



## DMS POWDERS

FINAL ENVIRONMENTAL IMPACT  
ASSESSMENT REPORT - WASTE  
MANAGEMENT LICENSE APPLICATION

LOCALITY: MEYERTON

DEPARTMENTAL REF NO: 12/9/11/L1128/3

**SHANGONI**  
*Management Services (Pty) Ltd*



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MANAGEMENT LICENSE APPLICATION

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DEPARTMENTAL REF NO: 12/9/11/L1128/3

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Management Services (Pty) Ltd

## PROJECT DETAILS

National Department of Environmental Affairs

Reference No.: 12/9/11/L1128/3

Project Title: DMS Powders - Hazardous waste storage, Ferrosilicon (FeSi) powder production and the construction of a Wastewater Treatment Works: Waste License Application


Project Number: DMS/EIA/12-01-31

Compiled by: Ms Lizette Crous

Date: 24 July 2014

Location: Meyerton

Technical Reviewer: Mr Brian Hayes



R.B. Hayes



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## DEFINITIONS

### Building and demolition waste

Means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition [*NEM:WA, (Act No. 59, 2008)*].

### Demography

The scientific study of human population, especially, with reference to their size, structure and distribution.

### Domestic waste

Means waste, excluding hazardous waste, that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes [*NEM: WA, (Act No. 59, 2008)*].

### Environment

The surroundings (biophysical, social and economic) within which humans exist and that are made up of

- (i) the land, water and atmosphere of the earth;
- (ii) micro-organisms, plant and animal life;
- (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and
- (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

### Environmental Aspects

Environmental aspects are elements of an organisation's activities, products or services that can interact with the environment.

### Environmental Degradation

Refers to pollution, disturbance, resource depletion, loss of biodiversity, and other kinds of environmental damage; usually refers to damage occurring accidentally or intentionally as a result of human activities.



## Environmental Impacts

Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

## Environmental Impact Assessment

An Environmental Impact Assessment is the study of the environmental consequences of a proposed course of action.

## Environmental Impact Report

A report assessing the potential significant impacts as identified during the environmental impact assessment.

## Environmental impact

An environmental change caused by some human act.

## General waste

Means waste that does not pose immediate hazard or threat to health or to the environment, and includes-

- (a) domestic waste;
- (b) building and demolition waste;
- (c) business waste; and
- (d) inert waste [NEM: WA, (Act No. 59, 2008)].

## Hazardous waste

Means any waste that contains organic or inorganic elements compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment [NEM:WA, (Act No. 59, 2008)].

## Human Development Index

The **Human Development Index (HDI)** is a composite statistic used to rank countries by level of "human development" and separate developed (high development), developing (middle development), and underdeveloped (low development) countries. The statistic is composed from data on life expectancy, education and per-capita GNI (as an indicator of standard of living) collected at the national level using the formula given in the Methodology section below. There are also HDI for states, cities, villages, etc. by local organisations or companies.

(<http://encyclopedia.thefreedictionary.com>)



## Land use

Land use is defined as the various ways in which land may be employed or occupied. Planners compile, classify, study and analyse land use data for many purposes, including the identification of trends, the forecasting of space and infrastructure requirements, the provision of adequate land area for necessary types of land use, and the development or revision of comprehensive plans and land use regulations.

## Pollution

Pollution means any change in the environment caused by -

- (i) substances;
- (ii) radioactive or other waves; or
- (iii) noise, odours, dust or heat,

emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future [NEM: WA, (Act No. 59, 2008)].

## Pollution Prevention

Pollution prevention can be any activity that reduces or eliminates pollutants prior to recycling, treatment, control or disposal. [NEM: AQA, (Act 39 of 2004)]

## Public Participation Process

A process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development.

## Topography

Topography, a term in geography, refers to the "lay of the land" or the physio-geographic characteristics of land in terms of elevation, slope and orientation.

## Vegetation

Vegetation is defined as all of the plants growing in and characterising a specific area or region; the combination of different plant communities found there.

## Waste

Means any substance, whether or not that substance can be reduced, re-used, recycled and recovered-

- (a) that is surplus, wanted, rejected, discarded, abandoned or disposed of;
- (b) which the generator has no further use of for the purposes of production;
- (c) that must be treated or disposed of; or



- (d) that is identified as a waste by the Minister by notice in the *Gazette*, and includes waste generated by the mining, medical or other sector, but-
- (i) a by-product is not considered waste; and
  - (ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste [NEM:WA, (Act No. 59, 2008)].

### **Waste treatment facility**

Means any site that is used to accumulate waste for the purpose of storage, recovery, treatment, reprocessing, recycling or sorting of that waste [NEM:WA, (Act No. 59, 2008)].



## ABBREVIATIONS

<b>AQMP</b>	-	Air Quality Management Plan
<b>BID</b>	-	Background Information Document
<b>BTEX</b>	-	Benzene, Toluene, Ethylbenze and Xylenes
<b>CRR</b>	-	Comments Response Report
<b>DEA</b>	-	Department of Environmental Affairs
<b>DMS</b>	-	Dense Medium Separation
<b>EAP</b>	-	Environmental Assessment Practitioner
<b>ECA</b>	-	Environmental Conservation Act of 1989
<b>EIA</b>	-	Environmental Impact Assessment
<b>EIR</b>	-	Environmental Impact Report
<b>EMF</b>	-	Environmental Management Framework
<b>EMP</b>	-	Environmental Management Programme
<b>FeSi</b>	-	Ferrosilicon
<b>GDARD</b>	-	Gauteng Department of Agriculture and Rural Development
<b>GN</b>	-	Government Notice
<b>HDI</b>	-	Human Development Index
<b>I&amp;AP</b>	-	Interested and Affected Party
<b>IDP</b>		Integrated Development Plan
<b>NEMA</b>	-	Environmental Management Act, Act 107 of 1998 as amended
<b>NEMWA</b>	-	National Environmental Management: Waste Act, Act No. 59, 2008
<b>R</b>	-	Regulation
<b>S&amp;EIR</b>	-	Scoping and Environmental Impact Reporting
<b>SDM</b>	-	Sedibeng District Municipality
<b>SAHRA</b>	-	South African Heritage Resources Agency
<b>SWMP</b>	-	Storm Water Management Plan
<b>TCLP</b>	-	Toxicity Characteristic Leaching Procedure
<b>VTAPA</b>	-	Vaal Triangle Air-shed Priority Area
<b>WWTW</b>	-	Wastewater Treatment Works





# EXECUTIVE SUMMARY

## The Applicant

Dense Medium Separation (DMS) Powders produces ferrosilicon (FeSi) powders for use in dense media separation technology. DMS is located on Portion 4 and 36 of the farm Kookfontein 545 IQ in Meyerton, which is approximately 8.7km to the north of Vereeniging.

## Background and project description

Steel shavings, obtained from drilling operations, are used as an input for the FeSi production process (formerly GN 718, Category B, Activity No. 2 and 3, and now triggering GN 921, Category B, Activity No. 2 and 3). The steel shavings are stored in large unroofed stockpiles (formerly triggering GN 718, Category A, Activity No. 2, and now not subject to waste management licensing (Category C)). A Wastewater Treatment Works (WWTW) has been proposed to treat/purify the affected storm water runoff from the steel shaving stockpile area (formerly GN 718, Category A, Activity No. 11, 18 and 19, and now not subject to waste management licensing).

## Legal requirements and legislative process

In terms of the previous List of Waste Management Activities (GN 718 of 3 July 2009), the following listed activities are taking place or will take place at DMS Powders:

- **GN 718 of 3 July 2009, Category A, Activity No. 2:** “The storage including the temporary storage of hazardous waste at a facility that has the capacity to store in excess of 35m<sup>3</sup> of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons”;
- **GN 718 of 3 July 2009, Category A, Activity No. 11:** “The treatment of effluent, wastewater or sewage with an annual throughput capacity of more than 2 000m<sup>3</sup> but less than 15 000m<sup>3</sup>;
- **GN 718 of 3 July 2009, Category A, Activity No. 18:** “The construction of facilities for activities listed in Category A of this Schedule (not in isolation to associated activity)”;
- **GN 718 of 3 July 2009, Category A, Activity No. 19:** “The expansion of facilities of or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of pollution, effluent or waste”;
- **GN 718 of 3 July 2009, Category B, Activity No. 2:** “The reuse and recycling of hazardous waste”; and
- **GN 718 of 3 July 2009, Category B, Activity No. 3:** “The recovery of hazardous including the refining, utilisation or co-processing of waste at a facility with a capacity to process more than 500kg of hazardous waste per day excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises or unless the Minister has approved re-use guidelines for the specific waste stream”.



In terms of the newly published List of Waste Management Activities (GN 921 of 29 November 2013), activities at DMS Powders trigger the following listed activities:

- **GN 921 of 29 November 2013, Category B, Activity No. 2:** “The reuse or recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises”; and
- **GN 921 of 29 November 2013, Category B, Activity No. 3:** “The recovery of waste including the refining, utilisation, or co-processing of the waste at a facility that processes in excess of 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises”.

In accordance with the List of Waste Management Activities published in GN 921 of 29 November 2013, in terms of the National Environment Management Act: Waste Act, 2008 (Act No. 59 of 2008), Category B activities require a full Environmental Impact Assessment (EIA) to be undertaken.

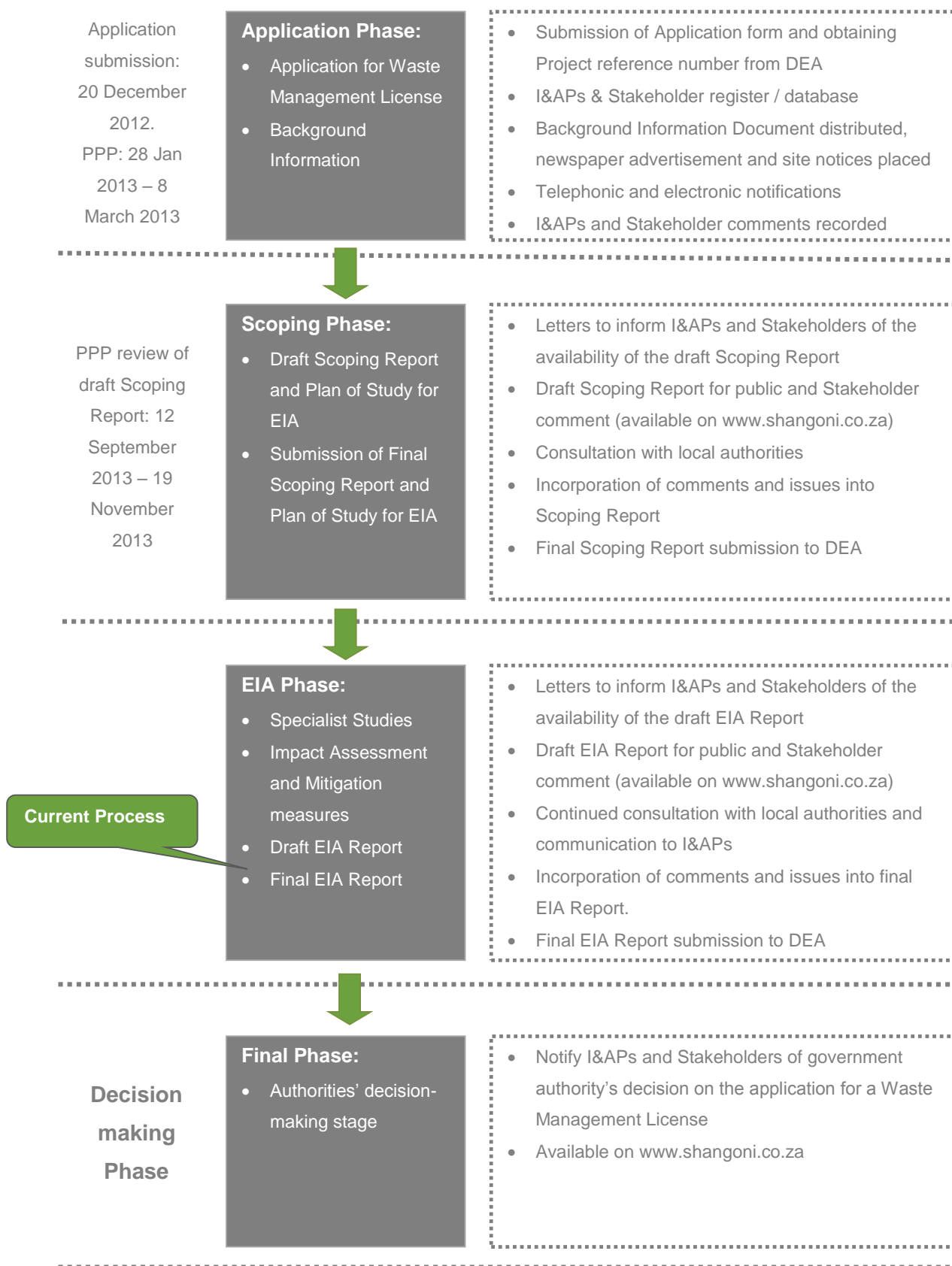
In terms of the storage of hazardous waste and the treatment of wastewater (affected stormwater), these activities (GN 718 of 3 July 2009, Category A, No. 2, 11, 18 and 19) no longer require a Waste Management License. In terms of GN 921, the storage of more than 80m<sup>3</sup> of hazardous waste is now listed under Category C. Such storage must comply with the Norms and Standards for Storage of Waste, 2013.

The treatment of process wastewater and sewage has been moved from being governed under the Waste Act, 2008, to being governed under the National Environmental Management Act, 1998. The construction of facilities for the treatment of effluent, wastewater or sewage with a daily throughput of more than 2 000m<sup>3</sup> now requires environmental authorisation under NEMA, 1998. The proposed wastewater treatment plant for treatment of affected stormwater will only treat 1 200m<sup>3</sup> of affected stormwater on a daily basis and therefore no environmental authorisation is required for the construction of the wastewater treatment plant (only facilities treating more than 2 000m<sup>3</sup> of effluent, wastewater or sewage per day require Environmental Authorisation).

It is the intention of this final Environmental Impact Assessment Report to provide the necessary information pertaining to the activities associated with the project, as required in terms of the NEM: WA, 2008, and the Environmental Impact Assessment Regulations (EIA Regulations R543: EIA Regulations in terms of Chapter 5 of the NEMA, 1998, dated 18 June 2010). This final Environmental Impact Assessment Report intends to highlight all information relevant to the project.

The diagram below provides a visual representation of the approach followed for the Scoping- and Environmental Impact Assessment in terms of NEMA, 1998, and the Environmental Impact Assessment Regulations, dated 2010.





## Anticipated Impacts

The purpose of this document is to supply the National Department of Environmental Affairs with the requested information pertaining to the National Environmental Management Act (NEMA), as amended, Regulation 31 of the Environmental Impact Assessment Regulations, 2010, and the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008). Contained in this document is a detailed investigation of the activity and site-specific potential impacts associated with the project.

The application for a Waste Management License entails conducting a Scoping and Environmental Impact Assessment process. During the Scoping phase the potential impacts related to the project were identified.

Regulation 31 (of Regulation 543) of the EIA Regulations, 2010, under the NEMA, 1998, requires that an Environmental Impact Assessment Report (EIR) includes an assessment of the status; extent; duration; probability; reversibility; replaceability of resources; and mitigatory potential of the major potential environmental impacts of the proposed project be undertaken. Refer to Part 7 for a detailed risk assessment of these identified impacts.

Potential significant impacts that were identified and assessed during the Environmental Impact Assessment process are:

### Construction Phase

As this process is for the licensing of an existing, operational facility, no construction activities will occur. Proposed activities as indicated in the final Scoping Report no longer require a Waste Management License, as explained below and in the Executive Summary under “Legal Requirements”.

The following activities, identified as potentially significant impacts during the Scoping process, are no longer applicable to this Waste Management Application and EIA process as the construction of the Wastewater Treatment Works (for the treatment of affected stormwater) is no longer a listed activity in terms of the National Environmental Management: Waste Act, 2008:

- Incorrect disposal of contaminated topsoil removed from area where the Wastewater Treatment Works is to be installed;
- Incorrect disposal of contaminated topsoil and subsoil removed from the area where the sump is to be constructed; and
- Soil, surface and groundwater pollution due to wash water runoff, contaminated by cement and concrete.



### Operational Phase

- Harm to the environment in general (this can include pollution of soil and water resources, as well as harm to employees and wasteful practices in terms of resource use and waste management);
- Surface and groundwater pollution as affected stormwater run-off, generated as rain infiltrates through the steel shaving stockpiles, flows into the environment. The pollution of surface water can have significant impacts on the sensitive ecological systems usually associated with watercourses;
- Surface and groundwater pollution due to incorrect management of general and hazardous waste generated at the site;
- Soil, surface water and groundwater pollution due to poor management and accidental spills of hazardous chemical substances, including fuel, greases and oils used onsite;
- Surface and ground water pollution due to the release of process water from the M8 and M9 processes into trenches that lead to the BHP Billiton Pollution Control Dam;
- Soil, surface water and groundwater pollution due to incorrect handling and storage of coal;
- Compromised storage capacity of the BHP Billiton Pollution Control Dam due to treated stormwater overflowing from DMS Powders' water reservoir and entering the Pollution Control Dam;
- Wastage or depletion of valuable resources (water from the local municipality, via BHP Billiton Metalloys, and electricity from the municipality) due to inefficient or redundant usage;
- Pollution of the atmosphere and degradation of ambient air quality; and
- Nuisance to adjacent land owners or tenants as well as a negative impact on workers that are exposed to high dB levels of noise as part of their work.

Appropriate mitigation measures will assist in minimising the potential impacts on the surrounding environment during all phases of the development. A draft Environmental Management Programme (EMP) has been compiled, with the aim of serving as a working document in order to manage and/or mitigate the identified potential impacts. Refer to Appendix G for a copy of the draft EMP.

This EIR is divided into the following parts:

- Part 1: Introduction (including a description of the project).
- Part 2: Nature and extent of the environment affected by activity.
- Part 3: Applicable legislation and guidelines.
- Part 4: Public Participation Process.
- Part 5: Need and desirability for the activity.
- Part 6: Consideration of alternatives.
- Part 7: Environmental Impact Assessment.
- Part 8: Environmental Impact Assessment Statement.
- Part 9: Conclusion.



# 1. INTRODUCTION

This final Environmental Impact Assessment forms part of an application for a Waste Management License for activities occurring at DMS Powders. Shangoni was appointed, as independent environmental practitioner, to assist the applicant in complying with the 2010 EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008).

A Waste Management License application was submitted to the identified competent authority, the National Department of Environmental Affairs. The Department subsequently registered the project and the formal Scoping and Environmental Impact Reporting (S&EIR) process was thereby initiated.

All the findings from the Environmental Impact Assessment process are included in this report.

## 1.1 Applicant

<b>Name of Applicant</b>	Dense Media Separation Powders (Pty) Ltd.
<b>Postal Address</b>	PO Box 945, Meyerton, 1960
<b>Telephone No.</b>	016 360 5200
<b>Fax No.</b>	016 360 5314
<b>Farm name and portion on which the activities take place</b>	Portion 4 and 63 of the farm Kookfontein 545 IQ
<b>Co-ordinates of operation</b>	26°34'32.54"S; 27°59'21.19"E.

## 1.2 Appointed Environmental Assessment Practitioner

<b>Name of firm</b>	Shangoni Management Services
<b>Postal address</b>	P.O. Box 74726 Lynnwood Ridge Pretoria 0040
<b>Telephone No.</b>	012 807 7036
<b>Fax</b>	012 807 1014
<b>E-mail</b>	lourens@shangoni.co.za
<b>Team of Environmental Assessment Practitioners on project</b>	

Name	Qualifications & experience to conduct the Waste Management License Application and EIA	Responsibility
Lourens De Villiers	<ul style="list-style-type: none"> <li>• MSc.(UP)</li> <li>• BSc. (Hons) (PU for CHE)</li> <li>• More than 12 years' experience conducting Environmental Impact Assessments and Waste Management License Applications</li> </ul>	Project Director
Lizette Crous	<ul style="list-style-type: none"> <li>• Post Graduate Certificate Environmental Management (University of London)</li> <li>• 3 years' experience conducting Environmental Impact Assessments and Waste Management License Applications</li> </ul>	EAP
Patricia van der Walt	<ul style="list-style-type: none"> <li>• B.Sc. (Hons) (Applied Science in Environmental Technology)</li> <li>• 2 years' experience conducting Environmental Impact Assessments and Waste Management License Applications</li> </ul>	Jnr. EAP

Detailed CVs for the project team are appended (Appendix F).

## 1.3 Current situation

DMS Powders produces ferrosilicon (FeSi) powder for use in dense media separation technology. Dense media separation is a process where a suspension of dense powder in water is used to form a type of “heavier liquid” to separate mineral particles in a sink-float process. Many modern dense media plants use this technology because it is both flexible and allows upgrading of resources, thereby increasing overall profitability of the resource. Two different processes are used at DMS Powders, namely Atomised FeSi production and Milled FeSi production. The standard method is to melt steel scrap, quartz, and a reductant in a submerged-arc furnace. The molten alloy is tapped into a sand-bed, allowed to cool, and then broken into lumps, after which it is crushed in two stages and milled to the required size range.

### 1.3.1 Atomised FeSi Production

The process starts at the raw material stockpile area where scrap steel (hazardous waste), plate scrap and 75% ferrosilicon is received and loaded into bins with a front end loader. The raw material is then loaded into the M8 induction furnace via a loading system. The loading system consists of a magnet that picks up the scrap and loads it onto feeding vibrators. The feeding vibrators fill up the charging car and subsequently vibrate all raw materials into the furnace. The furnace uses induction to heat metal to its melting point and produces molten ferrosilicon with a silicon content of between 14 and 16%. The

molten alloy is atomised, dried, classified into various grades and is then packaged. The process is summarised in Figure 1 below.

