

NON TECHNICAL SUMMARY

1.1

INTRODUCTION

An Environmental Impact Assessment (EIA) has been undertaken for the proposed acetylene gas production facility (the Project) at a site located in Daleside, south of Johannesburg in Gauteng, on behalf of Air Products South Africa (Pty) Ltd (hereafter referred to as Air Products). Air Products have appointed Environmental Resources Management Southern Africa Pty Ltd (ERM) as the independent environmental assessment practitioner (EAP) to undertake the EIA process for the Project, the main results of which are presented in this non-technical summary.

An EIA is a systematic process that predicts and evaluates the potential impacts a proposed project may have on aspects of the physical, biological, socio-economic and human environment as determined by specialist studies and analyses of the specific environment. Mitigation measures, as set out in the approved environmental management programme, are then developed and incorporated into the Project execution plan to eliminate, minimise or reduce adverse impacts and, where practicable, to enhance benefits.

The EIA process has been followed in accordance with the relevant South African environmental legislation, namely the National Environmental Management Act (Act No. 107 of 1998), as amended (NEMA) and associated EIA Regulations (Government Notice R. 543) of June 2010, as amended. The EIA process comprised of a number of key steps, these are described below.

- **Application Phase** - identify listed activities that are triggered by the Project and submit an application for Environmental Authorisation (EA) to the competent authority.
- **Scoping Phase** - identify interactions of project activities and environmental and social resources to determine which should be included in the scope of the impact assessment.
- **Specialist Studies** - undertake specialist studies as outlined in the Plan of Study (PoS).
- **Environmental Impact Reporting Phase** - the characteristics of the potential effects of project activities on bio-physical and social resources and features are evaluated and quantified to determine potential impact significance (or importance) taking into account the sensitivity of the particular resource or receptor. This phase also includes the identification of mitigation/management measures and the development of an Environmental Management Programme.
- **Competent Authority Decision** - the regulator's (Gauteng Department of Agriculture and Rural Development) decision on the Project will be

distributed to all project interested and affected parties and informed of the appeal process.

- **Public consultation activities** – public and stakeholder consultation has been undertaken throughout the EIA process including initial public notification of the application; key authorities and public meetings during the scoping phase and release of the draft and final scoping reports.

The Project is currently at the Environmental Impact Reporting (EIR) Phase.

1.2

PROJECT OVERVIEW

Air Products intends to decommission the acetylene plants at their Pinetown facility and at their Kempton Park facility. Over the years, lack of a managed town planning system at both locations has resulted in encroachment on the facilities' boundaries, which pose an off-site risk to adjacent neighbours. These facilities represent a higher risk now than they did when they were initially established. It is therefore planned to establish a new acetylene gas manufacturing facility with a location and site layout that aims to pose risk levels that comply with the United Kingdom's Health and Safety Executives "Broadly Acceptable" principle.

