



CAPE LIME (Pty) Ltd

Reg.no. 1999/002171/07

**ENVIRONMENTAL AUTHORISATION FOR THE
CONSTRUCTION OF LIME KILNS, HAUL ROAD AND
UPGRADE OF ENVIRONMENTAL MANAGEMENT
PROGRAMME REPORT WITH RESPECT TO MINING
ACTIVITIES ON FARM VADELANDSHCE RIETKUIL NEAR
VREDENDAL, WESTERN CAPE PROVINCE**

Draft EIAR and EMPr

DMR Reference Number: WC 30/5/1/2/3/2/1 294MR

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

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IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un- interpreted information and that it unambiguously represents the interpretation of the applicant.

1. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

- determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- determine the—
 - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) degree to which these impacts— (aa) can be reversed;
(bb) may cause irreplaceable loss of resources, and
(cc) can be avoided, managed or mitigated;
- identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- identify suitable measures to manage, avoid or mitigate identified impacts; and
- identify residual risks that need to be managed and monitored.

PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and correspondence address

a) Details of

i) Details of the EAP

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ii) Expertise of the EAP.

(1) The qualifications of the EAP (with evidence).

Ms. Ntsanko Ndlovu has been assigned as the lead Environmental Practitioner to undertake the necessary environmental authorisations process. Ntsanko holds a Masters degree in Environmental Management from North-West University with 12 years of professional experience as an environmental assessment practitioner. Ntsanko is currently Senior Environmental Specialist based at Afrimat. She has a wealth of experience in managing Environmental Impact Assessments (EIAs) with the required Public Participation Process (PPP), carrying out environmental audits and conducting environmental awareness, which she gained through the years. EAP's qualifications are attached as Appendix A of this report.

(2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

A copy of Ms. Ntsanko Ndlovu's curriculum vitae is attached as Appendix G.

b) Project Background and Description

Cape Lime (Pty) Ltd, a subsidiary of Afrimat (Pty) Ltd proposes to upgrade its current Environmental Management Programme report in order to be compliant with the NEMA EIA Regulations 2014 as amended. Cape Lime's existing Environmental Management Programme was approved (28 October 2002) in terms of the Minerals Act, 1991 (Act 50 of 1991) and updated in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) approved on 17 May 2013.

As from the 8th December 2014 the Department of Mineral Resources became a competent authority in all activities related to mining identified in terms of National Environmental Management, 1998 (Act 107 of 1998) and NEMA also set a minimum standard to which all the reports relating to mining activities must conform to.

Cape Lime mines and processes limestone and dolomite on Remainder of Portion 1 of Farm Vanderlandsche Rietkuil 308, Farm Nuwedrif 450, Portion 21 of Farm KYS 301, Portion 26 of Farm KYS 301 and Portion 162 of the Farm Karoo Vlakte 299, situated approximately 8 km south-east of Vredendal. The current activities entail, apart from mining, the crushing and screening of all mined material as well as calcination of limestone in an existing Fluid Bed Lime Kiln.

The Vredendal limestone and dolomite ore are of an exceptionally high quality and are the only current operating source suitable as raw materials for the production of high quality glass and refractory materials in South Africa. The high quality limestone is also suitable for the production of lime for water treatment and the manufacture of Precipitated Calcium Carbonate (PCC). The lime would otherwise have to be imported. The markets currently served are:

- Water treatment (potable and effluent)
- Glass Industry (Flat glass and container glass)
- Aggregates
- Chemical Industries
- Mineral Fillers Industries
- Metallurgical industry

Cape Lime is also a holder of the mining rights for the mining of limestone from within a 321 ha area on the Remainder of Farm 511 (Farm Welverdiend) in Vanrhynsdorp. Awarded in June 2012, in terms of Section 22 of the Mineral and Petroleum Resources Development Act 2002 (Act No. 28 of 2002), No processing takes place at Farm Welverdiend, all product material is transported to the existing Vredendal plant (\pm 15km west of the site) for processing.

The proposed project will also include the following new developments;

- The construction of two new kilns (calciners) in addition to the existing Kiln which has been in operation since 2004 and;
- The construction of a haul road between the two Cape Lime mining rights Farm 511/4 Welverdiend and Farm Vaderlandshce Rietkuil 308/1, see figure 2. The road will be used to transport material from Farm Welverdiend to the Vredendal primary crushing plant.

The addition of new Kilns will enable the mine to increase its overall production capacity of high quality white lime products. Cape Lime is confronted on a regular basis with enquiries with regards to the supply of high quality white lime products to potential new projects in South Africa, for which Cape Lime does not have the current production capacity.

The mine currently transports about 3000 tons of material a month from Farm 511/4 Welverdiend, Vanrhynsdorp to the Vredendal Plant via the N7 and R27 roads. The new haul road is more feasible than the current road due to reduced hauling distance and will prevent the need for trucks and machinery to travel along the N7 and R27 to the Vredendal plant.

Mining and Excavation

The Open Pit Mining process entails removal of overburden to expose the ore before drilling and blasting takes place according to a structured mine plan. Excavation of blasted material is done by an Excavator and 18 ton trucks haul the material to the primary crushing plant.

Primary crushing

Run-of-mine material from a specific quarry (dolomite and/or limestone) is tipped into the feed bin from where the ore is fed to a jaw crusher. Thereafter the material goes through a series of screening and further crushing stages. The top size of the material may vary with respect to the product/products being produced. Crushed material is stockpiled at the primary crusher stockpile area.

Mineral Fillers

Crushed white dolomite from the primary crushing plant is fed to the Mineral Fillers plant where the size of the white dolomite is progressively reduced using crushers, ball mills, screens and air classifier. The resultant range of micro-fine products (5 microns, 15 microns, 75 microns and 300 microns) are stored in silos from where it can be packed in small bags or bulk bags for sale.

Dolomite Processing Plant

Crushed dolomite from the primary crushing plant is fed to the Dolomite Processing Plant where it is crushed and screened to -2 mm particle size. The material is then stored in silos before being loaded into bulk road trucks.

Limestone secondary crusher:

Crushed limestone from the primary crushing plant is fed to the secondary crusher and subsequently screened and air classified to yield three products. The coarser fraction (+1-6mm) is stockpiled and used as feed material for the Kiln. The middle fraction (-1mm) is stored in bins from where it is subsequently blended (after analysis) to obtain a consistent product composition before being loaded into road trucks when sold. The fine fraction (-200micron) is removed from the middle fraction before it's fed to the storage bins by passing the material through an air classifier. The fine fraction (-200micron) are routed to silos for storage before dispatched in road tankers when sold.

Fluid Bed Kiln

Limestone (CaCO_3) is calcined in a Kiln at $\pm 920^\circ\text{C}$ to obtain quicklime (CaO) using coal as fuel. All exhaust gas streams pass through bag filter units to be cleaned before being released into the atmosphere. The plant is fully automated to monitor all the process parameters. Quicklime is stored in silos before being bagged, sold in bulk or conveyed to the Oxide Processing Plant or Hydrator plant for further processing. The material obtained at the bag filter units are sold as a low grade quicklime or passed through the hydrating plant to produce a low grade hydrated lime product.

Hydration Plant:

Quicklime is mixed with water in a process reactor to yield dry hydrated lime (Ca(OH)_2), which is air classified to remove oversize material. The oversize material separated by the air classifying system passes through a milling section to reduce its particle size. The final product is then bagged or dispatched in bulk road tankers.

Service departments:

Laboratory:

All basic analysis for product composition and grading are done in a fully equipped laboratory on site to ensure compliance to Cape Lime's ISO 9002 quality system. Analysis from external laboratories are obtained annually or on special request to verify our test results.

Workshops:

All maintenance is done with the aid of three fully equipped workshops for electrical, mechanical and automotive disciplines.

c) Description of the property.

Cape lime is located ± 8 km south-east of Vredendal, ± 18 km south-west of Vanrynsdorp and ± 12 km north of Klaver situated in the Matzikama Local Municipality, within the West Coast District Municipality of the Western Cape Province.

Cape Limes's existing mining area and associated mining activities take place on the remaining extent of Portion 1 of the Farm Vaderlandsche Rietkuil 308, Farm Nuwedrif 450, Remainder of Portion of Farm 510, and Portion 40 of the farm 301. Access to the property is from a regional road (R362) between Klaver and Vredendal, with an unsurfaced road to the mine.

Table 1: Property Details

Farm Name:	<ul style="list-style-type: none">• Portion 1 of Farm Vaderlandsche Rietkuil 308• Farm Nuwedrif 450• Remainder Portion of Farm 510• Portion 40 of farm 301
Application area (Ha)	4002.5 ha.
Magisterial district:	Vredendal
Distance and direction from nearest town	The proposed site is situated next to the R362. ± 8 km south-east of Vredendal, ± 18 km south-west of Vanrynsdorp and ± 12 km north of Klaver, in the Western Cape Province.
21 digit Surveyor General Code for each farm portion.	<ul style="list-style-type: none">• Portion 1 of Farm Vaderlandsche Rietkuil 308- C07800000000030800001• Farm Nuwedrif 450 - C07800000000045000000• Remainder of Farm 510 - C07800000000051000000• Portion 40 of farm 301 - C07800000000030100040

d) Locality map

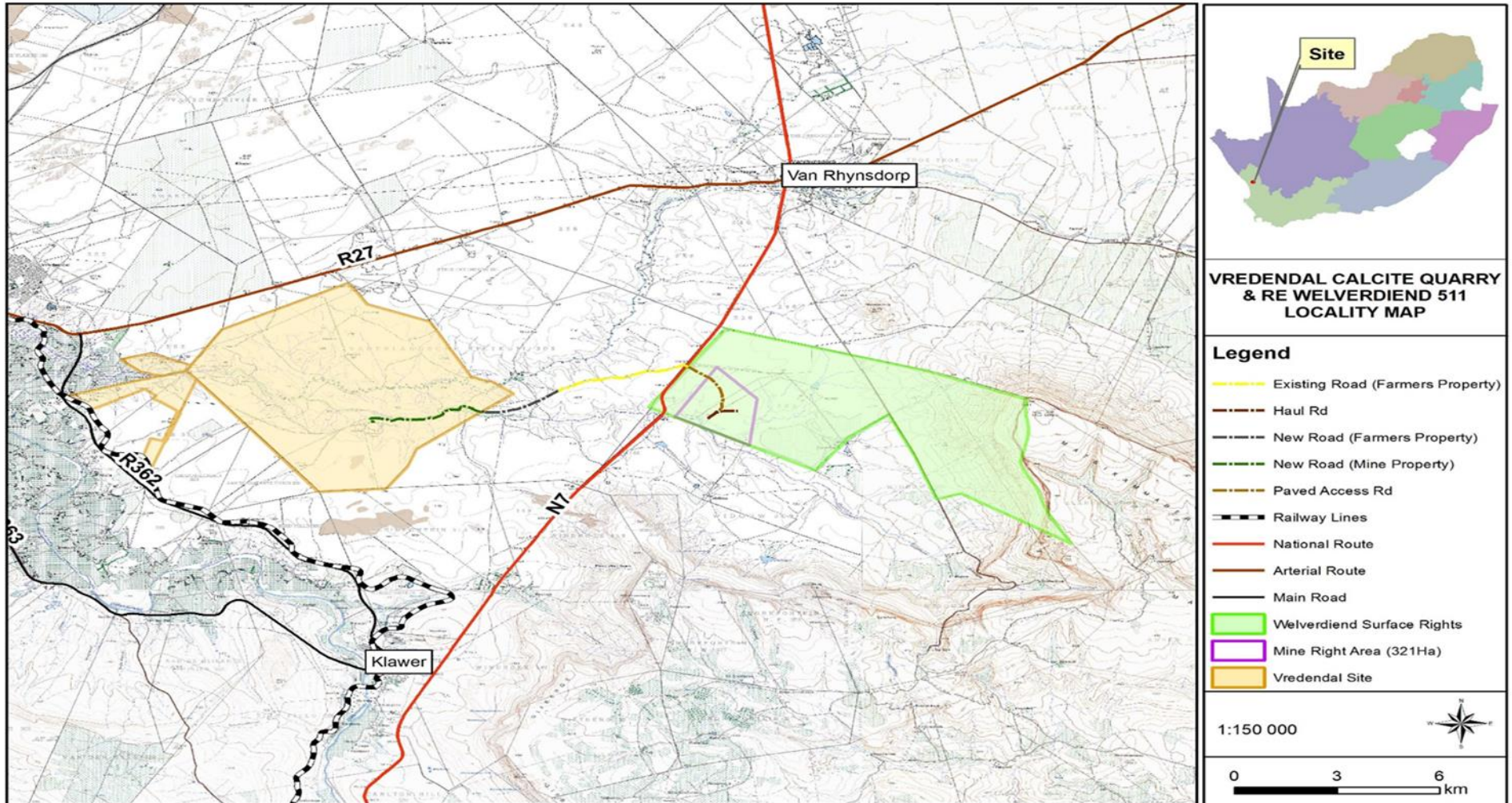


Figure 1: Locality of the proposed project.

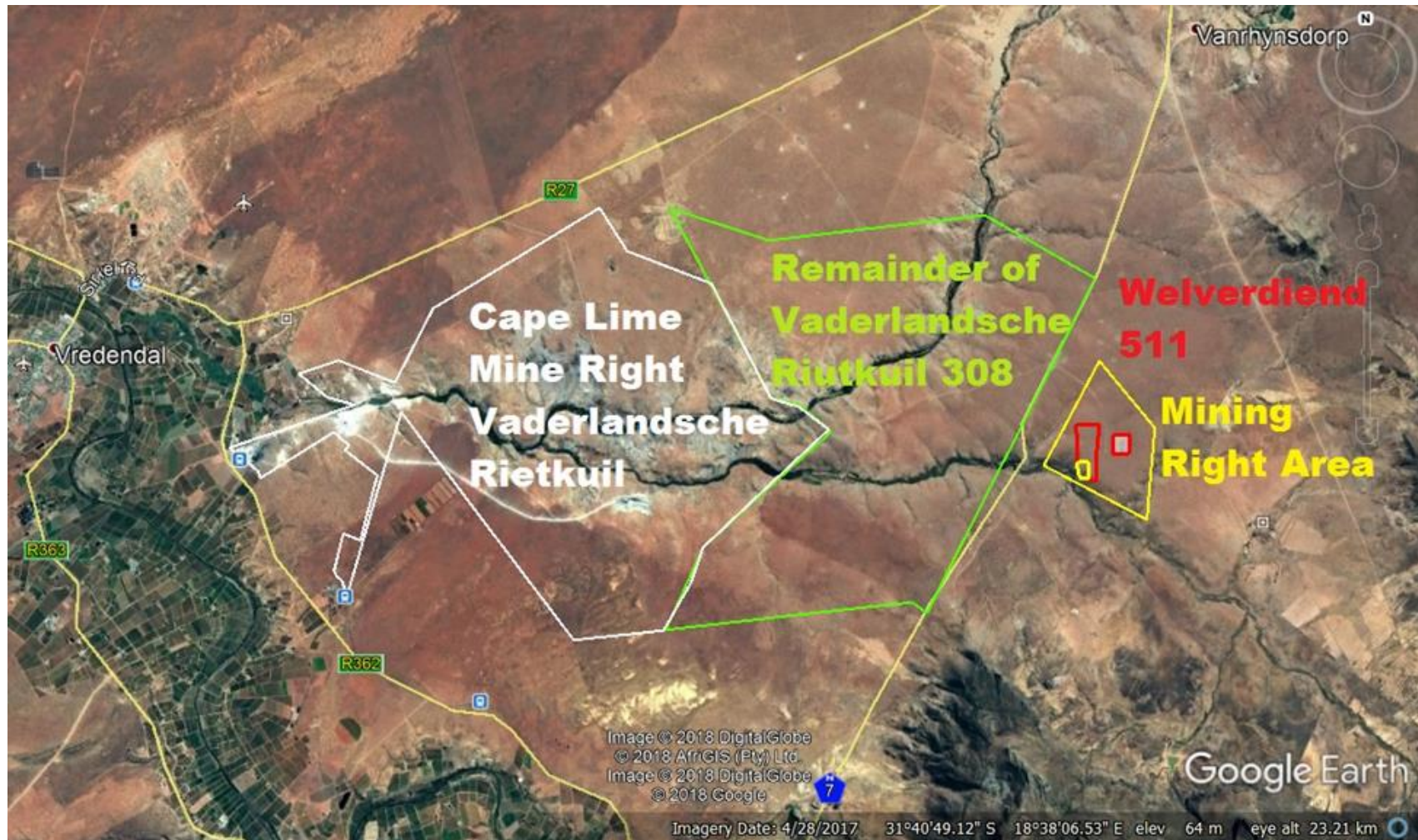


Figure 2: Google Earth Map showing the two Cape Lime mining rights: Farm Vanderlandsche Rietkuil and Welverdiend Farm

(i) Listed and specified activities

Table 2: Listed activities

NAME OF ACTIVITY (All activities including activities not listed) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY Mark with an X where applicable or	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)/NOT LISTED
<ul style="list-style-type: none"> The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre to connect the two limestones mines, Welverdiend and Vaderlandsche Rietkuil 	±3.49ha		GN R 983, Listing Notice 1, Listing Notice 2, Activity 56 of the EIA Regulations, 2014 (as amended)
<ul style="list-style-type: none"> The construction of a new haul road to connect Vaderlandsche Rietkuil and Welverdiend mine. 	±5km	X	GN R 983, Listing Notice 1, Listing Notice 2, Activity 24 of the EIA Regulations, 2014 (as amended)
<ul style="list-style-type: none"> Replace topsoil over mined-out area (concurrent rehabilitation) and final rehabilitation of entire major area 	±40ha	X	GNR 983, Listing Notice 1, Activity 22 of the EIA Regulations, 2014 (as amended),
<ul style="list-style-type: none"> The preparation of the land to put Run of Mine Material on the proposed haul road will cross traversing river crossings 	15m wide at 15 river crossing sections	X	GNR 983, Listing Notice 1, Activity 19, of the EIA Regulations, 2014 (as amended)
<ul style="list-style-type: none"> Reduction, crushing and screening of gravel material. 	±10ha	X	GNR 984, Listing Notice 2, Activity 17, of the EIA Regulations, 2014 (as amended)
<ul style="list-style-type: none"> Clearance of more than 20 ha of indigenous vegetation for the purposes of mining limestone and dolomite deposits and the erection of 2 Fluid Bed Calciners and associated facilities. 	±40ha	X	GNR 984, Listing Notice 2, Activity 15 of the EIA Regulations, 2014 (as amended)
<ul style="list-style-type: none"> Construction of 2 Fluid Bed Calciners. 	2ha	X	GNR 984, Listing Notice 2, Activity 6, of the EIA Regulations, 2014 (as amended)

<ul style="list-style-type: none"> The development of a 15m wide new road (of which 2.17km will be on Farmers Property and 3,30km will be on the applicants property) that will connect Vaderlanche and Welperdiend 	±5km	X	GNR 984, Listing Notice 3, Activity 4 of the EIA Regulations, 2014 (as amended)
<ul style="list-style-type: none"> The widening of the 3,49km existing road occurring on the farmer's property to connect with the proposed new road that will connect Vaderlanche and Welperdiend 	15m wide at various sections	X	GNR 984, Listing Notice 3, Activity 18, of the EIA Regulations, 2014 (as amended)

(ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

Project description

Cape Lime (Pty) Ltd, a subsidiary of Afrimat (Pty) Ltd. mines and processes limestone and dolomite on the remaining extent of Portion 1 of the Farm Vaderlandsche Rietkuil 308, Farm Nuwedrif 450, Remainder of Portion of Farm 510, and Portion 40 of the farm 301, situated approximately 8 km south-east of Vredendal in the Western Cape Province.

Mining takes place via drilling and blasting. Overburden is removed to expose the ore before drilling and blasting takes place according to a structured mine plan. Drilling is conducted by means of a drill rig, conducting vertical down-hole drilling while blasting is done by means of emulsion pumped into the holes. Each hole is connected by means of fast burning ignite cord. The blast is set electrically from a safe distance.

The blasted ore is loaded on 18ton trucks and transported to the primary crushing and screening plant. Current activities apart from mining of limestone and dolomite entails, crushing and screening of all mined material as well as calcination of limestone inside a Fluid Bed Lime Kiln.

On the 3rd of August 2018 the Department of Mineral Resources (DMR) advised Cape Lime to upgrade its Environmental Management Programme (EMPr) in order to be compliant with the NEMA EIA Regulations 2014 as amended. Cape Lime's current Environmental Management Programme was approved on the 28th of October 2002 in terms of the Mineral's Act, 1991 (Act 50 of 1991) and updated in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) approved on 17 May 2013. As from the 8th December 2014 the Department of Mineral Resources became a competent authority in all activities related to mining identified in terms of National Environmental Management, 1998 (Act 107 of 1998) and NEMA also set a minimum standard to which all the reports relating to mining activities must conform to.

Cape Lime proposes as part of the Environmental Management Programme upgrade project, to construct two new lime kilns (Fluid Bed Calciners) in addition to the existing kiln which has been in

operation since 2004 at the Vredendal Operations and also construct a new access road which will connect Vredendal and the Welverdiend mine.

The road will be used to transport material from Farm Welverdiend to the Vredendal primary crushing plant. The proposed connecting road will be gravel and the river crossings will be built from Run of Mine Material as it will not be washed away when and if the river flows. The road through the river will be 15m wide and approximately 200-300mm high. The new haul road will be a gravel road, built with the applicant's own road material (G5 material). The road will be 15 m wide. Where the road crosses narrow, confined or eroded watercourses, the channel will be filled with run of mine material (boulders etc.) to elevate the road surface above the stream bed and overlaid with G5 material. No culverts are planned and waterflow will pass through voids in the run of mine material. For broader unconfined watercourses the road will follow the profile of the channel, directly through the stream bed and will be filled with run of mine material to elevate the road above the stream bed. Road crossings in broad unconfined valleys are expected to be negligible. The lack of any serious erosion or other disturbances at existing road crossings provides evidence of this statement.

The construction of the new haul road will entail connecting a new road with 2 existing roads and broken down into the following table:

Table 3: Details of proposed new road

Name	Length (km)	Width
Existing Road (Farmers Property)	3,49km	15m
Haul Rd	1,03km	15m
New Road (Farmers Property)	2.17	15m
New Road (Mine Property)	3,30	15m
Paved Access Rd (Wolverdiend Farm)	2.04	15m

The following phases will be applied to the proposed haul road:

- The first phase is a minor straightening and upgrade of an existing gravel road across level terrain for a distance of 3.49 km west from the N7.
- The second phase is the construction of a new road that first turns southwards over the hill and then runs westwards across a steep midslope to the north of the two rivers before again turning south to cross the Wiedouw and Troetroer Rivers, a distance of the 3.30 km.
- The final phase is across the lower slope to the south of the rivers in a westerly direction towards the present mining site. This phase will cover a distance of 2.17 km, giving a total upgrade and new road a length of 10 km. Access from this point is through the Vrededorp

processing plant along the existing mine to processing plant road which is currently used daily and will require no alterations or upgrades. This road traverses 9 km of similar arid rangeland, giving a total haulage distance of 14.6 km.