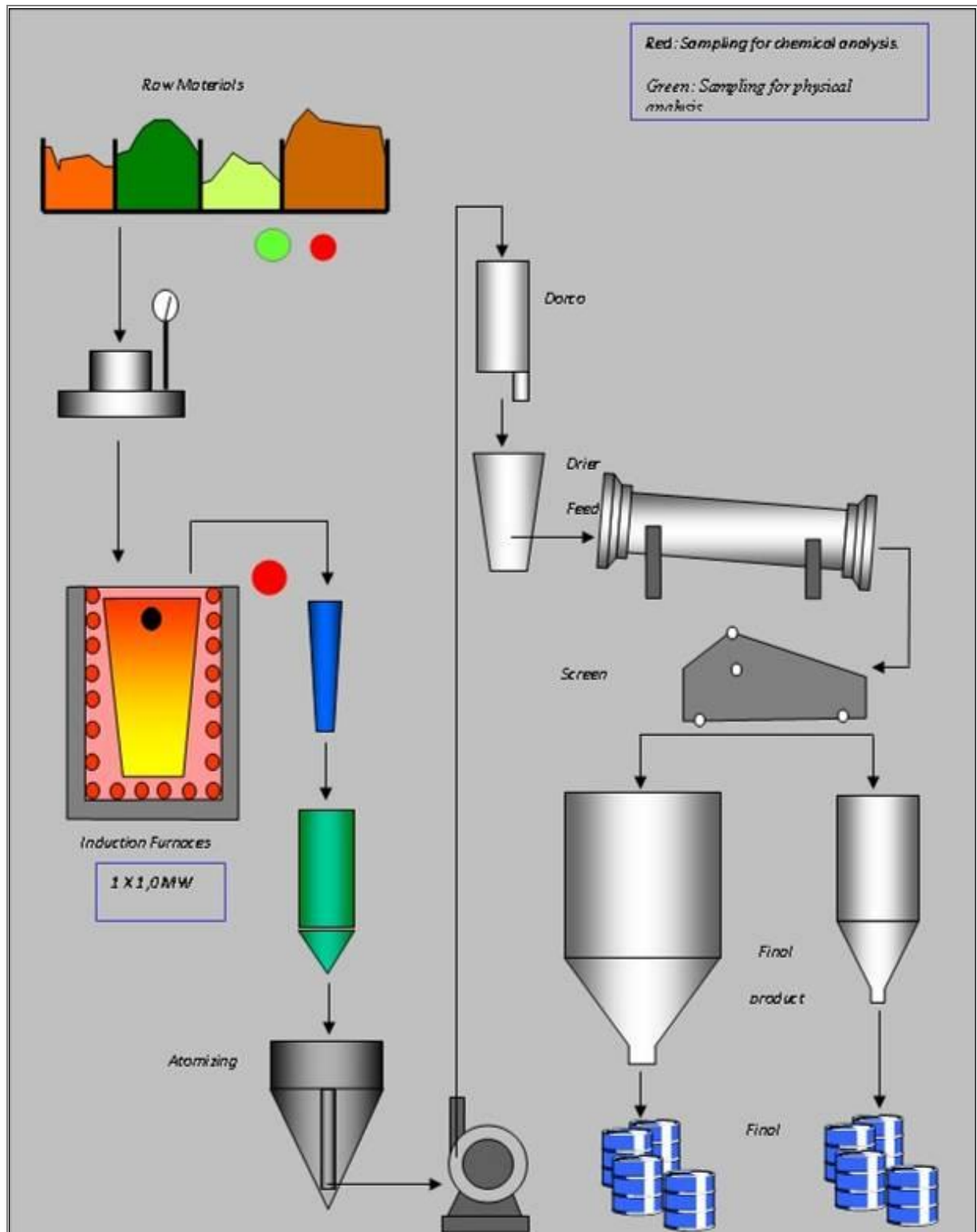


Figure 1: Atomised FeSi Production





### 1.3.2 Milled FeSi Production

This process starts at the raw material stockpile area where steel shavings (hazardous waste), quartz, coal and coke are received. The material is dumped at the raw materials yard and a front end loader loads it into the furnace bunkers. The raw material is vibrated into the M9 submerged arc furnace where the raw materials are melted with 3 electrodes at 1 650 degrees Celsius to produce molten ferrosilicon with a silicon content of between 14 and 16%. The ladles are then taken up to the granulation plant where the metal is water granulated and broken into pieces. It is then sent to the drier where after it is sent for analysis and taken to the ball mills (MM4 / MM5 / MM6 / MM7).

The milling process starts at the ball mill production store. A front end loader collects M9 product and loads it into a bunker. The product is transported via conveyors from the bunkers into the mills (each mill has its own bunker). The product is milled into finer particles with chrome balls. A cyclone then separates the fine product from the coarser grades (the mills produce a number of different product grades). The product is then packaged into 1ton bags, 2ton bags or 250kg drums. The packaged product is transported to the dispatch area where it is stored and distributed to consumers. Figure 2 summarises this milled FeSi production process.

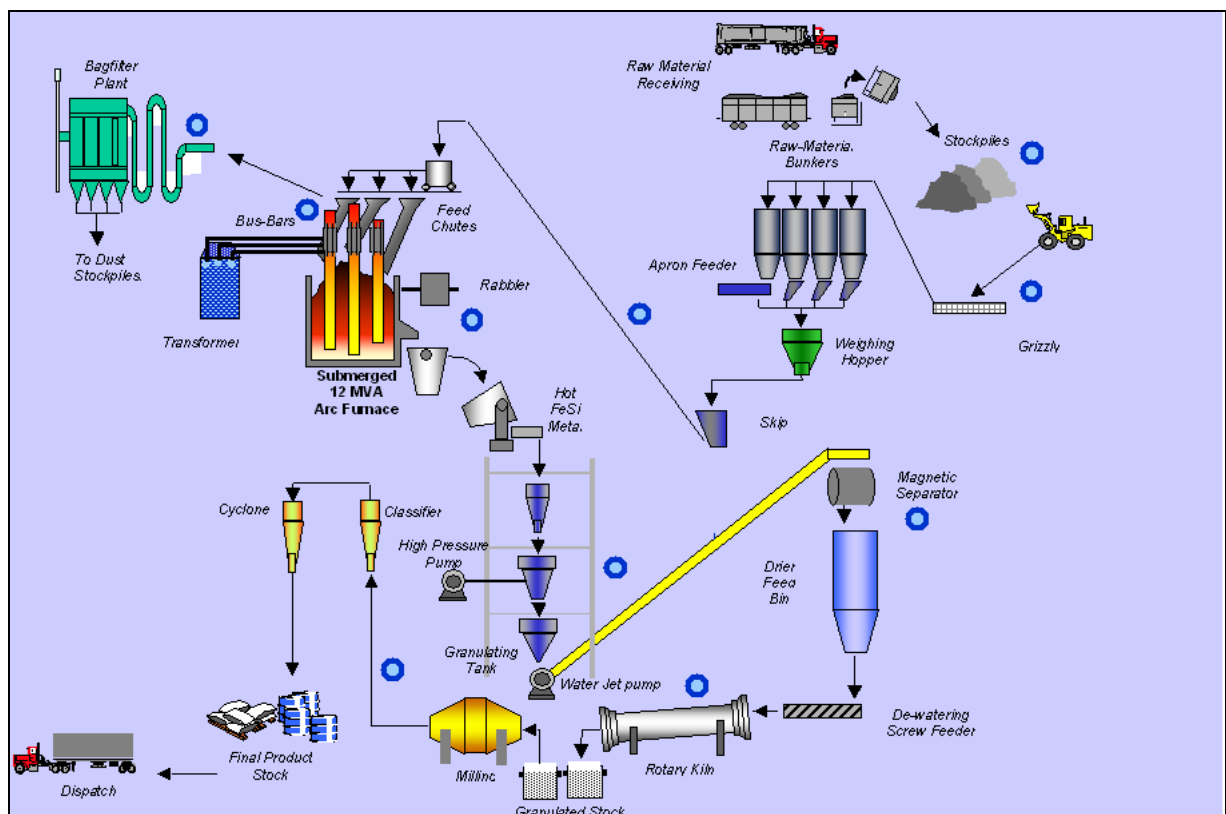


Figure 2: Milled FeSi Production

### 1.3.3 Scrap steel (Hazardous waste) used in FeSi Production

DMS Powders obtain steel shavings, formed in other organisations' drilling activities, to be used as an input for the FeSi production process (**formerly GN 718, Category B, Activity No. 2 and 3 and now GN 921, Category B, Activity No. 2 and 3**). Up to 6 000 tons of steel shavings can be stored on-site.

According to the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), the steel shavings are classified as hazardous waste. The definition of "hazardous waste" as stipulated in the Waste Act, 2008, is as follows:

"Hazardous waste" means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

The steel shavings are classified as hazardous waste, as they are contaminated by grease and oil, used when drilling through steel.

The steel shavings stockpile area is not roofed (**formerly GN 718, Category A, Activity No. 2 and now GN 921, Category C**). Rainwater falling on the steel shaving stockpile area becomes contaminated and this affected stormwater is classified as a hazardous wastewater due to its composition. The storm water includes small quantities of arsenic (As) and mercury (Hg), amongst other components, and the Total Petroleum Hydrocarbon (TPH) count is high. It was calculated that 8 826.444m<sup>3</sup> of affected storm water will be generated per year from the stockpile areas ( $\pm 24\text{m}^3$  per day on average).

## 1.4 Activities to be licensed in terms of the Waste Act, 2008

The production of  $\pm 12\,000$  tons per annum of atomised ferrosilicon (FeSi) powder and  $\pm 39\,050$  tons per annum of milled FeSi powder requires a Waste Management License as these processes constitute the re-use or recycling (GN 921, Category B, Activity No. 2) and recovery (GN 921, Category B, Activity 3) of hazardous waste (steel shavings) at a rate of approximately 180 tonnes per month.

The storage of the steel shavings in the unroofed stockpile area and the construction of the Wastewater Treatment Works for the treatment of affected storm water no longer require authorisation in terms of GN 921 of 29 November 2013. The rest of this document will therefore only focus on the waste management activities that do require licensing in terms of GN 921 of 29 November 2013 (GN 921, Category B, Activity No. 2 and 3).



## 1.5 Proposed Locality

The project site is located on Portion 4 and 36 of the farm Kookfontein 545 IQ in Meyerton (refer to Figure 7), which is approximately 8.7km's to the north of Vereeniging. The site is situated within the Midvaal Local Municipality of the Sedibeng District Municipality, Gauteng Province. GPS coordinates for the site are: 26°34'32.54"S; 27°59'21.19"E.

Table 1: Direction and distance to the nearest town

Direction	Distance from site	Closest town
North	8.7km	Vereeniging

The site photographs are shown in Figure 3 to Figure 10, as in Appendix B.



Figure 3: Illustration of steel shaving stockpiles (input to the production process) (1)





Figure 4: Illustration of steel shaving stockpiles (input to the production process) (2)



Figure 5: Steel shaving stockpile area showing magnet that loads the shavings onto feeding vibrators





Figure 6: The conveyor system used at the facility



Figure 7: DMS Powders plant (1)





Figure 8: DMS Powders plant (2)



Figure 9: Product bagging area





Figure 10: Product storage area



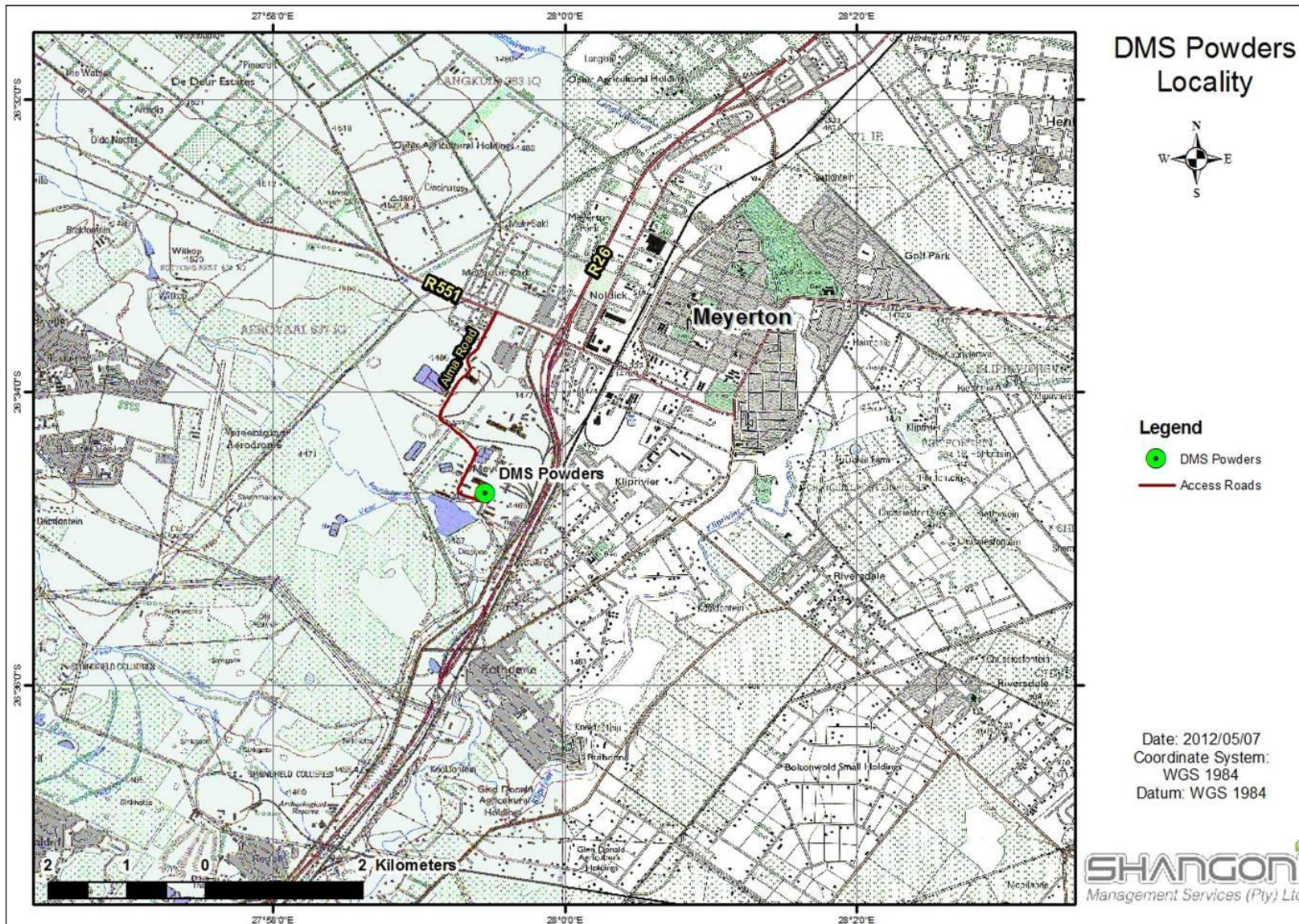


Figure 11: Locality Map





## 2. NATURE AND EXTENT OF THE ENVIRONMENT AFFECTED BY ACTIVITY

### 2.1 Regional climate

The regional climate of the area can be described as summer rainfall season with heavy thunderstorm in the late afternoons. The area has an average of 645.7mm of rain per year with the main prevailing wind direction being north-north west.

#### 2.1.1 Rainfall and Evaporation

The area receives a mean annual rainfall of 645.7mm per year, of which most is received during typical late afternoon thunderstorms in the summer months. The gross annual evaporation is on average 2 001 – 2 200mm.

Table 2: Average Monthly Rainfall (mm)

Date	Rainfall (mm)
January	118
February	88.1
March	86.8
April	30.5
May	12.4
June	7.9
July	2.6
August	6.5
September	25
October	69.3
November	93.3
December	105.3
<b>Annual</b>	<b>645.7</b>

#### 2.1.2 Temperature

The mean annual maximum and minimum temperatures for the area are 24.0°C and 9.3°C respectively and the mean annual temperature is calculated to be 16.7°C for the area. The mean monthly temperatures for the area are provided in Table 3 below.

Table 3: Mean monthly temperatures (°C)

Months	MAX	MIN	MEAN
January	27,9	15,9	21,9



February	27,4	15,2	21,3
March	26,3	13,6	19,9
April	23,2	9,6	16,4
May	20,7	4,4	12,6
June	17,7	0,4	9,1
July	18,5	0,2	9,3
August	21,4	3,4	12,4
September	24,9	8,6	16,7
October	26,0	11,8	18,9
November	26,6	13,8	20,2
December	27,7	15,0	21,3
<b>Yearly</b>	<b>24,0</b>	<b>9,3</b>	<b>16,7</b>

### 2.1.3 Wind

The dominant wind course in Vereeniging is in a south easterly direction with an average wind speed of 6.5 knots. The following wind roses (refer to Figures 12 to 23) were based on observations taken from February 2006 to April 2013, daily from 7am to 7pm ([www.windfinder.com](http://www.windfinder.com)).

## 2.2 Biophysical aspects affected

### 2.2.1 Geology

The following geological information was abstracted from the Specialist Groundwater Phase I Investigation Report compiled by Shangoni AquiScience, a division of Shangoni Management Services (Pty) Ltd. The geology and geohydrology of the catchment was characterised by a desktop study with information gathered from topographical, geological and hydrogeological maps, including data sourced from Groundwater Resource Directed Measures (GRDM).

The 2626 West Rand 1:250 000 geology map series indicates that DMS Powders is located on the contact of the Vryheid Formation belonging to the Ecca Group of the Karoo Supergroup and the Malmani subgroup belonging to the Chuiniespoort Group of the Transvaal Supergroup (refer to Figure 24). A representative stratigraphic section of the Karoo Supergroup was obtained by Cilliè and Savage (1961) from a borehole drilled in the Springfield mining area to the south of BHP Billiton Metalloys (Table 4). The Vryheid Formation consists predominantly of arenaceous rocks with beds of shale and coal at depths of approximately 400m, 500m and 700m. The Dwyka Group, consisting of shale, sandstone and conglomerate, directly underlies the Ecca Group and is situated at approximately 850m. The Chuiniespoort dolomite is found below the Dwyka Group at approximately 890m. Major fault zones occur to the north and west of Meyerton (approximately 10km).



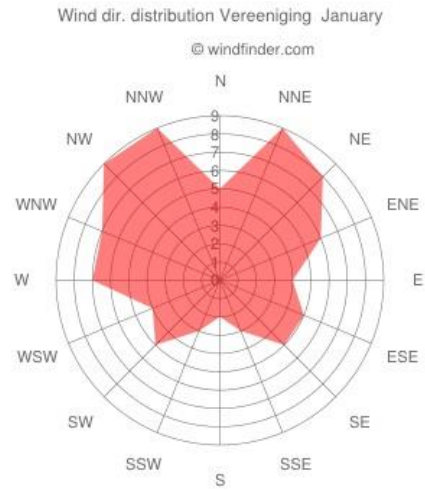


Figure 12: Wind rose for January

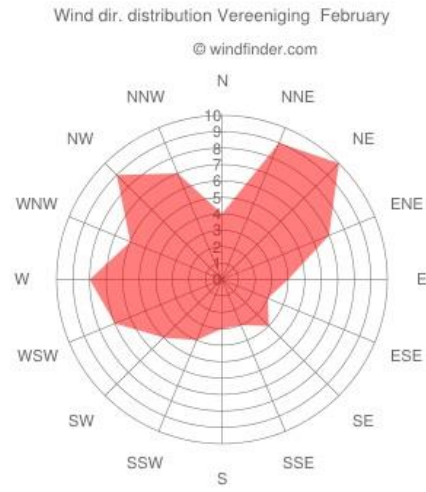


Figure 13: Wind rose for February

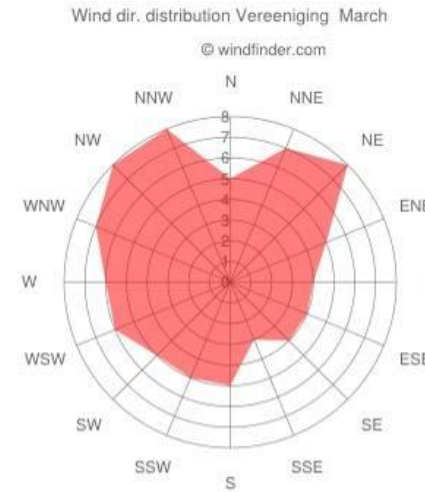


Figure 14: Wind rose for March

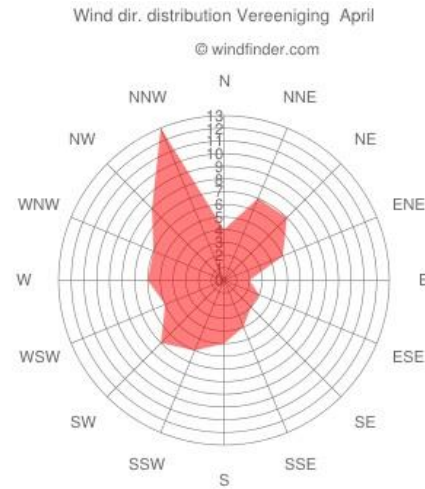


Figure 15: Wind rose for April

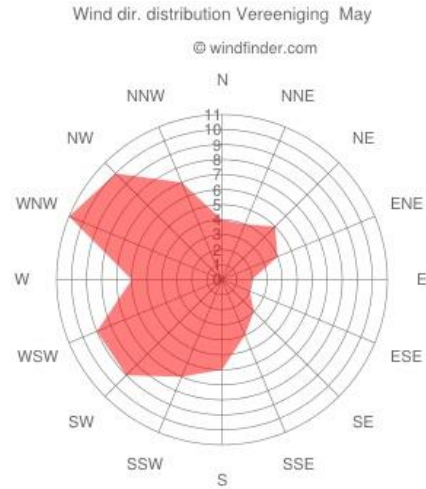


Figure 16: Wind rose for May

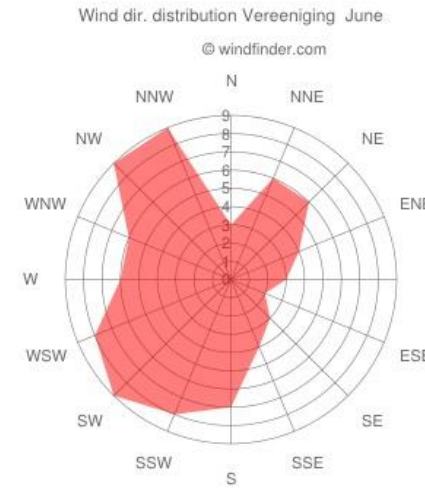


Figure 17: Wind rose for June



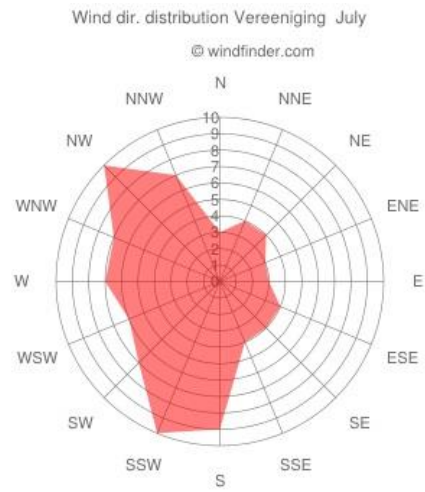


Figure 18: Wind rose for July

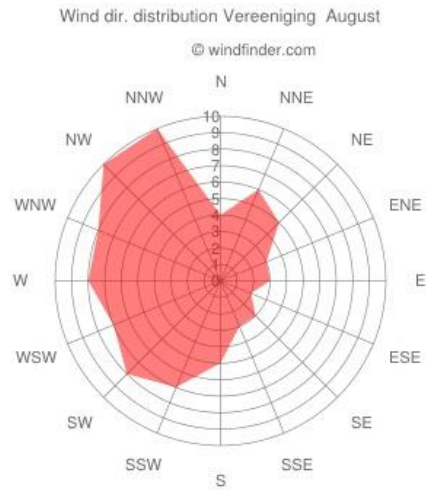


Figure 19: Wind rose for Augustus

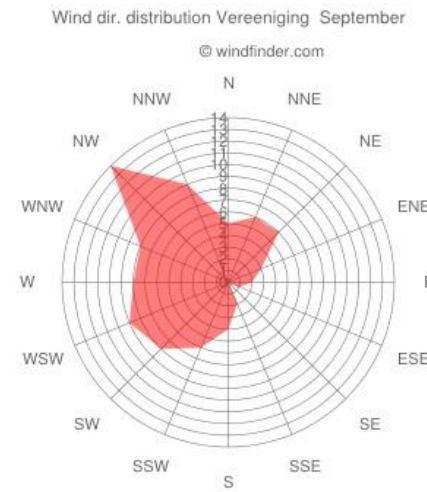


Figure 20: Wind rose for September

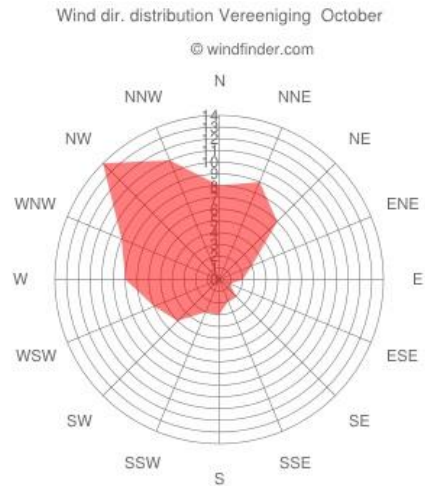


Figure 21: Wind rose for October

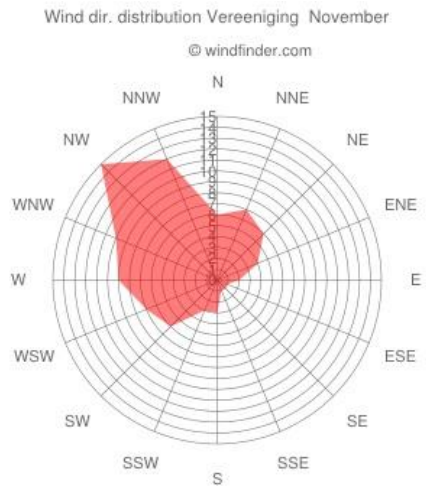


Figure 22: Wind rose for November

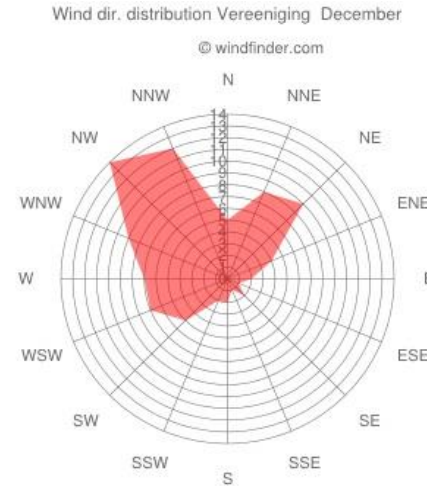


Figure 23: Wind rose for December



Table 4: Representative succession of the Karoo Supergroup south of BHP Metalloys in the Springfield mining area