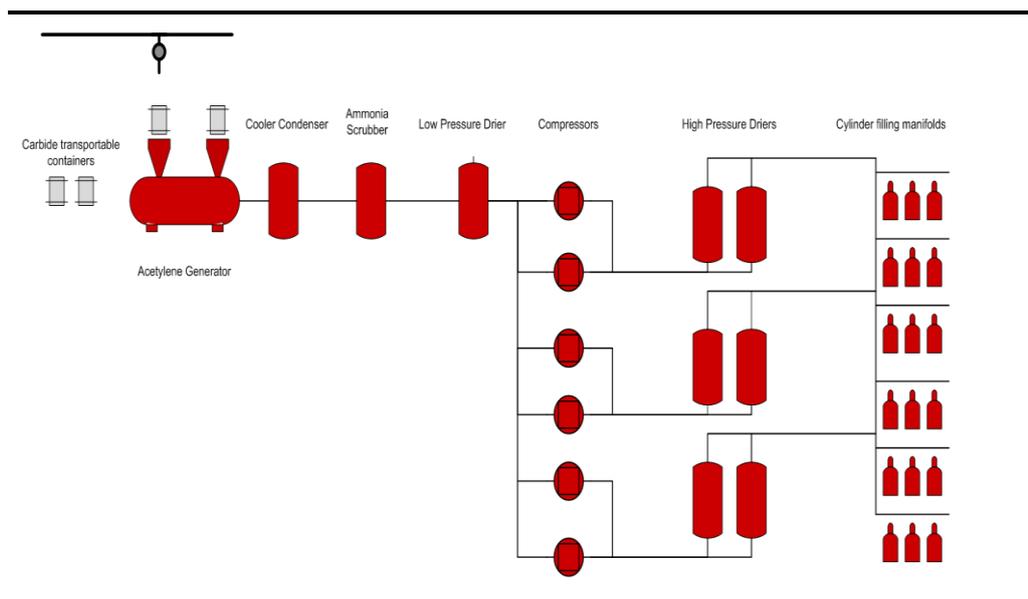
Acetylene gas (C_2H_2) is a chemical compound which is used amongst various industrial sectors as a fuel or chemical building block. The Project will produce acetylene gas from mixing calcium carbide (CaC_2) with water. The Project will be developed in a phased approach, with two defined phases:

- Phase 1: 1 generator vessel, 6 compressors and 2 filling halls with a total production capacity of 7200 m³/day;
- Phase 2: 1 additional generator vessel with an additional 2 filling halls and 6 compressors with a production capacity of 7200 m³/day

The Project will therefore produce a maximum of 14400 m³ of acetylene gas per day and will comprise the following components (also see *Figure 0.1*):

- turn bins;
- generator vessel;
- heat exchanger;
- ammonia scrubber;
- low pressure dryer;
- compressors;
- pressure swing adsorption system; and
- storage vessels for the nitrogen and acetone.

Figure 0.1 *Components of the Acetylene Production Process*



Source: Air Products South Africa (Pty) Ltd (February 2013)

The facility which is planned to manufacture, store and distribute acetylene gas will require associated infrastructure, these include:

- administration office (including change and ablution facilities);
- maintenance workshop;
- site access and a one-way ring road around the facility;
- electrical substation;
- waste management facilities;
- water catchment pits for collection and storage of surface water run-off;
- sludge tanks and pits for the calcium hydroxide (Ca(OH)₂) slurry, which is a by-product of the gas production process; and
- security facilities.

The facility will have a lifespan of between 40 to 50 years. A provisional schedule for Project activities is outlined in *Table 0.1*. The proposed facility is planned to be operational in Quarter 4 of 2015. Phase 2 of the Project is expected to commence in 2024 and be fully operational in 2026; however this would be subject to customer future demand for acetylene gas.

Table 0.1 *Provisional Project Schedule*

Project Activity	Duration	Start	Finish
Construction (Plant and Associated Infrastructure)	12 months	January 2015	December 2015
Plant Commissioning	40 days	October 2015	December 2015
Plant Optimisation	2 months	January 2015	March 2015
Plant Personnel Training	1 month	October 2015	November 2015
Phase 1 Completion	0 days	December 2015	December 2015
Phase 2 Commissioning	2 years	2024	2026

Source: Air Products South Africa (Pty) (May 2014)

Due consideration has been given to project alternatives during the EIA process. The various alternatives considered during this process, include:

- **Site location alternatives** - As part of the site selection process a number of potential sites were investigated, through a desk-top analysis. The preferred site (in Daleside) was selected based on a number of criteria, including an area of 3.5 ha or more, water and electricity demand requirements and access to major roads/highways.
- **Site layout alternatives** - The site layout, in particular the position of the water catchment pits, has undergone an amendment based on the topographical gradient of the Project site. The preferred site layout was chosen due to technical, financial and environmental considerations.
- **Technological alternative** - Two different types of high pressure (HP) dryers used during the production process to reduce the water content of the acetylene gas have been considered; namely the non-regenerative HP dryer and the regenerative HP dryer in a Pressure Swing Adsorption (PSA) system (preferred). The PSA is preferred due to its higher efficiency.
- **No-go alternative** - It is mandatory to consider the “no-go” alternative as part of the EIA process which would entail maintaining the status quo. This alternative would mean that the site would remain as is, covered by disturbed grassland vegetation and abandoned buildings. The no-go alternative was not preferred due to the lost socio-economic benefits.

