVANTAGES	DISADVANTAGES
ENVIRONMENTAL ATTRIBUTES	
The additional air emissions and possible fugitive dust emissions associated with the proposed foundry would not occur associated with the no-go option. The proposed development design, including appropriate process and abatement technology, as well as dust control measures, however, are expected to reduce emissions to within statutory and therefore acceptable limits. This benefit is not considered significant enough to warrant not developing the plant. The waterbodies and vegetation situated in close proximity to the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR would remain unharmed**.** According to the Need and Desirability assessment and Site Sensitivity Verification Report that have been undertaken, however, the freshwater and vegetation sensitivity of most of the site is considered to be low to negligible. There is no natural vegetation in close proximity to the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR. The wetlands are also heavily transformed and more than 380 and 750m away from the site.	Impacts resulting from proceeding with the development proposal will impact negatively on the air emissions quality, however through effective mitigation, monitoring and management the effects are not significant enough to warrant not developing. Increased pressure on the aluminium industry for the continued mining of aluminium at the detriment of the environment and natural stocks. From the investigation of the need and desirability of the development that has been undertaken in **Annexure I**, the no-go option does not support the regional planning imperatives for the Germiston Knights and greater Ekurhuleni area in terms of investment in Germiston. The no-go option does not represent any contribution to the circular (waste-to-value) economy and to diversion of scrap metal from landfill.
SOCIO-ECONOMIC ASPECTS	
The identified health and safety risks associated with operating a foundry would not occur. But these impacts can be readily avoided with standard, best-practice measures and adherence to statutory requirements contained in the Occupational Health and Safety Act. This benefit is therefore not considered significant enough to warrant not developing the foundry.	**Employment opportunities:** The no-go option does not represent jobs and associated income, to the benefit of the surrounding Germiston community. **Economic growth:** There is market demand from the construction and manufacturing sectors for GeT Alloys' product, namely recycled aluminium alloy and copper. The no-go option would mean that necessary support for these sectors would not be realised. **Industry investment:** The South African scrap aluminium recovery industry would not receive much-needed investment and growth with the establishment of a technologically advanced foundry. The scrap could potentially need to be transported to other countries for processing. **Market viability:** The no-go option could curtail the profitability and therefore financial stability of GeT Alloys.

11.3 Impact statement

11.3.1 Summary of key findings of the EIA

The development proposal (including the technology, site and activity alternatives that were found on investigation to be the best practicable options for the minimisation of health, safety, and environmental impacts) was assessed against the no-go option, or the option of not establishing a foundry on the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR.

CONSTRUCTION PHASE IMPACTS

1. Waste management

General construction waste – managed in accordance with the measures contained in appendix K resulting in a low negative significance.

2. Ambient air quality

PM_{10} such as dust and smoke as a result of construction and vehicle emissions may result in poor health due to potential cumulative impacts on the ambient air quality. A low negative significance with mitigation measures implemented.

3. Noise

Construction noise will result in a temporary nuisance for the duration of construction relate activities. A low significance impact is expected with mitigation measures implemented.

4. Geological

No dolomite formations underlying the development site Headroom Initiative together with their strategic partner Rock and Stock Investments have provided a geological review of the development site which aims to determine the probability of development site intercepting underlain dolomite formations and the potential impacts and risk factors it may have on the development proposal.
*The Geological Review (**Rock and Stock, 2022 in Annexure** C4) concludes:*

"The site is not affected by dolomite. The site is underlain by quartzites of the Johannesburg Subgroup of the Central Rand Group. At the 350m to 400m depths indicated by the BGC plan, there should be no building restrictions (Brink, 1979), unless specifically imposed by authorities. The shaft indicated on the BGC plan could be of concern should it be a surface shaft which was capped in the past (though this seems less likely than a sub-level shaft). Furthermore, notwithstanding the general absence of specific restrictions due to the mining being at intermediate depths, engineering design should take cognisance of the possibility of differential subsidence on the site related to closures at depth. As a final note, the site is surrounded by old mine dumps, which due to oxidation of contained pyrite, result in acidic (sulphuric) waters draining from them. Adequate protection must be provided for concrete in contact with soils on the site."

5. Soil and groundwater contamination

Handling and storage of hydrocarbons, as well as fuel and refuelling activities to be done in accordance with standard operating procedures will result in a low significance impact with mitigation.