Group	Formation	Lithology	Thickness (m)	Depth (m)
Regolith		Sand, gravel		
ECCA	Vryheid	Sandstone, micaceous	128	226
		Shale, micaceous, black, sandy	174	399
		Coal, <b>Top seam</b>	6	405
		Shale and sandstone bedded	21	427
		Coal, <b>Middle seam</b>	104	531
		Sandstone, micaceous	18	549
		Shale, micaceous, sandy grey to black	119	668
		Coal, <b>bottom seam</b>	55	722
		Shale/ brown, <b>bottom seam</b>	12	735
		Coal, <b>bottom seam</b>	119	853
DWYKA	Mbizane	Shale, sandstone, conglomerate	9	863
	Elandsvlei	Diamictite	21	884
Chuiniespoort		Dolomite	+ 0.6	890

### 2.2.2 Topography

DMS Powders is situated at an elevation of 1 474m (refer to Figure 25). The surrounding environment slopes gently to the south. Most of the adjacent area is built up and surface water runoff is canalised. The general slope along the site is gentle at approximately 1:60. There is a depression on site between the plant and the raw material stockpile area where damming is confirmed to occur during the raining season (Shangoni Management Services (Pty) Ltd., 2012).

### 2.2.3 Soils

The soils in the area are classified as S2 (refer to Figure 26) and described as red, yellow and greyish soils with a low to medium base status and a water holding capacity of 41-60mm (AGIS, 2007).



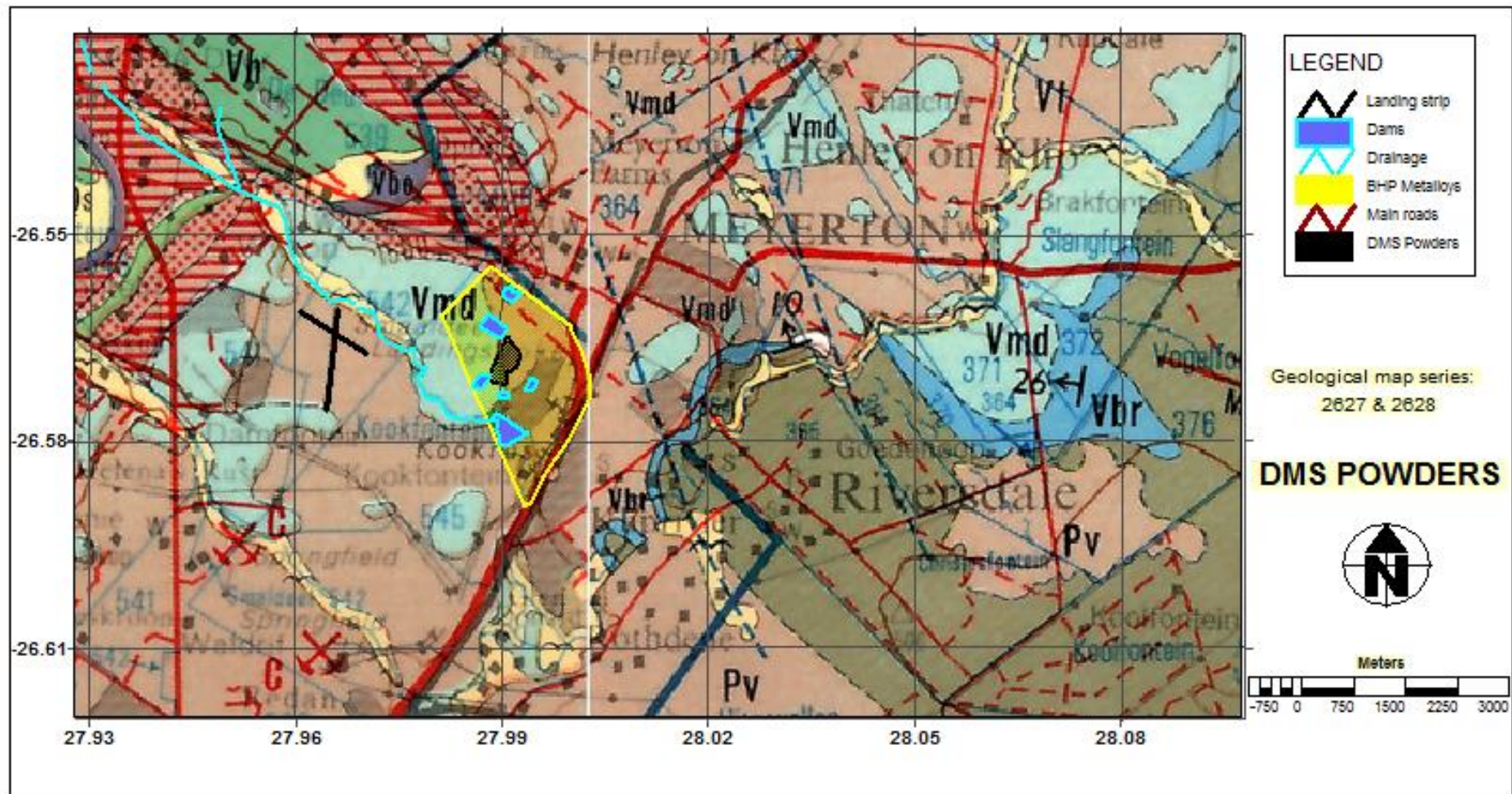


Figure 24: 2528 Pretoria Geological Map 1:250 000



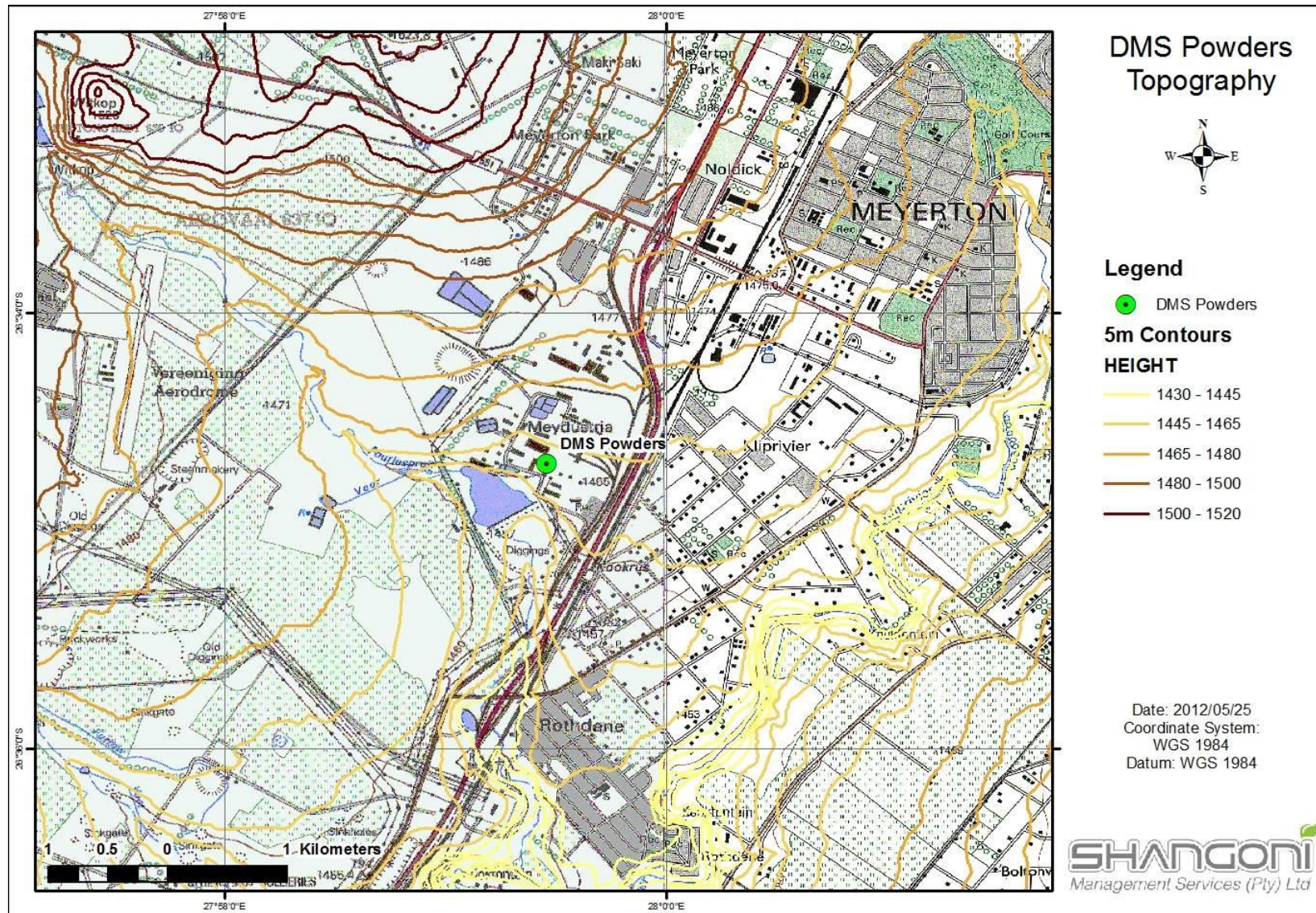


Figure 25: Topography Map of the area



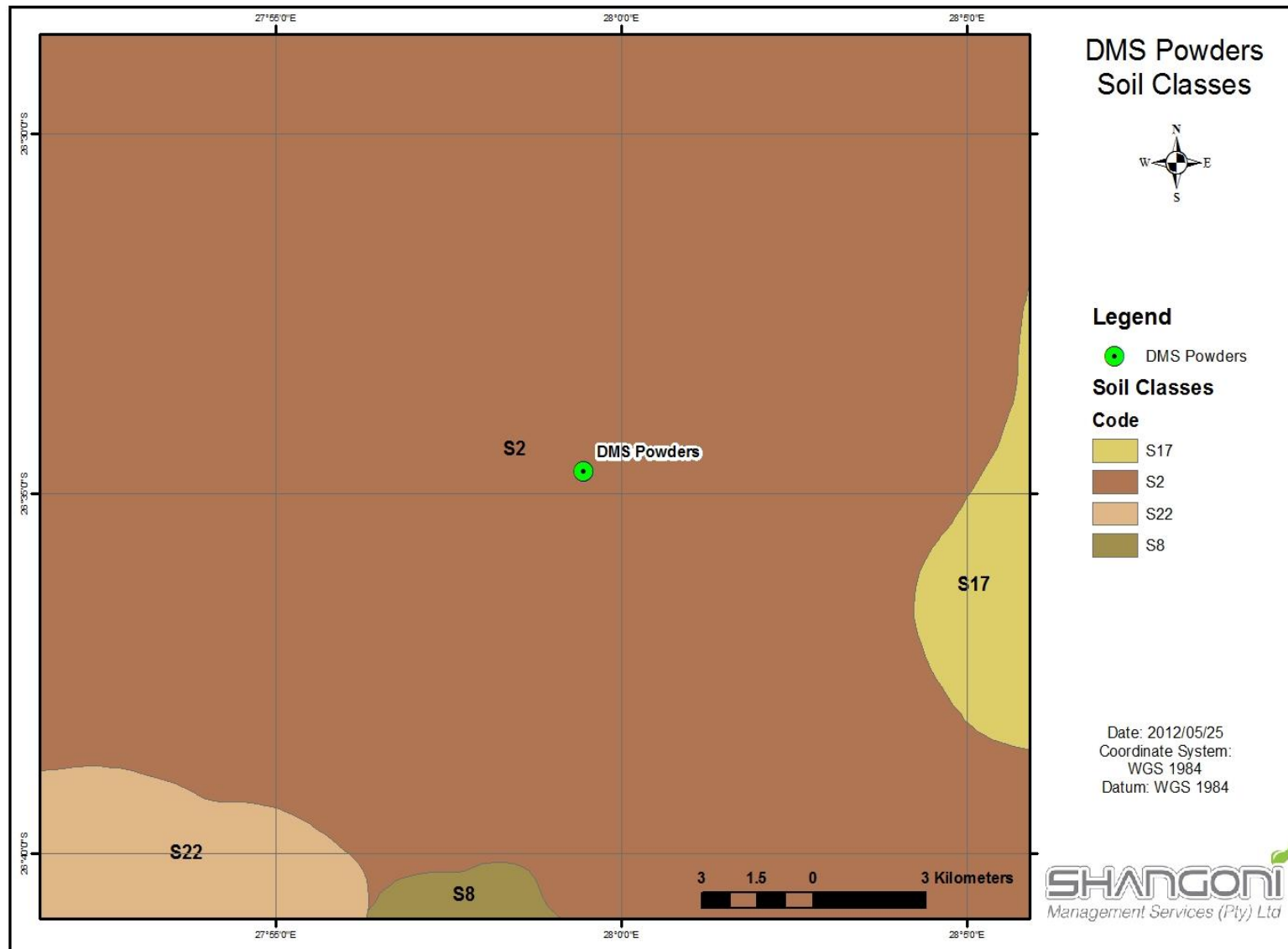


Figure 26: Soil classes map of the area.





## 2.2.4 Fauna and Flora

The site falls within the Soweto Highveld grassland vegetation type (Figure 27). This vegetation type is generally described as a gentle to moderately undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropogon contortus* and *Tristachya leucothrix*. In places not distributed, only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover (Mucina and Rutherford, 2006). Refer to Table 5 for plant species of importance in the Soweto Highveld grassland.

Table 5: Plant species of importance in the Soweto Highveld grassland.

Graminoid	
<i>Andropogon appendiculatus</i>	<i>Brachiaria serrata</i>
<i>Cymbopogon pospischilii</i>	<i>Cynodon dactylon</i>
<i>Elionurus muticus</i>	<i>Eragrostis capensis</i>
<i>Eragrostis chloromelas</i>	<i>Eragrostis curvula</i>
<i>Eragrostis plana</i>	<i>Eragrostis planiculmis</i>
<i>Eragrostis racemosa</i>	<i>Heteropogon contortus</i>
<i>Hyparrhenia hirta</i>	<i>Setaria nigrirostris</i>
<i>Setaria sphacelata</i>	<i>Themeda triandra</i>
<i>Tristachya leucothrix</i>	<i>Andropogon schirensis</i>
<i>Aristida adscensionis</i>	<i>Aristida bipartite</i>
<i>Aristida congesta</i>	<i>Aristida junciformis subsp. galpinii</i>
<i>Cymbopogon caesius</i>	<i>Digitaria diagonalis</i>
<i>Diheteropogon amplexens</i>	<i>Eragrostis micrantha</i>
<i>Eragrostis superba</i>	<i>Harpochloa falx</i>
<i>Microchloa caffra</i>	<i>Paspalum dilatatum</i>
Herbs	
<i>Hermannia depressa</i>	<i>Acalypha angustata</i>
<i>Berkheya setifera</i>	<i>Dicoma anomala</i>
<i>Euryops gilfillanii</i>	<i>Geigeria aspera var. aspera</i>
<i>Graderia subintegra</i>	<i>Haplocarpha scaposa</i>
<i>Helichrysum miconiifolium</i>	<i>Helichrysum. nudifolium var. nudifolium</i>
<i>Helichrysum rugulosum</i>	<i>Hibiscus pusillus</i>
<i>Justica anagaloides</i>	<i>Lippia scaberrima</i>
<i>Rhynchosia effuse</i>	<i>Schistostephium crataegifolium</i>
<i>Selago densiflora</i>	<i>Senecio coronatus</i>
<i>Vernonia oligocephala</i>	<i>Wahlenbergia undulate</i>
Geophytic Herbs	



<i>Haemanthus humilis</i> subsp. <i>hirsutus</i>	<i>Haemanthus montanus</i>
<b>Herbaceous Climber</b>	
<i>Rhynchosia totta</i>	
<b>Low Shrubs</b>	
<i>Anthospermum hispidulum</i>	<i>Anthospermum rigidum</i> subsp. <i>pumilum</i>
<i>Berkheya annectens</i>	<i>Felicia muricata</i>
<i>Ziziphus zeyheriana</i>	



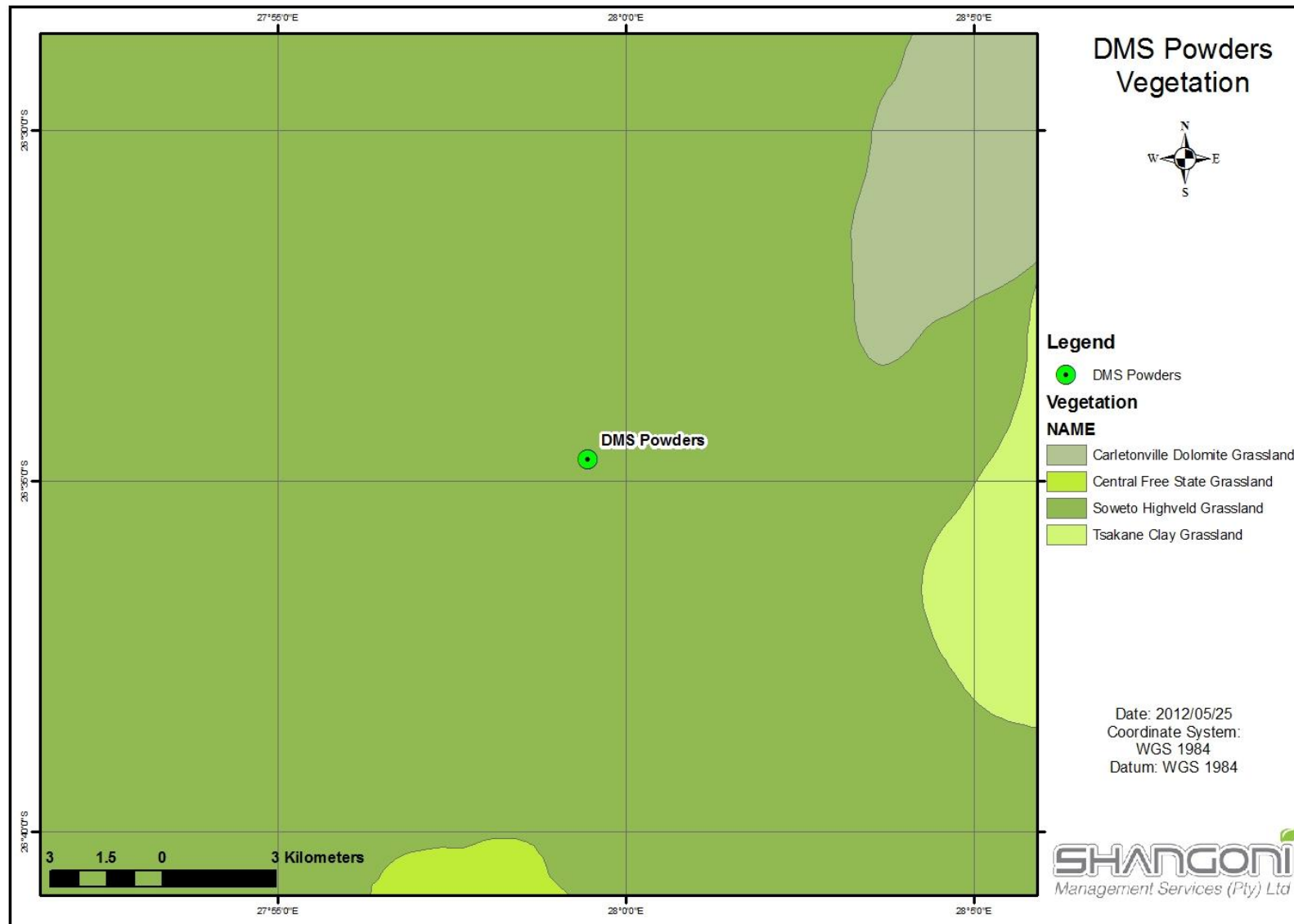


Figure 27: Vegetation Map of the area

### 2.2.5 Surface water

Surface water drainage from and in the vicinity of the DMS site will be predominantly from north to south, towards the Fouriespruit and Klip River. The Klip River is approximately 2.6km to the south-east of DMS Powders and the Fouriespruit is approximately 550m to the south-west of DMS Powders.

#### Quantity

The DMS Powders site is divided into three catchment areas: Northern stockpile area, Southern stockpile area, and Plant area. The storm water leaving the DMS Powders site is currently collected within an affected water dam (Samancor Storm Water Control Dam). Table 6 and Figure 28 illustrate the surface runoff at DMS Powders.