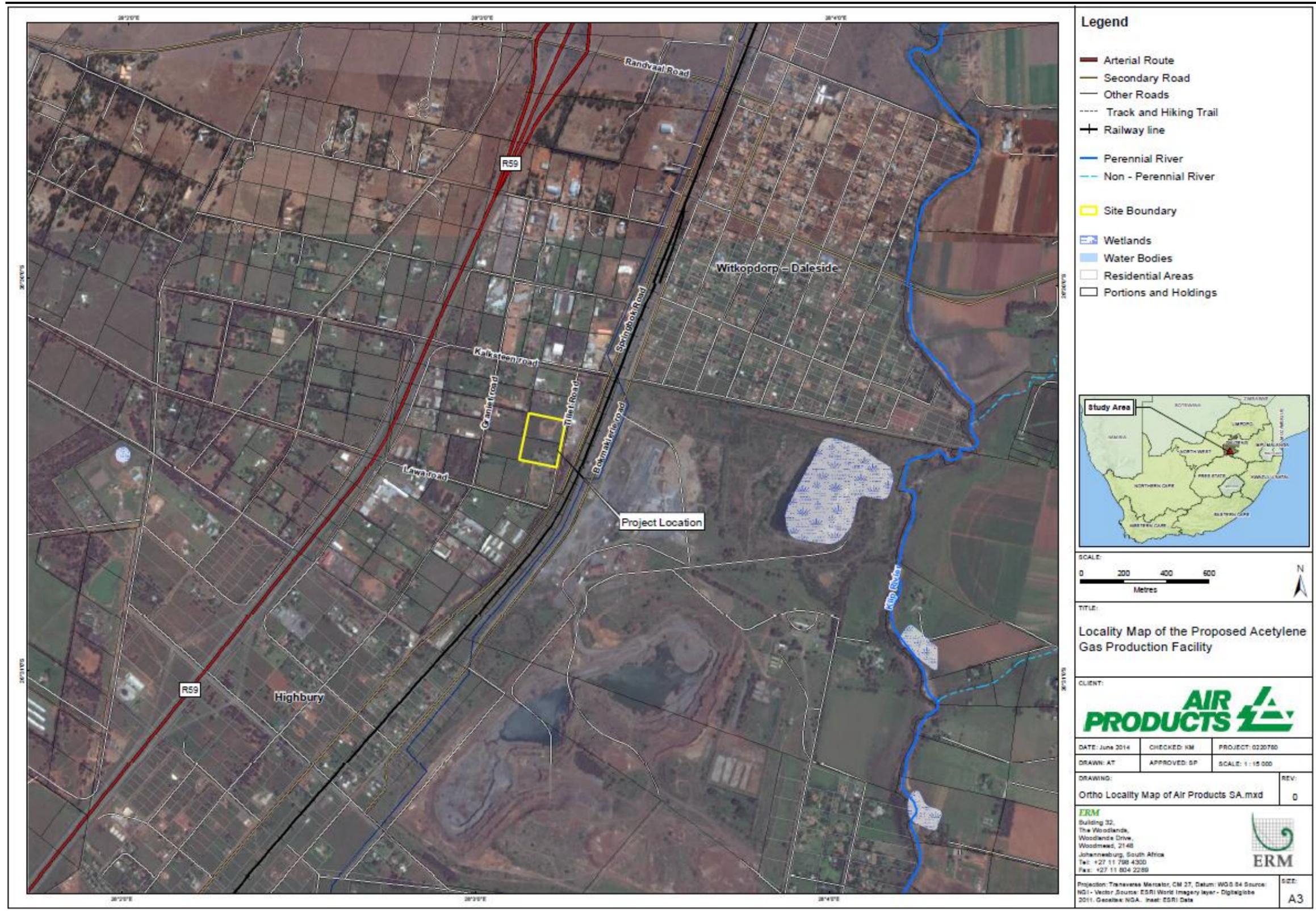
DESCRIPTION OF THE EXISTING ENVIRONMENT

The study area includes the proposed site (Stands 88 and 89 of Valley Settlements Agricultural Holdings in Daleside, approximately 4ha in area) and the immediate surrounds. The surrounding land uses are described in *Table 0.2* below:

Table 0.2 *Surrounding Land Uses*

Direction	Current Land Use
East	The site is bordered by Tilliet Road to the east with warehousing and trucking businesses across Tilliet Road. Further east, the Glen Douglas Mine (open pit-mine producing metallurgical dolomite, aggregate and agricultural lime) is located beyond the railway line.
South	Storage and maintenance facility for construction equipment (Earthman)
West	The majority of this area is open grassland with some disturbance such as trenches, soil dumping and alien bush clumps.
North	Small businesses (ie brick manufacturing and carpentry facilities)

Figure 0.2 Project Locality Map



1.4.1

Physical Baseline

Climate

The climate of the greater Gauteng area is characterised by a warm, moist summers and cool dry winters. Rainfall in the region occurs almost exclusively in showers and thunderstorms with the maximum rainfall occurring between November and January, while winter months are normally dry. The wind direction in the area is primarily north-westerly, northerly and north-easterly with southerly winds predominating when cold fronts extend into the Gauteng province during the winter months.

Topography

The greater study area is characterised by slightly undulating plains, dissected by prominent rocky chert ridges. The area around the site is undulating and generally flat. Air Products undertook a land survey for the proposed site, which indicates that the site is generally flat; however there is a natural gradient which slopes to the south east. The elevation of the proposed site is approximately 1502 m above mean sea level (msl).

Geology and Soils