The mine currently transports about 3000 tons of material a month from Farm 511/4 Welverdiend, Vanrhynsdorp to the Vredendal Plant via the N7 and R27 roads. The proposed haul road is more economically feasible than the current road due to reduced hauling distance. This will in turn prevent the need for trucks and machinery to travel along the N7 and R27 to the Vredendal plant.

Cape Lime is confronted on a regular basis with enquiries regarding the supply of high quality white lime products to potential new projects in South Africa, for which Cape Lime does not have the current production capacity. The addition of new Kilns will enable the mine to increase its overall production capacity of high quality white lime products.

e) Policy and Legislative Context

Table 4: Applicable legislation to the project

<p>National Heritage Resources Act, No. 25 of 1999 (NHRA) serves to protect and manage South African heritage and cultural resources, which include places, buildings, structures and equipment of cultural significance.</p>	<p>Refer to Appendix D1 for specialist Heritage studies.</p>	<p>A Heritage Impact Assessment study was conducted and Indications are the footprint of the proposed upgrades does not lie on pristine ground but occurs in area already affected by modern developments that include farming quarrying and access roads. The archaeology of the area is concentrated along the valleys outside the proposed development footprint where 10 lithic clusters were reported. Those lithic artefacts that occur in the area, appear in isolated clusters and are of low significance.</p>
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<p>The purpose of the National Environmental Management: Biodiversity Act, No. 10 of 2004 (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMBA. This includes: the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity Institute (SANBI).</p>	<p>Refer to appendix D3 for Ecological Impact Assessment study.</p>	<p>An ecological assessment study has been conducted for site and indicated that the mining area is located in a botanical diverse area with at least five vegetation types (belonging to the Succulent Karoo Biome) found on the property.</p> <p>Currently four of the five have been affected by mining activities, including Vanrhynsdorp Gannabosveld, Knersvlakte Dolomite Vygieveld, Knersvlakte Quartz Vygieveld and Namaqualand Riviere. None of the vegetation types are currently listed as threatened. However, Vanrhynsdorp Gannabosveld is the most transformed vegetation type in the area, while Dolomite Vygieveld has a very limited distribution range.</p>
<p>Conservation of Agricultural Resources Act 43 of 1983 (CARA) provide for control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.</p>	<p>Refer to Appendix D6 for the specialist agricultural impact study.</p>	<p>The proposed mine will occur on area zoned for agricultural activities. The agricultural potential of the site has been assessed through an Agricultural Impact study and it explains that there is no agronomic or agribusiness reason why the mining operation should not be approved.</p>
<p>The National Environmental Management Air Quality Act, No. 39 of 2004 (NEMAQA) has placed the responsibility for air quality management on local authorities that will be tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and emissions reduction strategies. GN893 of 2013 provides the list of activities in terms of Section 21(1)(a) for which licensing is required in terms of Chapter 5 of the Act. This notice further establishes minimum emission standards</p>	<p>Refer to Appendix D6 for the specialist air quality study.</p>	<p>The proposed development includes the construction of 2 Fluid Bed Calciners. As such, in terms of the National Environmental Management Air Quality Act (Act No. 39 of 2004) (NEM: AQA) an Air Emissions License (AEL) is required.</p> <p>An Air quality impact study has been conducted and recommended management measures will be stipulated in the EMPr, to ensure that the Applicant complies with the legislative requirements.</p>

<p>for the listed activities.</p> <p>The ambient air quality standards (GN1210 of 2009) were determined based on international best practice for PM10 (particulates with an aerodynamic diameter of 10 micron), dust-fall, Sulphur dioxide (SO2), nitrogen dioxide (NO2), ozone (O3), carbon monoxide (CO), lead (Pb), benzene and recently PM2.5. The PM2.5 standards were published in GN486 of 2012. Section 32 of NEMAQA allows for the promulgation of measures to control and monitor dust.</p> <p>The National Dust Control Regulations (GNR827 of 2013) prescribe general measures for the control of dust in all areas, including residential and light commercial areas. Section 33 of NEMAQA relates to rehabilitation of mining operations, which states that an Applicant must notify the minister five years prior to mine closure of the planned closure and provide a closure and rehabilitation plan for the prevention of pollution of the atmosphere by dust after operations have ceased.</p>		
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<p>The Mine Health and Safety Act, No. 29 of 1996 as amended and the Regulations thereto provide for protection of the health and safety of employees and other persons at mines and, for that purpose to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety; to promote training and human resources development; to regulate employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety; to entrench the right to refuse to work in dangerous conditions; and to give effect to the public international law obligations of the Republic relating to mining health and safety.</p>	<p>The commitment to abide by the requirements of the Mine Health and Safety Act, No. 29 of 1996 have been included in the EMPr in the relevant plans.</p>	<p>The Applicant will ensure that operations on site are in line with the requirements of the Act and Regulations.</p>
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f) Need and desirability of the proposed activities.

Environmental responsibility.

The project entails upgrading Cape Lime's Environmental Management Programme (EMPr) to be in line with NEMA EIA Regulations 2014 as amended. Various specialist studies have been undertaken as part of the upgrade. The upgraded EMPr will contain management measures aimed at mitigating potential negative impacts on the environment that may occur as a result of the construction and operation of activities applied for, as well as the current mining and processing activities at Cape Lime.

Socio-Economic Benefits.

The Vredendal limestone and dolomitic ore are of an exceptionally high quality and are the only currently operating source suitable as raw materials for the production of high quality glass and refractory materials in South Africa. The high quality limestone is also suitable for the production of lime for water treatment and the manufacture of Precipitated Calcium Carbonate (PCC). The

lime would otherwise have to be imported. The markets currently served includes: Water treatment (potable and effluent); Glass Industry (Flat glass and container glass) Aggregates; Chemical Industries; Mineral Fillers Industries and Metallurgical industry.

Cape Lime is confronted on a regular basis with enquiries regarding the supply of high quality white lime products to potential new projects in South Africa, for which Cape Lime does not have the current production capacity. The proposed project (i.e. activities applied for) will result in direct economic benefits for Cape Lime, and contribute to the long-term economic sustainability of the company. The new access road connecting the Vredendal site and Welverdiend mine will result in reduced transportation costs. The addition of the two lime kilns will result in a three-fold increase in production rate, enabling the company to supply a better quality product to its clients. This will also result in direct and indirect economic benefits for the local and broader community (goods and services), in the form of job creation, inter alia.

The mining sector was, until recently, one of the slow growing sectors within the Matzikama Municipality's economy. According to the Matzikama Municipality's Integrated Development Plan (2012-2017), this sector currently stands at 4% but is expected to increase its contribution to the local economy in the near future. The IDP (2012-2017) identifies the reduction of poverty & unemployment, the creation of an environment that maximizes the social well-being of the community and the creation of an environmentally sustainable economy as key priorities and strategic objectives for the Municipality. The mining and processing activities at Cape Lime contribute towards achieving the above objectives through the creation of employment opportunities, supporting community development, provision of bursaries and learnerships to those in need, building workforce capacity (via the provision of employee skills development programmes), contributing to local economic development, and contributing to a reduction in local poverty. Cape Lime currently employs about 70 permanent employees, 8 learnerships, 1 Intern and 20 contractors of which the majority were sourced from the local area. It is anticipated that the construction and operation of the proposed kilns will result in the creation of 18 new permanent employment opportunities for local people.

Given the relatively high rates of poverty & unemployment and low levels of skills development in the community (as highlighted by the local IDP and the National Census 2011), the proposed development and its associated positive socio-economic impacts is regarded as desirable and needed by the surrounding community at this time and place.

Public safety benefits

Cape Lime currently transports about 3000 tons of material a month from the Welverdiend mine to the Vredendal site via the N7, R27 and R326 for further processing. The new access road is will prevent heavy Trackless Mobile Machines on the public road, therefore improving safety.

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

i) Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

(a) Property and Location/Site Alternatives

In terms of the new kilns, no site alternatives were considered as the proposed project entails the expansion of an existing production facility where a mining right has already been granted. The kilns will be constructed on Remainder Portion of Farm 510 on an open area (bare soil) next to the existing processing facilities in order to centralise the processing facilities, ensure optimal production efficiency, and to prevent the removal of natural vegetation.

For the new haul road, two alternative routes have been proposed (see Figure 7 and Figure 8). From the quarry on Portion 1 of Farm 308 (mining property), Alternative 1 follows an existing farm road that runs northwards down towards the Wiedou River and then runs eastwards along the edge of the river. The road crosses the river at an existing crossing and then proceeds eastwards in the direction of the N7, crosses over into the neighbouring property (RE/308) where it will eventually join an existing farm road. A new road will need to be constructed from the point the road crosses the Wiedou River till it meets up with the existing farm road in RE/308 and the existing road will be widened to 15 m. Alternative 1 runs within the bed of the Wiedou River (for approximately 2.3 km) and crosses several drainage lines on the southern and northern side of the river (Figure 7 and Figure 8). On the southern side the road crosses several alluvial fans associated with the drainage lines flowing from the south.

Alternative 2 runs eastwards from the quarry, further upslope, approximately 100 m away from the Wiedou River. The road crosses the Wiedou River at the same point as Alternative 1 and then proceeds eastwards at a higher elevation compared to Alternative 1. The road eventually meets up with the existing farm road at the same point as Alternative 1. Alternative 2 will require a new road to be constructed throughout its course in the mine property. Alternative 2 lies outside of the bed of the Wiedou River and crosses several drainage lines on the southern side of the river, but avoids the broader alluvial fans associated with tributaries draining into the river from the south. The section of the new

road on the northern side of the Wiedou River almost follows the catchment divide and avoids crossing the small drainage lines that flow in a southerly direction into the Wiedou River (Figure 3 and Figure 4). Alternative 2 also involves straightening the existing road on RE/308 with a view to shortening the overall length of the road and minimising wear and tear on haul trucks.

Proposed road alternative Alternative 2 is considered as the preferred option as this option crosses fewer tributaries, avoids the alluvial fans associated with tributaries draining from the south into the Wiedou River and also avoids a large section of the bed and banks of the Wiedou River. This alternative is consistent with the management objectives of aquatic CBAs which are to be maintained in a natural or near-natural state, with no further loss of natural habitat (the habitat loss associated with widening the existing road crossing is considered to be negligible). Only low-impact, biodiversity-sensitive land uses are appropriate.

Alternative 1, which would involve widening an existing section of 2.3 km jeep track road in the bed of the Wiedou River, is not consistent with the management objectives for aquatic CBAs and is therefore not recommended.

Crossings over the small drainage channels are also consistent with the management objective of ESAs which is to maintain them in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised. In this respect, road crossings in broad unconfined valleys are expected to be negligible. The lack of any serious erosion or other disturbances at existing road crossings (e.g. CL_5 and CL_9 to CL_11) provides evidence of this statement.

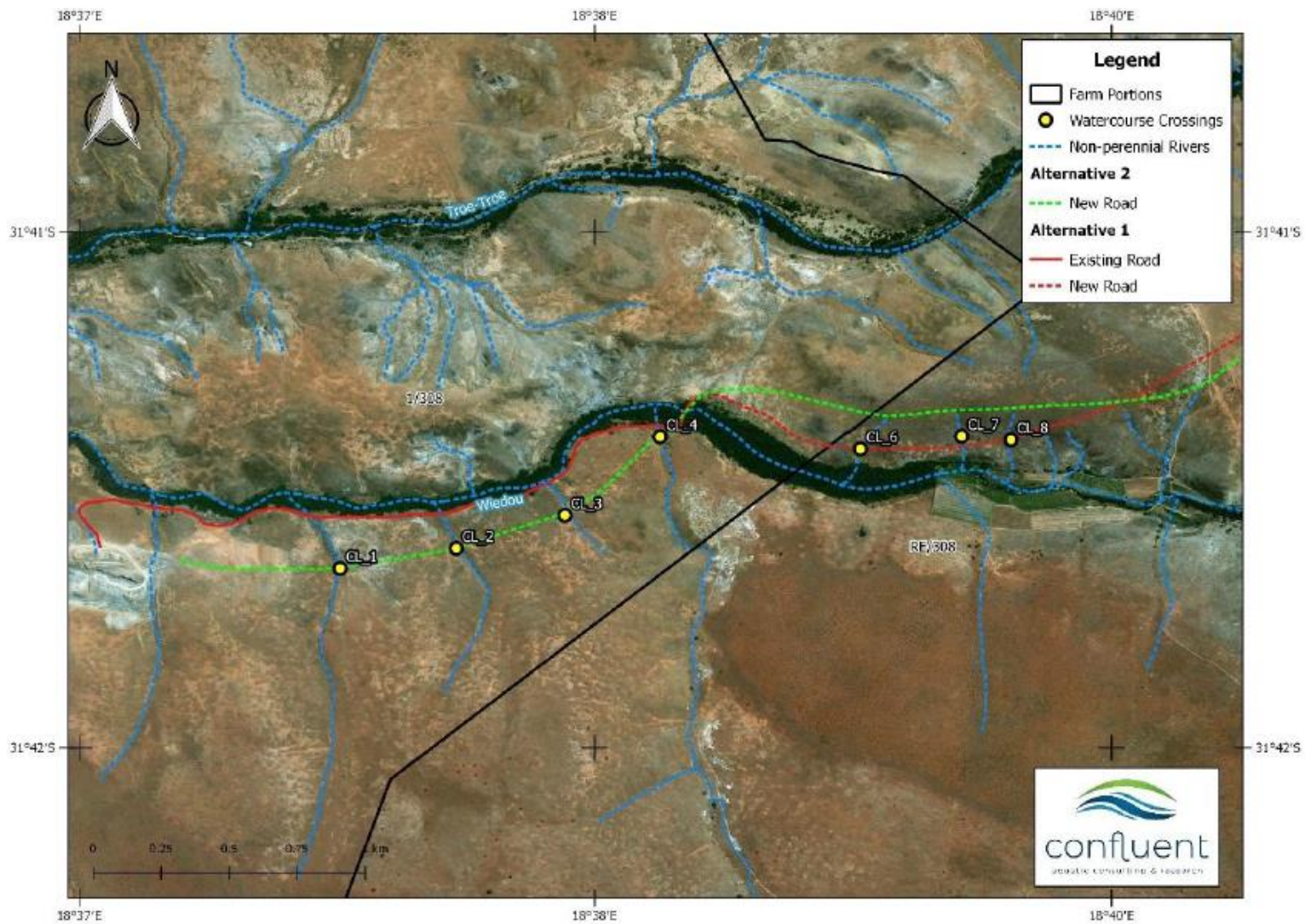


Figure 3: Watercourse crossings (CL_1 to CL_8) associated with Alternative 1 and 2

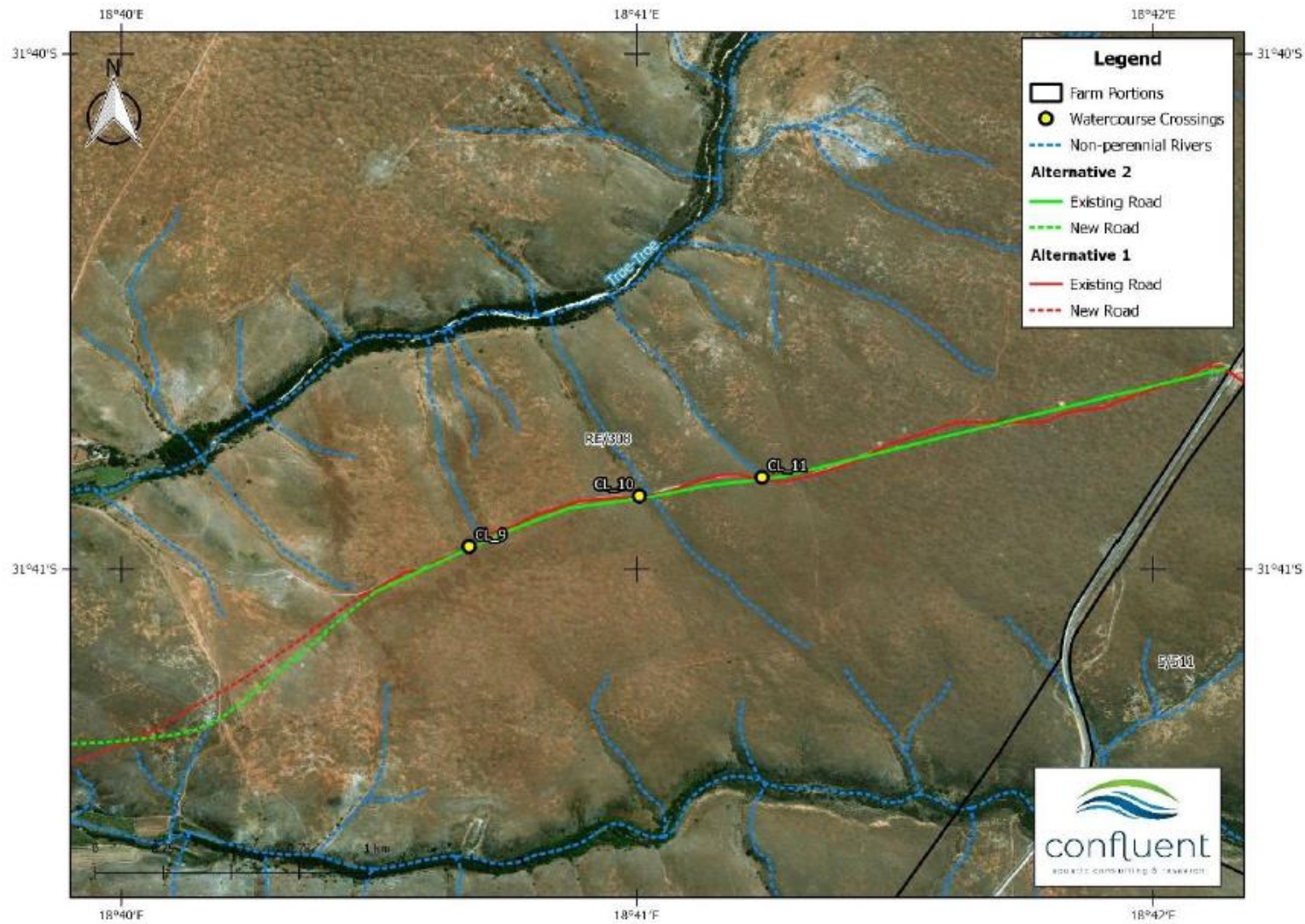


Figure 4: Watercourse crossings (CL_9 to CL_11) associated with Alternative 1 and 2

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(b) The type of activity to be undertaken

The proposed activity is the same as the existing, and involves the expansion of lime kilns to increase the production capacity. Limestone is mined by means of drilling and blasting activities. The blasted rocks are then crushed and screened until it is a suitable size for the kiln. Calcining of the limestone is done by means of a Fluidized Bed Kiln. The calcining is done by burning the fuel source to reach temperatures in the region of 900 °C when the calcination reaction takes place. After the calcination has taken place, the burnt lime can be sold as is or it can be hydrated with water and sold as calcium hydroxide. Cape lime has more than one lime producing mining operations and believes that the existing mining and processing methods are feasible.

(c) The design or layout of the activity.

The additional kilns will be replicas of the existing fluidized bed kilns which has been in operation since 2014. The rest of the current operational facilities will be used for the crushing and screening of limestone for the kiln feed. The existing coal feeding systems will also be utilized for feeding the additional kiln. Depending on the market requirements some of the additional burnt lime will be sold as is and some will be hydrated.

(d) Technology to be used

Technological improvements in calcination technology have focused on (1) improving energy efficiency and (2) improving the yield of calciner feed from the orebody.

- (i) **Alternative 1: energy efficiency** - vertical shaft type kilns are best because heat exchange is optimised by the intimate contact between the stone and gas to achieve efficiencies close to the theoretical requirement for dissociating the carbon dioxide from the carbonate mineral. When the mineral decrepitates on heating, it breaks up, fills the voids and stops the gas flow. The Japanese have developed a small scale rotating preheater vertical shaft system capable of calcining smaller stones. They confirmed that their technology will not work with Maskam limestone. The only conventional technology capable of calcining our limestone is the long shaft rotary kiln.

- (ii) **Alternative 2: maximizing the yield of stone from the quarry** - various techniques have been developed to calcine the finer limestone fractions. For example, the vertical shaft kilns which typically fire a -100+50mm size fraction, can also fire the -50+25mm fraction in a separate fine lime kiln or by loading these fractions as alternating layers in the shaft thereby enabling the firing of the -100+25mm limestone from the crushing plant. The -25mm fraction represents the yield loss of the mined limestone. For the calcination of this fine limestone, there are three technologies: The rotary, fluid bed (FBC) and flash calciners.

The remote location at Vredendal relative to the market and fuel sources saddles the project with serious price and cost handicaps unless lime uses arise in the area. On the other hand, the limestone has unique quality properties enabling entry to high value specialty markets which are currently being supplied by imports. The environmental applications have been made with a 400 TPD (ton per day) capacity based on an enquiry for a new development, other new markets and existing market growth. The advantage of the FBC kiln, like the one running in Vredendal, is that it is modular and units can be added as indicated by the market. The other technologies like the rotary or flash calciners would require the installation of the full capacity upfront. The preferred technology is therefore the FBC option.

(e) The operational aspects of the activity; an

A number of process alternatives have been considered by the applicant and they anticipate that the process that will be followed at the proposed plant will be Fluid Bed Calciners. Process alternatives include, for example, the calcination of limestone by different available technologies paying attention to the suitability of the product being mined and the quantity (in tonnages) of product to be mined in ensuring that high quality lime is produced.

The lime kilns will be fed by a common limestone feed conveyor, drawing from

underneath the limestone stockpile. The coal to be used as fuel in the kilns will also be fed from underneath a coal stockpile, via a common coal conveyor, to the respective kilns. Limestone (CaCO_3) is calcined at $\pm 920^\circ\text{C}$ to obtain quicklime (CaO) using coal as fuel. The plant is fully automated, and all of the process parameters are to be monitored and controlled.

Different types of kilns have been considered for the proposed plant, i.e.