Table 6: Modelled runoff volumes for the DMS Powders Site (Shangoni Management Services, 2012)

Catchment areas	Runoff volumes (m3)			
	1:50 24hours	1:50 48hours	1:100 24hours	1:100 48hours
Northern Stockpile area	637	839	738	977
Southern Stockpile area	915	1205	1060	1404
Plant area	218	287	253	335

#### Quality

The following information was abstracted from the Specialist Groundwater Phase I Investigation Report compiled by Shangoni Aquiscience, a division of Shangoni Management Services (Pty) Ltd. Leachate tests and Acid Base Accounting (ABA) analyses were conducted on the iron shavings-, coal-, Si-carbide- and 'lumpy' stockpiles to determine their impact on the storm water quality emanating from the site. The following tests were done:

- Three TCLP leaching tests of iron shavings for organic and inorganic parameters.
- Three distilled water leaching tests of the coal stockpiles for inorganic parameters.
- Three ABA analyses on coal, Si-carbide and 'lumpy' stockpiles stored on site.

The water quality of the storm water emanating from the raw material storage area, the M9 process water together with the storm water emanating upstream from, but draining through DMS Powders, was analysed to identify contaminants that may originate from the site (refer to Table 7).



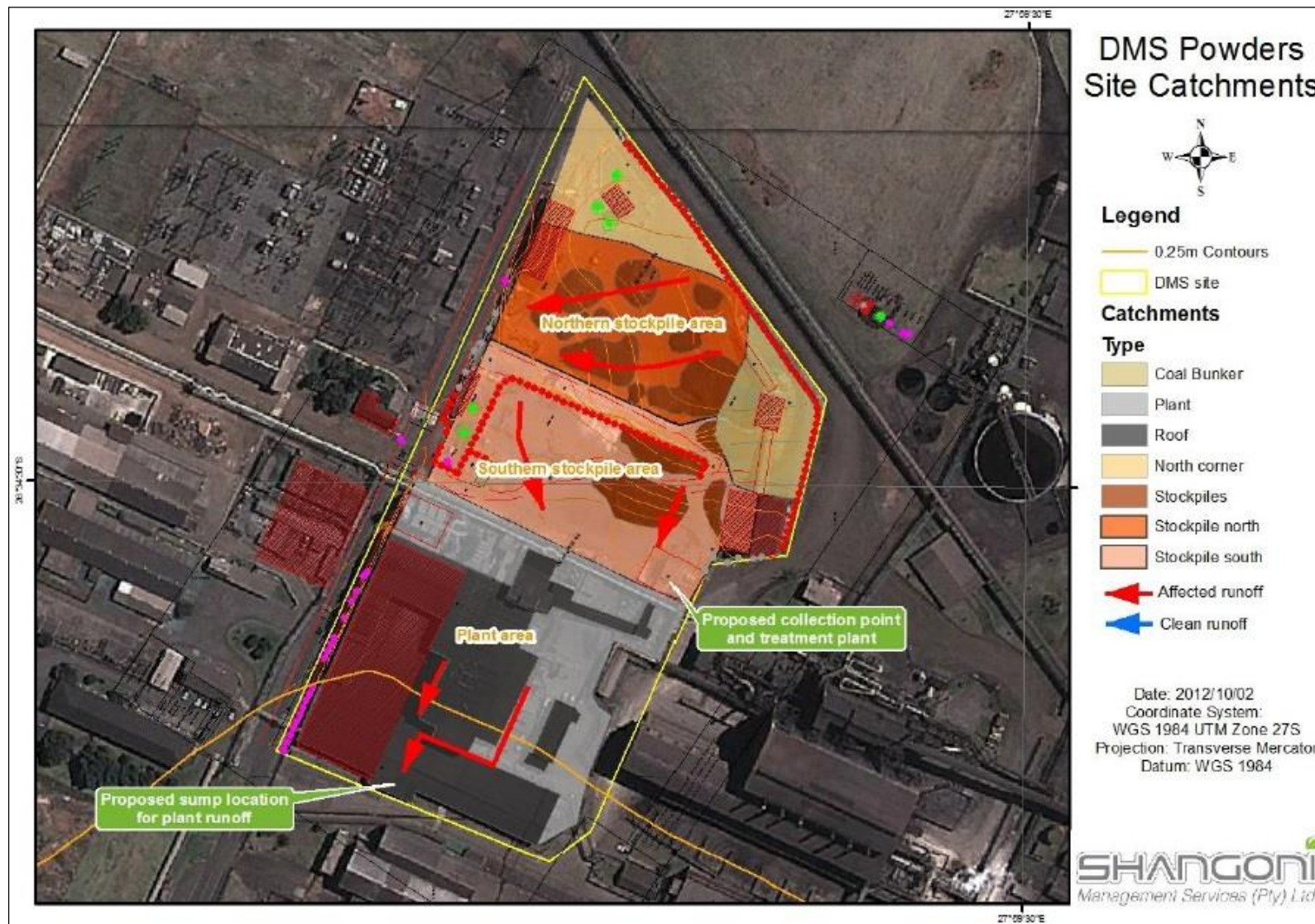


Figure 28: Onsite drainage catchments



Table 7: Groundwater Phase I investigation test results.

Area	Test/analysis	Results
Iron shavings stockpiles	TCLP leaching tests	<ul style="list-style-type: none"> <li>Above detection limits of mostly petroleum hydrocarbons comprising volatile aromatic hydrocarbons (mostly phenols and cresols), including polycyclic aromatic hydrocarbons (PAH); and</li> <li>Chlorophenol 4-chloro-3-methylphenol, recorded in trace quantities.</li> </ul>
Coal stockpiles	Distilled water leaching tests ABA analyses	<ul style="list-style-type: none"> <li>High total sulphur content of 0.52%;</li> <li>Potential to generate acid; and</li> <li>Soluble and mobile major and trace metals. Metals recorded above detection limits that may pose a potential risk to the environment include F, Al, Fe, Mn, Mo, Sn and Zn.</li> </ul>
Si-Carbide and "Lumpy" stockpiles	ABA analyses	<ul style="list-style-type: none"> <li>Lower total sulphur contents for the Si-Carbide (0.09%) and lumpy stockpiles (0.04%); and</li> <li>Non-acid forming.</li> </ul>
Raw material storage area	Storm water analysis	<ul style="list-style-type: none"> <li>Contained constituents similar to the iron shaving leach tests, but also recorded trace quantities of metals not found in the iron shavings or coal stockpiles, including As, Cd, Hg, Pb and Cr; and</li> <li>The organic parameters recorded included mostly petroleum hydrocarbons consisting of phenols, cresols and polycyclic aromatic hydrocarbons. Chlorophenol, 3-chloro-4-methylphenol, was also recorded.</li> </ul>
M9 process water	Storm water analysis	<ul style="list-style-type: none"> <li>Some of the BTEX compounds were recorded for M9 process water but in relatively low concentrations.</li> </ul>
Metalloids area	Storm water analysis	<ul style="list-style-type: none"> <li>Trace quantities of a few polycyclic hydrocarbons were recorded.</li> </ul>

### 2.2.6 Groundwater

The following information was abstracted from the Specialist Groundwater Investigation Report, Phases I & III compiled by Shangoni Aquiscience, a division of Shangoni Management Services (Pty) Ltd.

DMS Powders is located in the C22E quaternary catchment of South Africa in the Upper Vaal Water Management Area of the Gauteng Province.



### Quantity

The groundwater occurrence in the vicinity of the study area is associated with weathered and fractured sedimentary/sandstone/dolomite rocks not associated with dolerite intrusions but more related to compressional stresses and offloading. According to the hydrogeological map series 2526 Johannesburg (Barnard, 2000), the entire Meyerton region, including BHP Billiton Metalloys and DMS Powders, are situated in a C5 Karstic type aquifer (>5l/s) and not in the Vryheid sandstones of lesser quantities. The groundwater yield potential is classed as excellent on the basis that 50% of boreholes drilled into the Malmani dolomites produce more than 5l/s.

### Quality

Reference boreholes relative to DMS Powders (BHP Billiton owned) were sampled to assess the impact of DMS on the groundwater regime. The upgradient groundwater quality can be described as neutral, non-saline and soft with high to elevated levels of phosphate ( $PO_4$ ) and ammonia ( $NH_4$ ) and low to trace amounts of As and petroleum products, including toluene and styrene. The water is unfit for human consumption given the high ammonia concentration (10.3mg N/l).

The groundwater quality downgradient from DMS can be described as neutral to slightly acidic, non-saline with high levels of nitrate ( $NO_3$ ) and trace quantities of toluene, styrene and halogenated hydrocarbons. Although the  $NO_3$  concentration recorded in the downgradient borehole (11.2mg N/l) marginally exceeds the domestic limit for recommended use (<11.0mg N/l) it is not attributed to DMS since ammonia ( $NH_4$ ) concentrations are already elevated at the upgradient borehole (nitrification process). However, the presence of the halogenated hydrocarbons can most probably be related to DMS activities.

### 2.2.7 Water authority

The Gauteng Department of Water Affairs is the responsible water authority. DMS Powders is situated within the Upper Vaal water management area. The plant obtains its water directly from Rand Water.

### 2.2.8 Air Quality

#### Vaal Triangle Air-shed priority area

DMS Powders falls within the Vaal Triangle Air-shed Priority Area (VTAPA) as declared in Government Notice No. 365 in Government Gazette No. 28732 of 21 April of 2006. The VTAPA has 6 hotspots located all over the priority area. DMS Powders falls within the "Hotspot" Zone 4 (refer to Figure 29).

The pollutants of concern relating to "Hotspot" Zone number 4 are indicated in Table 8 and 9 below.



Table 8: Ambient Air Quality for common Pollutants as adopted to be the Air Quality Objection for Vaal Triangle Airshed Priority Area

Substance	10 Minute Maximum (ug/m <sup>3</sup> )	1 hour maximum (ug/m <sup>3</sup> )	8 hour maximum (ug/m <sup>3</sup> )	24 hour maximum (ug/m <sup>3</sup> )	Annual average (ug/m <sup>3</sup> )
Sulphur Dioxide (SO <sub>2</sub> )	500	350		125	50
Nitrogen dioxide (NO <sub>2</sub> )		200			40
Carbon Monoxide (CO)		30 000	10 000		
Particular Matter (PM10)				75	40
Ozone (O <sub>3</sub> )		200	120		
Lead (Pb)					0.5
Benzene					5

Table 9: Priority Hotspot: zones indicating the sensitive receptors within the main contributing sources

Hotspot Zone	Sensitive Receptors within the Zone	Emission Sources within the Zone	Additional Sources not quantified and included	Pollutants of concern
4	Residential developments of Vereeniging and Meyerton	Industrial activities (viz. Arcelor Mittal, Vaal works, Arcelor Mittal Klip Works Metallloys, commercial boilers, other smack industrial activities) and domestic fuel burning	Agricultural activities and large areas of biomass burning	PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>2</sub> , Ozone, VOCs

\*\* Table C from the Vaal Triangle Air-shed Priority Area, Air Quality Management Plan, 2009

In Section 5 of the VTAPA Air Quality Management Plan (AQMP) Metalloys Samancor was identified as one of the industries that have to reduce their emission to assist the air shed area to be able to reduce their emission within a certain time period. Refer to Table 10 for Ferroalloys' contribution to inhalable particulate emissions.

DMS Powders operates on Metalloys Samancor's property and therefore shares the responsibility to reduce the emissions generated from that area to reach the targets as set-out in the VTAPA AQMP.

Table 10: Source Contribution of inhalable Particulate Emissions

Industry	Emission %
Iron & Steel Processes	30.70%
Petrochemical	10.01%
<b>Ferroalloys</b>	<b>2.08%</b>





Industry	Emission %
Power generation	15.60%
Domestic Fuel Burning	5.14%
Vehicles	13.71%
Mines and Ash dumps	12.30%
Commercial	0.13%
Other Industries	10.33%

*\*\* Vaal Triangle Air-shed Priority Area, Air Quality Management Plan, 2009*



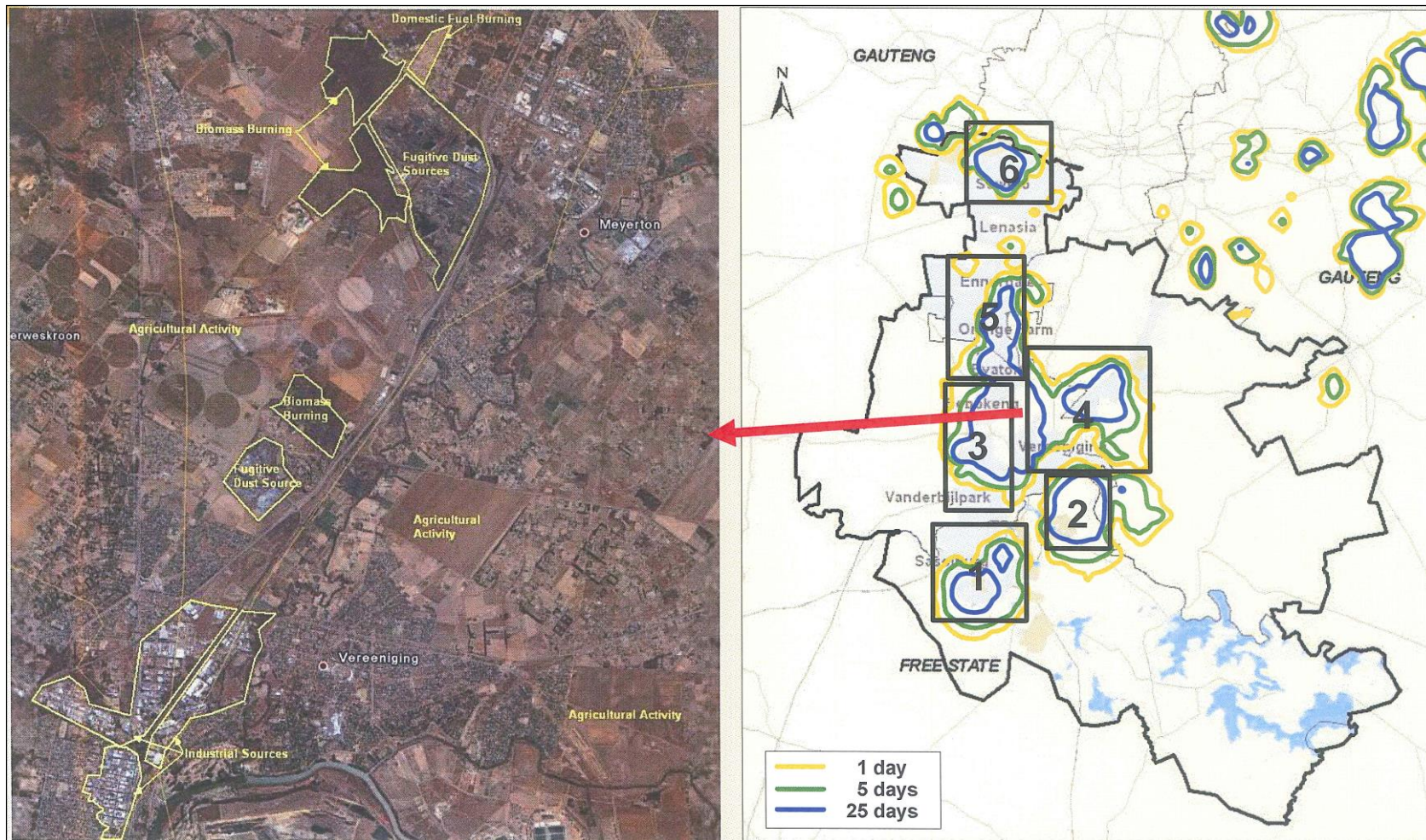


Figure 29: "Hotspot" Zone Number 4.

\*\*Vaal Triangle Air-Shed Baseline Characterisation presentation 11 October 2007 – Airshed Planning Professional



### DMS Powders' Atmospheric Impact

The production of Ferrosilicon (FeSi) powders at DMS Powders triggers the activity listed in Category 4, Subcategory 4.9: Ferro-alloy production in terms of Government Notice No. 248 as contemplated in Section 21(1)(a) of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004). Refer to Table 11 for the minimum emission standards for this listed activity.

Table 11: Subcategory 4.9: Ferro-alloy production

Description		Production of alloys of iron with chromium, manganese, silicon or vanadium, the separation of titanium, slag from iron-containing minerals used in heat	
Application		All Installations	
Substance or mixture of substances		Plant Status	Mg/Nm <sup>3</sup> under standard conditions of 273K and 101.3kPa
Common Name	Chemical Symbol		
Sulphur Dioxide	SO <sub>2</sub>	New	500
		Existing	500
Oxides of Nitrogen	NO <sub>x</sub>	New	400
		Existing	750
<b>Particulate matter from primary fume capture system, open and semi-closed furnaces</b>			
Particulate Matter	PM	New	30
		Existing	100
<b>Particulate matter from primary fume capture system, closed furnaces</b>			
Particulate Matter	PM	New	50
		Existing	100
<b>Particulate Matter from secondary fume capture system, all furnaces</b>			
Particulate Matter	PM	New	50
		Existing	100

Processes and associated installations that contribute to atmospheric emissions include the:

- Atomised Ferrosilicon: M8 Furnaces, M8 Baghouse and Drier, M8 Atom Tank and M8 Vacuum Pump; and
- Milled Ferrosilicon: M9 Furnace and Ball Mills (MM4, MM5, MM6, MM7).

A consultant from Poltech visited the DMS facility on 7 and 8 October 2010 to conduct emission measurements on the above mentioned installations. The results can be viewed in Table 12.



Table 12: Stack Emission concentration taken at the various stack emission points.

Sample Number	Pollutant Monitored	Emission Concentration (mg.Nm <sup>3</sup> )	Mass flow (kg/h)
<b>MM4, MM5 and MM6 (8/10/10 from 09:00 – 10:00)</b>			
VAR 271	Total Particles	21.52	0.03
MSI 150 PRO Gas Monitor	Nitrogen Oxide	17.4	0.025
	Sulphur dioxide	ND	N/A
	Carbon monoxide	0.1%	N/A
	Carbon Dioxide	20.8	N/A
	Oxygen		N/A
<b>MM7 Mill (8/10/10 from 10:10-11:10)</b>			
VAR 273	Total Particles	16.11	0.17
MSI 150 PRO Gas Monitor	Nitrogen Oxide	21.3	0.22
	Sulphur dioxide	ND	N/A
	Carbon Monoxide	ND	N/A
	Carbon Dioxide	0.1%	N/A
	Oxygen	20.8%	N/A
<b>Baghouse and drier M8 (8/10/10 from 11:15-12:15)</b>			
VAR 269	Total Particles	176.94	0.57
MSI 150 PRO Gas Monitor	Nitrogen Oxide	25.7	0.083
	Sulphur dioxide	ND	N/A
	Carbon Monoxide	ND	N/A
	Carbon Dioxide	0.3%	N/A
	Oxygen	20.5%	N/A
<b>M8 atom tank (7/10/10 from 11:30 – 12:30)</b>			
VAR 266	Total Particles	16.02	0.046
MSI 150 PRO Gas Monitor	Nitrogen Oxide	1.54	0.004
	Sulphur dioxide	ND	N/A
	Carbon Monoxide	ND	N/A
	Carbon Dioxide	0.1%	N/A
	Oxygen	20.8%	N/A
<b>M8 Vacuum pump (8/10/10 from 11:15-12:15)</b>			
MSI 150 PRO Gas Monitor	Nitrogen Oxide	ND	N/A
	Sulphur dioxide	3.2	0.0008
	Carbon monoxide	ND	N/A
	Carbon Dioxide	0.1%	N/A
	Oxygen	20.7	N/A



<b>M9 Drier (7/10/10 from 14:00-15:00)</b>			
VAR 270	Total Particles	1002.24	4.29
MSI 150 PRO Gas Monitor	Nitrogen Oxide	11.5	0.05
	Sulphur dioxide	28.4	0.13
	Carbon monoxide	ND	N/A
	Carbon Dioxide	2.5%	N/A
	Oxygen	17.9%	N/A
<b>M9 Baghouse (7/10/10 from 10:00-11:00)</b>			
VAR 274	Total Particles	30.51	0.95
MSI 150 PRO Gas Monitor	Nitrogen Oxide	22.4	0.69
	Sulphur dioxide	168.4	5.25
	Carbon monoxide	1.5	0.047
	Carbon Dioxide	0.4%	N/A
	Oxygen	20.3	N/A
<b>M9 Granulation (7/10/10 from 15:10-16:10)</b>			
VAR 269	Total Particles	15.37	0.076
MSI 150 PRO Gas Monitor	Nitrogen Oxide	3.4	0.017
	Sulphur dioxide	ND	N/A
	Carbon monoxide	ND	N/A
	Carbon Dioxide	0.4%	N/A
	Oxygen	20.4	N/A
**Kg/hr	<i>Kilogram per hour</i>		
**Mg/Nm <sup>3</sup>	<i>Milligrams per normal cubic metre (at 0°</i>		
**NA	<i>Not Applicable</i>		
**ND	<i>Pollutant Not detected</i>		
	<i>Highlighted blocks indicate areas where the figure is above regulation values</i>		

DMS Powders' oxides of nitrogen emissions and sulphur dioxide emissions are well within the regulatory specifications. Particulate matter concentrations sampled at the Bag House, Drier M8 and M9 Drier were, however, of concern. DMS Powders is investigating feasible ways to manage the emissions effectively and to mitigate this problem.

## 2.2.9 Aesthetics

### Land use

The land use and the land cover of the area has been identified as a built up area. The DMS Powders site is located within an existing industrial area on the M61 just west of the town of Meyerton (refer to Figure 30).



### **Sites of Archaeological and cultural interest**

The South African Heritage Resources Agency (SAHRA) requested a Phase 1 Heritage and Archaeological Impact Assessment, for the project. They also stipulated that should the property be very small or disturbed and there are no significant sites, the heritage specialist may choose to send a letter to the heritage authority to indicate that there is no necessity for any further assessment.

The Phase 1 Heritage and Archaeological Impact Assessment was conducted by A Pelser Archaeological Consulting in August 2013.

The site is in an industrial area and has been completely disturbed. If any sites, objects or features of historical, cultural or archaeological significance did exist in the past, they would have been destroyed or disturbed to a large degree. During the site assessment, no sites, objects or features of historical, cultural or archaeological significance were identified. There is no objection to the project from a cultural heritage perspective (A Pelser Archaeological Consulting, 2013). The Phase 1 Heritage and Archaeological Impact Assessment report has been submitted to SAHRA via their online submission environment (SAHRIS) and Shangoni is awaiting feedback from SAHRA in this regard.

### **2.2.10 Socio-economic aspects**

DMS Powders is located within Ward 3 of the Midvaal Local Municipality (LM) within the jurisdiction of the Sedibeng District Municipality.

#### **Demography**

The Demography of the Midvaal Local Municipality, especially relating to the labour force in relation to the district municipality and the other local municipalities in the Sedibeng District, is described in the sections below.

#### **Major economic activities**

The major economic activities within the Midvaal Local Municipality can be divided into three (3) sectors namely primary, secondary and tertiary sectors. The main activities in the different sectors have been set out in Figure 31.