According to the 1:250 000 geological map sheet [2628] of East Rand, the study area is characterised by pockets of dolomite and chert. As the site may therefore be underlain by dolomite, a detailed dolomite stability investigation will be undertaken prior to construction to understand the inherent risk class.

The soils of the proposed site are considered well-drained, red, apedal soils of the Hutton form (Hu) overlying weathered and hard rock and various other unconsolidated materials which are evident by the exposed rock on site.

Surface and Groundwater

The site falls within the Klip River catchment which covers an area of approximately 3000km² ⁽¹⁾. The Klip River is approximately 2km to the east of the proposed site. Whilst the proposed site is situated within the Klip River catchment, there are no freshwater systems (tributaries) on or near the proposed site. The greater area is underlain by dolomite, which is generally characterised by large quantities of groundwater. Groundwater in the region is primarily used for irrigation for agricultural purposes.

Air Quality

The Project is located within the Vaal Triangle Priority Area. PM₁₀ concentrations measured at nearby monitoring stations exceed both the current and future National Ambient Air Quality Standards (NAAQS) PM₁₀ limits. Sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and respiratory particulates (PM₁₀) are the pollutants of concern for this Project.

(1) Department of Water Affairs, 2009

1.4.2

Biological Baseline

Flora

The Project site is situated within the Grassland Biome as defined by Rutherford & Westfall (1994) which is dominated by non-grassy herbs (forbs). Further to this, the National Spatial Biodiversity Assessment identifies this grassland as the Endangered Soweto Highveld Grassland, while the South African National Biodiversity Institute's (SANBI) defines this area as the Bushveld Bankenveld region, which is a Priority Area. One Conservation Important (CI) species was detected and scattered across the site, which is generally transformed, while approximately 30 percent of the species recorded were alien species.