- Alternative 1: Fluid Bed Calciner;
- Alternative 2: Long Shaft Rotary Kiln;
- Alternative 3: Polcal Flash Calciner
- Alternative 4: Polcal Preheater with Rotary Conditioning Kiln
- Alternative 5: Producer Gas Add-On

i. Alternative 1: Fluid Bed Calciners

The FBC has a capacity of 100TPD. Cape Lime therefore need four of these units. The FBC uses a 1-6mm feed limestone and peas coal. It has no moving parts, does not recover any heat from the product and makes use of a fluidizing pod and recuperator heat exchanger to recover some heat from the kiln exit gases. Recent trials have shown that the feed size can be adjusted to 0,3-6mm which will improve the yield of crushed stone that can be fed to the kiln.

The kiln operates by maintaining a bed of material about 1m deep through which preheated air is blown. The air is distributed evenly over the kiln floor area by specially designed jetcaps making “bubbles” which pass through the bed and exit into the freeboard. The bed contains a mixture of limestone, partially calcined limestone and coal which burns in the bed transferring heat to the air and stone at a relatively constant temperature around 920°C . The decrepitated burnt lime – typically finer than 0,5mm is carried out of the kiln by the upflowing gases – is recovered in a product cyclone. This product is cooled by quenching in air after which it is transferred to storage silos.

ii. Alternative 2: Long Shaft Rotary Kiln

Rotary kilns have been used for many years in calcining operations. They can be scaled to any size of operations from a few tons per day to 2 000 TPD. The length of the rotary kiln is used to provide sufficient contact time for the complex heat transfer processes between the gas, kiln refractory and limestone being fed into the kiln. It can be fed with a variety of sizes 10-20mm, 20-40mm, 25-50mm and combinations of these sizes. We have assumed the standard lump size 20-40mm, but for Cape Lime a -50mm may be preferable. The kiln is fired with a pulverised coal burner, which means that this

technology requires a coal milling and pulverised coal storage options (PF – pulverised fuel). Alternatively, the kiln could be fired with producer gas made by gasifying coal if ash, sulphur and carbon contamination are issues. A partial heat recovery of the heat in the fired product is obtained via a rotary cooler. See Figure 5 below.

Limestone is fed into the kiln which due to the shaft inclination and rotation causes the limestone to move towards the discharge end. The speed of rotation determines the residence time of the stone in the kiln. At the discharge end, a burner introduces hot air (1 300-1 450 °C) which heats the refractory and the stone. The calcined product at ~1 100 °C falls into the rotary cooler which contacts the hot product with air thereby cooling it to about 80 °C. The cooled product is discharged directly onto a product belt for transfer to storage. The heated air from the cooler is used as secondary air for the burner and to transfer heat up the kiln shaft.

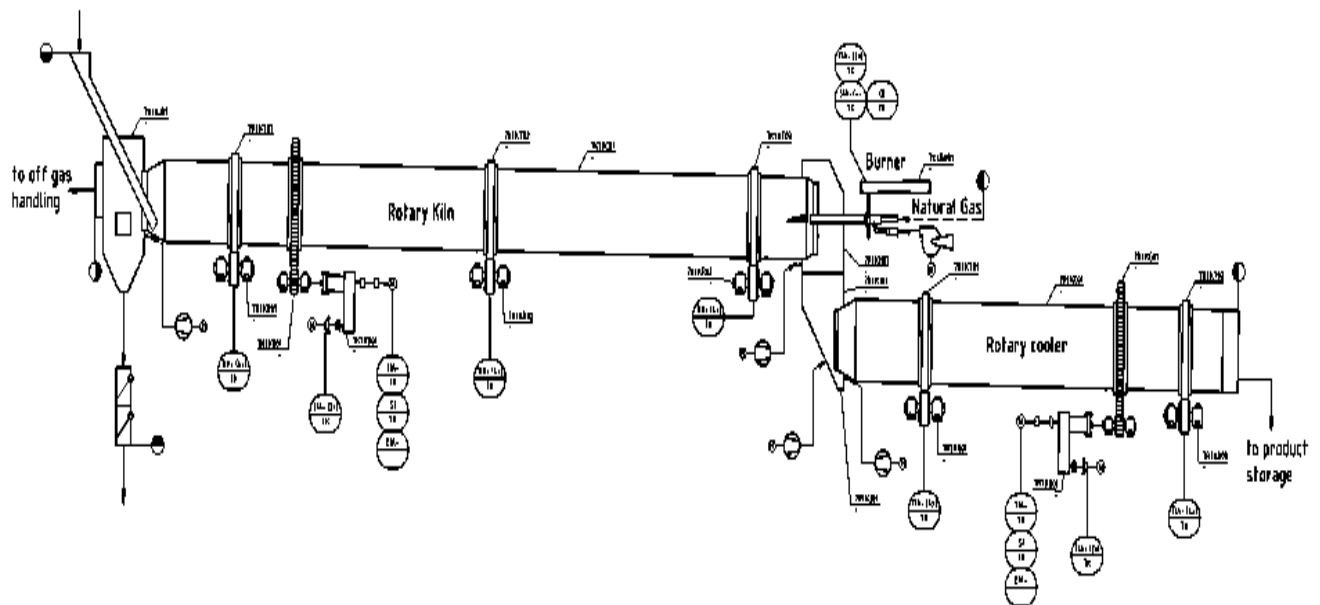


Figure 5: Image of Rotary Shaft Kiln.

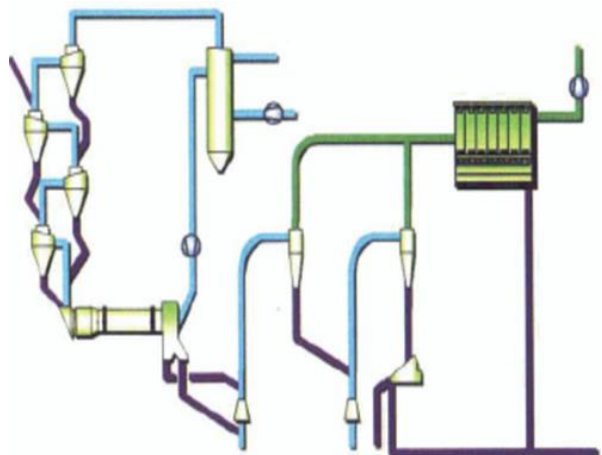
iii. **Alternative 3: Polcal Flash Calciner**

Since the limestone decrepitates, Thyssenkrupp suggested that flash calcining might be an option. They have tested a sample of the Maskam limestone and found it suitable for their Polcal process. The plant uses a feed limestone that is crushed to below 2mm before feeding into the calciner. The kiln is also fired with either (PF – pulverised fuel) or producer gas in a specially designed chamber which contacts the preheated limestone with hot gases. Heat recovery from the product is achieved by the use of a flash, grate, or rotary cooler. This technology is essentially the back end of a cement plant – counter current contact of hot gas and ground limestone in multi stage cyclones. It has no moving parts and can be scaled to very large capacities.



iv. **Alternative 4: Polcal Preheater with Rotary Conditioning Kiln.**

This is a combination of options 2.2 and 2.3 for making controlled reactivity quicklime for example the AAC market. The preheated / partially calcined limestone from the cyclones is treated in a short rotary kiln for adjustment of the final reactivity characteristics.



v. **Alternative 5: Producer Gas Add-On**

Since the burning of coal exposes the lime to ash and sulphur contaminants, the idea has been put forward to first convert the coal to producer gas by gasifying it. Although the gas operation will have a very beneficial effect on the product quality and the kiln operating stability, it may have a negative effect in terms of the overall plant availability because of the sequential linking of two plants.

The use of producer gas will also improve the yield of premium product and eliminate the need for beneficiation. It can be applied to the FBC, rotary and flash calciners – using a gas instead of pulverised fuel burners. This improvement comes at the cost of a lower energy efficiency because of the coal energy loss in the gasifying process. This option will only be considered if required by the market.

The remote location at Vredendal relative to the market and fuel sources burdens the project with serious price and cost handicaps unless lime uses arise in the area. Due to the fact that the Fluid Bed Calciner is modular and units can be added as indicated by the market, it is the preferred kiln option from the above-mentioned alternatives. The fluidized bed calcination process is by far the most feasible and reliable calcination technology available for the type of limestone mined at Cape Lime. The lime source has a high deprecating. The other technologies, like the rotary or flash calciners, would require the upfront installation of the full processing capacity and thus were not considered cost-effective.

(f) No-Go Alternative

The No-Go alternative implies no change in the site's status quo, in other words no process expansion will take place. Should the expansion not be granted, the applicant will face continued shortages of production of high quality lime to the different industries that needs lime. The work opportunities to the proposed employees will be lost

Not proceeding with the proposed haul road means that more transport cost will be incurred by the applicant to bring material from Maskam to the Vredendal site, more carbon will be emitted into the atmosphere and the public will experience more truck traffic along the N7 and R27 public roads.

ii) Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The Public Participation Process (PPP) for this project satisfied the requirements stipulated in Chapter 6, Sections 41, 42, 43 and 44 of R982 of the NEMA EIA Regulations 2014 promulgated in terms of the National Environmental Management Act, Act 107 of 1998.

Scoping Phase

Stakeholder Identification

The interested and affected parties (I&APs) in and around the study area were identified and a dedicated stakeholder database for the project was developed. A dedicated stakeholder database for the project is and has been fundamental to the ultimate success of the consultation process.

The database includes stakeholder representatives of a broad range of sectors of society, i.e. National Government, Provincial Government, Local government (municipalities within the study area), Surrounding and effected Land owners, NGOs, CBOs and authorities, Organised Labour, Business and commerce, Developmental bodies, Research, engineering and other professional bodies, Community and tribal leaders, previously disadvantaged groups (i.e. women, the youth and organisations for the disabled), etc.

Announcement of the project and its EIA process

The proposed project and EIA process was announced in the study area in the following ways:

Notification of I&APs

At the commencement of the project, written notices and Background Information Documents (BIDs), were sent to the landowners surrounding the Vaderlandshce Rietkuil, as well as stakeholders and organs of state with a direct interest in the project. Since then, there has been ongoing distribution of these documents via email to I&APs that are identified as the project progresses. Copies of these letters, together with the details of the recipients are included in **Appendix C5**.

- Department of Mineral Resources (DMR)
- National Department of Environmental Affairs
- Department of Agriculture, Fisheries and Forestry
- Matzikama Local Municipality
- Department of Transport and Public Works – Road Network Management
- West Coast District Municipality
- Department of Agriculture Forestry and Fisheries - Directorate: Land Use and Soil Management
- Cape Nature – Scientific Services
- Heritage Western Cape
- Kleinrivier Primary School
- Lower Olifants River Water Use Association
- Transnet Ltd
- Eskom

Site Notices

Six (6) site notices of A2 size were erected in various conspicuous places including Vanrhynsdorp

Public Library at 9 Church Street; Shoprite entrance, Vredendal; Thusong community center, Vredendal North; E learning center, Vredendal North; Vredendal Public Library on 37 Kerk Street; as well as on the entrance of Cape Lime properties. Proof of the placement of the site notices is included in **Appendix C2**.

Media Announcement

A newspaper advert was placed on Ons Kontrei Newspaper on the 13th of March 2020 notifying the general public and other interested and affected parties about the public participation process that will be taking place. See **Appendix C1**.

Consultation of Stakeholders

A pre-application Focus Group Meeting was held with the Matzikama Local Municipality on Thursday the 21st November 2019. Attendance register and minutes of the meeting are attached in **Appendix C6**.

Comments and responses during scoping phase

Comments received were responded to as per the requirements of Regulation GN No. R.982. The comments and response report as well as all comments received have been attached to this report in **Appendix B8**. A record of all comments received, together with a note of the responses given, will maintained continuously.

The interested and affected parties (I&APs) in and around the study area were identified and a dedicated stakeholder database for the project was developed. A list with complete details of the I&APs is kept by the EAP and will be updated as the project progresses. The I&APs register is included in **Appendix B5**.

EIA PHASE

An advertisement regarding the availability of the Draft EIA/EMP reports was placed in the Ons Kontrei and Die Burger Newspaper published on 12 March 2021, see **Appendix C10**.

Availability of Reports

The draft EIA/EMP will be made available to all registered stakeholders on the Vaderlandsche Project for the required public review period.

iii) Summary of issues raised by I&As

Table 5: Summary of comments and issues raised

Interested and Affected Parties		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.					
AFFECTED PARTIES					
Landowner/s	X		The Landowner is the applicant of the project and is well aware of the proposed project		
Lawful occupier/s of the land	X		The lawful occupiers of the site is the applicant		
Landowners or lawful occupiers on adjacent properties			The landowner was notified of the proposed project and he had no comments concerning the proposed project		
Municipal councilor	X		The ward councilor was notified of the proposed project and no comments concerning the proposed project.		

Matzikama Local Municipality	X	Email on 17 March 2020	No record of any approval for mining activities on Portion 4 of the Farm Welverdiend No 511 can be found and therefore it seems that Portion 4 of the Farm Welverdiend No 511, which is a portion of land that is for road widening of the N7 (see following inserts and attached SG Diagrams 2696/2013-1 and -2) is an incorrectly used property description.	The proposed road construction and expansion will take place on the Vaderlandsche Rietkuil 308 and does not involve the expansion of the N7. This road will connect to an already existing slip road/off ramp on the N7 that is at the entrance of the Welverdiend property.	N/A
			Please take note that a portion (±460,19ha) of Farm Welverdiend No 511 as indicated with in the attached land use approval with reference “15/6/1/9; 17/11/2/1/17; 15/6/7/2/9 & PI 511” dated 28 May 2015 is zoned as Agricultural zone I with a temporary departure for mining activities.	The applicant (Cape Lime) will undertake the process for land zoning with the Matzikama Municipality	N/A
Matzikama Local Municipality	X	Email on 17 March 2020	It seems from the documents provided that the proposed development will not be contained within the approved departure area and therefore a new land development application in terms of Section 15(2) of the Matzikama Municipality: Land Use Planning By-Law, 2015 must be submitted to and approved by the Municipality before expansion commences on Portion 5 of the Farm Welverdiend No 511.	No expansion activities will take place on the farm Welverdiend on this application. Only a road from Vaderlandsche Rietkuil 308 will be connected to farm Welverdiend	Appendix C6

Matzikama Local Municipality	X	Email on 17 March 2020	Cognisance must be taken of the judgement handed down in the Constitutional Court of South Africa on 12 April 2012 on the issue of the Minister of Mineral Resources vs. Swartland Municipality and Others and Maccsand (Pty) Ltd vs. City of Cape Town (Chamber of Mines of South Africa and Agri South Africa as Amici Curiae Case nos.: CCT 102/11 [2012] ZACC 8 & CCT 103/11 [2012] ZACC 7) where relevant companies are restrained from conducting mining and / or prospecting activities.	Comment noted, the applicant has been advised to follow the right procedure	
			The Environmental Section of the Municipality is included within this email to enable them to provide comments from an environmental side.	No comments from the Environmental Section have been received	
West Coast District Municipality – Air Quality Officer	X	Email on 26 May 2020	Knersvlakte Dolomite Vygjeveld has a very limited distribution range and are mostly threatened by mining activities and road construction. Any loss of designated CBA's must be avoided. A search and rescue plan and activity must be compiled and executed to remove and recover ant plants and animals before road construction commences. This should be done in partnership with Cape Nature	Recommendation on compilation and execution of search and rescue plan and activity will be added on EAP's recommendations to be added on the Environmental authorisation	
			The necessary water use license must be obtained from the Department of Water and Sanitation for the legal extraction, discharging or disposing of both surface and groundwater	The Water Use License application process is still in progress on e-WULAAS	

West Coast District Municipality – Air Quality Officer	X	Email on 26 May 2020	The DSR fails to provide a description of the alternatives of the proposed activities that have been considered by the applicant. The EAP is reminded of the requirements of regulation 2(1) of Appendix 2 of the NEMA EIA Regulations, 2014 (as amended), which requires that a scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives. This includes, inter alia, a description of alternatives considered for the proposed access road, technology alternatives considered for the proposed lime kilns, etc.	The alternatives considered have discussed in section of the FSR, section v).	
			New and existing roads and maintenance/improvements thereof, including dust suppression measures, need to be done by mining company (Cape Lime (Pty) Ltd).	Comment to be added on the EMPr section	
			The construction of two lime kilns in addition to the existing which has been in operation since 2004 necessitates an air quality license being issued by the WCDM Air Quality Section. Application for the construction of the additional kilns should therefore be lodged with the WCDM's Air Quality Officer	The applicant will submit an application with the WCD Air Quality Section in due course	
			Various complaints received over the years from surrounding vineyard owners regarding the impact of the Cape Lime operations on the agricultural sector in the immediate vicinity begs the question whether additions to the existing facility will exacerbate this situation. More information should be provided in this regards.	Complaints have been from 1 farmer only. The Kilns have baghouses with AEL licenses. The new Kilns will not increase the dust issue. The applicant has capital approved to improve the airborne dust generated from ROM bins and loading points. A dust management plan as well as dust management improvement plan. Dust buckets are situated on our boundaries (neighboring farmer) and this is managed monthly and additional actions put in place if dust bucket readings exceed limits.	

West Coast District Municipality – Air Quality Officer	X	Email on 26 May 2020	Possible contamination of groundwater from the coal stockpiled for the kilns, as referenced in the DSR, must be investigated based on best practices to prevent such occurrence. An action plan and findings must be submitted to the WCDM Air Quality Officer	Cape Lime would like to use LNG (liquid natural gas) as a fuel source, instead of Coal for the proposed new Kilns. This will be a major environmental improvement and hence only the current Kiln will continue to operate on Coal as its fuel source.	
			Best practices must be included in the Environmental Management Plan to manage all potential sources of pollution during the construction and processing phases in order to prevent any negative impacts on the surrounding environment. Dust management and monitoring must be done in accordance with the National Dust Control Regulations (No 827 of 1 November 2013 as amended)	Mitigation measures to address air pollution and dust management will be addressed on the EMP	
			Copies of the following must be submitted to the WCDM Air Quality Officer for comment: <ul style="list-style-type: none"> • Comments and Responses Report as well as Final Scoping Report • Air Quality Impact Assessment report conducted by Lethabo Air Quality Specialists (Pty) Ltd Granted Environmental Authorisation	The requested documents will be submitted to the WCDM Air Quality Officer, however, the Environmental Authorisation is not available as it is only issued on the final stage of the EIA should the competent authority be satisfied with the EIA process conducted.	
			It is recommended that the Ambient Air Modelling Specialist Studies be included in the list of studies under item 8.1 in the DSR. Once completed, the report must be submitted to the Air Quality Officer for comments	Results of Ambient Air Modelling Specialist has been included on section 8.1 of the FSR	

West Coast District Municipality – Air Quality Officer	X	Email on 26 May 2020	An updated fugitive dust management plan, containing dust preventative measures and control in respect of nearby land owners and agricultural activity during construction, production and abnormal conditions, must be submitted to the Air Quality Officer. The plan must be adapted to accommodate the existing operations as well as proposed upgrades	A dust management plan is already in place and the applicant will revised to accommodate the proposed operations.	
			The potential cumulative impact description mentions that vehicular movement on and off site contributes to traffic, dust generation on unpaved roads and product spillage. Detail on how these impacts will be managed must be included in the above mentioned plan	Comment noted	
			Dust mitigation measures must be implemented and maintained at all times and in all areas where dust could be generated in order to prevent negative impacts on the surrounding environment	Comment noted, the EAP will liaise with the Department to initiate the AEL process	
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e	X				
	X	Email on 4 April 2020	Afrimat abstract water from the limestone mining area. This activity triggers Section 21 (j) of the National Water Act, 1998 (Act 36 of 1998) which is removing, discharging or disposing of water found underground if it necessary for the efficient continuation of an activity or the safety of people. It has been noted that a Water Use License Application was submitted to this Department in this regard.	The Water Use License application process is still in progress on e-WULAAS	

Western Cape Department of Water and Sanitation	X	Email on 4 April 2020	A stormwater management plan that will address the impacts of storm water on both surface and groundwater resources must be put in place	Vredendal is classed as hot desert climate (BWh) with 170mm rainfall per annum (if they are lucky). April to Aug is their rainy season with approx. 20mm rainfall per month (max). When it rains, large puddles form on site and water doesn't flow (there is not enough to start the flow of water). We manage this by firstly laying out stone (from our quarry) in areas that are slippery or have large puddles of water. We wait for the ground to dry (a few days) and then grade the site to assist with road maintenance. There is no need for a stormwater plan.	
			No pollution of Troe-Troe and Wiedou Rivers or any surface water or groundwater resources may occur due to the proposed activity	Measures will be put in place in the EMPr and stormwater management plan to prevent pollution into these water resources	
			All the requirements of the National Water Act, 1998 (Act 36 of 1998) regarding water use and pollution management must be adhered to at all times	Comment to be added to EMPr section	
			These comments do not exempt you from complying with other relevant legislation.	Comment noted	
			Please note that the Department reserves the right to amend and/or add to the comments made above in the light of subsequent information received	Comment noted	

Other Competent Authorities affected					
Western Cape Department of Environmental Affairs and Development Planning Directorate: Development Facilitation	X	Email on 08 July 2020	It is noted that an application for an atmospheric emission licence (“AEL”) will be lodged with the Department of Environmental Affairs, Forestry and Fisheries (“DEFF”) after the completion of the EIA process. As per paragraph 2.8. above, the requirements of the One Environmental System would also apply, specifically in terms of the synchronisation of the applications in terms of the NEMA and the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (“NEM: AQA”). A decision on an AEL application must be decided at the same time as the decision on the NEMA EIA application.	Comment noted, the EAP will start liaising the Department to initiate the AEL process	

Western Cape Department of Environmental Affairs and Development Planning

Directorate: Development Management (Region 1)

X

Email on 08 July 2020

The DSR indicates that the application for an AEL will be submitted to the DEFF as the proposed lime kilns trigger the specified activity in subcategory 5.6: Lime Production identified in GN No. 893 of 22 November 2013 (as amended): *Listed Activities and Associated Minimum Emission Standards identified in terms of section 21 of the NEM: AQA, 2004*. Please note the requirements of section 38(3)(b) of the NEM: AQA, stipulating the publication of a notice in at least two newspapers circulating in the area in which the AEL listed activity is applied for. Proof of the placing of the newspaper advertisements must be included in the Draft EIA Report.

One advert was placed for the DSR, to ensure compliance, two adverts will be placed on the adverts to advertise the Draft EIAR

It is noted that more than 20ha of virgin land will be cleared to expand the current limestone mining activities, phasing in the provision of two new kilns and establishing workshops and an office complex. An explanation is absent of how each of the listed activities for which environmental authorisation ("EA") is sought, will be triggered by the proposed development. This Directorate suggests that going forward in the EIA application, the EAP should explain how/why each of the listed activities is triggered, which would assist I&APs in understanding why EA is sought for the identified listed activities.