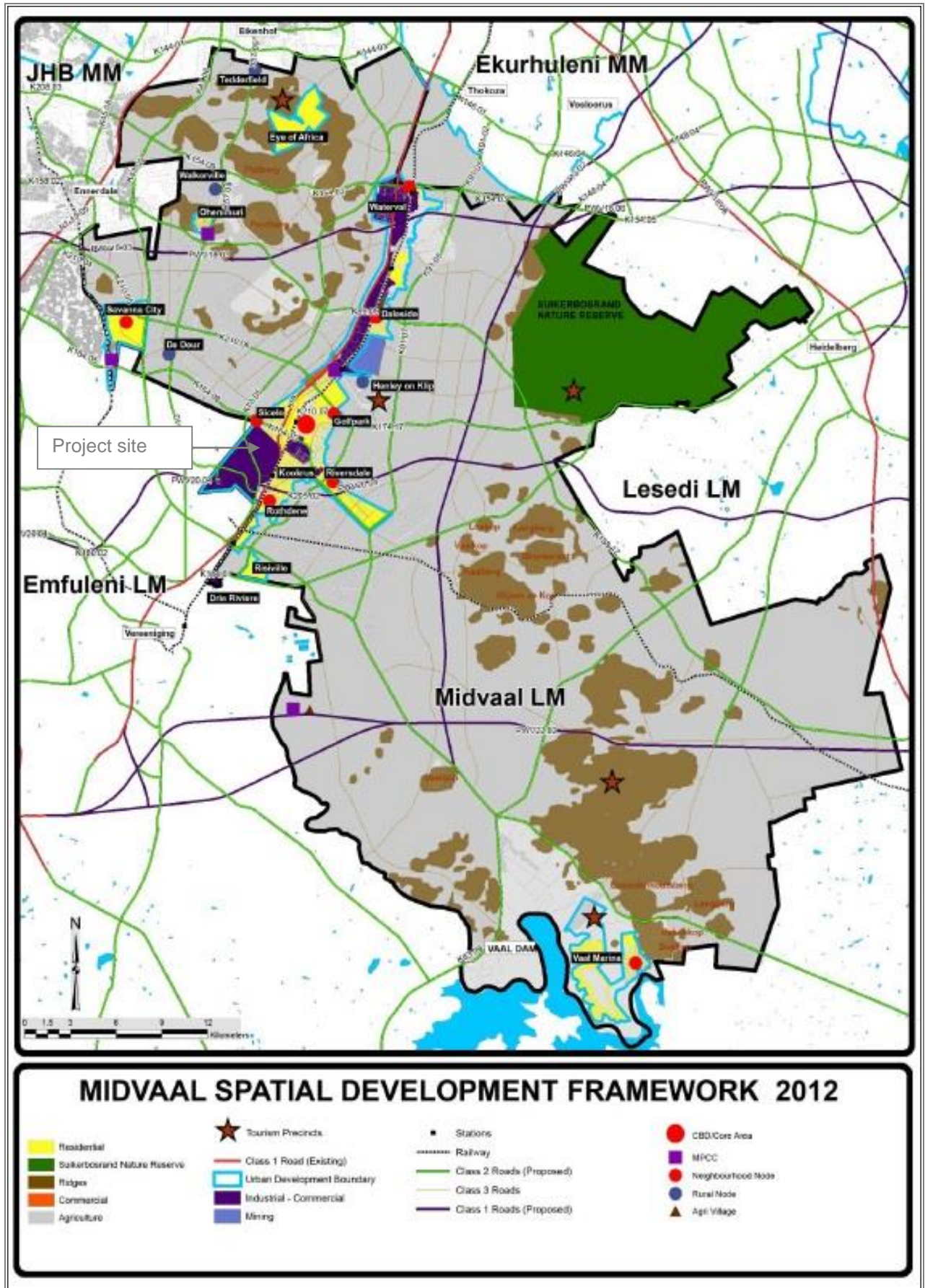


Figure 30: Map of the Midvaal Local Municipality (IDP 2012-2016 for 2012-2013)

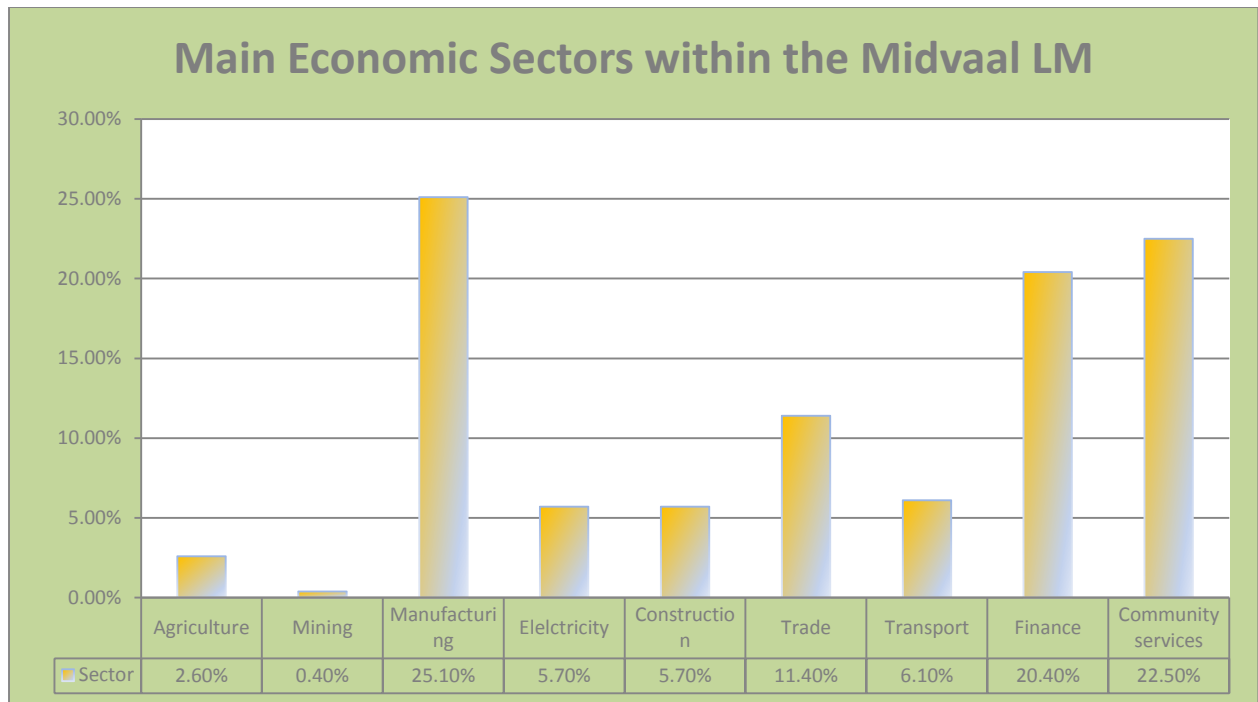


Figure 31: Main Economic activities in the Midvaal LM (Midvaal IDP 2012/2013)

### Unemployment and employment

According to statistics shown in the Midvaal Integrated Development Plan (IDP) of 2012/13, the Midvaal Municipality has the lowest poverty rate at approximately 17.2% in relation to 41% for Emfuleni LM and 37% for Lesedi LM (refer to Figure 32).

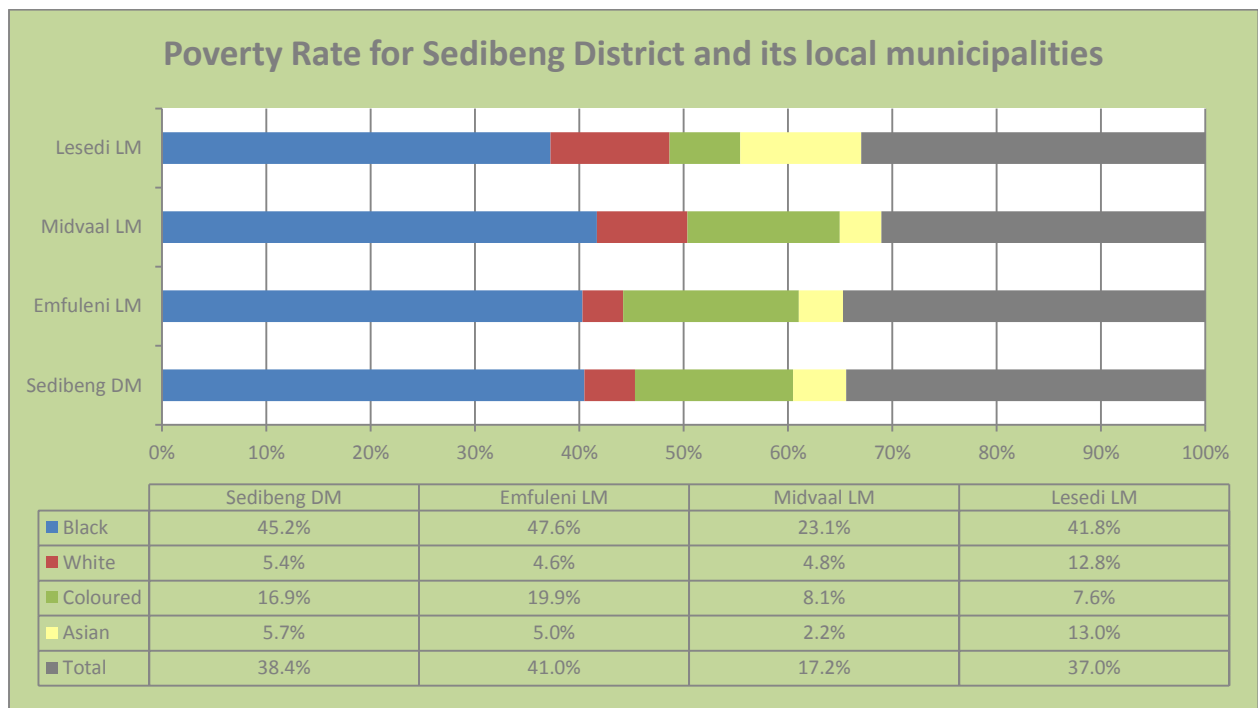


Figure 32: Poverty rate for Sedibeng and its local Municipalities (Midvaal IDP 2012/2013)





### Human Development Index

The Human Development Index for the Midvaal Local Municipality is the highest of all the local municipalities in the Sedibeng District Municipality (refer to Figure 33).

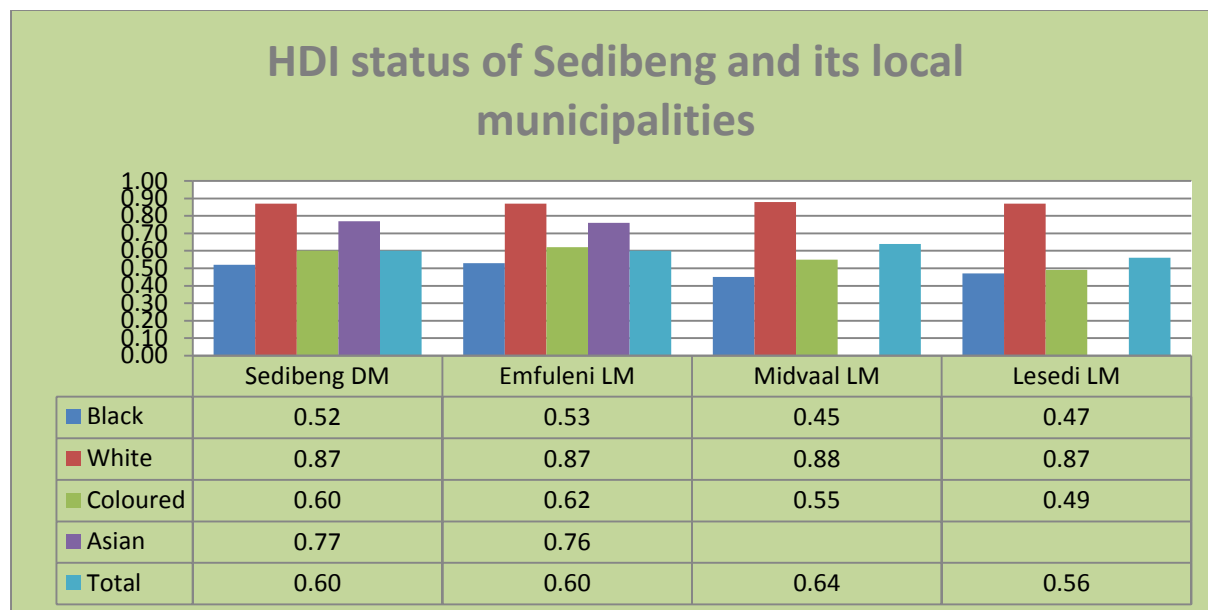


Figure 33: HDI status of Sedibeng and its local municipalities (Midvaal IDP 2012/2013)

### Employment per Economic Sectors

The three main employment opportunities are within the trade, manufacturing and the community services sectors within the Midvaal Local Municipality. The agricultural sector only employs approximately 2% and the transport sector only 6% of the economically active population (refer to Figure 34 below).

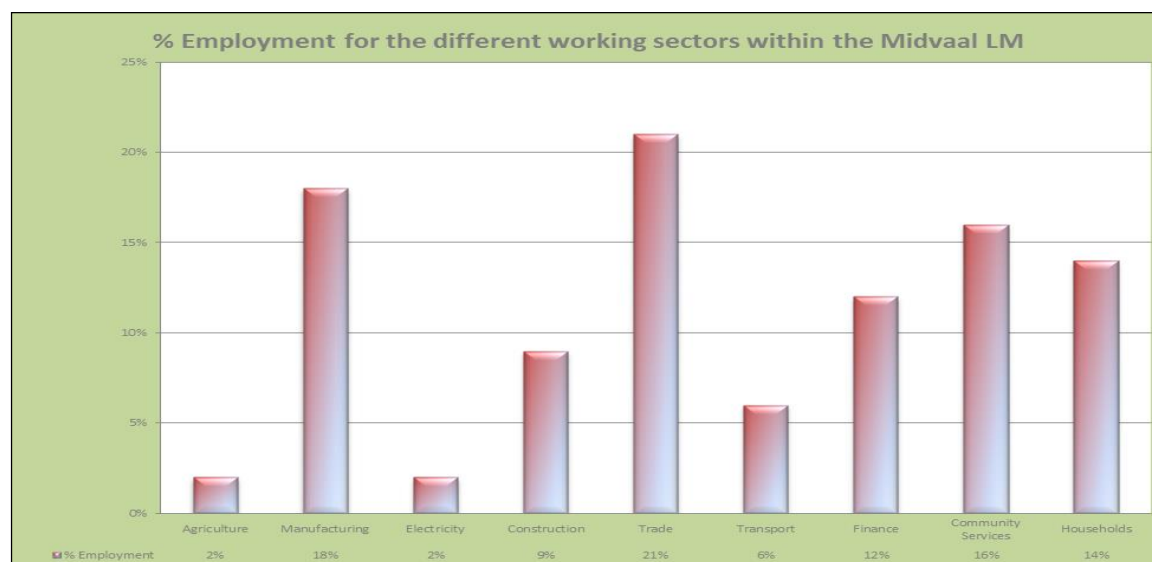


Figure 34: Percentage employment for the different working sectors within the Midvaal LM (Midvaal IDP 2012/2013)



## 3. LEGISLATION, BYLAWS & GUIDELINES

### 3.1 Laws of general application

The list below form part of the general legislation within the Republic of South Africa:

- Constitution of the RSA, 1996 (Act No 108 of 1996);
- National Environmental Management Act, 1998 (Act No 107 of 1998);
- Environment Conservation Act, 1989 (Act No 73 of 1989, as amended); and
- Promotion of Access to Information Act, 2000 (Act No 2 of 2000, as amended).

### 3.2 Atmospheric emissions

The National Environmental Management: Air Quality Act, 2004 (Act No 39 of 2004) was promulgated in 2004 and this act repealed the old Atmospheric Pollution Prevention Act, 1965 (Act No 45 of 1965). Together with the new act is a list of activities indicated what standard needs to be complied with for the different industry types.

The documents listed below are strategic planning documents related to the Vaal Triangle Airshed Priority Area:

- Vaal Triangle Airshed Priority area Air Quality Management Plan, 29 May 2009, Government Notice No 613, Government Gazette No 32263 of 28 May 2009;
- Proposed regulations to provide for the application for atmospheric emission license and matter pertaining to the implementation of the atmospheric emission licensing system, General Notice No 141, Government Gazette No 32962 of 17 February 2010;
- Gauteng Province Air Quality Management Plan, GDARD, August 2009;
- Declaration of the Vaal Triangle Air-shed Priority area in terms of Section 18(1) of the National Environmental Management: Air Quality Act 2004, (Act 39 of 2004), Government Notice No 365, Government Gazette No 28732 of 21 April 2006;
- Regulation for implementing and enforcing the Vaal triangle Air-shed Priority Area Air Quality Management Plan, Government Notice 614, Government Gazette No 32254 of 29 May 2009; and
- Vaal Triangle Air-shed priority Area (VTAPA) Implementation Report one, DEAT, September 2011.

### 3.3 Water Management

- National Water Act, 1998 (Act No 36 of 1998); and
- Government Gazette Notice No 1199 of 2009, Department of Water Affairs and Forestry – Replacement of general authorisations in terms of Section 39 of the National Water Act, 1998 (Act No 36 of 1998).



### 3.4 Waste Management

- National Environmental Management: Waste Act, 2008 (Act No 59 of 2008);
- Government Notice No. 921 of 29 November 2013: List of waste management activities that have, or are likely to have, a detrimental effect on the environment;
- Government Notice No. 926 of 29 November 2013: National Norms and Standards for the Storage of Waste;
- Government Notice No. 634 of 23 August 2013: Waste Classification and Management Regulations; and
- Government Notice No. 635 of 23 August 2013: National Norms and Standards for the assessment of waste for landfill disposal.

### 3.5 Planning of new activities

- National Environmental Management Act, 1998 (Act No 107 of 1998).

### 3.6 Biodiversity

- National Environmental Management Biodiversity Act, 2004 (Act No 10 of 2004);
- Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983);
- National Veld and Forest Fire Act, 1998 (Act No 101 of 1998);
- Agricultural Pest Act, 1983 (Act No 36 of 1983, as amended) – GN R276 of 5 March 2004;
- National Fencing Act, 1963 (Act No 31 of 1963, as amended); and
- National Forest and Fire Laws Amendment Act (Act No 12 of 2001).

### 3.7 Land and Soil Management

- National Environmental Management Act, 1998 (Act No 107 of 1998); and
- Environmental Conservation Act, 1989 (Act No 73 of 1989).

### 3.8 Heritage resources

- National Heritage Resources Act No 25 of 1999 (Act No 25 of 1999, as amended).

### 3.9 Protected areas

- National Environmental Management: Protected Areas Act, 2003 (Act No 57 of 2003, as amended).

During the course of the development, the developer and contractors must comply with all other relevant legislation (including the bylaws of the Local Municipality).



## 4. PUBLIC PARTICIPATION PROCESS

### 4.1 Introduction

A Public Participation Process (PPP) is a requirement in terms of the 2010 EIA Regulations of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and it forms an integral part of any EIA process.

This section provides information pertaining to the PPP that was conducted by Shangoni Management Services during this particular assessment.

The purpose of this process is to gather information from the community and relevant Stakeholders that could ultimately affect the decision-making process concerning the Planning & Design, Construction, Operational and Closure Phases of the DMS Powders project. The community and public have been identified as I&APs and have been given the opportunity to participate in this process. Their comments, whether positive or negative, will influence the decision of the Authorities and the developer's final actions.

### 4.2 Objectives of the PPP

The PPP has the following objectives:

- To inform I&APs as well as all Stakeholders of the proposed development;
- To provide an opportunity for I&APs and Stakeholders to raise environmental issues or concerns and make suggestions;
- To promote transparency and an understanding of the project and its consequences;
- To serve as a structure for liaison and communication with I&APs and Stakeholders.

To summarise, the objective of the on-going PPP is to promote openness and transparency concerning the proposed wastewater treatment works for the duration of the project. The process should by no means be regarded as a vehicle to temper opposition or objections. Any conclusions agreed upon must be socially, financially and technically acceptable and feasible in order to meet the requirements of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), and the vision of DMS Powders.

### 4.3 The Guidelines Followed for the PPP

The PPP for this project was conducted by Shangoni Management Services and undertaken strictly according to the guidelines in terms of the National Environmental Management Act (NEMA), No. 107 of 1998, Chapter 6.



## 4.4 Public Participation Process

54. (1) This regulation only applies in instances where adherence to the provisions of this regulation is specifically required.
- (2) The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by-
- (a) fixing a notice board at a place conspicuous to the public at the boundary or on the fence of -
- (i) the site where the activity to which the application relates is or is to be undertaken; and
  - (ii) any alternative site mentioned in the application;
- (b) giving written notice to -
- (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - (v) the municipality which has jurisdiction in the area;
  - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in –
- (i) one local newspaper; or
  - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in sub regulation (c) (ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to
- (i) illiteracy;
  - (ii) disability;
  - (iii) or any other disadvantage.
- (3) A notice, notice board or advertisement referred to in sub regulation (2) must
- (a) give details of the application which is subjected to public participation; and



- (b) state-
  - (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;
  - (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
  - (iii) the nature and location of the activity to which the application relates;
  - (iv) where further information on the application or activity can be obtained; and
  - (vi) the manner in which and the person to whom representations in respect of the application may be made.
  
- (4) A notice board referred to in sub regulation (2) must-
  - (a) be of a size at least 60cm by 42cm; and
  - (b) display the required information in lettering and in a format as may be determined by the competent authority.
  
- (5) Where deviation from sub regulation (2) may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub regulation to the extent and in the manner as may be agreed to by the competent authority.
  
- (6) Where a basic assessment report, scoping report or environmental impact assessment report as contemplated in regulations 22, 28 and 31 respectively is amended because it has been rejected or because of a request for additional information by the competent authority, and such amended report contains new information, the amended basic assessment report, scoping report or environmental impact assessment report must be subjected to the processes contemplated in regulations 21, 27 and 31, as the case may be, on the understanding that the application form need not be resubmitted.
  
- (7) When complying with this regulation, the person conducting, the public participation process must ensure that-
  - (a) information containing all relevant facts in respect of the application is made available to potential interested and affected parties; and
  - (b) participation by potential interested and affected parties is facilitated in such a manner that all potential interested and affected parties are provided with a reasonable opportunity to comment on the application.
  
- (8) Unless justified by exceptional circumstances, as agreed to by the competent authority, the applicant and EAP managing the environmental assessment process must refrain from conducting any public participation process during the period of 15 December to 2 January.