Fauna

The highly transformed and fragmented habitat on site in addition to the lack of any natural rocky ridges, wetlands or open water habitats means that the Project site is predisposed to a low diversity of faunal species that are likely to occur. A total of three mammal, 22 bird, two reptile, three frog and 12 terrestrial macro-invertebrate species were detected during the site survey.

1.4.3

Socio-Economic Baseline

The Project is located within Ward 5 of the Midvaal Local Municipality which forms part of the Sedibeng District Municipality (within the Gauteng Province). The population of the Midvaal Local Municipality is estimated at 9 5 301 persons, which constitutes approximately eight percent of Sedibeng's population and 0,7 percent of the Gauteng population⁽¹⁾.

Midvaal Local Municipality can be described as a primarily rural area while the major employment sector is community services (60.4 percent), followed by manufacturing (25.1 percent). Despite this the unemployment rate in the municipality is currently 18 percent.

In terms of environmental health of the municipality, there are three priority areas of intervention namely water pollution (in particular the Klip River), waste management and air quality.

Archaeology and Cultural Heritage

Agricultural activities have, over the years, destroyed most archaeological resources that may have been present. Industrial activities would further have destroyed any viable archaeological and palaeontology sites that may have existed pre-1999. As no heritage resources were identified within or near the Project site; there are no sources of risks associated with the Project for heritage resources.

(1) Midvaal Spatial Development Framework (2011)

Both short-term construction phase impacts and longer-term operational phase impacts have been assessed using the methodology provided in *Section 3* of this Draft EIR. *Table 0.3* and *Table 0.4* provide a summary of the significance ratings of the potential impacts prior to and after mitigation.

Table 0.3 *Impact Summary: Construction Phase*

Affected Resource/Receptor	Potential Impact	Pre-Mitigation Significance	Post-Mitigation Significance
Soil Resources	Disturbance and loss of soil resources	Negligible	Negligible
	Increased potential for soil erosion	Negligible	Negligible
Air Quality	Potential PM ₁₀ emissions	Major	Moderate
Ambient Noise	Potential increase in noise emissions	Minor	Minor
Flora	Loss of grassland and floral habitat	Moderate-Minor	Minor
	Potential impact of alien invasive species on remaining grassland	Moderate	Minor
Fauna	Loss of faunal habitat (Cumulative)	Moderate-Minor	Minor
	Potential sensory disturbance to fauna	Negligible	Negligible
	Potential loss of faunal species due to spills	Minor-Negligible	Negligible
Local Economy	Creation of employment opportunities	Minor (Positive)	Minor (Positive)
	Training and skills development	Minor (Positive)	Minor (Positive)
	Procurement of goods and services	Minor (Positive)	Minor (Positive)
Heritage/Archaeology/Palaeontology	Potential Impact on Heritage, Archaeological and Paleontological Resources	Negligible	Negligible
Traffic	Potential increase in traffic volumes	Negligible	Negligible
	Vehicle accidents	Minor	Minor
Soil and Groundwater	Accidental spills/leaks from materials	Moderate	Minor
	Accidental spills/leaks from wastes	Moderate	Minor