The current mining right is currently authorised under the MPRDA, it is anticipated that the mine will expand its activities in the future for the aggregate and limestone mining. The triggered Listed Activities under the NEMA EIA 2014 as amended have been explained on Table 2 above to align to the current activities for compliance

<p>Western Cape Department of Environmental Affairs and Development Planning</p> <p>Directorate: Development Facilitation</p> <p>Western Cape Department of</p>	<p>X</p> <p>X</p>	<p>Email on 08 July 2020</p>	<p>This Directorate has noted that some specialist studies will be undertaken for the proposed development. The EAP is advised to consider the “Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation” (“the protocols”), promulgated in GN No. 320 of 20 March 2020, which came into effect on 9 May 2020. With regards to the specialist studies for which no specific protocol has been prescribed, the level of assessment must be based on the findings of the site verification and must comply with Appendix 6 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (“NEMA”) EIA Regulations, 2014 (as amended).</p>	<p>The specialists have been compiled prior to the promulgation of these regulations, however the EAP will ensure that the appointed specialists are furnished with these regulations to confirm if they have complied.</p>	
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Environmental Affairs and Development Planning

Directorate: Development Facilitation

Email on 08 July 2020

X

<p>It is noted that the proposed haul road will cross the non-perennial Wiedou River. Photo 4, page 23 of the DSR depicts “An existing passage through riverine bush in the vicinity of the proposed river crossing for new access road to the Maskam mine.” Statements on page 24 of the DSR refer to “The proposed access road (8.7 km) to the Maskam mining site passes through mainly Gannabosveld, with a ±180 m passage through Namaqualand Riviere” and “The western part of the proposed access road ... angling down towards the Widou River, which is crossed.” The EAP is advised that the applicability of the following listed activities not currently applied for, should be considered and if applicable, the identified listed activities must be applied for via the submission of a Revised Application Form to the competent authority. Where necessary, specialist input may be required to investigate the (direct and cumulative) impacts associated with the listed activities, which must be reported on in the Draft EIA Report.</p> <ul style="list-style-type: none"> • Activity 12 of Listing Notice 1 of the EIA Regulations, 2014 (as amended); • Activity 19 of Listing Notice 1 of the EIA Regulations, 2014 (as amended); and • Activity 4 and/ or 18 of Listing Notice 3 of the EIA Regulations, 2014 (as amended). 	<p>Activity 12 of Listing Notice 1 of the EIA Regulations, 2014 (as amended) is not applicable, the applicant has explained that the the river crossing will be built from Run of Mine Material as it will not be washed away when and if the river flows. The new haul road will be a gravel road, built with the applicant’s own road material (G5 material). The road will be 15 m wide. Where the road crosses narrow, confined or eroded watercourses, the channel will be filled with run of mine material (boulders etc.) to elevate the road surface above the stream bed and overlaid with G5 material. No culverts are planned and waterflow will pass through voids in the run of mine material.</p> <p>EIA activity 19 of Listing Notice 1 and Activity 4 and 18 of Listing Notice 3 have been considered and the EAP will revise the application and submit to the competent authority with the Final Scoping Report. The Biodiversity specialist has been requested to revise the report to address the cumulative impact</p>	
<p>Please further be advised should more than 30m³ but less than 80m³ of dangerous goods on any of the affected properties be stored or handled for the proposed development, then Activity 10 of Listing Notice 3 of the EIA Regulations, 2014 (as amended) would be applicable and must be applied for. If applicable, the location of the dangerous good storage facility must be indicated on the site layout plan.</p>	<p>The applicant will confirm that they store 70m³ of dangerous goods, however, this activity does not apply to the description on the EIA regulations amended</p>	

X

Email on 08
July 2020

<p>Page 43 of the DSR states that more than 20ha of indigenous vegetation will be cleared “<i>for the purposes of mining limestone deposits, erection of existing offices, processing plants and associated office facilities</i>” (own emphasis). Please provide clarity whether additional mining activities will be undertaken, which would trigger Activity 17 of Listing Notice 2 of the NEMA EIA Regulations, 2014 (as amended).</p>	<p>The applicant already have a mining right, this activity will be listed on the amended application form to confirm compliance</p>	
<p>Page 27 of the DSR indicates that “<i>None of the vegetation types appear on the current national list of threatened ecosystems (DEA 2011)</i>”. Page 32 of the DSR however indicates that Activity 12 of Listing Notice 3 of the EIA Regulations, 2014 (as amended) is applied for. The Draft EIA Report must confirm the applicability of said listed activity, i.e. that it will involve the clearance of more than 300m² of indigenous vegetation listed as an endangered or critically endangered ecosystem in terms of the <i>National List of Ecosystems that are Threatened and in Need of Protection</i> published in GN No. 1002 of 9 December 2011 in terms of section 52(1)(a) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).</p>	<p>The Biodiversity specialist has confirmed that the vegetation within the mining area and proposed haul is not threatened. The EAP will therefore remove this activity on the amended application to be submitted to DMR</p>	

X

Email on 08
July 2020

This Directorate advises that the DSR does not meet the minimum requirements of Appendix 2 of the NEMA EIA Regulations, 2014 (as amended). It is noted that the EAP compiled the DSR using the competent authority's *Guideline for the compilation of a Scoping Report with due regard to Consultation with Communities and Interested and Affected Parties*. The EAP is advised that the correct Scoping Report template must be used, which can be downloaded from the URL <http://www.dmr.gov.za/samrad-online-system>. The Scoping Report Template requires that all the information requirements must be provided, including the following:

- 2.1.1. Details and expertise of the EAP that compiled the DSR, including a curriculum vitae;
- 2.1.2. Description of the application area;
- 2.1.3. The Surveyor General code of each cadastral land parcel;
- 2.1.4. A description and coordinates (with start, middle and end-point coordinates) of the corridor of the proposal haul route;
- 2.1.5. Need and desirability of the proposed activities; and
- 2.1.6. Policy and legislative context.

Please ensure that the Final Scoping Report ("FSR") to be submitted to the competent authority is compiled using the correct template.

The correct report has been downloaded and used. Most of the content provided on the template used has been addressed by the content

**Western Cape Department of
Environmental Affairs and
Development Planning**

**Directorate: Development
Facilitation**

**Email on 08
July 2020**

In terms of GN No. 960 of 5 July 2019, the submission of a report generated from the National Web Based Environmental Screening Tool ("Screening Tool") is a compulsory requirement when applying for EA in terms of the NEMA EIA Regulations, 2014 (as amended). If not yet undertaken, the EAP is advised to urgently consult the Screening Tool and generate a screening report. Based on the findings of the screening report, the EAP will be required to either appoint specialists to undertake the identified specialist studies, or to provide a motivation in the FSR and Plan of Study for EIA why the specialist studies will not be undertaken or deemed necessary for the EIA process. Should additional specialist studies identified by the Screening Tool be required, these specialist studies must be undertaken and the Plan of Study for EIA must be amended to indicate which additional specialist studies will be undertaken.

The screening exercise has been undertaken and the report was submitted to the competent authority with the application form. The FSR has been amended to elaborate on studies that will not be conducted

The DSR indicates that the applicant currently mines and processes limestone and dolomite on the Remainder of Portion 1 of Farm Vaderlandsche Rietkuil No. 308, Farm Nuwedrif No. 450, Portions 21 and 26 of Farm KYS No. 301, and Portion 162 of the Farm Karoo Vlakte 299, Vredendal ("the Vredendal mine"). The applicant is also in possession of a mining right on the Remainder of Portion 4 of Farm Welverdiend No. 511, Vanrhynsdorp ("the Welverdiend mine"). Per the DSR, the proposed development entails the construction of two new kilns (calciners) and the construction of a haul road between the Welverdiend mine and the Vredendal mine. The construction of the new haul road will entail connecting a new road with two existing roads.

		<p>The Draft EIA Report should provide detailed information on the following:</p> <ul style="list-style-type: none"> • Please indicate on which property/ies of the Vredendal mine the proposed two kilns will be developed (assuming to be on Portion 1 of the Farm Vaderlandsche Rietkuil No. 308 per the layout on Figure 3). • Page 5 of the DSR refers to the construction of a haul road between the Welverdiend mine and Portion 1 of the Farm Vaderlandsche Rietkuil No. 308. Pages 9 and 10 however indicate that Portion 0 of the privately-owned Farm Vaderlandsche Rietkuil No. 308 is proposed for the haul road. Please confirm the affected property for the development of the new haul road. • Information regarding the construction of the new haul road (e.g. type of road proposed (gravel vs. surfaced), whether the existing two roads would require upgrading to accommodate the haulage of 3000-ton material per month whether any road bypasses would be required for upgrading of the existing two roads, etc.). • The width, length and road reserve of the proposed haul road and dimensions of the existing two roads, should upgrading thereof be required. • Whether any associated infrastructure and structures (e.g. bridges, culverts, etc.) will be required for the proposed haul road, especially where it crosses the river. (In this regard, please refer to paragraph 2.4. below.) • Development footprints of all the components of the proposed development, which must be superimposed on a site layout plan. 	<p>The two kilns will be located on Farm 510 Remainder (the old Karoo Vlakte Farm), near the existing Kilns</p> <p>Remainder Vaderlandsche Rietkuil 308, the applicant plans to purchase farmers land and register the new road as a servitude</p> <p>The new haul road will be a gravel road, it will be build in-house with the applicant's own road material (G material). There will be no bypasses as there is no traffic (private road). The road will be 15m wide. The applicant has their own road maintenance machines eg the road grader for road maintenance and building.</p> <p>The proposed road will be 15m wide with no road reserve. It is anticipated that there should be an upgrading on the existing gravel that occurs on the farmer's land to increase its width to 15m should it have narrowed since it is not frequently used. The upgrading process will also laying down the G material</p> <p>Comment noted</p>	
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		<p>It is noted that an application for a water use licence (“WUL”) has been submitted to the Department of Water and Sanitation in terms of section 21(j) of the National Water Act, 1998 (Act No. 36 of 1998) (“NWA”). Please be advised that the proposed development of the haul road also potentially trigger water use activities in terms of section 21(c) and (i) of the NWA, 1998. Please further be advised that the “One Environmental System” would be applicable to this application, specifically in terms of the synchronisation of the applications in terms of the NEMA and the NWA, 1998. In this regard, please refer to this Department’s Circular EADP 0028/2014: One Environmental Management System.</p>	<p>Section 21(c) and (i) of the NWA water uses have already been included on the application specifically for the proposed haul road</p>	
		<p>It is noted that the only operational borehole remaining (of the three drilled), is utilised for on-site dust suppression purposes, and that dust suppression measures “will also be implemented on the Welverdiend road to prevent excessive dust.” Does this imply that the operational borehole will also be utilised for dust suppression purposes on the Welverdiend road, or will further alternatives be investigated in this regard? Additional information is required. Please further note that the use of potable water for dust suppression is not supported and should be avoided.</p>	<p>The quarry currently extracts underground water from the pit in order to allow to continue mining safely. Part of the water is discharged into the Wiedou River and a small percentage of the water is also used for dust suppression.</p>	
		<p>This Directorate notes and supports the proposed Geohydrology Impact Assessment. It is recommended that measurements for the groundwater table be conducted during the rainy season when the highest water table is anticipated.</p>	<p>Mitigation measure to conduct groundwater table during the rainy season when the highest water table is anticipate will be added on the EMPr</p>	

		<p>Furthermore, it is recommended that the proposed Monitoring Programme emanating from the Geohydrology Impact Assessment, consider and investigate potential adverse impacts to ground – and surface water due to the abstraction and discharge of water from the limestone mining area. Alternatively, if measures are already in place to mitigate potential impacts associated with discharge, kindly provide a description thereof. In addition, it is requested that more information on this practice and the “valley” and “discharge point” referred to, are identified on a map and included in the Draft EIA Report.</p>	<p>Comment will be addressed on the Draft EIA</p>	
		<p>The DSR indicates that the Wiedou and Troe Troe Rivers which traverse the property, are seasonal; however, potential adverse impacts should still be assessed in terms of river crossings for the proposed new access and haulage road. Furthermore, it is noted that the properties are not relatively “flat” as indicated on page 16, but that the overall topography is gently undulating, as depicted in the maps and photographs, with the relatively steep gradients down to the river beds, as correctly noted on page 16. These gradients are particularly relevant when considering potential impacts associated with runoff, pollution, and contamination risks emanating from the haulage road, dewatering of the mining area, and operational mining activities.</p>	<p>Potential impacts associated with runoff, pollution, and contamination risks emanating from the haulage road, dewatering of the mining area, and operational mining activities will be assessed</p>	

		<p>Further detail is required on the location of the proposed new kilns (at a finer scale than that provided in the DSR). It is noted that the potential for suspended solids from raw material preparation, storage and handling, can be considered a water pollutant, and management measures should be in place to prevent such impacts. This would also include storm water management for the area housing the kilns and material storage areas. Considering this, it is recommended that the Environmental Management Programme (“EMPr”) compiled for the environmental impact reporting (“EIR”) phase include detail with respect to good housekeeping and storm water management.</p>	<p>The two proposed kilns will be located on Farm 510 Remainder (the old Karoo Vlake Farm), near the existing Kilns. Vredendal is classed as hot desert climate (BWh) with 170mm rainfall per annum (if they are lucky). April to Aug is the rainy season with approximately 20mm rainfall per month (maximum). When it rains, large puddles form on site and water doesn’t flow (there is not enough to start the flow of water). This is managed by firstly laying out stone (from the quarry) in areas that are slippery or have large puddles of water. The ground is then left to dry for a few days and then grade the site to assist with road maintenance. With that said, it can be said that there is no need for a stormwater management plan.</p>	
		<p>Further to the above, page 36 of the DSR states the following: <i>“Surface water – Removing and discharging of groundwater from the mine pit into a surface body (river) increases the risk of introducing contaminants into the surface water body, should vehicle and equipment break downs and leaks occur close to the dewatering pit. Cleaning of vehicle equipment near the river will result in surface water contamination.”</i> Please note that there should be no cleaning of equipment near any river or tributary, irrespective of whether the watercourse is seasonal. It is essential that contingencies in the case of breakdowns or leaks close to the dewatering pit are incorporated into the EMPr, and that mitigation measures are recommended to adequately manage and maintain equipment and materials.</p>	<p>A fresh water specialist will be appointed and findings will be added into Draft EIAR</p>	

		<p>Pages 20 and 24 of the DSR refer to Appendix 1. Furthermore, section 7.6, page 43 of the DSR refer to the minutes and attendance register of a consultation meeting held on 21 November 2019, attached as Appendix A. Please note that Appendix 1 and Appendix A were not included in the DSR received via e-mail correspondence.</p>	<p>The minutes of the meeting held with the Matzikama Local Municipality could have mistakenly omitted, these minutes and attendance register are attached as Appendix C6</p>	
		<p>Page 12 of the DSR states that the Kleinrivier Primary School is situated approximately 550m west of the processing plants. Figure 3 (surrounding land uses map) indicates the location of the “fluid bed calciner site” directly adjacent to the primary school. Will the Air Quality Impact Assessment provide an assessment of potential air quality and noise impacts to the sensitive receptors, and have alternative locations for the proposed lime kilns been considered?</p>	<p>The Air Quality Specialist has been requested to add an assessment of potential air quality and noise impacts to the sensitive receptors. The two proposed kilns will be located on Farm 510 Remainder (the old Karoo Vlake Farm), near the existing Kilns. The kilns will be constructed on an open area (bare soil) next to the existing processing facilities in order to centralise the processing facilities, ensure optimal production efficiency, and to prevent the removal of natural vegetation.</p>	
		<p>The findings of the externally appointed review EAP must be included with the submission of any reports to the competent authority. In this regard, the EAP is referred to regulation 13(2) of the NEMA EIA Regulations, 2014 (as amended), which requires the appointment of an independent EAP prior to undertaking the PPP.</p>	<p>Comments from the independent reviewer are attached as Appendix C5</p>	
		<p>Please update the section on socio-economic by utilising the most recent figures and statistics as opposed to 2013 statistics that were cited in the DSR. The Draft EIA Report should include reference to the most recent Municipal Economic Review and Outlook Report and the most recently approved Integrated Development Plans and Spatial Development Frameworks of Matzikama Municipality and West Coast District Municipality.</p>	<p>Comment noted</p>	
<u>OTHER AFFECTED PARTIES</u>				
<u>INTERESTED PARTIES</u>				

iv) The Environmental attributes associated with the development footprint alternatives.
(The environmental attributed described must include socio- economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) **Baseline Environment**

(a) Type of environment affected by the proposed activity.

(its current geographical, physical, biological, socio- economic, and cultural character)

TOPOGRAPHY

The site is located in the Knersvlakte, a topographically uniform area or plain that stretches from Klawer in the south to Kliprand in the north. The surrounding area is relatively flat with a few steep dips down into the Troe Troe and Wiedou Rivers, which cut through the centre of the property. The latter have its source in the Matzikama Mountains, which form a dramatic backdrop 15 km to the east.

CLIMATE

Vredendal on average receives about 105 mm of rain per year and receives most of its rainfall during winter. It has a Mediterranean climate, with mild wet winters and warm dry summers. Figure 6 shows the monthly average air temperature distribution and Figure 7 shows average rainfall values for Vredendal per month. On average it receives the lowest rainfall in January and the highest in June.

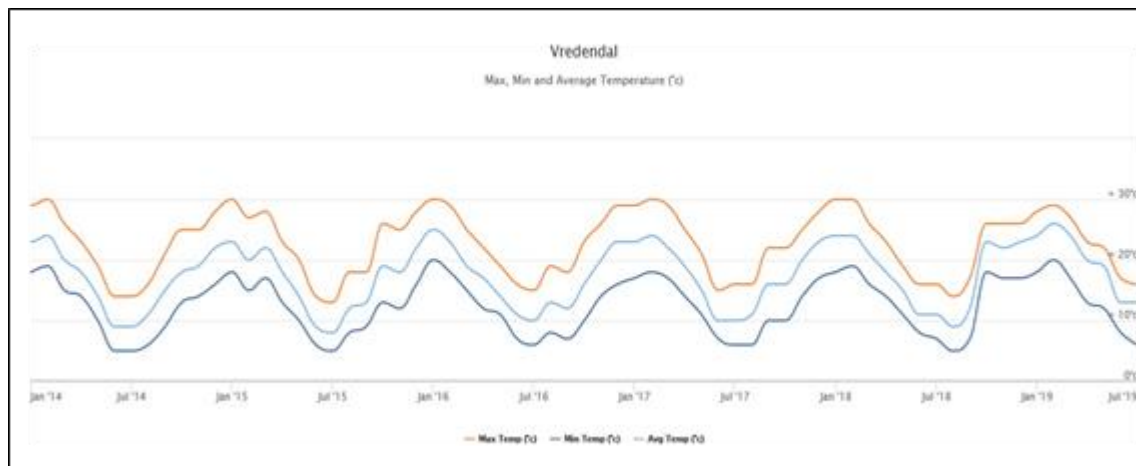


Figure 6: Monthly average air temperature distribution for Vredendal area (2014 - 2018) (weatheronline.com).

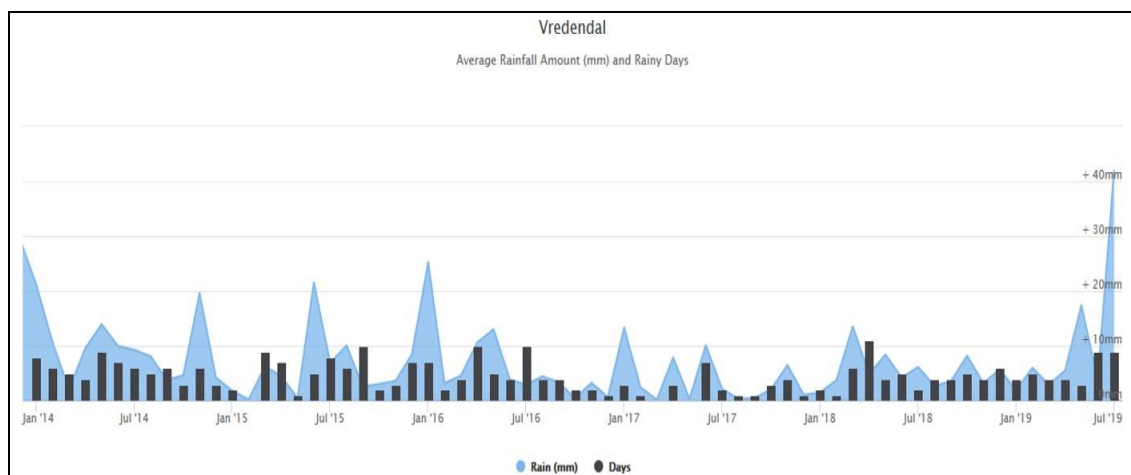


Figure 7: Monthly average rainfall distribution for Vredendal area (2014 – 2018) (weatheronline.com).

GEOLOGY

The surficial cover of the site is alluvial/colluvium material which comprises of weathered phyllite and quartzite, the weathered material is generally argillaceous (weathered phyllite) and sandy (weathered quartzite) in nature. The bedrock underlying the site comprises of a brown to red phyllite grading into a black graphitic schist (Nat - Aties Formation). These are the oldest sediments in the area, even older than the sandstone formations associated with Matsikamma (Table Mountain Group). These sediments are overlain by calcareous and gypsiferous soil, red aeolian sand, small deposits of silcrete, and recent alluvium in the riverbeds, which are all of Quaternary and Tertiary age. Limestone and dolomite are exposed on the steeper slopes above the Troe Troe and Wiedou Rivers. Also found in the area are patches of weathered out quartz and iron oxide (hematite/magnetite!). These appear to originate from quartz/iron veins found in the Gariep metasediments.

The Aties Formation is located in the central section of the site with basement rock assumed the Wiedouw (Nwi) Formation, located on the eastern and western section of the site. The formation comprises of a “dirty” marble (marl) and dolomite. The geological setting is presented in Table 6 and the geological setting is shown in figure 8.