## 4.5 Register of interested and affected parties

### Register of interested and affected parties

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

### Registered interested and affected parties entitled to comment on submissions

56. (1) A registered interested and affected party is entitled to comment, in writing, on all written submissions, including draft reports made to the competent authority by the applicant or the EAP managing an application, and to bring to the attention of the competent authority any issues which that party believes may be of significance to the consideration of the application, provided that-
- (a) comments are submitted within-
    - (i) the timeframes that have been approved or set by the competent authority; or
    - (ii) any extension of a timeframe agreed to by the applicant or EAP;
  - (b) a copy of comments submitted directly to the competent authority is served on the EAP; and
  - (c) the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.
- (2) Before the EAP managing an application for environmental authorisation submits a final report compiled in terms of these Regulations to the competent authority, the EAP must give registered interested and affected parties access to, and an opportunity to comment on the report in writing.
- (3) The report referred to in sub regulation (2) include-
- (a) basic assessment reports;
  - (b) basic assessment reports amended and resubmitted in terms of regulation 24 (4);
  - (c) scoping reports;
  - (d) scoping reports amended and resubmitted in terms of regulation 30(3);



- (e) specialist reports and reports on specialised processes compiled in terms of regulation 32;
  - (f) environmental impact assessment reports submitted in terms of regulation 31;
  - (g) environmental impact assessment reports amended and resubmitted in terms of regulation 34(4); and
  - (h) draft environmental management programmes compiled in terms of regulation 33.
- (4) The draft versions of reports referred to in sub regulation (3) must be submitted to the competent authority prior to awarding registered interested and affected parties an opportunity to comment.
- (5) Registered interested and affected parties must submit comments on draft reports contemplated in sub regulation (4) to the EAP, who should record it in accordance with regulations 21, 28 or 31.
- (6) Registered interested and affected parties must submit comments on final reports contemplated in sub regulation (3) to the competent authority and provide a copy of such comments to the applicant or EAP.
- (7) The competent authority must, in order to give effect to section 24O of the Act, on receipt of the draft reports contemplated in sub regulation (5), request any State department that administers a law relating to a matter affecting the environment to comment within 40 days.
- (8) The timeframe of 40 days as contemplated in sub regulation (7) must be read as 60 days in the case of waste management activities as contemplated in the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), on which the Department of Water Affairs must concur and issue a record of decision in terms of section 49(2) of the National Environmental Management: Waste Management Act, 2008 (Act No. 59 of 2008)
- (9)(a) When a State department is requested by the competent authority to comment, such State department must, within 40 days or in the case of Department of Water Affairs, 60 days for waste management activities, of being requested to comment by the competent authority, provide comments to the competent authority.
- (b) If a State department fails to submit comments within 40, or 60 days for waste management activities, from the date on which the Minister, MEC, Minister of Mineral Resources or identified competent authority requests such State department in writing to submit comment, it will be regarded that there are no comments.





**Comments of interested and affected parties to be recorded in reports submitted to competent authority**

- 57(1) The EAP managing an application for environmental authorisation must ensure that the comments of interested and affected parties are recorded in reports and that such written comments, including records of meetings, are attached to the report, submitted to the competent authority in terms of these Regulations.
- (2) Where a person is desiring but unable to access written comments as contemplated in sub regulation (1) due to-
- (i) a lack of skills to read or write;
  - (ii) disability; or
  - (iii) any other disadvantage;
- reasonable alternative methods of recording comments must be provided for.

## 4.6 Public Participation Process Followed

### 4.6.1 Identification & Registration of I&APs on a Database

Through networking and advertising, I&APs were registered on a database. Shangoni ensured that individuals or organisations from an institutional as well as a geographical point of view were identified.

Geographically, Shangoni focused on nearby or adjacent landowners, communities and structures that represents them. Institutionally, the focus was on those organisations or individuals that may influence policies and decisions or make a contribution to the project. Not all of these organisations were necessarily in the direct project sphere of impact.

### 4.6.2 Information to I&APs

The interested and affected parties, including the adjacent land owners as well as certain Organs of State, were informed of the project via newspaper advertisements, notice boards and registered notification letters. A period of 30 days was allowed for any person who feels that he or she is an interested and affected party to register as such.

### 4.6.3 Information to Stakeholders

The stakeholders received a background information document that was accommodated by a map as well as a stakeholder form this information pack was send via registered mail on the 28<sup>th</sup> of January 2013 (refer to Table 13 for stakeholders identified).



Table 13: Stakeholders identified

Name of Department	Contact Person	Contact details
Gauteng Department of Community Safety	Advocate Mongezi Tshongweni / Ms Nonhlanhla Faith Mazibuko	Tel: (011) 689 3618 Fax: (011) 689 3660 Postal address: PO Box 62440, Marshalltown, 2107
Gauteng Department of Economic Development	Mr. Khulu Radebe	Tel: (011) 355 8705 Fax: (011) 355 8289 Email: Khulu.radebe@gauteng.gov.za Postal address: Private Bag X091, Marshalltown, 2107
Gauteng Department of Finance	Mr. Mandla Nkomfe / Mr. Stewart Lumka	Tel: (011) 689 8001 Fax: (011) 355 2005 Email: Stewart.lumka@gauteng.gov.za Postal address: Private Bag X112, Marshalltown, 2107
Gauteng Department of Health	Dr. Nomonde Xundu	Tel: (011) 355 3513 Fax: (011) 355 3512 Email: nomonde.xundu@gauteng.gov.za Postal address: Private Bag X085, Marshalltown, 2107
Gauteng Department of Infrastructure Development	Ms Maggie Modipa / Mr Stewart Lumka (Acting)	Tel: (011) 355 7438 / 5002 Fax: (011) 355 7457 Email: Stewart.lumka@gauteng.gov.za Postal address: Private Bag X83, Marshalltown, 2107
Gauteng Department of Local Government and Housing	HOD: Mr Mongezi Mnyani	Tel: (011) 355 4230 Fax: (011) 355 8973 Email: Mongezi.mnyani@gauteng.gov.za



Name of Department	Contact Person	Contact details
		Postal address: Private Bag X79, Marshalltown, 2107
Gauteng Department of Roads and Transport	Ms Margaret-Ann Diedricks	Tel: (011) 355 7301 Fax: (011) 355 7509 or 086 720 3011 Email: Margaret-ann.Diedricks@gauteng.gov.za Postal address: Private Bag X88, Marshalltown, 2107
Department of Water Affairs	Ms Florah Mamabolo	Tel: (012) 392-1361 Fax: (012) 336 8664 Email: MamaboloF@dwa.gov.za Postal address: Private Bag X313, Pretoria, 0001
South African Heritage Resource Agency	Mr. Andrew Salomon	Tel: (021) 462 4502 Fax: (021) 462 4509 Postal address: PO Box 4637, Cape Town, 8000
	Henry Human	Tel: 016 360 7422 Fax: 016 360 7538 Email: henryh@midvaal.gov.za Postal address: PO Box 9, Meyerton, 1960
Sedibeng District Municipality	Mr. Ziez van Zyl	Tel: 016 450 3259 Fax: 016 427 1014/016 455 2573 Email: ziesvz@sedibeng.gov.za Postal address: PO Box 471, Vereeniging, 1930



#### 4.6.4 Registering Stakeholders

A contact database was opened for all registered interested and affected parties. The register includes the name of the I&AP, Postal Address, Physical Address, E-mail Address, Telephone Number, Cell phone Number and Fax Number as well as designation and the company name (refer to Table 14).

Table 14: I&AP Register

Name	Organisation/Farm	Postal Address	Contact details
Mr. Andrew Salomon	South African Heritage Resources Agency	P.O. Box 4637 Cape Town 8000	Tel: (021) 462 4502 Fax: (021) 462 4509
Natalie Koneight	Rand Water	PO Box 1127 Johannesburg 2000	Tel: (011) 724 9366 Fax: (011) 900-2108 nkoneigh@randwater.co.za
Mpati Mpshe	Rand Water	PO Box 1127 Johannesburg 2000	Tel: (011) 724 9357 Fax: (011) 900 1208 mmpshe@randwater.co.za
Ms. Paula Tolksdorff	Terra Pacis Environmental	PO Box 41409 Craighall 2024	Tel: 011 781 7800 Fax: 011 781 7711 Cell: 082 376 2497 Email: paula@terrapacis.co.za
Ms. Nelisiwe Malevu	Gauteng Department of Local Government and Housing	Private Bag X79 Marshalltown 2107	Tel: 011 355 4000/4230 Fax: 011 838 8973
Mr. Killian Mwiinga	Gauteng Department of Local Government and Housing	PO Box 102350 Moreleta Plaza 0167	Tel: 011 355 5734 Cell: 072 522 5510 Email: killian.mwiinga@gauteng.gov.za
Anthony M. Hearn	Vaal Triangle resident	PO Box 264196 Three Rivers 1935	Cell: 082 574 2901 Email: tony@shebaconsulting.co.za
Mr. Jako Verster	Midvaal Local Municipality	PO Box 9 Meyerton 1960	Tel: 016 360 5860 Cell: 082 783 0057 Email: jakov@midvaal.gov.za

#### 4.6.5 Press Notices

Newspaper advertisements were placed in the Beeld and the Vaal Ster on the 29<sup>th</sup> of January 2013. (refer to Appendix E6).



### 4.6.6 Placement of Public Notices

Two Notice boards were placed in and around the project site at strategic locations to be as visible as possible (Figure 35 and Figure 36).

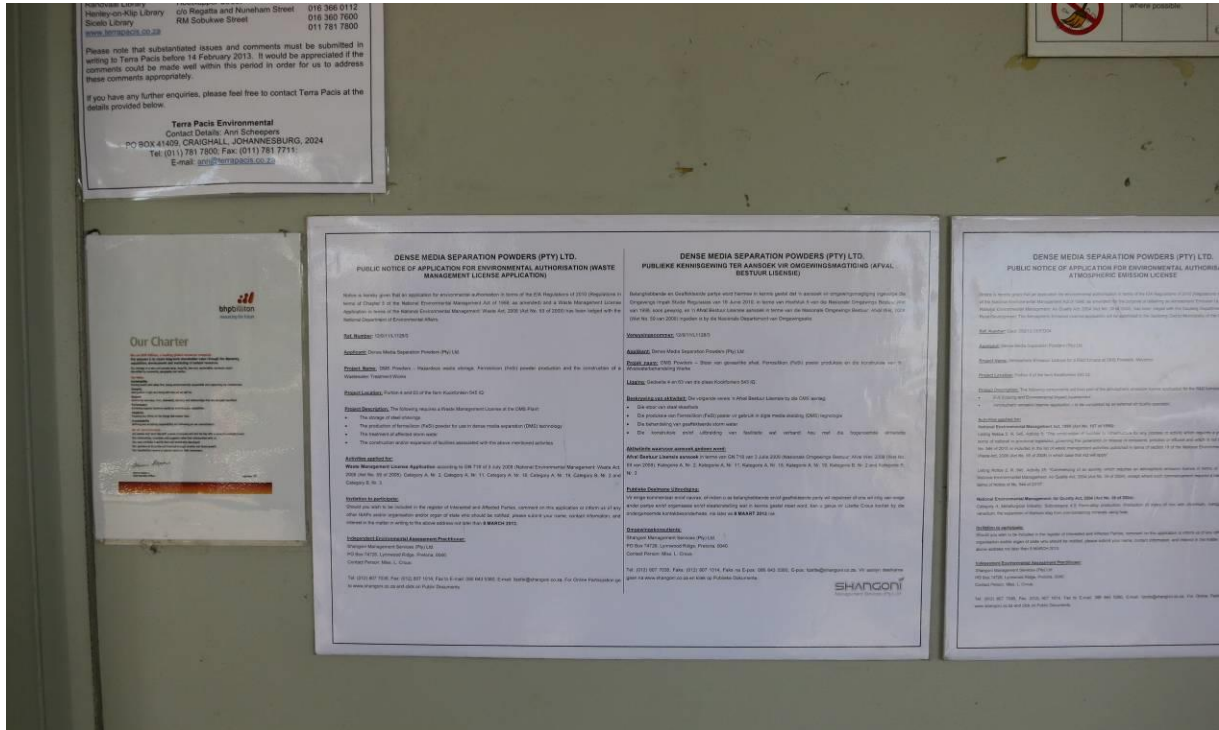


Figure 35: Photograph of first notice board.



Figure 36: Photograph of second notice board.



#### **4.6.7 Issuing I&APs and Stakeholders with the Draft Scoping Report**

The draft Scoping Report was sent to all Departments and Organs of State as well as all registered I&APs in order to obtain their comments and notices. The report was also submitted to the National Department of Environmental affairs for review. The review period was from the 10<sup>th</sup> of September 2013 to the 19<sup>th</sup> of November 2013.

#### **4.6.8 Comments received on the draft Scoping Report**

No comments were received on the draft Scoping Report.

#### **4.6.9 Final Scoping Report**

The final Scoping Report was submitted to the National Department of Environmental Affairs on the 25<sup>th</sup> of November 2013. The acceptance letter for the final Scoping Report was received from the Department on the 5<sup>th</sup> of February 2014.

#### **4.6.10 Issuing I&APs and Stakeholders with the Draft Environmental Impact Assessment Report**

The draft Environmental Impact Assessment Report was sent to all Departments and Organs of State as well as all registered I&APs in order to obtain their comments and notices. The review period was from the 23<sup>rd</sup> of April 2014 to the 10<sup>th</sup> of June 2014 for all Departments, Organs of State and registered I&APs. The review period was from the 23<sup>rd</sup> of April 2014 to the 1<sup>st</sup> of July 2014 for the Department of Water Affairs. The report was also submitted to the National Department of Environmental affairs for review.

#### **4.6.11 Comments received on the draft Environmental Impact Assessment Report**

No comments were received on the draft Environmental Impact Assessment Report.

#### **4.6.12 Minutes of public meeting**

No public meetings have been held during the Public Participation Phase.



**4.6.13 Comments and response report**

Table 15: Comments / Concerns received from Department and or Organs of State.

Date received	Received from	Comment/Concern received	Responses sent
06-02-2013	Gauteng Department of Local Government and Housing	<p><b>RE: Application for Environmental Authorisation: DMS Powders – Hazardous Waste Storing, Ferrosilicon (FeSi) Powder Production and the Construction of a Wastewater Treatment Works</b></p> <p>Receipt of your correspondence regarding the above mentioned matter is hereby acknowledged. The matter has been referred to Mr. Patrick Mokoma and Mr. Killian Mwinga and they can be contacted on 011 355 5734.</p>	<p>Dear Madam,</p> <p>Your letter dated 6 February 2013 refers: We hereby confirm receipt of your letter. Your comments will be included in the Scoping and Environmental Impact Assessment Reports for this project.</p> <p>We thank you for your input.</p>
15-02-2013	South African Heritage Resources Agency	<p><b>ENVIRONMENTAL AUTHORISATION APPLICATION: DMS POWDERS - HAZARDOUS WASTE STORAGE, FERROSILICON (FeSi) POWDER PRODUCTION AND THE CONSTRUCTION OF A WASTEWATER TREATMENT WORKS DMS POWDERS - HAZARDOUS WASTE STORAGE, FERROSILICON (FeSi) POWDER PRODUCTION AND THE CONSTRUCTION OF A WASTEWATER TREATMENT WORKS (DEA EIA Ref: 12/9/11/L1128/3; SMS Ref: DMS-EIA-31-01-12)</b></p> <p>Thank you for your Background Information Document regarding this development.</p>	<p>1. Good day Mr. Salomon</p> <p>I hereby acknowledge receipt of SAHRA's comments on the application for environmental authorisation of the following project: DMS Powders - Hazardous waste storage, Ferrosilicon (FeSi) powder production and the construction of a Wastewater Treatment Works (EIA Ref Nr: 12/9/11/L1128/3).</p> <p>Thank you for your inputs.</p>



Date received	Received from	Comment/Concern received	Responses sent
		<p>In terms of the National Heritage Resources Act, no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer to ensure that a <b>Heritage Impact Assessment</b> is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.</p> <p>The quickest process to follow for the archaeological component is to contract an accredited specialist (see the web site of the Association of Southern African Professional Archaeologists <a href="http://www.asapa.org.za">www.asapa.org.za</a>) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any large development takes place.</p> <p>The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or</p>	<p>2. A Phase 1 Heritage Impact Assessment has been conducted by A Pelsler Archaeological Consulting and has been submitted to SAHRA on the SAHRIS website for consideration.</p> <p>The site is in an industrial area and has been completely disturbed. If any sites, objects or features of historical, cultural or archaeological significance did exist in the past, they would have been destroyed or disturbed to a large degree. During the site assessment, no sites, objects or features of historical, cultural or archaeological significance were identified. There is no objection to the project from a cultural heritage perspective (A Pelsler Archaeological Consulting, 2013). The Phase 1 Heritage and Archaeological Impact Assessment report has been submitted to SAHRA via their online submission environment (SAHRIS) and Shangani is</p>





Date received	Received from	Comment/Concern received	Responses sent
		<p>excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.</p> <p>Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological Desk Top study must be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter of exemption from a Palaeontologist is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary.</p> <p>If the property is very small or disturbed and there is no significant site the heritage specialist may choose to send a letter to the heritage authority to indicate that there is no necessity for any further assessment.</p> <p>Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed.</p>	<p>awaiting feedback from SAHRA in this regard.</p>



Date received	Received from	Comment/Concern received	Responses sent
		Should you have any further queries, please contact the designated official using the case number quoted above in the case header.	
14-03-2013	Rand Water – Natalie Koneight	<p>Rand Water is hereby registering as IAP for the above-mentioned project. Kindly forward confirmation of registration as IAP to Natalie Koneight at nkoneigh@randwater.co.za Attached is Rand Water’s Wayleaves, for your information.</p> <p>Rand Water would like to be sure that the development as per the BID have planned adequately for their sewerage removal off site. Please provide Rand Water with:</p> <ol style="list-style-type: none"> <li>1. The detail about the facility that will receive the sewerage.</li> <li>2. An agreement that the identified sewerage facility I aware of the development and that they have the capacity to accept the sewerage from the site without overloading the facility.</li> <li>3. Will there be any discharges other than the sewerage system that will increase storm water entering the environment. If so, has the development considered retention and stilling ponds to slow down high peak flows.</li> </ol> <p>If the sewerage facility cannot accept the additional load into their facility then this will have a negative impact on the environment and the pollution load into the river system.</p>	<ol style="list-style-type: none"> <li>1. Your email dated 14 March 2013 refers: We hereby confirm receipt of your email, Interested and Affected Party registration form and comments.  We further confirm that you have been registered as an Interested and Affected Party for the above mentioned project. You will henceforth receive all correspondence regarding public participation opportunities as the process unfolds. Your comments will be included and addressed in the Scoping and Environmental Impact Assessment Reports for this project. These reports will be forwarded to you for comment once completed.  We thank you for your inputs.</li> <li>2. Sewage is pumped into the BHP Billiton Metalloys system where it is reworked at</li> </ol>



Date received	Received from	Comment/Concern received	Responses sent
			<p>their treatment plant at the Amcor dam. This practice will continue. The proposed Wastewater Treatment Works will treat the first flush of affected stormwater generated when rainwater infiltrates through the unroofed steel shaving stockpiles on site. The affected stormwater will be treated to a quality that complies with the Department of Water Affairs' General Limit standard for discharge into a water resource. The treated wastewater will be re-used in the M8 and/or M9 production process. Reject and backwash water from the WWTW will be sent to the filter press at M9 for further processing. The WWTW will not treat any sewage on site.</p>
14-03-2013	Rand Water – Mpati Mpshe	All traversing along and over rand water pipelines. Possible leaks from other services that could cause ground stability to change. Please keep us informed regarding the above aspects.	<p>1. Your email dated 14 March 2013 refers: We hereby confirm receipt of your email, Interested and Affected Party registration form and comments.</p> <p>We further confirm that you have been registered as an Interested and Affected</p>



Date received	Received from	Comment/Concern received	Responses sent
			<p>Party for the above mentioned project. You will henceforth receive all correspondence regarding public participation opportunities as the process unfolds. Your comments will be included and addressed in the Scoping and Environmental Impact Assessment Reports for this project. These reports will be forwarded to you for comment once completed.</p> <p>We thank you for your inputs.</p> <p>2. DMS Powders takes note of your concerns. The locations of all water pipelines on the site have been documented and due care will be taken during any construction activities in the vicinity of the water pipelines. Furthermore, you will be informed of any activities that may negatively impact on the water pipelines.</p>
05-04-2013	Midvaal Local Municipality -	Midvaal Local Municipality Engineering does not have objections to the proposed facilities per se. We however would like further clarity	1. We hereby confirm receipt of the Midvaal Local Municipalities' comments on the



Date received	Received from	Comment/Concern received	Responses sent
	Gundo Maswime	once the design in done so that we are able to understand the treatment technology, level of treatment and what will be done with the final effluent.	<p>following project: DMS Powders - Hazardous waste storage, Ferrosilicon (FeSi) powder production and the construction of a Wastewater Treatment Works (Reference number: 12/9/11/L1128/3).</p> <p>Your comments will be included and addressed in the Scoping and Environmental Impact Assessment Reports for this project.</p> <p>2. The proposed Wastewater Treatment Works will treat the first flush of affected stormwater generated when rainwater infiltrates through the unroofed steel shaving stockpiles on site. The affected stormwater will be treated to a quality that complies with the Department of Water Affairs' General Limit standard for discharge into a water resource. The treated wastewater will be re-used in the M8 and/or M9 production process. The WWTW will be a filtration system</p>



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Date received	Received from	Comment/Concern received	Responses sent
			consisting of a number of filtration discs and membranes to remove suspended solids up to a particle size of 0.02 micron as well as all dissolved impurities. Reject and backwash water from the WWTW will be sent to the filter press at M9 for further processing.



#### **4.6.14 Conclusions of the Public Participation Exercise**

In conclusion, the Public Participation exercise has provided adequate information to enable an understanding of what the proposed project would entail and also to address the concerns and comments of this Environmental Assessment.



## 5. NEED AND DESIRABILITY

### 5.1 Developer

The production of ferrosilicon powder at DMS Powders requires a Waste Management License as an input to the production process, namely the steel shavings, is considered to be a hazardous waste. The use of the steel shavings in the production of ferrosilicon powder therefore constitutes the re-use or recycling and recovery of hazardous waste in excess of 1 ton per day.

The licensing of the ferrosilicon (FeSi) production process in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), will decrease the liabilities faced by the company in terms of non-compliance to environmental legislation. This is important for the long term operation of the facility. DMS Powders is the largest global supplier of both atomised and milled FeSi and the FeSi powder is used extensively in the mining sector for the gravity separation of minerals, metals and aggregates. The importance of DMS' product in the mining sector is also ever increasing as ore bodies are becoming more exploited and only less-economically viable ore bodies, requiring sophisticated separation techniques, are left for future exploitation.

### 5.2 Local Community

Continued operation of the DMS Powders facility, in compliance with the Waste Act (2008), will ensure that people from the local community that are currently employed at DMS retain their jobs. This income sustains the employee's families and has a positive impact on the local community due to the influx of income.





## 6. IDENTIFIED ALTERNATIVES

### 6.1 No-Go Option

The potential impact of the preferred project option on environmental and socio-economic attributes – identified during the assessment phase – was evaluated against the potential impact of the no-go option on the same attributes. The summary of this assessment is provided in Table 16 below.

Table 16: Development vs. No-Go Option

Attribute	Development Option	No-go Option 2
<b>Physical environment</b>		
Air Pollution	0	0
Noise Pollution	0	0
Water Quality	0	0
Water Quantity	0	0
Waste Management	1	-1
Visual Aesthetics	0	0
<b>Biophysical environment</b>		
Fauna and Flora	0	0
Sensitive Environments	0	0
<b>Social environment</b>		
Traffic	0	0
Impact on property values	1	-1
Safety and security	0	0
Local and regional economy	1	0
Infrastructure development	0	0
Legal liability	1	-1
<b>Total</b>	<b>4</b>	<b>-3</b>

The no-go alternative is the option wherein the facility is not licensed in terms of the Waste Act, 2008, for the production of ferrosilicon powder. This has a negative impact on the environment as the facility will be operated without a Waste Management License and therefore without being required to comply with the conditions of a Waste Management License and Environmental Management Programme. The valuation of the company would be less should the company not be licensed and the company will also face high legal liabilities.