6. Heritage resources

No Impact expected.

7. Biophysical (terrestrial and aquatic)

No impact expected.

8. Socio-economic

A low positive significance is expected as a result of temporary jobs and employment resulting in temporary improved living conditions.

OPERATIONAL PHASE IMPACTS

9. Impacts on air quality / pollutants

Increased particulate matter and gaseous emissions may occur from aluminium scrap pre-heating and oil-fired furnaces, resulting in poor ambient air quality. At sufficiently high concentrations, these pollutants may result in potential health, nuisance, dust, and odour impacts without mitigation. Regional air quality may be negatively affected as a result of the cumulative impacts associated with these emissions which may lead to a potentially more widespread negative impact for residents within proximity to the facility. A low significance impact is expected with mitigation.

10. Increase traffic and congestion – nuisance

The foundry will have associated additional trucks on the road, transporting scrap aluminium and copper to the plant while also transporting alloy to customers. Which will add to the cumulative impacts associated with the movement of heavy vehicle within the industrial area and localised surrounds. Effects are likely to only be felt on a localised level resulting in a low significance impact with mitigation.

11. Potential risk of soil, groundwater, and surface water contamination (Indirect)

Refer to construction phase impacts.

12. Adverse occupational health effects on staff due to significant levels and periods of exposure

The foundry has significant associated risks in terms of health and safety of workers (working with extreme temperature machinery and molten metal; furnace emissions in the workplace; handling hazardous dross (corrosive; skin and lung irritant; potential for harmful and explosive fumes when wet). The facility needs to be designed and operated in such a way as to effectively avoid and manage health and safety risks.

Get Alloys will need to prepare standard operating procedures for the various foundry processes (e.g., furnace charging, tapping, casting, dross handling and storage), as well as prepare preventative maintenance plans for all infrastructure associated with the foundry activities, in order to ensure that best-practice health and safety measures are implemented, and that infrastructure does not become derelict and unsafe to operate. With mitigations as included implemented the impact is expected to result in a low negative significance.

13. Noise resulting in nuisance factors / potential complaints

Potential noise impact related to the operation of the facility. This may be significant at start up and shut sown procedures but is compatible with the existing land use planning objectives for the property (zoned for industrial use).

14. Waste impacts

The operation of the foundry will generate only small quantities of general waste such as office and some kitchen waste. This will be disposed of in the municipal waste stream [normal solid waste collection services as provided by the Municipality in the area]. Therefore, no increase expected on the current municipal solid waste capacity.

15. Socio-economic benefits

The components making up the socio-economic benefits are highlighted below – the result of the associated impacts is expected to a have a medium positive impact.

16. Impact on natural resources (positive)

The operation of the facility will result in a positive impact on the use of natural resources:

both aluminium and copper are non-renewable / finite natural resources. The proposed development thus addresses this through the smelting and moulding of scrap aluminium and copper, thereby reducing the demand for mining of these metals. Recovering aluminium and copper from scrap is commonly known to have a smaller carbon footprint and to be less energy intensive than mining these virgin ores.

In addition, scrap metal will be diverted from landfill, thereby saving on scarce landfill airspace. The foundry will therefore have environmental benefits.

In addition, scrap metal will be diverted from landfill, thereby saving on scarce landfill airspace. The foundry will therefore have environmental benefits.

Also, the furnaces to be installed shall use fossil fuel, such as low sulphur oil (LSO) or natural gas. The consideration of replacing hydrocarbon furnace oil or natural gas with a biofuel, provided that the quality, performance, competitive costs, and security of supply can be assured, has been assured by the Applicant.

17. Socio-economic (employment opportunities)

GeT Alloys will increase their market share and profitability. Not only will there be knock-on benefits for Get Alloys staff in terms of job and income security, and benefits to the owners of GeT Alloys, but the new plant will require the employment of potentially 50 new staff members. GETA please confirm?

18. Socio-economic (contribution to capital investment)

GeT Alloys provides a service to downstream production and construction industries. These are essential industries which support human activities.

It can be argued that successful businesses in the Germiston Knights industrial area, could attract additional investment into the area: businesses which provide goods and services to GeT Alloys, the scrap providers (companies and individuals), and construction-related businesses which use GeT Alloys' aluminium alloy and copper in their manufacturing and construction processes.

19. Socio-economic (contribution to the economy)

An expanded and financially stable and profitable industry generates tax revenue for the government, which is an essential aspect of the economy.