Table 6: Geological summary of study area

Code	Lithology	Formation	Group
	Alluvium		
E-Si	White to pale-red sandy soil with silcrete	n/a – Quaternary age	
Nat	Brown phyllite and black graphitic schist and quartzite	Aties	Gifberg
Nwi	Marble/marl and limestone	Widouw	

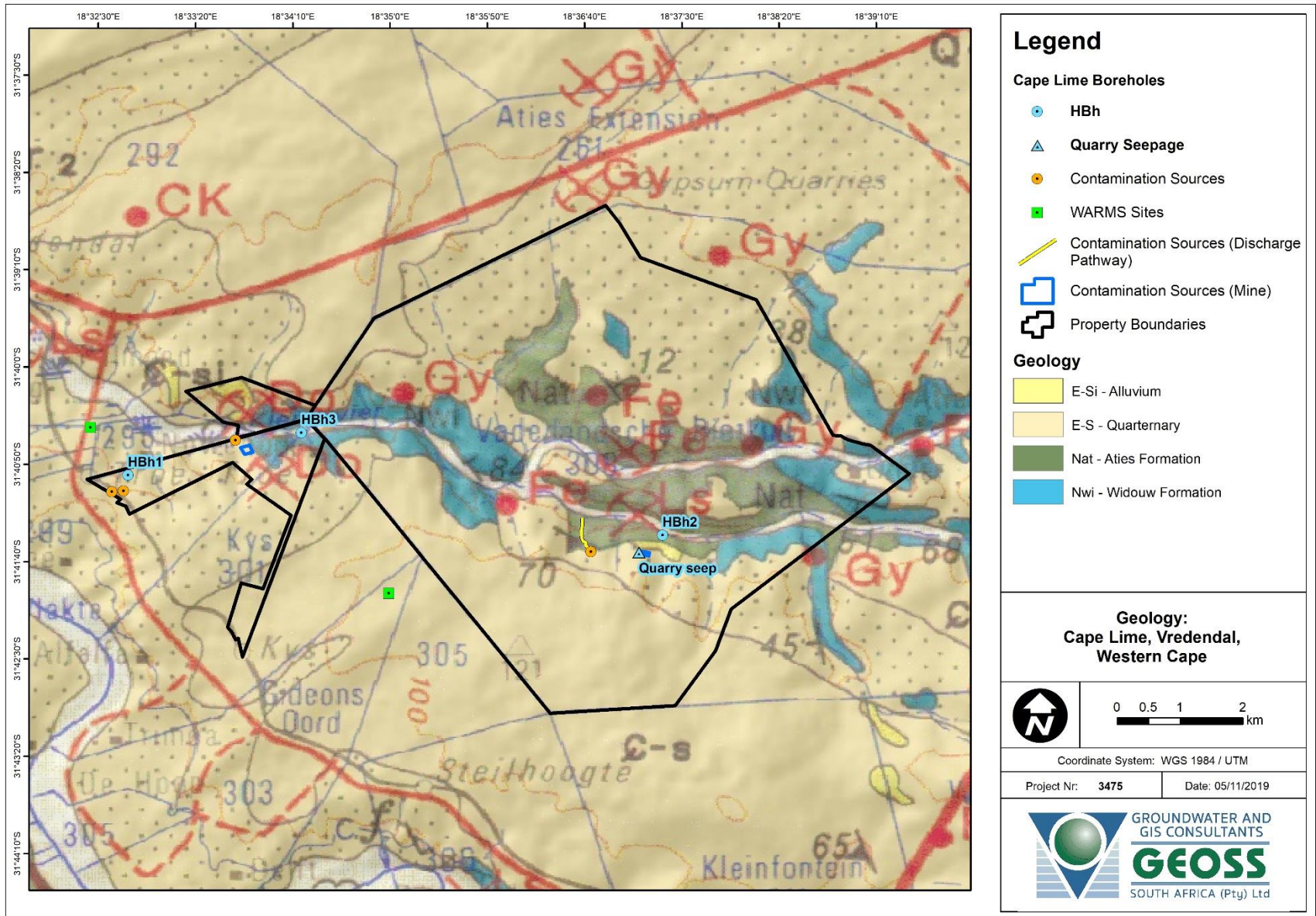


Figure 8: Geological map of the study area and surrounds (CGS, 3118 Calvinia)

BIOGEOGRAPHICAL CONTEXT

Being located in the north-western corner of the Western Cape interior, the site lies inside the Succulent Karoo Biome evidenced by a prominence of succulent shrubs, such as mesembs (*vygies*), *Aloe falcata*, *Tylecodon* species and *Euphorbia* species. Grasses were more prominent in the sandy areas away from the rivers. According to the South African Vegetation Map (2018), the area is covered by a mixture of Vanrhynsdorp Gannabosveld, Namaqualand Spinescent Grassland, Knersvlakte Dolomite Vygieveld, Knersvlakte Quartz Vygieveld and Namaqualand Riviere (see figure 9). The dominant vegetation type Vanrhynsdorp Gannabosveld is found in the southern Knersvlakte between Vredendal and Vanrhynsdorp at the foot of the Matsikamma and Gifberg Mountains, as well as northeast of Vanrhynsdorp (Mucina & Rutherford 2006). The landscape is mainly flat or slightly undulating, supporting succulent shrubland dominated by *Salsola*, *vygies* and *Galenia* species (Mucina & Rutherford 2006). In the south, the plains can acquire a grassland appearance through seasonal dominance of certain grass species, such as *Bromus pectinatus* and *Stipa capensis* (Mucina & Rutherford 2006).

Knersvlakte Dolomite Vygieveld, along with Namaqualand Riviere vegetation, follows the main river courses (Troe Troe and Wiedou Rivers) between Vanrhynsdorp and Vredendal. It is described as a sparse, succulent shrubland dominated by erect shrubs lower than 0.3 m with succulent leaves. It is found on the metasediments of the Namibian Gariep Supergroup, especially on the dolomite units (Mucina & Rutherford 2006). Namaqualand Riviere is characterized by tall shrub species, such as *Vachellia karroo*, *Tamarix usneoides*, *Suaeda fruticosa* and *Roepera morgsana* (Mucina & Rutherford 2006). Thickets of *Vachellia karroo* often dominate on alluvial, sandy deposits in the riverbeds.

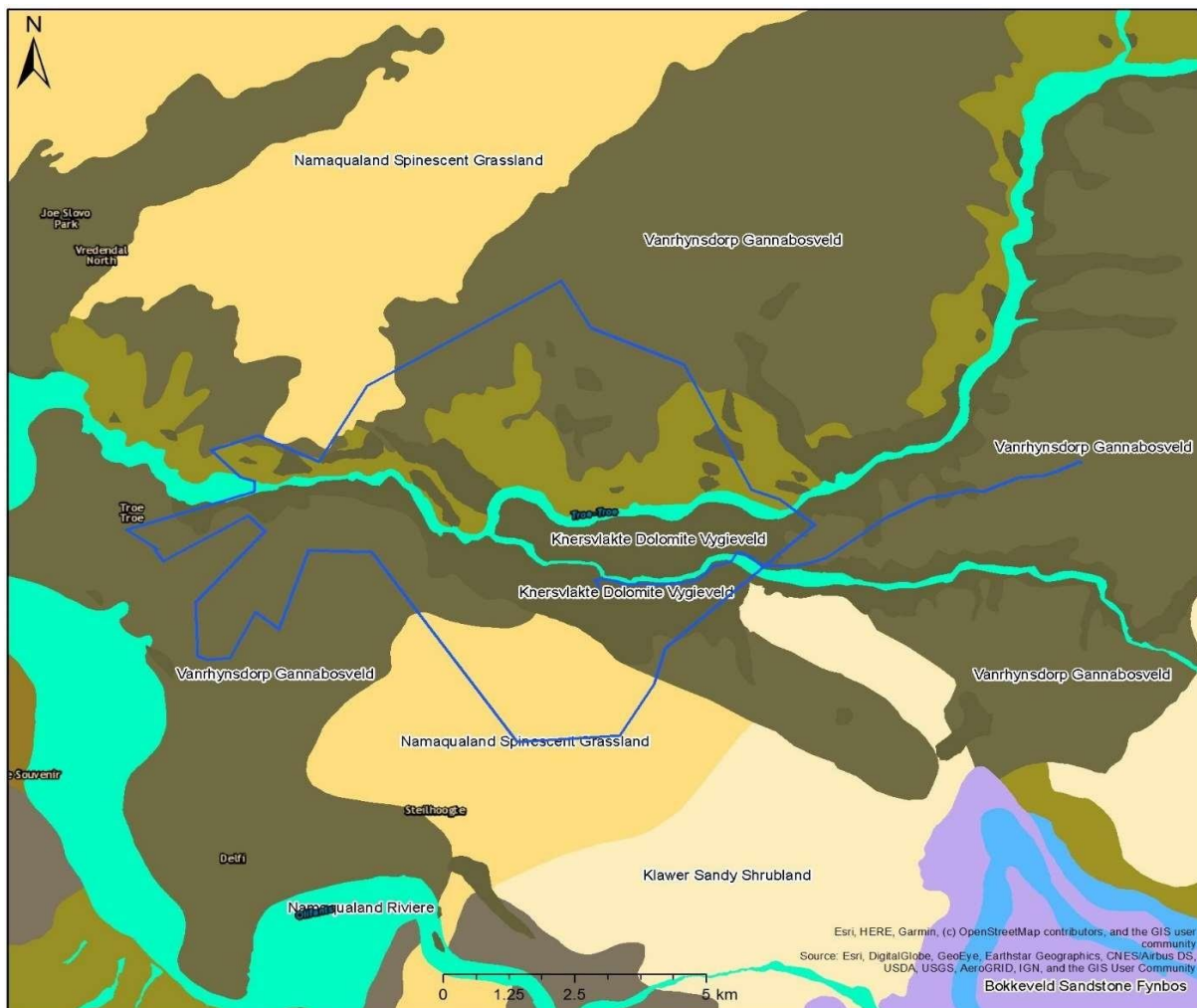


Figure 9: Extract of the 2018 SA Vegetation Map (Source: Cape Farm Mapper), showing the position of the study site (outlined in blue) and proposed access road (blue). The unlabelled green areas represent Knersvlakte Quartz Vygieveld.

Knersvlakte Quartz Vygieveld, which is found in patches in the deflations, occurs from Bitterfontein southwards to Klawer, with the main area north and northwest of Vanrhynsdorp (Mucina & Rutherford 2006). The landscape is described as slightly undulating with slopes and ridges covered by a prominent, but patchy white layer of quartzite (Mucina & Rutherford 2006). This dwarf succulent shrubland supports a high proportion of compact and subterranean vygies (“living stones”), often imitating its surroundings. *Ruschia* and *Drosanthemum* are the important structure-determining genera (Mucina & Rutherford 2006). Endemic taxa include *Argyroderma fissum*, *A. congregatum*, *Monilaria moniliformis*, *Salicornia xerophila* and *Othonna intermedia*.

Schmiedel & Jürgens (1999), who undertook research in quartz vygieveld, found that the Knersvlakte supports 52 quartz-field specialists of which 39 were endemic to the region. The average canopy cover of the vegetation was found to be less than 10%, and more than half of this comprised dwarf succulents (Schmiedel & Jürgens 1999). In general, the soils of quartz fields were shallower compared to those of adjacent zonal habitats (Schmiedel & Jürgens 1999). The combination of reduced competition from larger/taller shrubs, shallow soils and high soil salinity, represents a regionally unusual selective regime (Schmiedel & Jürgens 1999).

Namaqualand Spinescent Grassland occurs in a strip from Lutzville and Koekenaap eastwards to the north of Vanrhynsdorp (Mucina & Rutherford 2006). It is characterised by a flat landscape covered with a vegetation dominated by spinescent grass (*Cladoraphis spinosa*) and other emergent shrubs, such as *Euphorbia*,

Ruschia, *Othonna*, *Salsola* and *Roepera* (Mucina & Rutherford 2006). It is associated with Cenozoic aeolian, red sandy soil, which has been transported inland from its source by westerly winds (Mucina & Rutherford 2006).

VEGETATION & FLORA

The study area is covered by a mixture of Vanrhynsdorp Gannabosveld, Namaqualand Spinescent Grassland, Knersvlakte Dolomite Vygieveld, Knersvlakte Quartz Vygieveld and Namaqualand Riviere (see Photos 1-5). Gannabosveld is arguably the dominant vegetation type, covering the flatter areas away from the Troe Troe and Widou Rivers. Namaqualand Riviere, Dolomite Vygieveld and Quartz Vygieveld are more closely associated with the rivers (see Figure 10). Dolomite Vygieveld is typically found on the exposed dolomite/limestone slopes above the rivers, while the riverbeds support Namaqualand Riviere. Adjacent to these, Quartz Vygieveld is found in the quartz and iron oxide (hematite/magnetite!) strewn deflations. Gannabosveld and Spinescent Grassland are associated with the flat sandy areas to the north and south of the rivers away from the mining activities.

Outside the riparian areas, vegetation height varies between 0.3 to 1 m, with emerging species (e.g. *Lycium* and *Prosopis glandulosa*) reaching 2 m or more. Vegetation cover ranges between 30 and 70% (70% for Dolomite Vygieveld). Structurally, the vegetation can be described as a low open to mid-dense succulent shrubland, following Campbell's (1981) classification. Bare soil can be 80% or more depending on the substratum or past disturbances. Quartz Vygieveld has the lowest vegetation cover (<10%), while that of Namaqualand Riviere approaches 100%. Succulent shrubs are dominant in Gannabosveld and Dolomite Vygieveld, with *Drosanthemum*, *Mesembryanthemum* and *Ruschia* species especially common (see Appendix 1 of the Biodiversity study). A characteristic of Quartz Vygieveld is the abundance of dwarf vygies (quartz specialists), such as *Argyroderma cf. congregatum*, *A. fissum* and *Conophytum uviforme*, most of which are Knersvlakte endemics. Of the 129 indigenous species recorded on site, 20 (16%) are regional/local endemics (see appendix 1 of the Biodiversity study)

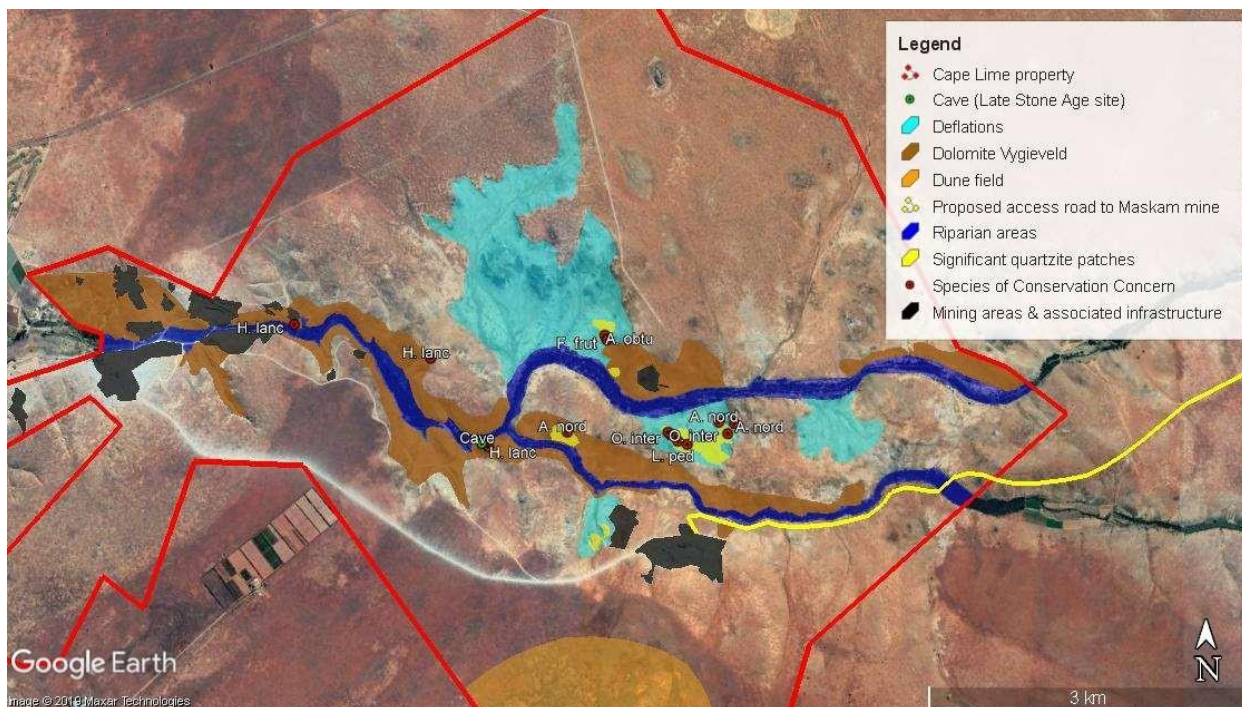


Figure 10: Botanical features map, showing the mining areas in relation to significant botanical features and recorded Species of Conservation Concern.



Photo 1 Typical Gannabosveld in the northern part of study area. Insert: *Lachenalia splendida*



Photo 2 Dolomite Vygieveld overlooking the Troe Troe River east of the dolomite mines. Insert: *Haemanthus lanceifolius*.



Photo 3: Quarts Vygieveld north of the Troe Troe River. Insert: *Argyroderma cf. congregatum*



Photo 4: An existing passage through riverine bush in the vicinity of the proposed river crossing for new access road to the Maskam mine.



Photo 5: Dune area south of the limestone mine, with a *Euclea tomentosa* in the foreground.

The highest species diversity and number of endemics appear to be associated with Dolomite Vygieveld and Quartz Vygieveld, in other words the more gravelly/stony areas (see figure 8). These areas are therefore regarded as the most sensitive and home to all the recorded Species of Conservation Concern (see appendix 1 of the Biodiversity study). The predominant families are Aizoaceae and Asteraceae, which represent a third of the recorded flora. Mining activities appear to be concentrated in the areas historically covered by Dolomite Vygieveld.

The Wiedou and Troe Troe Rivers (seasonal) which run through the property accommodate *Vachellia karroo* thicket (see Photo 3). The latter has been invaded by *Prosopis glandulosa* in places. From a distance it is impossible to distinguish between the *V. karroo* and *P. glandulosa* due to their similar growth form and armed branches. Other indigenous species mixed in with the *Vachellia karroo* include *Salicornia* cf. *pillansii*, *Suaeda plumosa*, *Gomphocarpus fruticosus*, *Tamarix ramosissima*, *Juncus acutus* and *Phragmites australis*. Erosion does not seem to be a great problem in the area (due to low rainfall), although there are signs of sheet and gully erosion in a few places.

The proposed access road (8.7 km) to the Maskam mining site passes through mainly Gannabosveld, with a ± 180 m passage through Namaqualand Riviere. The eastern half of the route follows an existing farm road through an area that shows significant degradation from overgrazing (see Photo 6). This is a flat area with 50-60% grass cover and 5% shrub cover. Species recorded here include grasses (*Stipa capensis*),

Mesembryanthemum guerichianum, *Asparagus capensis* and the invasive shrub *Atriplex nummularia* (1.8 m tall). The latter was planted along the farm road nearby the eastern end.

The western part of the proposed access road leaves the farm road to skirt the southern slope of a low koppie angling down towards the Widou River, which is crossed (see Photo 7). The vegetation height on the koppie is <0.5 m, while vegetation cover ranges from 30-40%. Here, grasses (*Stipa capensis*), *Caroxylon zeyheri*, *Mesembryanthemum species*, *Drosanthemum species*, *Didelta carnosus* and *Oncosiphon suffruticosum* dominate.

The passage through the Weidou River comprises dense *Vachellia karroo* thicket, infested with *Prosopis glandulosa*. The remainder of the road will follow a route on compact red sand parallel to the river, but setback from its floodplain. On this side, the vegetation is higher (0.3-1 m) and dominated by *Caroxylon zeyheri*, with *Mesembryanthemum guerichianum* and *M. junceum/dinteri*.

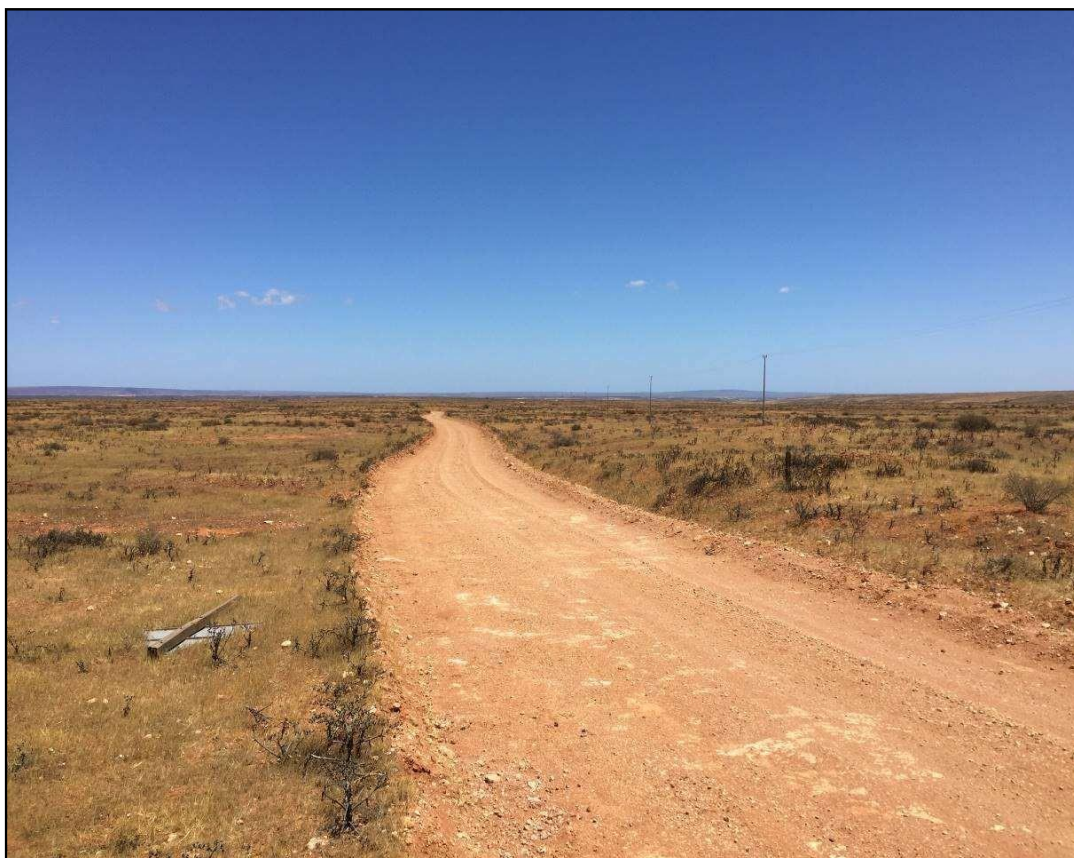


Photo 6 Eastern part of proposed access road to the Maskam mine.



Photo 7 Western part of proposed access road skirting low koppie. Insert: western section of proposed road on southern side of the Widou River.

The following Species of Conservation Concern were recorded inside Knersvlakte Dolomite Vygieveld and Quartz Vygieveld:

- *Antimima nordenstamii* (rare)
- *Ruschia bipapillata* (vulnerable)
- *Haemanthus lanceifolius* (vulnerable)
- *Othonna intermedia* (near threatened)
- *Aspalathus obtusata* (vulnerable)
- *Lasiosiphon pedunculatus* (vulnerable)

All these species were recorded in Dolomite and Quartz Vygieveld, with none of them abundant. No Species of Conservation Concern were recorded along the proposed access road.