The development option, namely licensing the production of ferrosilicon powder, will have a positive impact on the environment due to the following reasons:

1. The facility will be operated subject to the conditions of a Waste Management License and Environmental Management Programme;



2. Licensing the facility in terms of the Waste Act will increase its property value and company valuation; and
3. The long term operation of the facility will be more certain due to legal compliance. This will ensure that DMS can continue to provide jobs to their existing employees, which in turn has a positive impact on the local and regional economy. This is also applicable to all the suppliers of DMS for their entire supply chain.

## 6.2 Alternatives to Site Selection

Firstly, it must be stated that the proposed development aims at utilising the applied property to its full economic potential, taking the natural as well as socio-economic environment into consideration.

The property on which the project will take place belongs to BHP Billiton Metalloys Samancor. DMS Powders have been leasing the property from Metalloys for the past 10 years. Relocating is not foreseen in the near future and therefore no site alternatives could be considered.

## 6.3 Construction Alternatives:

### 6.3.1 Alternative Design

As this application is for the licensing of an existing, operational process (the production of ferrosilicon powder) and the process was designed many years ago, no design alternatives could be considered.

### 6.3.2 Activity Alternatives

As the activity is the production of ferrosilicon powder and as DMS Powders does not plan to change the focus of their business or the products that they produce, no activity alternatives could be considered.

### 6.3.3 Location Alternatives

As this application is for the licensing of an existing facility that was established in 1949, no location alternatives could be considered.

### 6.3.4 Process Alternatives

The same rationale was used as described under section 6.3.1 and no alternatives could be considered.



## 7. ENVIRONMENTAL IMPACT ASSESSMENT

### 7.1 Introduction and approach followed

The DMS Powders operation can have a variety of impacts. These can also cover different spatial and temporal scales. The nature of each impact can also vary widely depending on the physical environment and the perceptions and values of the affected parties. In general, the environmental impacts associated with the development will tend to decrease with increasing distance from the activity. The most noticeable impacts are therefore present on the site of operation or on adjacent properties. An assessment of the potential impacts on the social and natural environment should be conducted in a methodical manner.

Assessment and evaluation of environmental impacts is often complicated by the subjective nature of the impacts. Ideally, the severity or significance of a particular impact should be expressed in quantitative terms. There must also be some expression as to whether a particular impact is desirable or not. As the desirability of an impact will depend largely on the attitude and experience of the assessment practitioner, subjectivity is unavoidable. To address these problems, a standard set of definitions were used for the entire impact assessment process.

It is believed that the approach followed will adequately fulfill the environmental authorities' requirements, the requirements of the EIA Regulations (2010), the requirements of the Waste Act (2008) and the objectives of the environmental best practice, so as to ensure transparency and to enable an informed decision to be made regarding the project.

### 7.2 Methods used to identify impacts

Impact assessments should be conducted based on a methodology that includes the following:

- Clear processes for impact identification, predication and evaluation;
- Specification of the impact identification techniques;
- Criteria to evaluate the significance of impacts;
- Design of mitigation measures to lessen impacts;
- Definition of the different types of impacts (indirect, direct or cumulative); and
- Specification of uncertainties.

In broad terms, the impact assessment for this project included the following:

- All potential impacts of the activity were identified and assessed;
- The nature, extent, magnitude and duration of all potentially significant impacts were predicted;
- A range of mitigation measures that could diminish the impacts were identified; and



- The significance of residual impacts that remain, after the proposed mitigation measures are implemented, was evaluated.

The different phases of the project were considered whilst identifying impacts. A detailed understanding of the activity was obtained to ensure that all the potential impacts could be identified. The following process was followed to identify and assess the potential impacts of the activity:

- The current environmental conditions were determined in detail. This acted as a baseline against which impacts could be identified and measured;
- The changes that will occur in future, should the proposed activity not occur, were identified;
- A detailed understanding of the activity was obtained in order to fully understand its consequences; and
- The significant impacts that will occur as a result of the proposed activity were identified (should the activity be authorised).

After all impacts were identified, the nature of each impact could be predicted. The impact prediction took into account physical, biological, socio-economic and cultural information and the likely parameters and characteristics of the impacts were then estimated. The aim of the impact prediction was to provide a basis from which the significance of each impact could be determined and appropriate mitigation measures could be developed. The impact prediction took into account the following parameters (summarised in the table below):

- The extent of the impact. This refers to the physical or geographical size that is affected by the impact and is divided into the following categories:
  - Onsite: Within the specific site boundary;
  - Local: Within the municipal boundary; and
  - Regional: Outside of the municipal boundary.
- The duration of the impact. This refers to the time span associated with the impact and is divided into the following categories:
  - Short term: An impact lasting for one year or less;
  - Medium term: An impact lasting for one to five years; and
  - Long term: An impact lasting for more than five years.
- The intensity and reversibility of the impact. This refers to the severity of the impact on the receiving environment and is divided into the following categories:
  - Low: Natural and/or cultural processes continue in a modified way and the impact is reversible;
  - Medium: Natural and/or cultural processes stop and the impact is partially reversible; and
  - High: Natural and/or cultural processes are disturbed to an irreversible state.

A weighting value is assigned to each parameter category, with the value increasing as the impact becomes higher. For example, an impact that is of short duration will have a lower weighting value than one that is of longer duration.



To determine the significance of an impact, the weighting values for its extent, duration and intensity are added together (Extent + Duration + Intensity = High / Medium / Low Impact). Multiplication of the significance of the impact by the probability of the impact occurring produces a final conclusion of the overall risk that an impact poses to the surrounding environment (the “environmental risk”). To determine the probability or likelihood of an impact occurring, the following categories are used:

- Unlikely: There is a 0% - 45% chance of the potential impact occurring;
- Possible: There is a 46% - 75% chance of the potential impact occurring; and
- Likely: There is a greater than 75% chance of the potential impact occurring.

The environmental risk of an impact is plotted in a matrix, shown in Table 18. Assigning a colour to the environmental risk provides a clear and immediate visual representation of the magnitude of the risk of an impact on the environment.

Table 17: Environmental impact assessment parameters

Parameters	Description
Extent	Refers to the physical or geographical size that is affected by the impact. It can be categorised into the following ranges: <ul style="list-style-type: none"> <li>• Onsite – Within specific site boundary (weight value – 1)</li> <li>• Local – Within municipal boundary (weight value – 2)</li> <li>• Regional – Outside municipal boundary (weight value – 3)</li> </ul>
Duration	Time span associated with impact: <ul style="list-style-type: none"> <li>• Short term – 1 Year or less (weight value – 1)</li> <li>• Medium term – 1-5 Years (weight value –2)</li> <li>• Long term – Longer than 5 Years (weight value – 3)</li> </ul>
Intensity and reversibility	The severity of an impact on the receiving environment: <ul style="list-style-type: none"> <li>• Low – Natural and/or cultural processes continue in a modified way and is reversible (weight value – 1)</li> <li>• Medium – Natural and/or cultural processes stop and is partially reversible (weight value – 2)</li> <li>• High – Natural and/or cultural processes disturbed to an irreversible state (weight value – 3)</li> </ul>
Significance of Impact/Consequence	Adding the extent, duration and intensity together provides the significance of the impact (High, Medium or Low).  <b>Extent + Duration + Intensity = High/Medium/Low Impact</b>
Probability	The likelihood of an impact occurring: <ul style="list-style-type: none"> <li>• Unlikely – 0% - 45% chance of the potential impact occurring (weight value – 1)</li> <li>• Possible – 46% - 75% chance of the potential impact occurring (weight value – 2)</li> <li>• Likely - &gt;75% chance of the potential impact occurring (weight value – 3)</li> </ul>
Environmental Risk - Refer to Table 18 below	Multiplication of the significance of the impact by the probability of the impact occurring produces a final conclusion of the overall risk that an impact poses to the surrounding environment.  <b>High/Medium/Low Impact X Probability = High/Medium/Low Environmental Risk</b>



Table 18: Environmental Risk Matrix

		Significance of Impact		
		Low Impact (3 → 5)	Medium Impact (6 → 8)	High Impact (9)
Probability	Definite / Very Likely 3	9 - 15 L - M	18 - 24 M - H	27 H
	Possible 2	6 - 10 L - M	12 - 16 M	18 M - H
	Unlikely 1	3 - 5 L	6 - 8 L	9 L
ENVIRONMENTAL RISK		Guidelines for Control Strategies		
(H) - High		Proactively reduce risk level, short term response.		
(M- H) Medium to High		Proactively reduce risk level, short term response.		
(M) – Medium		Management strategies to reduce risk level, short to medium term response.		
(L – M) Low to Medium		Management strategies to reduce risk level, short to medium term response, operational control and housekeeping.		
(L) - Low		Operational control and housekeeping.		

### 7.3 Processes undertaken to ensure that impacts are mitigated

Mitigation measures were identified to ensure that impacts from the activity are reduced as far as possible. The following mitigation measure objectives were kept in mind while the mitigation measures were identified:

- To find more environmentally sound ways of undertaking specific activities;
- To enhance any environmental and social benefits of a activity;
- To avoid, minimise or remedy negative environmental impacts; and
- To ensure that any residual negative environmental impacts are environmentally acceptable.

Identifying appropriate mitigation measures were conducted in a hierarchal manner:

1. Preventative measures were identified to avoid, where possible, negative impacts that may arise as a result of the activity;
2. Measures were identified to minimise and/or reduce the negative impacts to “as low as practicable” levels; and
3. Measures were identified to compensate or remedy residual negative impacts that are unavoidable and cannot be minimised or reduced any further (Department of Environmental Affairs, 2006).



## 7.4 Description of Environmental Impacts

The aim of this section of this EIA report is to provide information regarding the potential environmental impacts associated with the activity. In order to provide background information and a framework for the environmental risk assessment, a description of the different phases of the project is provided below.

### Construction Phase

As this process is for the licensing of an existing, operational facility, no construction activities will occur.

### Operational Phase

- Harm to the environment in general (this can include pollution of soil and water resources, as well as harm to employees and wasteful practices in terms of resource use and waste management);
- Surface and groundwater pollution as affected stormwater run-off, generated as rain infiltrates through the steel shaving stockpiles, flows into the environment. The pollution of surface water can have significant impacts on the sensitive ecological systems usually associated with watercourses;
- Surface and groundwater pollution due to incorrect management of general and hazardous waste generated at the site;
- Soil, surface water and groundwater pollution due to poor management and accidental spills of hazardous chemical substances, including fuel, greases and oils used onsite;
- Surface and ground water pollution due to the release of process water from the M8 and M9 processes into trenches that lead to the BHP Billiton Pollution Control Dam;
- Soil, surface water and groundwater pollution due to incorrect handling and storage of coal;
- Compromised storage capacity of the BHP Billiton Pollution Control Dam due to treated stormwater overflowing from DMS Powders' water reservoir and entering the Pollution Control Dam;
- Wastage or depletion of valuable resources (water from the local municipality, via BHP Billiton Metalloys, and electricity from the municipality) due to inefficient or redundant usage;
- Pollution of the Atmosphere and degradation of ambient air quality; and
- Nuisance to adjacent land owners or tenants as well as a negative impact on workers that are exposed to high dB levels of noise as part of their work.

### Decommissioning Phase

Closure and decommissioning of the facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the National Department of Environmental Affairs prior to decommissioning.



## 7.5 Environmental Impact Assessment

All activities related to the project that could have some impact on the environment were identified. These impacts can be of environmental, socio-economic or cultural nature. Impacts are often not only confined within the direct scope of the activity and can accumulate as a network of indirect impacts on the surrounding area.

Different impacts are associated with the different phases of the activity. The suitability and feasibility of all proposed mitigation measures are included in the assessment of significant impacts. This was achieved through comparison of the significance of the impact before and after the proposed mitigation measure is implemented.





7.5.1 Impacts associated with the production of ferrosilicon powder (GN 921 of 29 November 2013, Category B, No. 2 and 3)

Table 19: Environmental impact assessment: Environment in general

Activity:											
<ul style="list-style-type: none"> <li>Operational activities as part of the Ferrosilicon powder production process.</li> </ul>											
Aspect:											
<ul style="list-style-type: none"> <li>Lack of knowledge amongst workers and contractors in terms of how their actions may impact on the environment.</li> <li>Equipment failure.</li> </ul>											
Applicable Alternatives: Proposed activity (development option)											
Nature and significance of environmental impact											
Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Significance	Environmental Risk					Probability	Significance	Environmental Risk	
<b>Construction Phase</b>											
As this Environmental Impact Assessment process is for the licensing of an existing, operational facility, no construction activities will occur and there are therefore no construction phase impacts.	N/A										
<b>Operational Phase</b>											
Harm to the environment in general (this can include pollution of soil and water resources, as well as harm to employees and wasteful practices in terms of resource use and waste management).	3	6	18 M-H	To prevent harm to the environment by educating workers and contractors.	<ul style="list-style-type: none"> <li>All employees are required to attend onsite Environmental Awareness/Training prior to commencing work on site.</li> <li>Follow-up Environmental Awareness/Training may be required from time to time as new employees commence work or for specific activities that may potentially impact the environment.</li> <li>The facility manager is to maintain accurate records of any training undertaken.</li> <li>Training is to cover all aspects of the EMP and procedures to be followed, as well as the requirements of DMS Powder's internal Environmental Management Plan.</li> </ul>	Life of operation	Facility Manager	1	4	4 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>NEMWA, 2008</li> <li>OHSA, 1993</li> </ul>
<p>Molten metal is inherently dangerous. When molten metal comes into contact with water or any liquid-bearing-material it instantaneously turns water into steam, expanding 1 600 times its original volume and potentially producing explosions that endanger workers, the surrounding infrastructure and the environment.</p> <p>The furnace coils requires continual cooling to increase electrical efficiency and to prevent them from melting. If an electrical or mechanical failure damages the cooling system, a dangerous build-up of heat and resulting explosion may result.</p>	2	8	16 M	To prevent emergencies, such as failure of equipment or control technologies and to ensure optimum operation of the M8 and M9 furnaces.	<ul style="list-style-type: none"> <li>Train employees on the environmental risk of the M8 and M9 furnaces and the manner in which their tasks must be performed.</li> <li>A sufficient number of employees must receive training to cover for leave periods, absences due to illness and public holidays.</li> <li>The facility manager is to maintain accurate records of any training undertaken.</li> <li>Maintenance of the backup cooling system, or its installation if not already in place.</li> <li>Maintenance of the dry spill pits in front of the induction furnaces to contain any molten metal spills, or their installation if not already in place.</li> <li>Maintenance of the ground leak detection system to provide protection against electrical shock and warning of metal to coil penetration, or its installation if not already in place.</li> </ul>	Life of operation	Facility Manager	1	5	5 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>OHSA, 1993</li> <li>NEM:AQA, 2004</li> </ul>
<b>Decommissioning Phase</b>											
Closure and decommissioning of the facility is not anticipated for the foreseeable future. Should the facility close, a detailed	N/A										

closure and rehabilitation plan will be submitted to the National Department of Environmental Affairs prior to decommissioning.

Table 20: Environmental impact assessment: Soil, Surface water and Groundwater

Nature and significance of environmental impact											
Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Significance	Environmental Risk					Probability	Significance	Environmental Risk	
<b>Activity:</b>											
<ul style="list-style-type: none"> <li>The storage of steel shavings (hazardous waste) at the raw materials stockpile area.</li> <li>The generation of general and hazardous waste as part of the Ferrosilicon powder production process.</li> <li>Storage and handling of hazardous chemical substances including fuel, greases and oils.</li> <li>Vehicle and equipment maintenance and fueling.</li> <li>The production of Ferrosilicon powders.</li> <li>The storage of coal.</li> </ul>											
<b>Aspect:</b>											
<ul style="list-style-type: none"> <li>Unroofed storage of the steel shavings (hazardous waste) at the raw materials stockpile area.</li> <li>Incorrect management and storage of general and hazardous waste prior to its removal off site.</li> <li>Poor management and spills of hazardous chemical substances including fuel, greases and oils.</li> <li>Leaking and/or spilling of fuels, greases and oils.</li> <li>Incorrect management of wastewater generated as part of the Ferrosilicon powder production process.</li> <li>Inadequate storage and management of coal.</li> </ul>											
<b>Applicable Alternative:</b> Proposed activity (development option)											
<b>Construction Phase</b>											
As this Environmental Impact Assessment process is for the licensing of an existing, operational facility, no construction activities will occur and there are therefore no construction phase impacts.	N/A										
<b>Operational Phase</b>											
Surface and groundwater pollution as affected stormwater run-off, generated as rain water infiltrates through the steel shaving stockpiles, flows into the environment. The pollution of surface water can have significant impacts on the sensitive ecological systems usually associated with watercourses.	3	6	18 M-H	To ensure that hazardous waste (the steel shavings) is stored in a responsible manner and that affected stormwater run-off is contained and managed correctly to avoid pollution of water resources, as far as possible.	<ul style="list-style-type: none"> <li>Ensure that the raw materials, including steel shavings, are kept on concrete areas to prevent seepage.</li> <li>Implement the storm water management plan developed for DMS Powders (refer to Appendix D) to prevent affected stormwater run-off from the raw material stockpiles from entering the clean water system.</li> <li>Operate the affected stormwater Wastewater Treatment Works in a responsible manner and conduct regular maintenance of the WWTW, sump and pumps as stipulated by the plant designer. Maintenance of the sump and pumps is important to ensure capacity and availability of the system.</li> <li>Brine water will be returned to the M8 and M9 processes and will not be contained or disposed of into the BHP Billiton Pollution Control Dam.</li> <li>Should heavy rainfall events occur (very rare) a first flush principle should be followed to treat the first 200mm of affected stormwater run-off. The remaining</li> </ul>	Life of operation	Facility Manager	1	5	5 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>NEMWA, 1998</li> <li>NWA, 1998</li> </ul>



					<p>water should be allowed to spill over and drain into the BHP Billiton Pollution Control Dam.</p> <ul style="list-style-type: none"> <li>• Undertake regular Geohydrological Studies to determine the impact of the raw materials, including steel shavings, on groundwater quality.</li> <li>• Implement the groundwater monitoring programme as detailed in DMS's Integrated Water and Waste Management Plan (IWWMP).</li> <li>• Regular review of the monitoring programme by a competent person to identify areas of improvement and additional monitoring requirements.</li> <li>• New hazardous waste storage areas must be registered with the competent authority within ninety (90) days prior to construction taking place.</li> <li>• Waste storage facilities must have correct access control and signage as stipulated in GNR. 926 of 29 November 2013.</li> <li>• Waste storage facilities must be operated as stipulated in GNR. 926 of 29 November 2013.</li> <li>• All waste storage containers must comply with the conditions as stipulated in GNR. 926 of 29 November 2013.</li> <li>• Training must be provided continuously to employees working with waste. The training programme must include the provisions stipulated in GNR. 926 of 29 November 2013.</li> <li>• An Emergency Preparedness Plan must be compiled in accordance with GNR. 926 of 29 November 2013.</li> <li>• Monitoring, auditing, reporting and record keeping must be conducted in accordance with GNR. 926 of 29 November 2013.</li> <li>• All waste storage containers must be labelled, as stipulated in GNR. 634 of 23 August 2013.</li> <li>• All waste transporters must complete waste manifest documents for each load of hazardous waste transported to the site, as stipulated in GNR. 634 of 23 August 2013 (specifically Annexure 2).</li> <li>• Waste manifest documentation must be retained for a period of at least five (5) years.</li> </ul>						
<p>Surface and groundwater pollution due to incorrect management of general and hazardous waste generated at the site.</p>	<p>2</p>	<p>6</p>	<p>12 L-M</p>	<p>To ensure correct management of all waste generated on site.</p>	<ul style="list-style-type: none"> <li>• Slag should be re-used as far as possible, or supplied to a licensed third party for re-use or recycling.</li> <li>• Waste must be collected regularly to prevent its accumulation on site.</li> <li>• New hazardous waste storage areas must be registered with the competent authority within ninety (90) days prior to construction taking place.</li> <li>• The location of hazardous waste storage areas must be in accordance with GNR. 926 of 29 November 2013 (National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008): National Norms and Standards for the storage of waste).</li> <li>• The design of the hazardous waste storage facility must be conducted in accordance with GNR. 926 of 29 November 2013.</li> <li>• Waste storage facilities must have correct access control and signage as stipulated in GNR. 926 of 29 November 2013.</li> <li>• Waste storage facilities must be operated as stipulated in GNR. 926 of 29 November 2013.</li> <li>• All waste storage containers must comply with the conditions as stipulated in GNR. 926 of 29 November 2013.</li> </ul>	<p>Life of operation</p>	<p>Facility Manager</p>	<p>1</p>	<p>5</p>	<p>5 L</p>	<ul style="list-style-type: none"> <li>• NEMA, 1998</li> <li>• NEMWA, 1998</li> </ul>