20. Contribution to green economy and national waste diversion from landfill objectives and targets

The metal recovery process has significant benefits in terms of the waste-to-value chain and diversion of waste from landfill and avoiding the impacts associated with mining and processing of virgin materials.

A summary of the findings of the impact assessment is contained in table LL and table MM. It has been found that any negative impacts associated with establishing and operating the proposed foundry can be avoided altogether or can be reduced to acceptable levels through appropriate mitigation. All of the negative impacts are of **low significance**.

The identified benefits associated with the proposed foundry were found to be of **low benefit** (construction phase) and **medium benefit** (operational phase).

The activity proposal has been assessed against the no-go option, which is the option of not establishing the proposed foundry. The no-go option has thus provided a baseline against which to assess the benefits and drawbacks of the proposed foundry.

With the no-go option, no benefits of sufficient significance were identified to warrant not establishing the foundry.

However, the no-go option has the drawback of constraining GeT Alloy's service offering to the construction industry, as well as their profitability. The no-go option also represents the loss of potential investment, income, job opportunities and service to downstream industries, which could be realised with the establishment of the new proposed facility.

Table LL - Summary of construction and decommissioning phase impacts associated with the GeT Germiston Alloys' foundry

GeT Alloys' Germiston foundry ((including all preferred activity, process, furnace, and emissions abatement system technology alternatives)		
Impact	**Before mitigation**	**After mitigation**
Waste management	**Low (-ve)**	**Low (-ve)**
Ambient air quality	**Medium (-ve)**	**Low (-ve)**
Noise	**Medium (-ve)**	**Low (-ve)**
Geological	**Low (-ve)**	**Low (-ve)**
Soil and groundwater contamination	**Medium (-ve)**	**Low (-ve)**
Heritage resources	**No impact**	
Biophysical (terrestrial and aquatic)	**No impact**	
Socio-economic	**Low (+ve)**	

Table MM Summary of operational phase impacts associated with the GeT Alloys' Germiston foundry

GeT Alloys' Germiston foundry ((including all preferred activity, process, furnace, and emissions abatement system technology alternatives)		
Impact	**Before mitigation**	**After mitigation**
Ambient air quality	**Medium (-ve)**	**Low (-ve)**
Traffic	**Low (-ve)**	**Low (-ve)**
Soil and groundwater contamination	**Medium (-ve)**	**Low (-ve)**
Fire explosion; health and safety risk	**High (-ve)**	**Low (-ve)**
Noise	**Medium (-ve)**	**Low (-ve)**
Waste management	**Medium (-ve)**	**Low (-ve)**
Socio-economic benefits	**Medium (+ve)**	

Table NN: Summary of no-go option [advantages vs disadvantages] associated with the GeT Alloys' Germiston foundry

ADVANTAGES	DISADVANTAGES
ENVIRONMENTAL ATTRIBUTES	
The additional air emissions and possible fugitive dust emissions associated with the proposed foundry would not occur associated with the no-go option. The proposed development design, including appropriate process and abatement technology, as well as dust control measures, however, are expected to reduce emissions to within statutory and therefore acceptable limits. This benefit is not considered significant enough to warrant not developing the plant. The waterbodies and vegetation situated in close proximity to the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR would remain unharmed. According to the Need and Desirability assessment and Site Sensitivity Verification Report that has been undertaken, however, the freshwater and vegetation sensitivity of most of the site is considered to be low to negligible. There is no natural vegetation in close proximity to the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR. The wetlands are also heavily transformed and more than 380 and 750m away from the site.	Impacts resulting from proceeding with the development proposal will impact negatively on the air emissions quality, however through effective mitigation, monitoring and management the effects are not significant enough to warrant not developing. Increased pressure on the aluminium industry for the continued mining of aluminium at the detriment of the environment and natural stocks. From the investigation of the need and desirability of the development that has been undertaken in **Annexure I**, the no-go option does not support the regional planning imperatives for the Germiston Knights and greater Ekurhuleni area in terms of investment in Germiston. The no-go option does not represent any contribution to the circular (waste-to-value) economy and to diversion of scrap metal from landfill.
SOCIO-ECONOMIC ASPECTS	
The identified health and safety risks associated with operating a foundry would not occur. But these impacts can be readily avoided with standard, best-practice measures and adherence to statutory requirements contained in the Occupational Health and Safety Act. This benefit is therefore not considered significant enough to warrant not developing the foundry.	**Employment opportunities:** The no-go option does not represent jobs and associated income, to the benefit of the surrounding Germiston community. **Economic growth:** There is market demand from the construction and manufacturing sectors for GeT Alloys' product, namely recycled aluminium alloy and copper. The no-go option would mean that necessary support for these sectors would not be realised. **Industry investment:**