New distributions records were made for *Frankenia fruticosa* (a local endemic, previously only known from the Moedverloren Nature Reserve area 14 km northeast of Lutzville) and *Erythrophysa alata* (previously known from Kotzesrus in the Northern Cape northwards to the Richterveld). *Frankenia fruticosa* was recorded on a quartzite patch north of the Troe Troe River, while the latter was recorded nearby the cave (Late Stone Age site).

Several alien species were recorded (mostly inside the riverine areas), including *Prosopis glandulosa*, *Nicotiana glauca*, *Tamarix ramosissima*, *Nerium oleander* and the naturalised weed *Atriplex lindleyi* subsp. *inflata*. *Prosopis glandulosa* is a declared alien invader under the Conservation of Agricultural Resources Act

(Act 43 of 1983). It is considered the most important woody invader species in Namaqualand (Mucina & Rutherford 2006). In terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) Alien and Invasive Species List (2016), the harbouring of *Atriplex nummularia* on a property requires a permit.

FAUNA

With regards to mammal and reptile fauna, evidence of aardvark, porcupine, rock hyrax (steep, rocky areas above Troe Troe River), mole/molerat, angulate tortoise and grysbok activity was noted throughout the area (see Photo 8). Several sightings of grysbok were made in the riverine areas. Other mammal species that may frequent the area include the common duiker, steenbok, suricate (meerkat), striped polecat (stinkmuishond), bat-eared fox, black-backed jackal, Cape fox (draaijakkals), caracal (rooikat), African wild cat and hare. Termite (snout harvester termite mounds) nests were also noted. The property was utilised as a sheep farm prior to mining.



Photo 8: Porcupine spoor in wet river sand. Insert: fresh mole-rat activity

CONSERVATION STATUS

Knersvlakte Dolomite Vygieveld is the best represented vegetation unit, with less than 3% transformed (Mucina & Rutherford 2006). Knersvlakte Quartz Vygieveld is also well represented, but is one of the largest units in the Knersvlakte. About 5% of the latter is conserved in the Moedverloren Nature Reserve, north-east of Lutzville. The Knersvlakte represents one of the richest succulent plant diversity centres in the world (Pool-

Stanvliet et al. 2017). Vanrhynsdorp Gannabosveld is the most transformed unit, with 79.5% remaining according to Mucina & Rutherford (2006).

None of the vegetation types appear on the current national list of threatened ecosystems (DEA 2011). However, Vanrhynsdorp Gannabosveld is threatened by agricultural transformation and open-cast gypsum mining (Mucina & Rutherford 2006). It is also not formally protected. Knersvlakte Dolomite Vygieveld has a very limited distribution range (the smallest vegetation unit in the area) with no formal protection. In the larger area, these vegetation types are being threatened by overgrazing, cultivation (limited mainly to the Olifants River valley), mining activities and road construction.

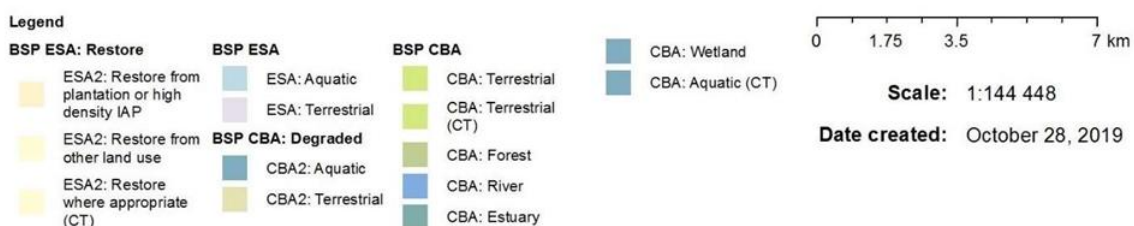


Figure 11: Biodiversity network map (Source: Cape Farm Mapper) with the mining property outlined in blue and the proposed access road to the Maskam mine also indicated in blue.

The study area falls within the Matzikama Biodiversity Network. Figure 11 above shows the mining area in relation to mapped critical biodiversity areas (CBA's) and ecological support areas (ESA's). The dolomite mines and stockpile areas in the western part of the study area encroach onto an aquatic/river CBA (Troe Troe River) and supporting aquatic ESA's (minor watercourses). The limestone mine is surrounded by both terrestrial and aquatic ESA's. The terrestrial ESA forms part of an extensive ESA that cuts through the property and extends eastwards towards the Matzikama and Bokkeveld Mountains. It provides support for two large terrestrial

CBA's which encroach the property from the northeast and southeast, respectively. Please note that these maps are produced at a small scale and become less accurate when zooming in.

CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure (Pool-Stanvliet et al. 2017). ESA's, on the other hand, are not essential for meeting biodiversity targets, but play an important role in supporting the functioning of protected areas or CBA's, and are often vital for delivering ecosystem services. These sites are selected for meeting national targets for species, habitats and ecological processes (Pool-Stanvliet et al. 2017). Many of these areas support known occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. They should be considered as essential regional priorities for conservation, and must be considered in all land-use planning initiatives (Pool-Stanvliet et al. 2017). Loss of designated CBA's is not recommended.

SOCIO-ECONOMIC BACKGROUND

The Cape Lime offices and processing facilities are situated within Ward 4, and the limestone and dolomite quarries (and haul road) within Ward 7 of the Matzikama Municipality under the jurisdiction of the West Coast District Municipality ±8 km south-east of Vredendal. The baseline socio-economic of the Matzikama Municipality is highlighted below.

Population

Matzikama currently has the 3rd largest population of the five local municipalities within the West Coast District (estimated at 70 274 in 2015). This total gradually increases over the 2015/16 MTREF years and is projected to reach 74 049 by 2020. This total equates to an approximate 5.4 per cent growth off the 2015 base estimate (Socio-economic Profile: Matzikama Municipality, 2015).

The economically active population

Approximately 67 per cent of the 70 274 inhabitants in the Municipality are currently considered to be within the working age category. On the other hand, Matzikama has a total dependency ratio of 48.6 which, while slightly lower than the 2013 total of 48.9 per cent, remains the highest in the District. High dependency ratios imply greater strain on the working age to support their economic dependants (children and aged) and do not bode well for improved social security and enhanced economic growth (Socio-economic Profile: Matzikama Municipality, 2015).

Employment

According to the Socio-economic Profile of the municipality (2015), Matzikama comprised 15 per cent of both the GDP and employment in the District in 2013. The biggest net job losses occurred during the 2000 - 2013 period in the Agriculture, Forestry and Fishing (3 260), and to a lesser extent Manufacturing (100) whilst the Services sectors created 410 jobs (Matzikama IDP 2019-2020).

Education

According to the Annual Survey of Public and Independent Schools (ASS) done by the WCED in 2014, learner enrolment in Matzikama increased from 9 759 in 2013 to 9 913 in 2014. The average school dropout rate in Matzikama was 40.5 per cent in 2012. The dropout rate measured amongst Grade 10 learners (in 2013) and Grade 12 learners (at the start of 2015) was 30.6 per cent, implying that approximately one in every three children from Matzikama that enrolled in Grade 10 in 2013 dropped out by the time they reach Grade 12 learners in 2015. The 2014 matric results for Matzikama improved from 92.0 per cent in 2013 to 93.7 per cent in 2014 – the highest matric pass rate in the Province (Socio-economic Profile: Matzikama Municipality, 2015).

GDP

Agriculture and manufacturing sectors are jointly the largest sectors in Matzikama, each comprising of 19 per cent of the Municipality's 2013 GDP as indicated in Figure 2 below. Although growth in Matzikama's commercial services sector remained subdued relative to the other municipalities, this sector was the largest from a value-added perspective, comprising 43 per cent of the Municipality's GDP in 2013. The construction sector is among the smallest sectors, contributing only 4 per cent towards GDP in 2013.

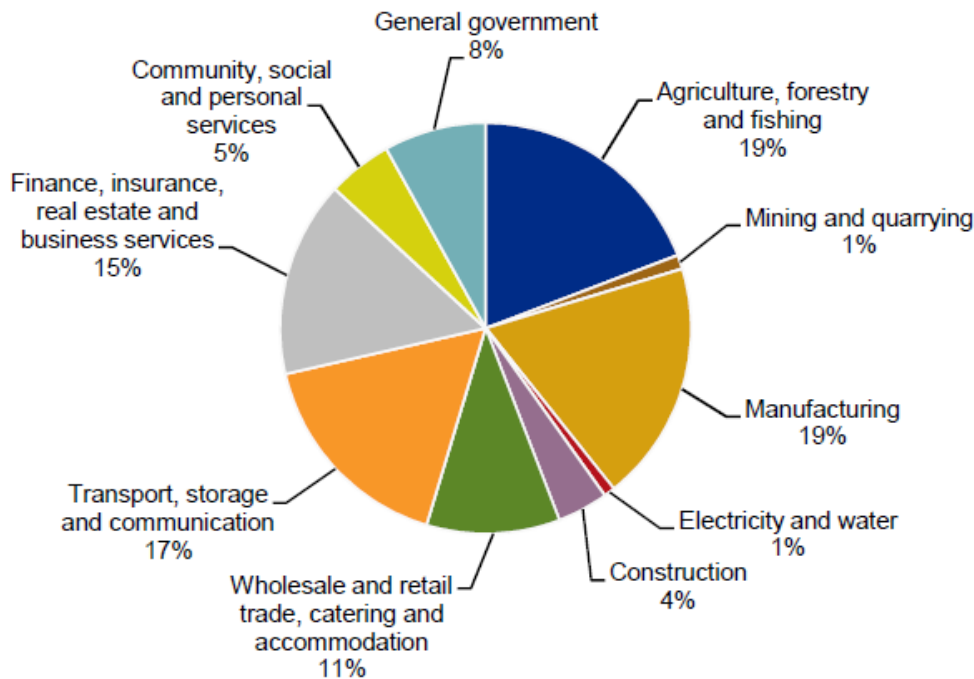


Figure 12: Matzikama: Sectoral composition, 2013: Source: Municipal Economic Review and Outlook (MERO), 2015

Health and Safety

As far as health and safety is concerned, the categories pertaining to residential burglaries and drug-related crime are dominant in relation to crime within the Matzikama Municipality. However, drug-related offences also remain a major concern in Matzikama. The number of reported cases increased in 2013/14 before reaching an all-time high of 680 in 2014/15. It is important to note that there were slight decreases in the number of murders reported, while the incidence of sexual offences and driving under the influence of alcohol or drugs remained relatively stagnant (Socio-economic Profile: Matzikama Municipality, 2015).

HERITAGE

Cape Lime appointed Integrated Specialist Services (Pty) to conduct a heritage impact assessment. According to the study, the footprint of the proposed upgrades does not lie on pristine ground but occurs in area already affected by modern developments that include farming quarrying and access roads. A total of ten isolated surface lithic clusters were recorded on the farm but none was recovered on the area earmarked for the development (Figure13).

The archaeology of the area is concentrated along the valleys outside the proposed development footprint where 10 lithic clusters were reported.



Figure 13: Lithics recorded in the farm.

Beyond the area ear marked for the proposed development, the study also reported historical sites perched high up the hillocks. These include stonewalled forts (probably dating to the Anglo-Boer period), probable historical farmhouse and a stonewalled fence. All these occur over 1km away from the proposed path and are shielded from view by several ridges (Figure 15 -17).



Figure 14: Possible historical structures in the project area. Note that the structures will not be affected by the proposed development.



Figure 15: Possible historical structures in the project area. Note that this structure is located outside the mining area but it provides an insight about the heritage character of the landscape.



Figure 16: Possible historical structures approximately 200m from the proposed access road route.



Figure 17: Possible historical structures in the vicinity of the proposed road route.

About 100m from the farm house was a cemetery with formal graves. One of the graves had a head stone with inscriptions showing the year of death as 1929, while the other headstone had two names (Wilhem Camhausen 1932 and Emelie Hausen 1920). The dimensions for the latter were uncharacteristically too wide for a single grave, showing that they may have re-opened Emelie's 1920 grave twelve years later (1932) to bury Wilhem next to Emelie (Figure 19).



Figure 18: A historical grave marked by a tombstones and inscribed headstone with two names. Note that this is an indication of twin grave.



Figure 19: Cemetery approximately 200m from the proposed access road route.

The cemetery was also fenced off with dry stonewall, parts of which were poorly cemented. All of these built structures occur over a kilometre away and are shielded from view by the ridge and will not be impacted by the development.

Table 7: Summary of Heritage sites recorded during survey.

Number	Material & Period	GPS Location	Significance	To be affected by development	
Lithic clusters	(1)	22 ESA/MSA lithics	31°41'12.92"S 18°35'30.42"E	Low	No (road already erected past this)
	(2)	10 ESA/MSA lithics	31°41'29.20"S 18°36'3.44"E	Low	No (road already erected past this)
	(3)	10 ESA/MSA lithics	31°42'11.70"S 18°37'29.39"E	Low	No (road already erected past this)
	(4)	2 ESA/MSA lithics	31°41'16.99"S 18°36'8.75"E	Low	No (road already erected past this)
	(5)	17 ESA/MSA lithics	31°41'31.39"S 18°36'24.19"E	Low	No (road already erected past this)
	(6)	13 ESA/MSA lithics	31°41'24.00"S 18°36'36.02"E	Low	No (road already erected past this)
	(7)	4 MSA lithics	31°41'31.15"S 18°37'59.33"E	Low	No (road already erected past this)
	(8)	1 ESA lithic	31°42'15.02"S 18°38'14.11"E	Low	No (outside development corridor)
	(9)	6 MSA lithics	31°41'10.62"S 18°38'46.39"E	Low	No (outside development corridor)
	(10)	4 MSA lithics	31°41'6.55"S 18°40'57.35"E	Low	No (outside development corridor)
Structures & Features	(11)	Dilapidated historical house attached to a stonewalled kraal	31°40'57.59"S 18°39'2.29"E	Low	No (outside development corridor)
	(12)	Cemetery with 1920s-1930s graves	31°41'0.32"S 18°39'1.77"E	High	No (outside development corridor)
	(13)	Historical stone walled fence stretching for about 2km	31°41'7.86"S 18°39'24.89"E	Low	No (outside development corridor)
	(14)	Circular stonewalled Anglo-Boer war fort	31°40'44.61"S 18°39'31.64"E	Medium	No (outside development corridor)

Paleontology

The Widow Formation and the overlying Aties Formation are considered to be non-fossiliferous (De Beer et al., 2002; Gresse et al, 2006; Frimmel, 2008) (see Figure 20 and Table 7). The carbonates, that constitute the Widow Formation, were set down as marine shelf deposits. These carbonates were originally probably fossiliferous like that of the sedimentologically comparable Neoproterozoic geological unit, the Bloupoort Formation, that occurs nearby and contains shelly fossils, stromatolites, trace fossils and microfossils. Similar fossils that would likely have occurred in the carbonates of the Widow Formation were destroyed through the severe pressures generated during the intense tectonic deformation and resulting metamorphism exerted on these sediments and subsequent recrystallization.



Figure 20: Palaeontological sensitivity map of the study area and surroundings (SAHRA, 2019) (INSER MAP on p1 of Paleontology report)

Table 8: Interpretation of the paleontology map

Colour	Palaeontological Significance	Action
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however, a protocol for finds is required
WHITE	UNKNOWN	These areas will require a minimum of a desktop study. As more information becomes known, SAHRA will continue to populate the map

The aeolian, alluvium, colluvium, elluvium and calcareous and gypsiferous deposits of the study site have a low to moderate potential to yield fossils and the possibility of finding fossil material cannot be ignored. The fossil record of these deposits is sparse, occurs sporadically and is low in diversity. Although no fossils have been reported for the study area, fossils such as root casts, burrows, termitaria, ostrich egg shells, mollusc shells and isolated bones have been discovered in similar deposits elsewhere (Almond & Pether 2008; Partridge et al., 2009).

Although no publications exist that mention fossils from the study site, several geological studies and palaeontological assessments have been done elsewhere on the same geological formations that occur at the study site. The ECO should take responsibility for supervising the development and should follow the Chance Find Procedure as stipulated on the EMPr section, if in the unlikely event a significant fossil discovery is made.

AIR QUALITY

An Air Quality Impact Assessment study has been conducted by Lethabo Air Quality Specialists (Pty) Ltd as part of the EMPr upgrade project. LAQS modelled the dispersion of pollutants emitted from Cape Lime's current operations to estimate ground-level concentrations of pollutants.

The following scenarios were assessed:

- **Calciner only:** The calciner operation is the only activity subject to an AEL. As a result, annual emissions from this operation must be calculated according to GN R.533, i.e. based on maximum emissions allowed by the AEL to show the maximum impact that emissions at the maximum level may have.
- Such a scenario will show a worst-case condition as measured emissions are below the emission limits. LAQS subsequently calculated annual emissions, based on measured values, to show a typical air quality impact scenario.
- **Cumulative impact:** The other operations on site, i.e. mining, crushing, stockpiles, road emissions, etc., are not controlled under Section 21 of the Air Quality Act. LAQS subsequently modelled the dispersion of TPM and PM10 emissions from all sources to show the cumulative impact of all source emissions.

The results obtained are given graphically and summarised in tabular format in the sections below. The approach was to determine both annual average ground-level concentrations and 99-percentile concentrations (the levels below which concentrations will occur for 99% of the time) of all of the pollutants listed in Section 4.6 above. A 99-percentile level was chosen as it is the closest comparison to the ambient air quality limit exceedances allowed legally (please see Section 7 below).

In addition, the maximum estimated ground-level concentrations were determined, as well as where these would occur. The annual average and 99-percentile concentrations at the nearest residential area was determined as well.

All simulations were carried out for a receptor height of 2 metres above ground level and a plume dispersion period of 60 minutes. This simulation period ensured that very low winds, e.g. 1 m/s, would carry pollutants some distance from source.

CALCINER EMISSIONS

Emissions at Maximum Allowed Concentrations

The outcome of the dispersion modelling study is shown graphically in Figures 21 to 22 below.

Figures 23 and 24 respectively show the annual average and 99-percentile daily ground-level concentrations of PM₁₀ particulates (all particulate emissions assumed to be PM₁₀ particles).

Figures 25 and 26 respectively show the average 8-hour and 99-percentile ground-level concentrations for sulphur dioxide (SO₂).

Figures 27 and 28 respectively show the annual average and 99-percentile ground-level concentrations for nitrogen dioxide.

Emissions at Measured Concentrations

The dispersion of pollutants under typical calciner operations is shown graphically in Figures 23 to 29 below.

Figures 29 and 30 respectively show the annual average and 99-percentile daily ground-level concentrations of PM₁₀ particulates (all particulate emissions assumed to be PM₁₀ particles).

Figures 31 and 32 respectively show the average 8-hour and 99-percentile ground-level concentrations for sulphur dioxide (SO₂).

Figures 33 and 34 respectively show the annual average and 99-percentile ground-level concentrations for nitrogen dioxide.

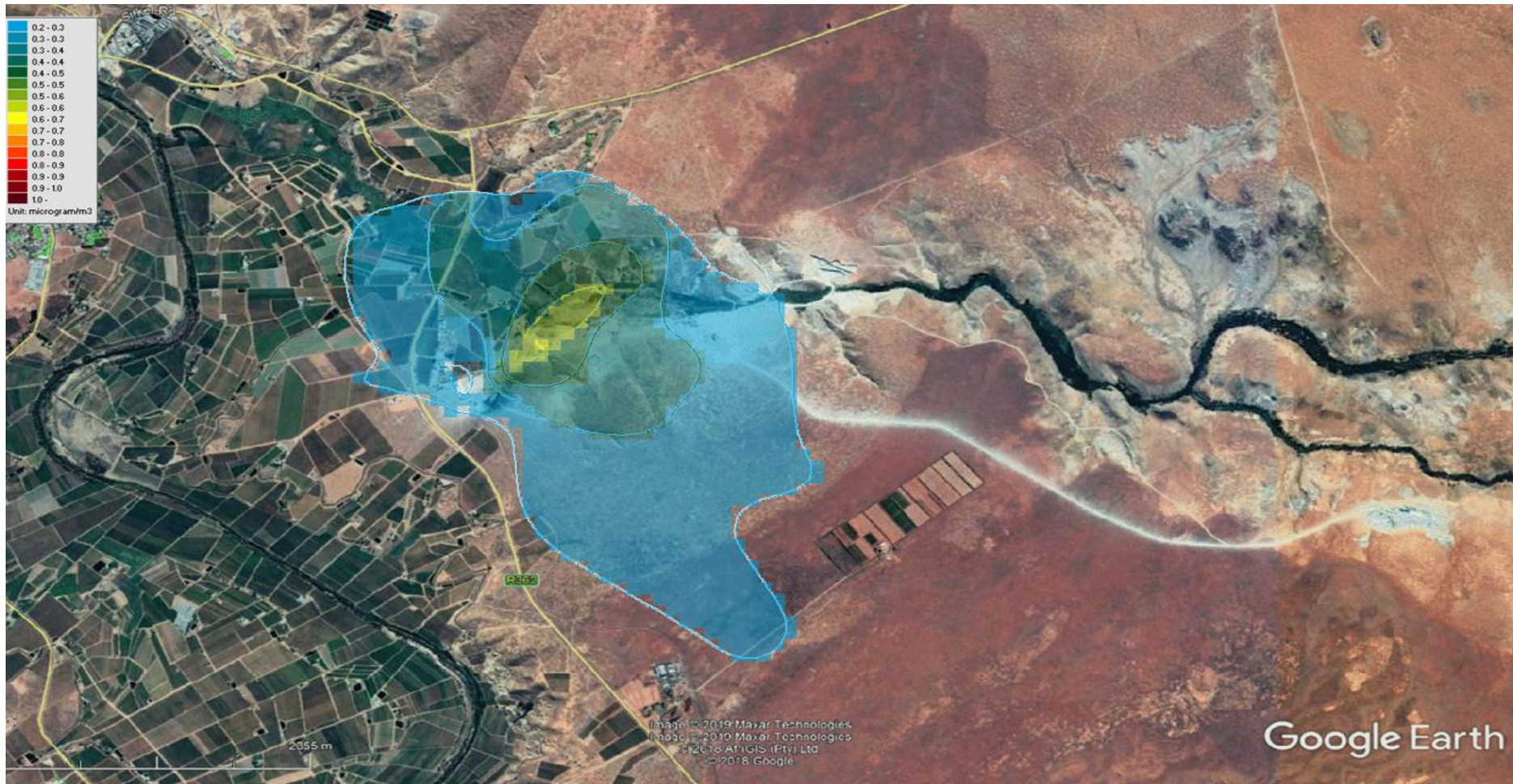


Figure 21: Maximum Emissions: Annual Average PM10 Concentrations. Maximum scale (burgundy) is 1.0 $\mu\text{g}/\text{m}^3$; air quality standard is 40 $\mu\text{g}/\text{m}^3$