Table 0.4 *Impact Summary: Operation Phase*

Affected Resource/Receptor	Potential Impact	Pre-Mitigation Significance	Post-Mitigation Significance
Air Quality	Potential PM ₁₀ emissions	Negligible	Negligible
	Potential NO ₂ emissions (Cumulative)	Negligible	Negligible
	Potential SO ₂ emissions	Negligible	Negligible
	Potential Acetone emissions	Negligible	Negligible
	Potential Phosphine (PH ₃) emissions	Negligible	Negligible
	Potential VOC emissions (Cumulative)	Negligible	Negligible
Ambient Noise	Potential increase in noise emissions	Moderate	Minor
Flora	Potential impact of alien invasive species on remaining grassland	Moderate	Minor
Fauna	Potential sensory disturbance to fauna	Negligible	Negligible
	Potential loss of faunal species due to spills	Minor-Negligible	Negligible
Local Economy	Creation of employment opportunities	Minor (Positive)	Minor (Positive)
	Training and skills development	Minor (Positive)	Minor (Positive)
	Procurement of goods and services	Minor (Positive)	Minor (Positive)
Heritage/ Archaeology/ Palaeontology	Potential Impact on Heritage, Archaeological and Paleontological Resources	Negligible	Negligible
Traffic	Potential increase in traffic volumes	Negligible	Negligible
	Vehicle accidents	Minor	Minor
Fire/Explosion	Acetylene generator rupture/failure	Moderate	Moderate
	Risk from acetone pool fires	Minor	Minor
Soil and Groundwater	Accidental spills/leaks from materials	Moderate	Minor
	Accidental spills/leaks from wastes	Moderate	Minor

The construction phase of the Project will have a major impact on the air quality, due to the current exceedance of the PM₁₀ regulatory limit, specified in the NAAQS. All other biophysical and socio-economic impacts resulting

from the construction of the Project are minor-negligible if the mitigation measures as proposed in the Construction EMPr (*Annex F*) are adhered to.

The operational phase of the Project will have no major impacts on the bio-physical or socio-economic environment. The impact from a rupture of the acetylene generator however is considered to be of moderate significance prior to and post-mitigation due to the extent of the impact, beyond the Project boundaries. All other impacts resulting from the operation of the Project are minor-negligible if the mitigation measures as proposed in the Operation EMPr (*Annex F*) are adhered to.

There is currently no agreement in place which defines what will happen to the facility at the end of its useful lifecycle, but it is anticipated that the Project site will be decommissioned with the intention for reuse or redevelopment, or returned to its original state. The bio-physical and socio-economic impacts as identified for the construction phase are similar to those that are likely to occur during the decommissioning phase of the Project. The key impact that is likely to occur as a result of the decommissioning phase is the generation of waste from the dismantling and removal of all Project infrastructure. Measures for the management of waste have been listed in the Decommissioning EMPr (*Annex F*).

1.6

MITIGATION

The EMPr is a delivery mechanism for environmental and social mitigation measures made in the EIA Report. The purpose of the EMPr is to ensure that recommendations are translated into practical management actions which can be adequately resourced and integrated into the project phases. The EMPr also outlines roles and responsibilities, reporting cycles and measures for corrective actions. It is considered critical that the following key mitigations be undertaken prior to construction to ensure the environmental and socio-economic viability of the Project:

- conduct a detailed dolomite stability investigation which shall include a gravity survey, percussion drilling as well as discussions with the Council for Geoscience;
- obtain and adhere to the Project Air Emissions Licence;
- obtain a permit from the GDARD to translocate the Conservation Important species (Declining *Boophane disticha*) to the south western section portion of the property, where no development is to take place;
- ensure that the Project is compliant with the requirements of the MHI Regulations; the MHI Risk Assessment must be submitted to the Local Provincial Director of the Department of Labour, the Chief Inspector of the Department of Labour and the local authorities.
- develop a Stormwater Management Plan;

- obtain building plan approval from the Midvaal Local Municipality for the establishment of the Project facility and adhere to building restrictions and or recommendations of buffers;
- establish a grievance procedure to allow community members to raise concerns and issues relating to the Project; and
- develop a Site Emergency Plan and determine the qualified and suitably experience local emergency services to support the Project.

The implementation of the mitigation measures identified above and those detailed in *Annex F*, including monitoring, will provide a basis for ensuring that the potential positive and negative impacts associated with the establishment of the development are enhanced and mitigated to a level which is deemed adequate for the Project to proceed. Should the magnitude of the Project's influence remain unchanged from that described in the EIA report, and should the proposed mitigation measures be implemented, there are unlikely to be any fatal flaws from an environmental and social perspective.