ADVANTAGES	DISADVANTAGES
	The South African scrap aluminium recovery industry would not receive much-needed investment and growth with the establishment of a technologically advanced foundry. The scrap could potentially need to be transported to other countries for processing. **Market viability:** The no-go option could curtail the profitability and therefore financial stability of GeT Alloys.

11.3.2 Uncertainties, assumptions, and gaps in knowledge

The following uncertainties, assumptions and gaps in knowledge pertain to this impact assessment:

- It has been assumed that the specialist findings are accurate and impartial; that mapping data from sources including Google Earth and the Council for Geosciences is accurate, and that information on all aspects of the proposed a new aluminium alloy and copper scrap foundry provided by the applicant is accurate.
- Besides the above, there are no assumptions, uncertainties or gaps in knowledge that are material to this application.

11.3.3 Recommendations of the EAP and conditions to be included in the environmental authorisation (EA)

The Environmental Practice recommends that the proposed development of an aluminium and copper foundry on the un-subdivided portion of remainder of portion 1 of farm Driefontein No. 87-IR be **authorized**. This recommendation is based on the outcome of the impact assessment process, which has been informed by Enviroprac's professional experience in environmental management as well as on specialist input and detailed process information provided by the Applicant. In addition, during public participation, no objections to the facility were raised – only requirements for the adequate management of emissions and other environmental risks associated with the facility.

The facility should be designed and operated with the implementation of all the mitigation measures recommended by the specialists and required by the commenting authorities. All of these measures are contained in the EMPr, which is attached as **Annexure K** The implementation of the EMPr should therefore be the condition of the environmental authorisation.
Once the foundry is operational, all ongoing emissions monitoring and other ongoing management measures contained in the EMPr should be reported on to GDARD and the Ekurhuleni Metropolitans' air quality branch by the applicant on a basis reflected in the environmental authorisation. On a five-yearly basis, the facility should be audited against the conditions of the EMPr by an independent Environmental Control Officer (ECO). These audit reports should be submitted to the GDARD and the Ekurhuleni Metropolitans' air quality branch for their record-keeping purposes.

These recommendations for monitoring and auditing of operations against the EMPr are contained in the EMPr and should therefore be a condition of authorisation.

12 EAP DECLARATION

I, **Colleen McCreadie**, EAPASA Registration number **2018/166** as the appointed EAP hereby declare/affirm the correctness of the:

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

19 April 2022

Signature of the EAP: Date:

The Environmental Practice

Name of company (if applicable):

REFERENCES

DEA&DP (2013) *Guideline on Alternatives, EIA Guideline and Information Document Series.* Western Cape Department of Environmental Affairs & Development Planning (DEA&DP), March 2013.

DEA&DP (2013) *Guideline on Need and Desirability, EIA Guideline and Information Document Series.* Western Cape Department of Environmental Affairs & Development Planning (DEA&DP), March 2013.

Department of the Environment, Forestry and Fisheries' 1998 *Guideline on the Implementation of Sections 21, 22 & 26 of ECA*

DEFF's 2006 *Guideline on Assessing Impacts & Alternatives*

DEA&DP's 2005 *Guideline for Involving Biodiversity Specialists in EIA*

Hacking, T 1998. IAIA SA Conference Paper, *An Innovative Approach to Structuring EIA Reports*.

Air quality standards and objectives. Online resource: https://www.dffe.gov.za/sites/default/files/docs/stateofair_executive_iaiquality_standardsonjectives.pdf

SPECIALIST STUDIES:

Freshwater Opinion – **No** Section 21 (c) and (i) water uses. Confluent Environmental, July 2021. **[*Annexure C1]***

Atmospheric Impact Report. Soundscape Consulting (Pty) Ltd. November 2021. **[*Annexure C2*]**

Heritage Screener. CTS Heritage. January 2022. **[*Annexure C3]***

Geological Review. Rock & Stock Investments. February 2022. **[*Annexure C4]***