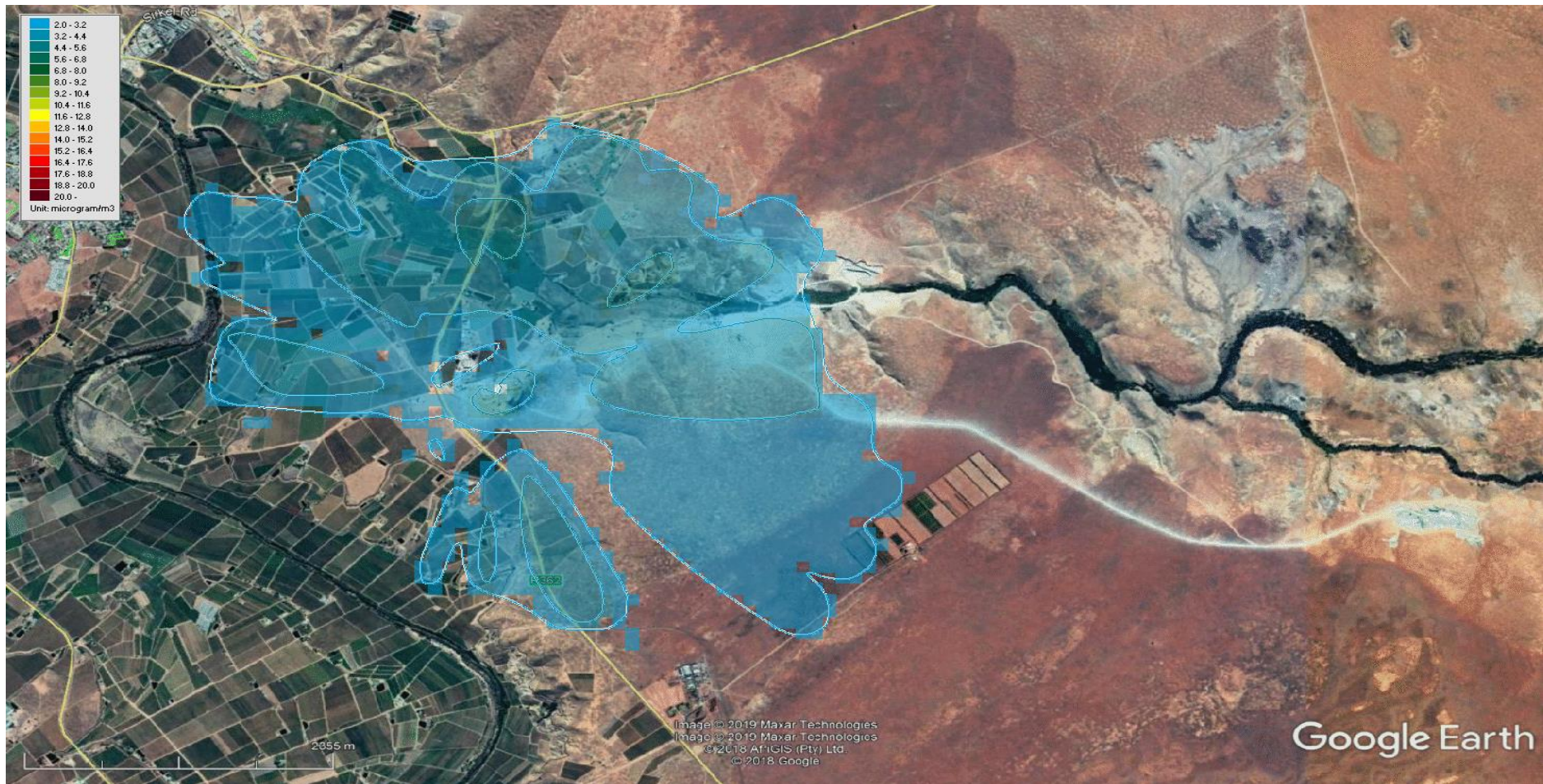


Figure 22: Maximum Emissions: 99-percentile PM10 Daily Averaged Concentrations. Maximum scale (burgundy) is 20 $\mu\text{g}/\text{m}^3$; air quality standard is 75 $\mu\text{g}/\text{m}^3$

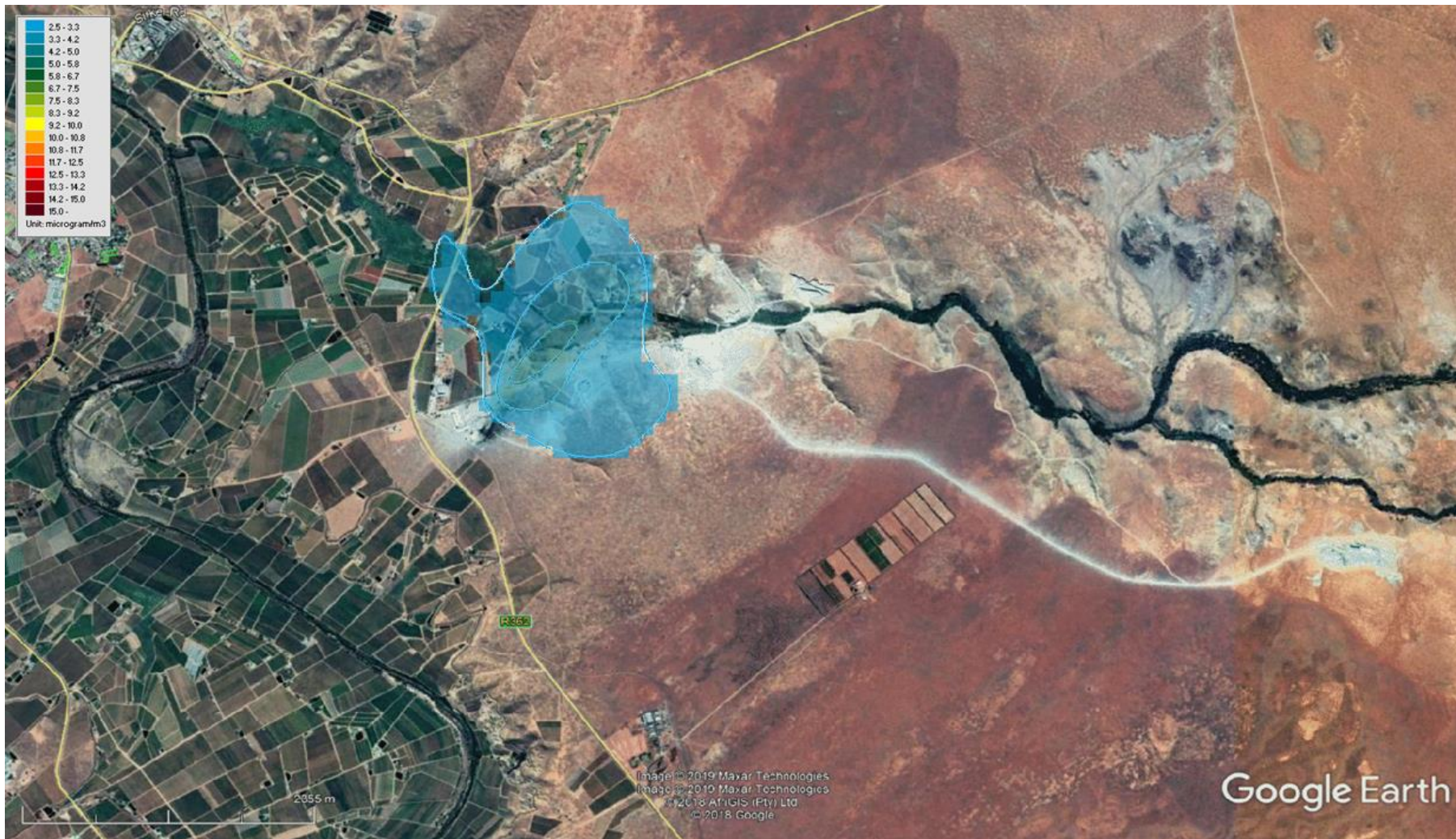


Figure 23: Maximum Emissions: Annual average SO₂ Concentrations. Maximum scale (burgundy) is 15 µg/m³; air quality standard is 50 µg/m³

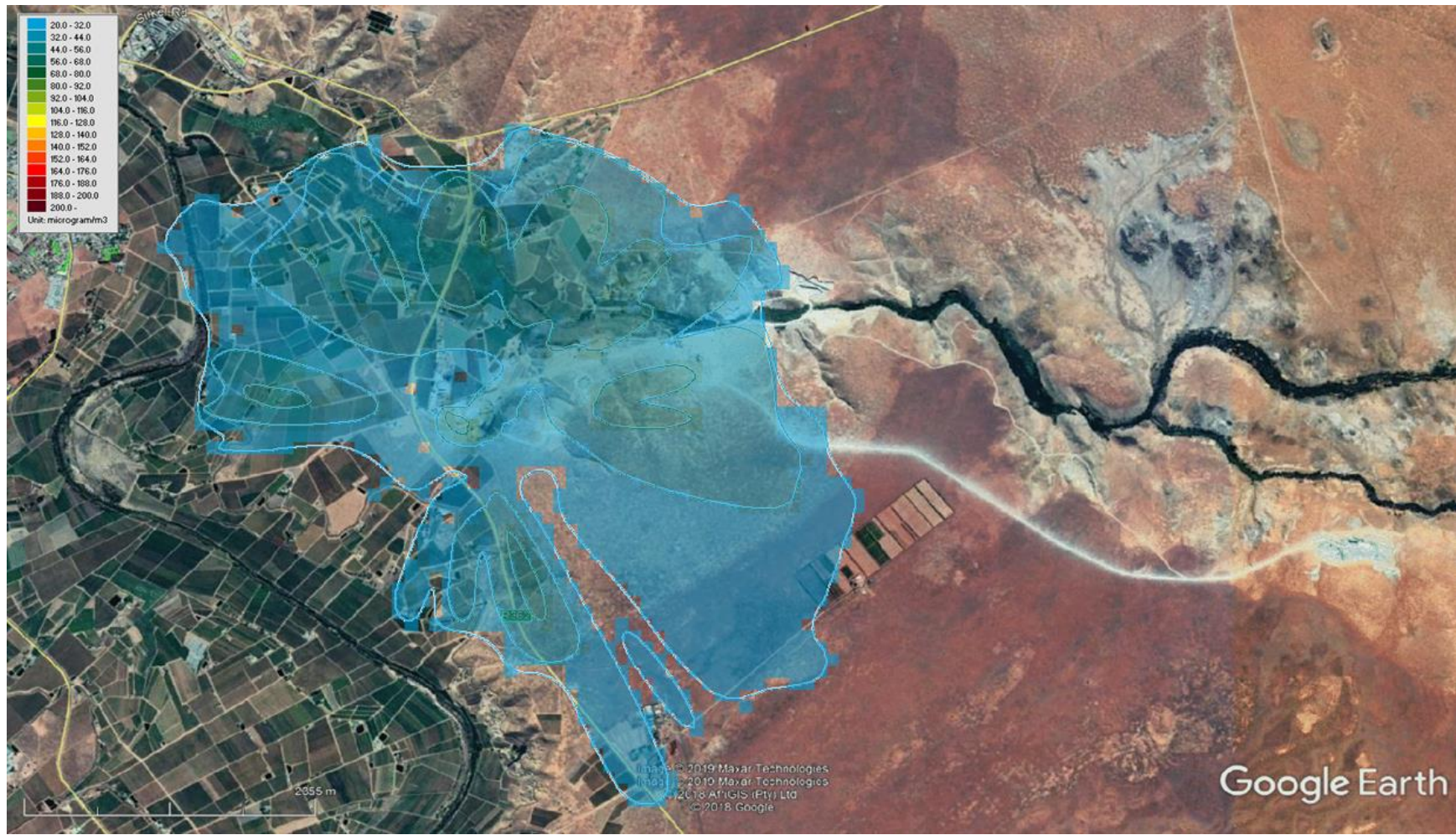


Figure 24: Maximum Emissions: 99-percentile SO₂ Concentrations. Maximum scale (burgundy) is 200 µg/m³; air quality standard is 350 µg/m³.

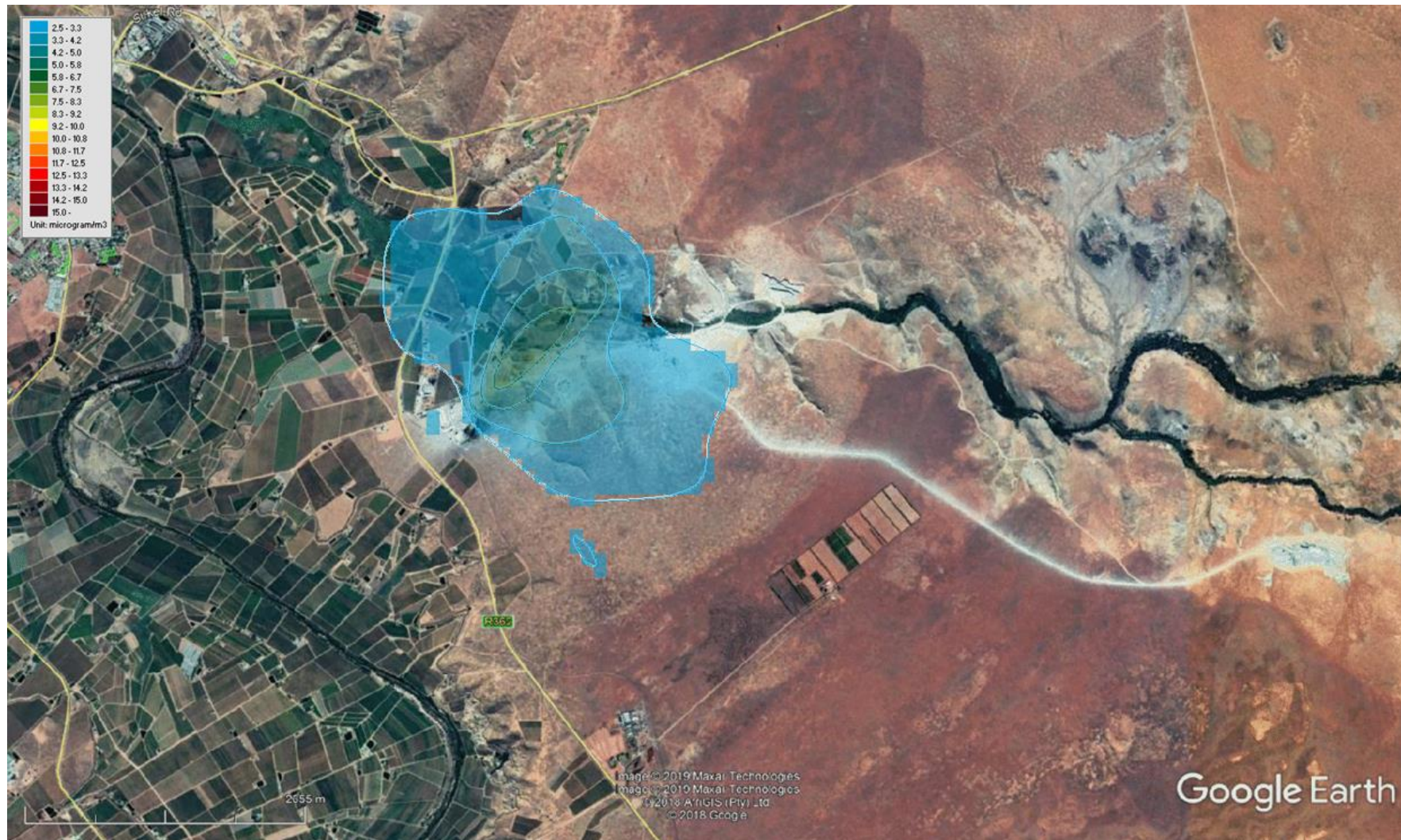


Figure 25: Maximum Emissions: Annual Average NO₂ Concentrations. Maximum scale (burgundy) is 15 µg/m³; air quality standard is 40 µg/m³

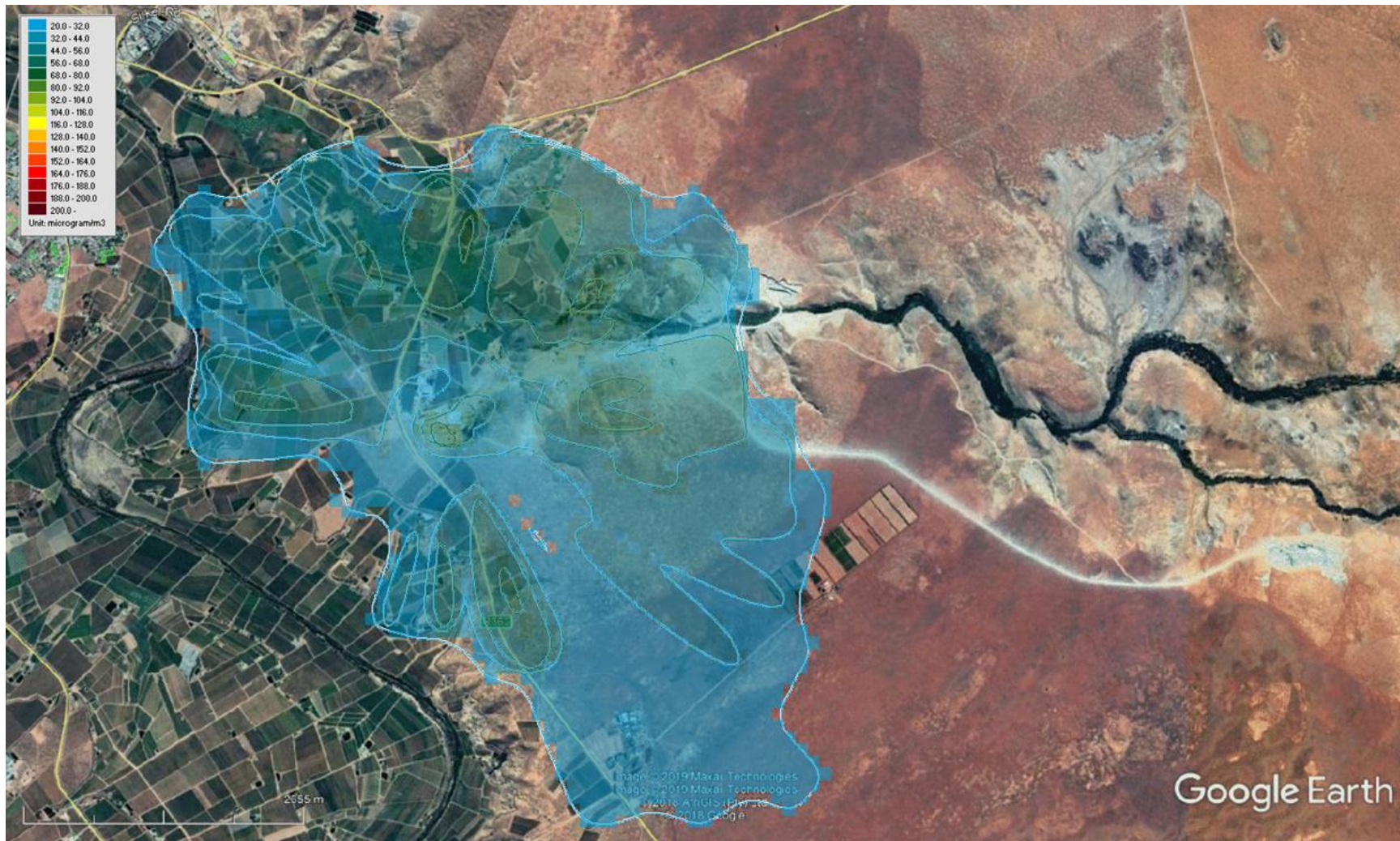


Figure 26: Maximum Emissions: 99-percentile NO₂ Concentrations. Maximum scale (burgundy) is 200 µg/m³, i.e. the air quality standard

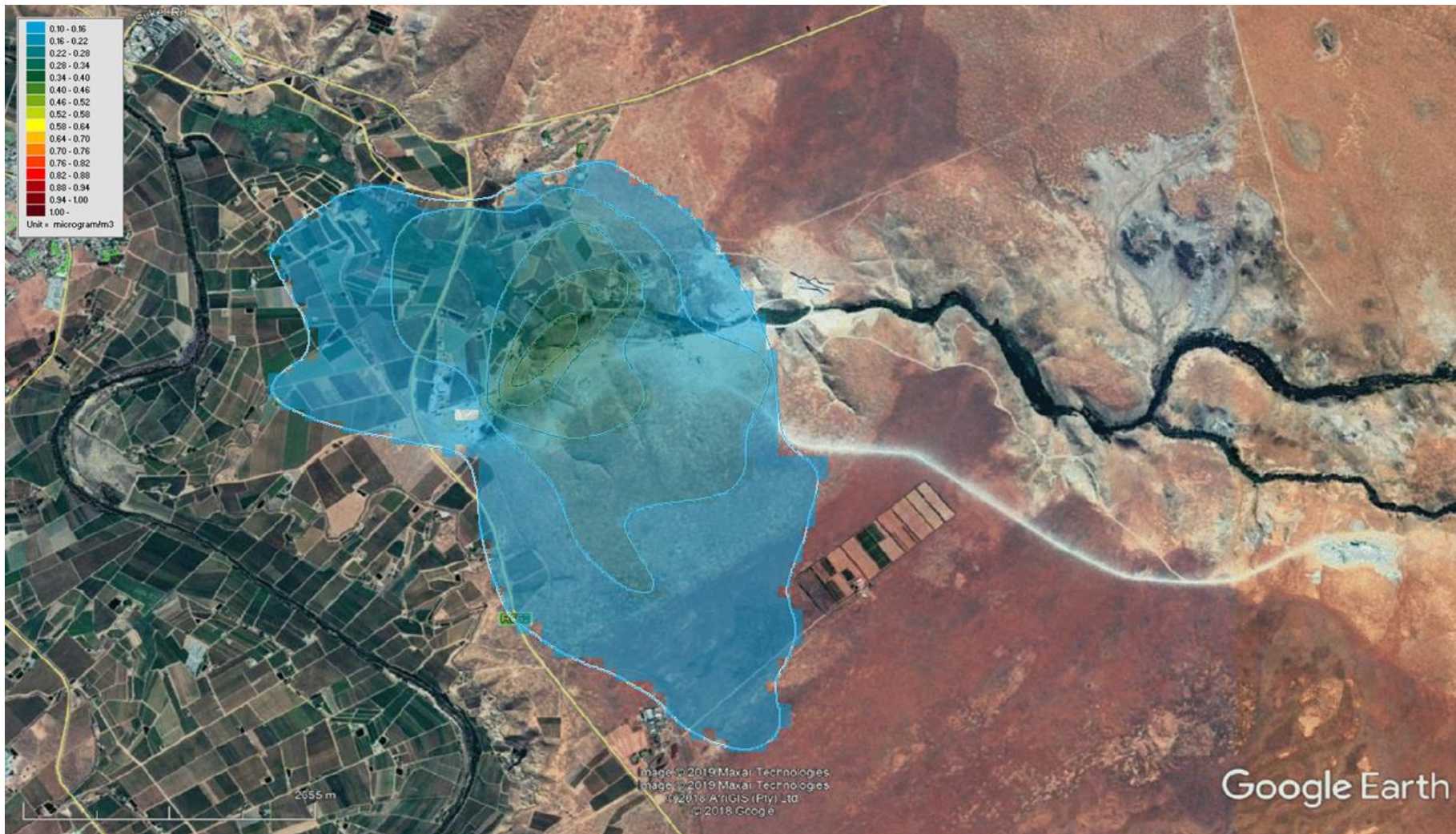


Figure 27: Typical Emissions: Annual Average PM10 Concentrations. Maximum scale (burgundy) is 1.0 µg/m³; air quality standard is 40 µg/m³.