				<ul style="list-style-type: none"> <li>• Training must be provided continuously to employees working with waste. The training programme must include the provisions stipulated in GNR. 926 of 29 November 2013.</li> <li>• An Emergency Preparedness Plan must be compiled in accordance with GNR. 926 of 29 November 2013.</li> <li>• Monitoring, auditing, reporting and record keeping must be conducted in accordance with GNR. 926 of 29 November 2013.</li> <li>• Take note that hazardous waste includes ash, empty hazardous chemical substance containers, soil and material (e.g. cloths) contaminated by hazardous chemical substances, etc.</li> <li>• Implement a waste management plan/procedure.</li> <li>• The waste management plan/procedure should consider the type of waste, description, source, storage, disposal method, disposal facility and responsible person.</li> <li>• The implementation of the waste management plan/procedure should ensure:             <ul style="list-style-type: none"> <li>▪ Installation of sufficient waste bins, skips or bulk containers. The design of the bins, skips or bulk containers must ensure containment to prevent seepage, must be covered to prevent water ingress and must be placed on impermeable surfaces within bunded areas.</li> <li>▪ All containers (bins, skips or bulk containers) shall be kept in a clean and hygienic manner.</li> <li>▪ Containers (bins, skips or bulk containers) utilised for the disposal of general and hazardous waste must be demarcated accordingly.</li> <li>▪ Waste material may only be temporarily stored at areas demarcated for such storage.</li> <li>▪ General waste shall be stored in a manner that prevents the harbouring of pests.</li> <li>▪ General and hazardous waste should always be stored and disposed of separately.</li> <li>▪ General and hazardous waste should be disposed of in appropriately demarcated bins. Bins are then emptied into appropriately demarcated skips or bulk containers once a week or more often, if required.</li> <li>▪ Skips or bulk containers should be removed to a licensed landfill site on a regular basis. No build-up of waste is permitted onsite.</li> <li>▪ Safe disposal certificates should be requested from general and hazardous landfill sites with every waste disposal. Waste may only be disposed of at a licensed landfill in accordance with the Norms and Standards for Disposal to Landfill as stipulated in Section 7(1)(c) of the NEMWA, 2008.</li> <li>▪ Safe disposal certificates should be kept on file to illustrate compliance with the cradle to grave principle.</li> <li>▪ Hazardous waste may only be handled by a registered waste disposal company.</li> </ul> </li> <li>• All waste generated at the facility must be classified in terms of GNR. 634 of 23 August 2013 (National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008): Waste Classification and Management Regulations).</li> <li>• Safety data sheets must be obtained or prepared for all hazardous waste generated at the facility, as stipulated in GNR. 634 of 23 August 2013.</li> <li>• All waste storage containers must be labelled, as stipulated in GNR. 634 of 23 August 2013.</li> </ul>					
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					<ul style="list-style-type: none"> <li>Detailed records must be kept of all waste generated, as stipulated in GNR. 634 of 23 August 2013. This includes the classification of the waste, quantities of waste generated and re-used, recycled, recovered, treated or disposed of (in tons or m<sup>3</sup> per month), and by whom the waste was managed.</li> <li>Waste manifest documents must be compiled for all hazardous waste generated onsite, as stipulated in GNR. 634 of 23 August 2013 (specifically Annexure 2).</li> <li>All waste transporters must also complete waste manifest documents for each load of waste transported, as stipulated in GNR. 634 of 23 August 2013 (specifically Annexure 2).</li> <li>Waste manifest documentation must be retained for a period of at least five (5) years.</li> <li>No incineration of any kind of waste will be permitted onsite.</li> </ul>								
Soil, surface water and groundwater pollution due to poor management and accidental spills of hazardous chemical substances, including fuel, greases and oils used onsite.	3	6	18 M-H	To ensure correct management of hazardous chemical substances.	<ul style="list-style-type: none"> <li>Identify all chemical substances used onsite including fuel, greases, detergents etc.</li> <li>Obtain the material safety data sheet of each of these chemical substances.</li> <li>Ensure that the material safety data sheets have sufficient information to enable the user to take the necessary measures to protect his/her health and safety and that of the environment.</li> <li>Material Safety Data Sheets for all hazardous chemical substances must be readily available on site.</li> <li>Develop and implement a dangerous goods management plan based on the material safety data sheets of all identified chemical substances and the 1995 Hazardous Chemical Substances Regulations in terms of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).</li> <li>Keep a stock inventory register of all chemicals in the store.</li> <li>Powders must be stored above liquids.</li> <li>Proper storage of chemicals in a lockable, well ventilated building.</li> <li>Ensure adequate access control for the storage area.</li> <li>Storage areas for hazardous chemicals must comply with standard fire safety regulations.</li> <li>Safety signage including "No Smoking", "No Naked Lights" and "Danger", and product identification signs, are to be clearly displayed in areas housing chemicals.</li> <li>Appropriate equipment to deal with emergency spill incidents must be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks and drums or containers for contaminated water.</li> <li>Chemicals must be properly labelled and handled in a safety conscious manner.</li> <li>All personnel handling hazardous chemicals materials must be issued with the appropriate Personal Protective Equipment (PPE).</li> <li>Ensure that diesel or fuel tanks are in a bunded area with capacity to hold 110% of the total storage volume.</li> <li>The removal of only the daily-required amount of chemicals to be used from the shed.</li> <li>If refuelling on site or from drums, the ground must be protected and proper dispensing equipment must be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel.</li> </ul>	Life of operation	of	Facility Manager	1	5	5 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>NEMWA, 1998</li> <li>OHSA, 1993</li> </ul>	



				<ul style="list-style-type: none"> <li>Use of drip trays during filling of machinery or equipment. Drip trays should be emptied into secondary containers on a regular basis.</li> <li>Ensure that any spilled chemicals cannot exit the designated storage area by constructing a berm or bump at the exit or store chemicals in a spill tray.</li> <li>Immediately clean any spillage of fuels, lubricants and other petroleum based products.</li> <li>The contaminated material must be disposed of in accordance with the waste management procedure.</li> <li>No hazardous chemical may be discarded in the sewage or stormwater system.</li> <li>Train staff on the use of chemicals in accordance with the risks as described in the material safety data sheets.</li> <li>Soil contaminated with hazardous chemical substances shall be treated as hazardous waste and removed from site.</li> </ul>							
Hydrocarbon pollution of soil, surface water and groundwater due to the spilling of fuel, grease or oil or leaking equipment and vehicles.	3	6	18 M-H	To ensure the correct management of fuel, grease and oil.	<ul style="list-style-type: none"> <li>Inspection and maintenance of equipment, generators, diesel tank(s) and vehicles owned by DMS Powders shall take place on a regular basis.</li> <li>Security shall inspect vehicles on entering the facility to ensure vehicles are in sound condition. This will reduce the risk of oil and diesel spillages.</li> <li>Equipment, generators, diesel tank(s) and vehicles are to be repaired immediately upon developing leaks.</li> <li>Diesel storage tanks and bund walls must undergo a yearly integrity assessment.</li> <li>Generators must be stored on a concrete floor in a bunded area.</li> <li>Drip trays shall be supplied for all repair work undertaken on machinery on site.</li> <li>Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to contain incidental spills and pollutants.</li> <li>Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow.</li> <li>Appropriate equipment to deal with emergency spill incidents is to be readily available on site. This includes fire extinguishers, spill kits for hydrocarbon spills, drip trays for equipment and/or machinery leaks, drums or containers for contaminated water.</li> <li>Soil contaminated with hazardous substances, fuel or oil shall be treated as hazardous waste and removed from site.</li> <li>If refueling on site or from drums, the ground must be protected and proper dispensing equipment is to be used i.e. hand pumps and funnels. Drums may not be tipped to dispense fuel.</li> <li>All liquid fuels (petrol and diesel) are to be stored in tanks or containers with lids.</li> </ul>	Life operation	of	Facility Manager	1	6 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> </ul>
Surface and ground water pollution due to the release of process water from the M8 and M9 processes into trenches that lead to the BHP Billiton Pollution Control Dam.	3	7	21 M-H	To ensure containment and treatment of process water generated in the M8 and M9 production processes.	<ul style="list-style-type: none"> <li>Implement the provisions of DMS Powders' Stormwater Management Plan.</li> <li>Process water must be treated in the process-water treatment works for M8 and M9.</li> <li>Process water may not be released into the stormwater trenches and should be re-used in the M8 and M9 processes.</li> <li>Slag produced in the treatment process must be reworked in the ferrosilicon production process or sent offsite for recycling or re-use by a licensed contractor.</li> </ul>	Life operation	of	Facility Manager	1	5 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>NEMWA, 2008</li> <li>NWA, 1998</li> </ul>
Soil, surface water and groundwater pollution due to incorrect handling and storage of coal.	3	6	18 M-H	To ensure the proper handling and storage of coal.	<ul style="list-style-type: none"> <li>Store coal in bunkers as far as possible.</li> <li>If possible, construct a bump/berm at the bunker entrance to prevent rain water from entering the bunker and becoming contaminated.</li> </ul>	Life operation	of	Facility Manager	1	4 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> </ul>

				<ul style="list-style-type: none"> <li>If possible, construct a roof to prevent rain water from being contaminated by the coal.</li> <li>Prevent coal spillages during loading and remove any coal spillages from the soil and return to the coal bunker.</li> </ul>						
<b>Decommissioning Phase</b>										
Closure and decommissioning of the facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the National Department of Environmental Affairs prior to decommissioning.	N/A									

Table 21: Environmental impact assessment: Resources (electricity and water)

<b>Activity:</b>											
<ul style="list-style-type: none"> <li>Storage of treated, affected stormwater from the WWTW in a water reservoir.</li> <li>Operational activities as part of the Ferrosilicon powder production process.</li> </ul>											
<b>Aspect:</b>											
<ul style="list-style-type: none"> <li>Inadequate capacity of the water reservoir for the storage of treated, affected stormwater.</li> <li>Inefficient or redundant use of water and electricity.</li> </ul>											
<b>Applicable Alternatives:</b> Proposed activity (development option)											
<b>Nature and significance of environmental impact</b>											
Impact Description	Risk rating (before mitigation)			Environmental Objective	Management / Mitigation / Monitoring Measures	Timeframe	Responsibility	Risk rating (after mitigation)			Applicable legislation / other documents
	Probability	Significance	Environmental Risk					Probability	Significance	Environmental Risk	
<b>Construction Phase</b>											
As this Environmental Impact Assessment process is for the licensing of an existing, operational facility, no construction activities will occur and there are therefore no construction phase impacts.	N/A										
<b>Operational Phase</b>											
Compromised storage capacity of the BHP Billiton Pollution Control Dam due to treated stormwater overflowing from the water reservoir and entering the Pollution Control Dam.	2	6	12 L-M	To ensure sufficient capacity is available for water storage in the reservoir.	<ul style="list-style-type: none"> <li>Affected stormwater that will be treated in the proposed wastewater treatment works will be stored in a reservoir prior to being used in the ferrosilicon production process. The reservoir levels should always be kept as low as possible so that as much treated water can be stored. This will ensure that minimal treated water needs to be released into the stormwater trenches that feed into the BHP Billiton Pollution Control Dam.</li> <li>The pumps that form part of the affected stormwater treatment plant should be regularly maintained to ensure that water is pumped out of the reservoir to the plant at the required rate.</li> </ul>	Life of operation	Facility Manager	1	5	5 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>NWA, 1998</li> </ul>
Wastage or depletion of valuable resources (water from the local municipality, via BHP Billiton Metalloys, and electricity from the local municipality) due to inefficient or redundant usage.	2	6	12 L-M	To prevent the wastage or depletion of valuable resources (water and electricity).	<p><b>General</b></p> <ul style="list-style-type: none"> <li>Ensure that all employees have been informed on the importance of natural resources (proper environmental training and awareness).</li> <li>Regular site inspection by supervisors.</li> <li>Inspect operations regularly to determine areas of improvement with regards to resource consumption.</li> </ul>	Life of operation	Facility Manager	2	3	6 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> </ul>

				<ul style="list-style-type: none"> <li>Regular maintenance and inspection of equipment such as hose pipes, to prevent leaks.</li> <li>Monitoring of resource consumption.</li> <li>Identify areas where resource consumption can be minimised.</li> <li>Set targets to try minimise resource consumption.</li> <li>Identify technologies and practices that may reduce resource consumption.</li> <li>Implementation of technologies and practices that can reduce resource consumption.</li> </ul> <p><b>Water</b></p> <ul style="list-style-type: none"> <li>Regular inspection and maintenance of all JoJo tanks, reservoirs, toilets, water pipes and taps.</li> <li>Leaking JoJo tanks, reservoirs, taps, toilets and pipes are to be repaired immediately.</li> <li>Running water taps and pipes may not be left unattended.</li> <li>All pipe, hose and tap connections are to be fitted with correct and appropriate plumbing fittings.</li> <li>The site Water Balance, as contained in the IWWMP, will be improved and updated, as and when required.</li> </ul> <p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>Consider technologies in the furnaces that can reduce energy consumption.</li> <li>Consider installation of measures to increase energy efficiencies and limit energy consumption, such as surface insulation and heat recovery systems.</li> <li>Save electricity by turning off lights and computers when leaving the office.</li> <li>Halogen light bulbs convert approximately 80% of the energy used into heat rather than light. Replace spent light bulbs with energy saving CFLs (compact fluorescent lights) or newer and more efficient LEDs (light-emitting diodes).</li> </ul>					
<b>Decommissioning Phase</b>									
Closure and decommissioning of the facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the National Department of Environmental Affairs prior to decommissioning.		N/A							

Table 22: Environmental impact assessment: Atmosphere

<p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Operational activities associated with the Ferrosilicon powder production process.</li> <li>Storage of raw materials (stockpiles), vehicles travelling within the DMS site and the Ferrosilicon powder production process.</li> <li>Operational activities associated with the Ferrosilicon powder production process.</li> </ul>							
<p><b>Aspect:</b></p> <ul style="list-style-type: none"> <li>Ineffective abatement and/or mitigation measures to deal with atmospheric emissions.</li> <li>Generation of dust.</li> <li>Generation of noise.</li> </ul>							
<p><b>Applicable Alternatives:</b> Proposed activity (development option)</p>							
<b>Nature and significance of environmental impact</b>							
<b>Impact Description</b>	<b>Risk rating (before mitigation)</b>	<b>Environmental Objective</b>	<b>Management / Mitigation / Monitoring Measures</b>	<b>Timeframe</b>	<b>Responsibility</b>	<b>Risk rating (after mitigation)</b>	<b>Applicable legislation / other documents</b>





	Probability	Significance	Environmental Risk				Probability	Significance	Environmental Risk		
<b>Construction Phase</b>											
As this Environmental Impact Assessment process is for the licensing of an existing, operational facility, no construction activities will occur and there are therefore no construction phase impacts.	N/A										
<b>Operational Phase</b>											
Pollution of the atmosphere and degradation of ambient air quality. The site lies within the Vaal Triangle Airshed Priority Area (VTAPA).	2	9	18 M-H	To minimise the release of atmospheric emissions and therefore atmospheric pollution.	<ul style="list-style-type: none"> <li>DMS Powders must ensure compliance with the requirements and conditions of their APPA Registration Certificate in terms of the Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965) and their Atmospheric Emission License in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).</li> <li>Routine maintenance must be carried out at the plant to ensure optimal functioning and therefore minimal emission generation.</li> <li>Bag filters must be regularly replaced as stipulated by the manufacturer.</li> <li>A complaints register must be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how concern was addressed.</li> </ul>	Life of operation	Facility Manager	2	8	16 M	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>NEM:AQA, 2004</li> </ul>
Degradation of ambient air quality.	3	6	18 M-H	To minimise the impact of dust on the ambient air quality.	<ul style="list-style-type: none"> <li>Use indoor or covered stockpiles for the storage of raw materials as far as possible. Where not possible, use dust suppression, windbreaks and/or water spray systems to minimise dust generation.</li> <li>Reduce raw material handling steps as far as possible.</li> <li>Regularly clean conveyor belts to remove loose dust.</li> <li>A dustcart needs to be onsite to water down dusty road.</li> <li>Speed bumps or traffic speed signs need to be erected to reduce speeding onsite that could result in the generation of dust.</li> <li>Regular maintenance of vehicles to address wear of tires and breaks. Optimal engine combustion will allow for 'cleaner' exhaust emissions.</li> <li>If the soil is compacted, bare/open areas should be ripped, fertilised and re-vegetated as soon as possible using suitable grass species (indigenous seed mix).</li> <li>A complaints register must be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how concern was addressed.</li> </ul>	Life of operation	Facility Manager	1	5	5 L	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>NEM:AQA, 2004</li> </ul>
Nuisance to adjacent land owners or tenants as well as a negative impact on workers that are exposed to high dB levels of noise as part of their work.	3	7	21 M-H	To minimise the amount of noise generated at the DMS Powders plant.	<ul style="list-style-type: none"> <li>The site workers and contractors will adhere to the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) regarding hearing protection and noise control measures.</li> <li>Enclose and insulate process buildings as far as possible.</li> <li>Insulate ventilation pipes, enclose fans or use dampers to limit noise generation.</li> <li>Where possible, limit transportation and handling of raw materials, including scrap steel, during night time hours.</li> <li>Regular maintenance of vehicles, back-up generators and equipment.</li> <li>All equipment and machinery should be fitted with adequate silencers.</li> </ul>	Life of operation	Facility Manager	2	3	6 L-M	<ul style="list-style-type: none"> <li>NEMA, 1998</li> <li>OHSA, 1993</li> </ul>



				<ul style="list-style-type: none"> <li>No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site.</li> <li>A complaints register must be kept onsite. The register must record the following: Date when complaint was received, name of person who reported the complaint, details of the complaint and when and how concern was addressed.</li> </ul>						
<b>Decommissioning Phase</b>										
Closure and decommissioning of the facility is not anticipated for the foreseeable future. Should the facility close, a detailed closure and rehabilitation plan will be submitted to the National Department of Environmental Affairs prior to decommissioning.	N/A									



Refer to Part 8 below for a summary on the key findings related to the DMS Powders ferrosilicon production facility and its associated infrastructure.

### 7.3.3 Cumulative Impacts

Cumulative impacts refer to the situation where an activity may in itself not have a significant impact, but may become significant when added to the existing and potential impacts from similar or different activities in the area.

The following potential cumulative impacts have been identified:

Table 23: Cumulative impacts

Activity	Impact	Cumulative Impact
Operational activities and the generation/release of atmospheric emissions	Pollution of the atmosphere	Atmospheric emissions generated by DMS Powders and released into the atmosphere will add to atmospheric emissions released by all other sources within the municipal area and beyond. The combined release of atmospheric emissions within the Sedibeng District Municipality is governed in terms of the Vaal Triangle Airshed Priority Area's Air Quality Management Plan. This impact is also dealt with in detail in the Atmospheric Emission License Application for the DMS Powders operation (conversion from their existing APPA Registration Certificate to an Atmospheric Emission License).
Operational activities and the generation of affected stormwater	Strain on control and containment structures and potential subsequent soil, surface water and ground water pollution	The infiltration of rainwater through stockpiles of raw materials, such as steel shavings (hazardous waste) generates affected stormwater. The first flush of affected stormwater will be treated in a proposed wastewater treatment works. In extreme rainfall events, it will not be possible to treat all affected stormwater due to capacity constraints at the wastewater treatment works. The excess affected stormwater will then by-pass the treatment system and run-off into the BHP Billiton pollution control dam. The cumulative impact of DMS' affected stormwater runoff is the addition of this affected stormwater to the BHP Billiton pollution control dam and additional strain on the storage and containment capacity of the pollution control dam. Should the storage and containment capacity be exceeded, the environment may



Activity	Impact	Cumulative Impact
		be polluted as a result of the release of polluted water into the environment.

## 8. ENVIRONMENTAL IMPACT STATEMENT

### 8.1 Summary of key findings

The application for a Waste Management License in terms of the National Environmental Management: Waste Act, 2008, has been initiated to allow the DMS Powders Meyerton facility to be licensed in terms of the required environmental legislation.

Licensing the facility will ensure that the Meyerton facility can operate for the long term without facing liabilities in terms of non-compliance to environmental legislation.

As the project entails the licensing of an existing facility and existing production processes, no alternatives could be considered for this project. The following main negative impacts from the operation of the facility could be identified:

- Harm to the environment in general (this can include pollution of soil and water resources, as well as harm to employees and wasteful practices in terms of resource use and waste management);
- Surface and groundwater pollution as affected stormwater run-off, generated as rain infiltrates through the steel shaving stockpiles, flows into the environment. The pollution of surface water can have significant impacts on the sensitive ecological systems usually associated with watercourses;
- Surface and groundwater pollution due to incorrect management of general and hazardous waste generated at the site;
- Soil, surface water and groundwater pollution due to poor management and accidental spills of hazardous chemical substances, including fuel, greases and oils used onsite;
- Surface and ground water pollution due to the release of process water from the M8 and M9 processes into trenches that lead to the BHP Billiton Pollution Control Dam;
- Soil, surface water and groundwater pollution due to incorrect handling and storage of coal;
- Compromised storage capacity of the BHP Billiton Pollution Control Dam due to treated stormwater overflowing from DMS Powders' water reservoir and entering the Pollution Control Dam;
- Wastage or depletion of valuable resources (water from the local municipality, via BHP Billiton Metalloys, and electricity from the municipality) due to inefficient or redundant usage;
- Pollution of the Atmosphere and degradation of ambient air quality; and



- Nuisance to adjacent land owners or tenants as well as a negative impact on workers that are exposed to high dB levels of noise as part of their work.

## 8.2 Comparative assessment of positive and negative implications of the proposed activity and alternatives

Part 6 of this EIR contains a detailed investigation and assessment of the alternative options for the project. The positive and negative implications of each alternative are also described in the table below. A comparison is done to assess the positive and negative implications of the project as compared with the no-go alternative. This should provide a fundamental consideration of the feasibility of the project.

Table 24: Comparison of the proposed preferred activity and the no-go option

	<b>Proposed Activity (licensing in terms of the NEM: Waste Act, 2008)</b>	<b>No-go option (current situation)</b>
<b>Positive impacts</b>	<ul style="list-style-type: none"> <li>• Licensing the facility in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) will mean that the operation of the facility will need to comply with all the requirements and conditions as contained in the Environmental Management Programme and Waste Management License (should the Department decide to issue the license). This will ensure that the facility is operated in an environmentally responsible manner with a reduced impact on the environment.</li> <li>• The continued operation of the facility in a lawful manner will ensure that permanent employment opportunities, and subsequently people's livelihoods, will remain.</li> </ul>	<ul style="list-style-type: none"> <li>• No positive impacts could be identified.</li> </ul>
<b>Negative impacts</b>	<ul style="list-style-type: none"> <li>• Licensing the facility in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) will mean that the facility will need to comply with all the requirements as</li> </ul>	<ul style="list-style-type: none"> <li>• The continued operation of the DMS Powders facility without a Waste Management License. This would mean that the operation of the facility would not be governed by conditions</li> </ul>



	<b>Proposed Activity (licensing in terms of the NEM: Waste Act, 2008)</b>	<b>No-go option (current situation)</b>
	<p>contained in the Environmental Management Programme and Waste Management License (should the Department decide to issue the license). This may entail additional financial costs for DMS Powders to comply with requirements such as monitoring and reporting on environmental performance in terms of waste management.</p>	<p>and requirements as stipulated by the National Department of Environmental Affairs in a Waste Management License. This may result in pollution of the environment due to environmentally irresponsible practises at the facility.</p> <ul style="list-style-type: none"> <li>• Furthermore, such operation without a license would present a legal liability to DMS Powders in terms of non-compliance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). Should the facility be closed due to non-compliance with the NEM: WA, 2008, a shortage of FeSi Powder would result. Many users of the product could subsequently be negatively impacted by decreased production rates due to ineffective recovery of their mineral or metal products in the absence of FeSi powder.</li> </ul>

As can be seen in the table above, the No-Go option has greater negative impacts on the environment than the proposed activity. No positive environmental impacts could be identified for the No-Go option. The proposed activity will result in the continued operation of the facility in a lawful manner and will ensure that environmentally responsible practices are followed. Employment opportunities at the facility will also remain in place and the value of the company will likely increase.

## 9. CONCLUSION

Information has been provided to the National Department of Environmental Affairs and interested and affected parties during the Scoping- and EIA Phase. Comments and concerns were received and integrated into the environmental impact assessment report. This document serves as the final report to be considered by the competent authority.

This EIA process has been carried out in accordance with the NEMA, 1998, NEMWA, 2008, and the Regulations there under.



The identified impacts/environmental risks to the environment as a result of the activity, the production of ferrosilicon powder, are mostly **Medium-High**. The impacts can, however, be mitigated to **Low**, provided that the draft Environmental Management Programme containing all proposed mitigation measures is implemented. It is further important that the EMP must be viewed as a dynamic, working document that will be improved upon when required.

Positive impacts from the project include the lawful operation of the facility and environmentally responsible practices as the facility will need to comply with the conditions and requirements of the Waste Management License and Environmental Management Programme. This will mean that existing employment opportunities will remain and DMS will keep producing their product (FeSi Powder) for use in a number of sectors, such as the mining sector, in South Africa and the world.

Based on the outcomes of the Environmental Impact Assessment conducted as part of this Waste Management License application as well as the alternatives assessment, the following recommendations are made:

- 1. The project should be authorised and allowed to proceed.**
- 2. The mitigation measures proposed in this report and the draft Environmental Management Programme must be implemented during all phases of the project.**
- 3. Proposed mitigation measures should be incorporated as far as possible into the operational plan for the facility.**
- 4. Strict monitoring and enforcement of requirements of the EMP must be undertaken to ensure that contractors and operators adhere to these requirements.**