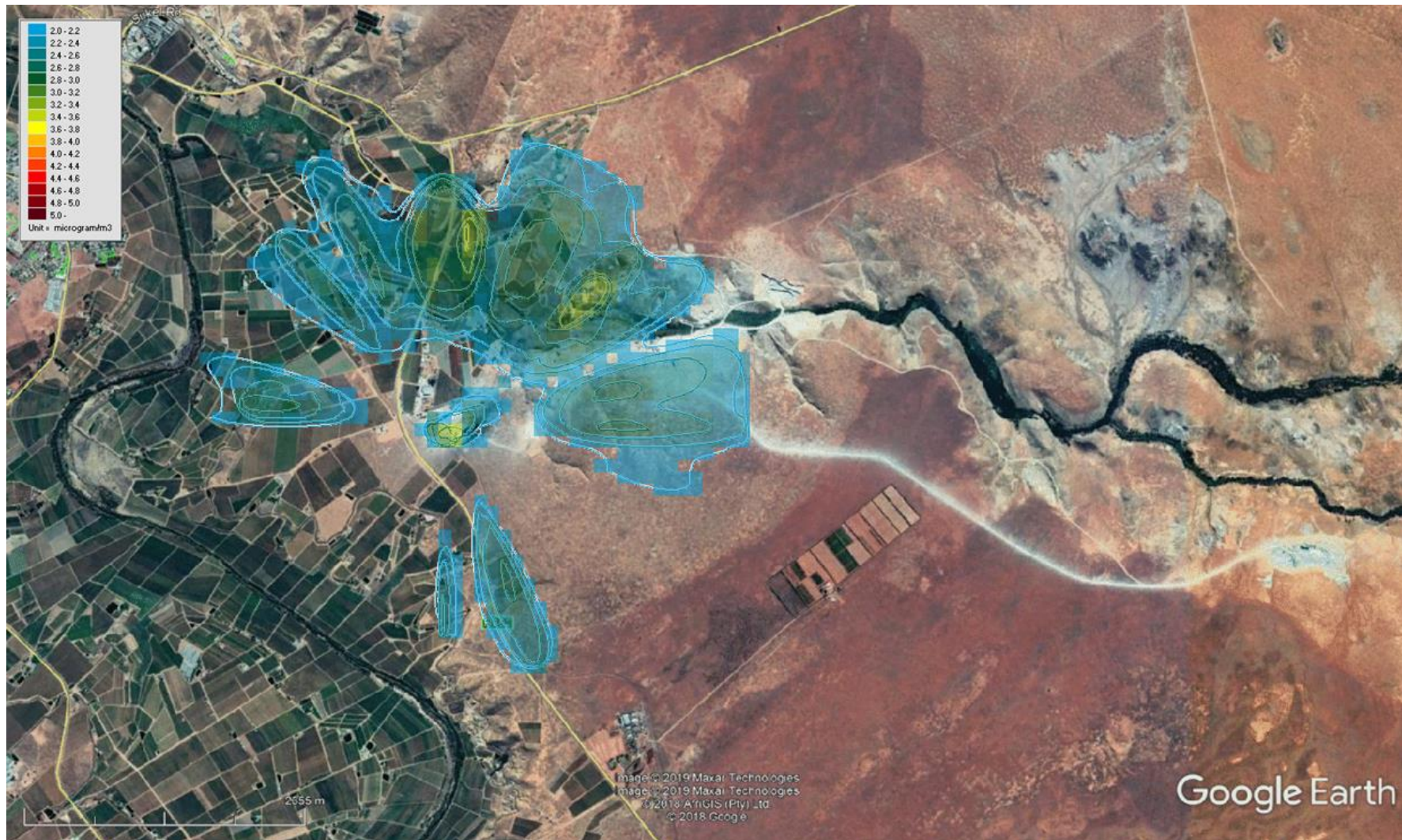


Figure 28: Typical Emissions: 99-percentile PM10 Daily Averaged Concentrations. Maximum scale (burgundy) is 5 $\mu\text{g}/\text{m}^3$; air quality standard is 75 $\mu\text{g}/\text{m}^3$

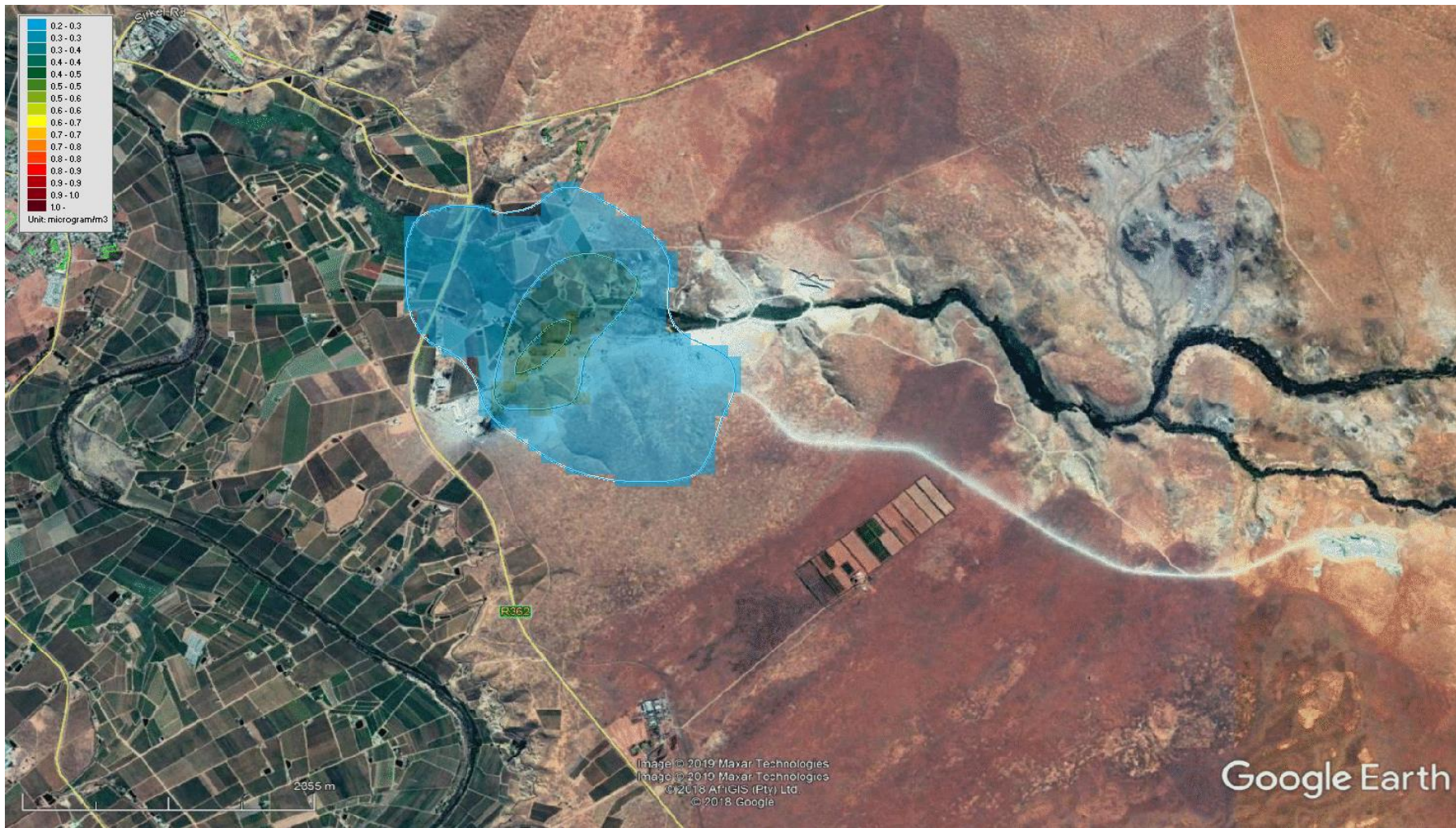


Figure 29: Typical Emissions: Annual average SO₂ Concentrations. Maximum scale (burgundy) is 1.0 µg/m³; air quality standard is 50 µg/m³

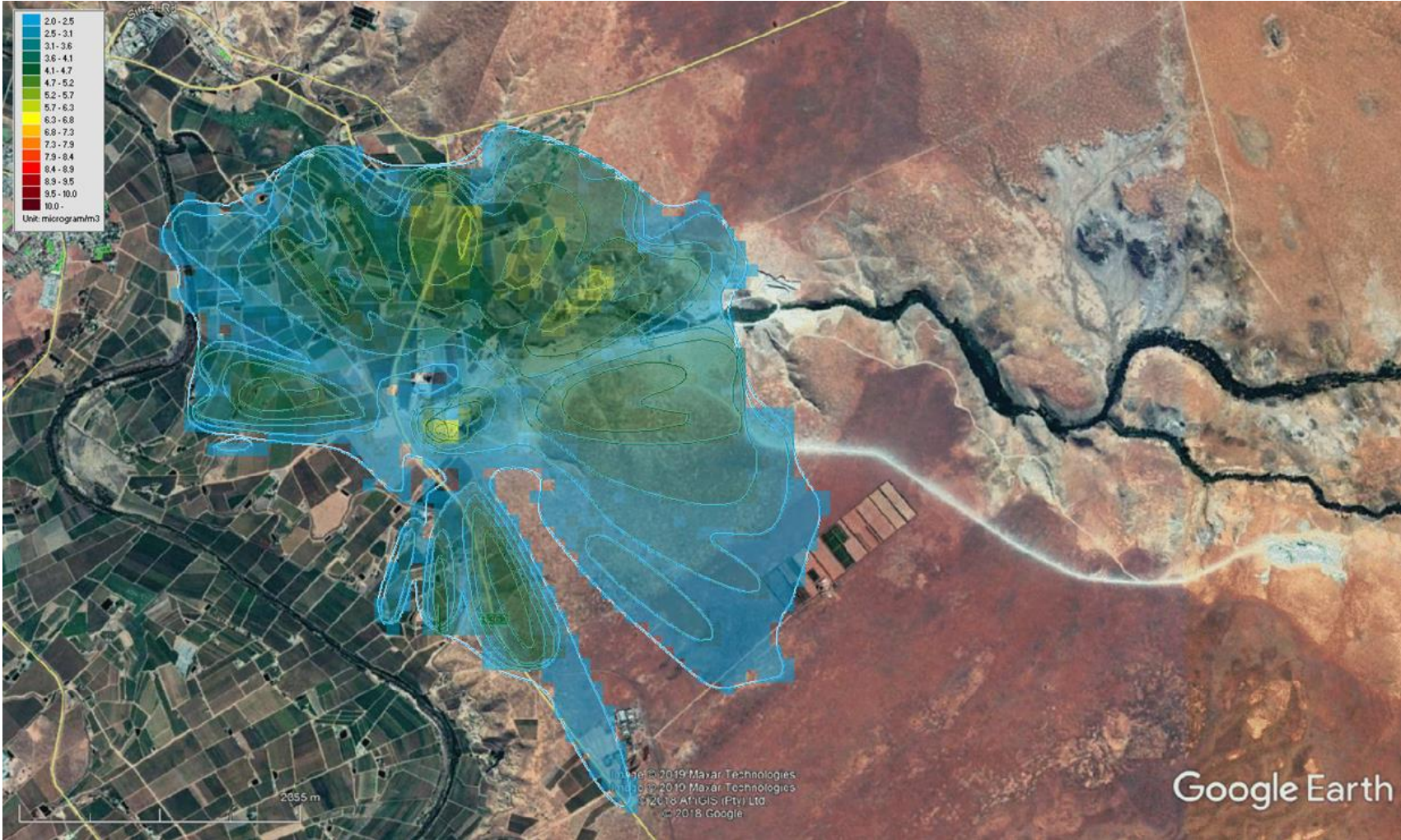


Figure 30: Typical Emissions: 99-percentile SO₂ Concentrations. Maximum scale (burgundy) is 10 µg/m³; air quality standard is 350 µg/m³

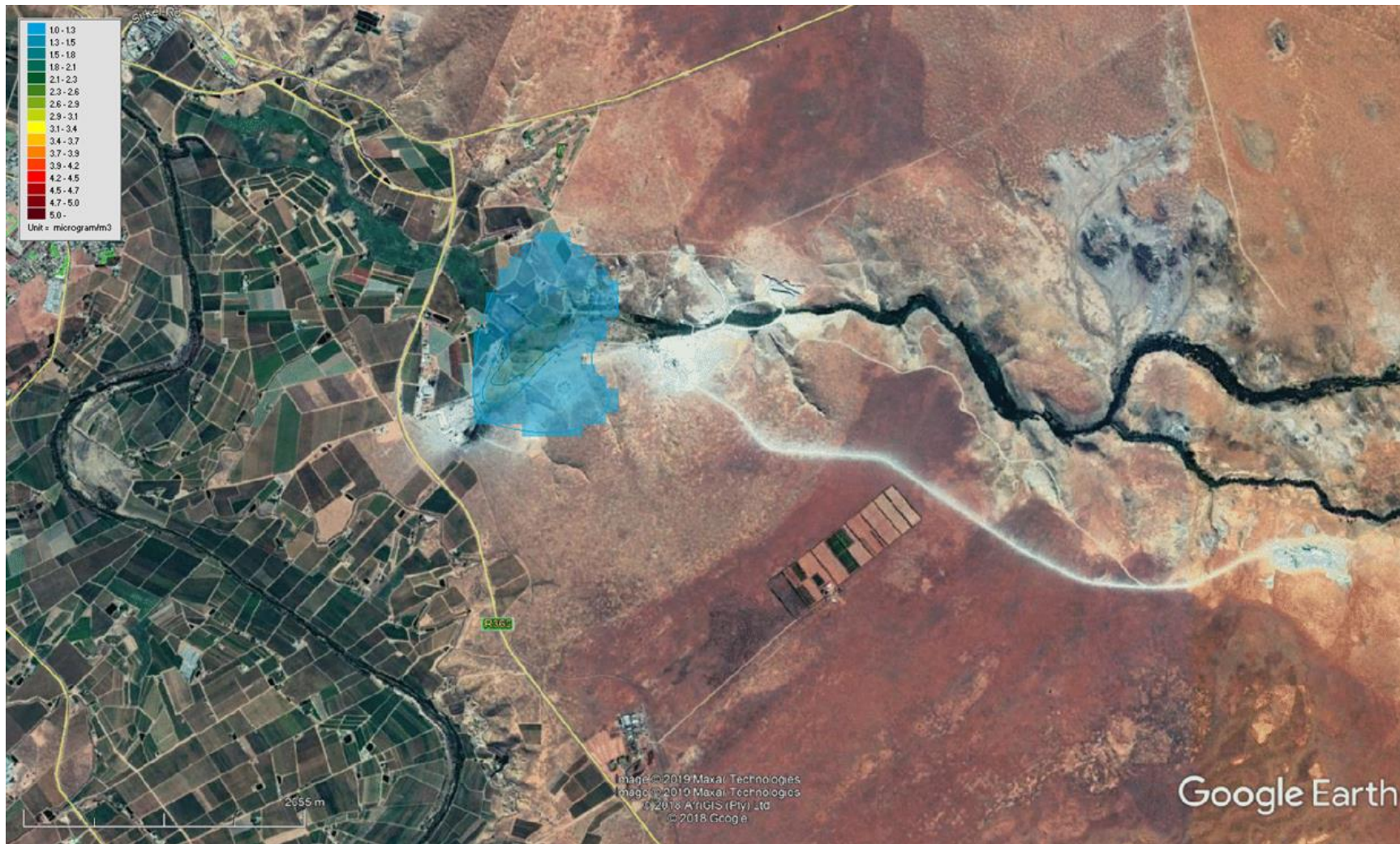


Figure 31: Typical Emissions: Annual Average NO₂ Concentrations. Maximum scale (burgundy) is 5 µg/m³; air quality standard is 40 µg/m³

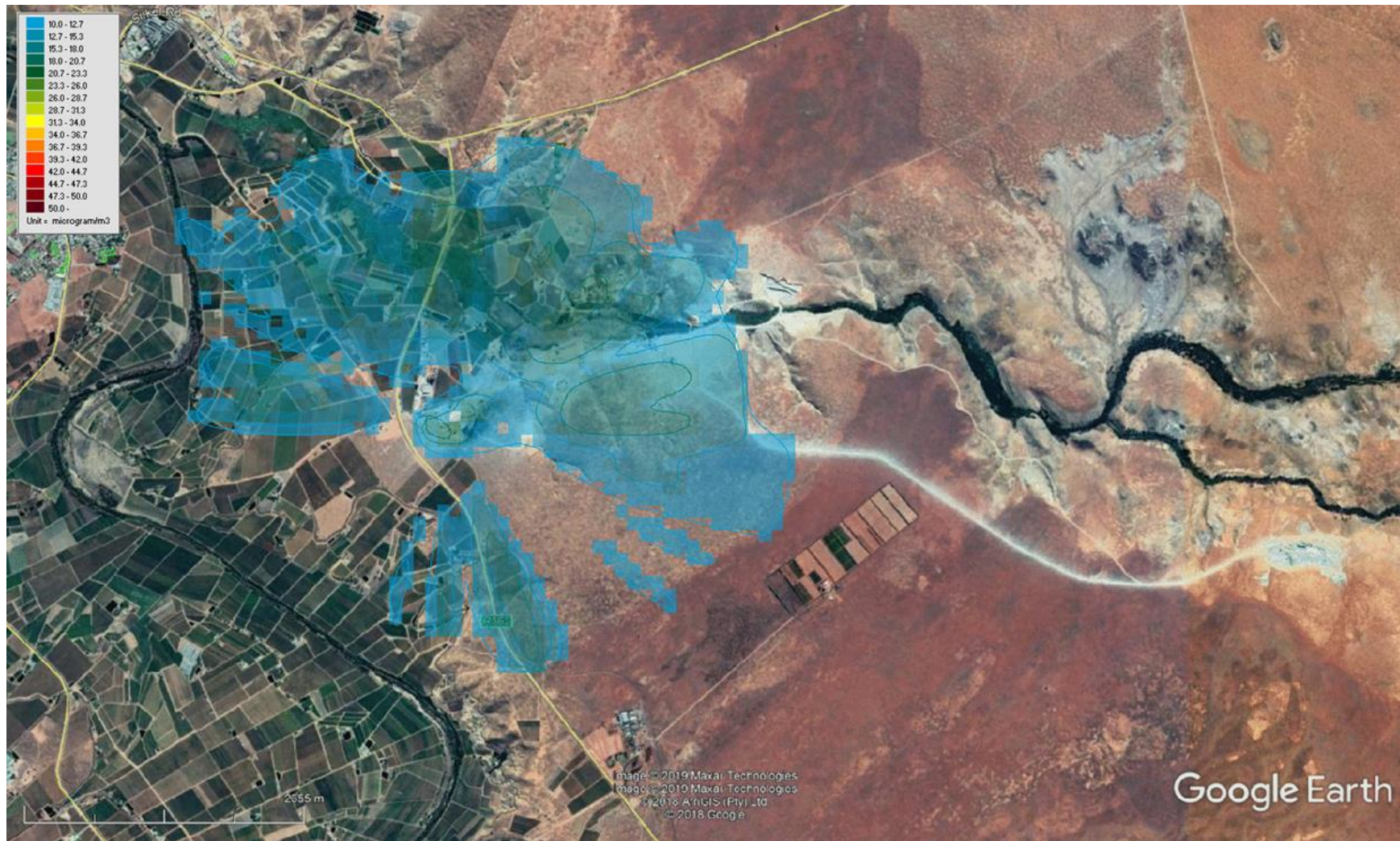


Figure 32: Typical Emissions: 99-percentile NO₂ Concentrations. Maximum scale (burgundy) is 50 µg/m³; air quality standard is 200 µg/m³

Estimated ground-level concentrations at maximum allowed emission rates are listed in Table 8 below.

Table 9: Results Summary, Maximum Emissions, µg/m³

Pollutant	Maximum Concentrations and locations	
	Annual average	99-percentile
PM ₁₀	0.6; 600m NE of stack	4.9; 1870m NE of stack
SO ₂	4.8; 600m NE of stack	61; 1870m NE of stack
NO ₂	5.7; 600m NE of stack	70.8; 1870m NE of stack
	Typical (measured) Concentrations	
PM ₁₀	1.1; 600m NE of stack	8.7; 1870m NE of stack
SO ₂	1.4; 600m NE of stack	16.1; 1870m NE of stack
NO ₂	5.2; 600m NE of stack	61.3; 1870m NE of stack

The Figures 31 - 32 and Table 9 show that the estimated maximum ground-level effect of emissions from the calciner operation are all well below the official air quality standards. Emissions from this process do not, therefore, pose any risk to the environment.

6.2 CUMULATIVE TPM AND PM₁₀ IMPACT

The same modelling and assessment approach, as described in Section 6, was used to estimate cumulative ground-level concentrations of TPM and PM₁₀ from all identified sources. The results obtained are shown graphically below and are summarised in tabular format in Table 8 below.

The outcome of the dispersion modelling study is shown graphically in Figures 30 to 33 below.

Figures 33 and 34 respectively show the annual average and 99-percentile daily ground-level concentrations of PM₁₀ particulates.

Figures 35 and 36 respectively show the annual average and 99-percentile daily ground-level concentrations of TPM particulates.



Figure 33: Maximum Emissions: Annual Average PM10 Concentrations: Minimum scale is set at air quality standard (40 µg/m³). All highlighted areas indicate exceedance of air quality standard

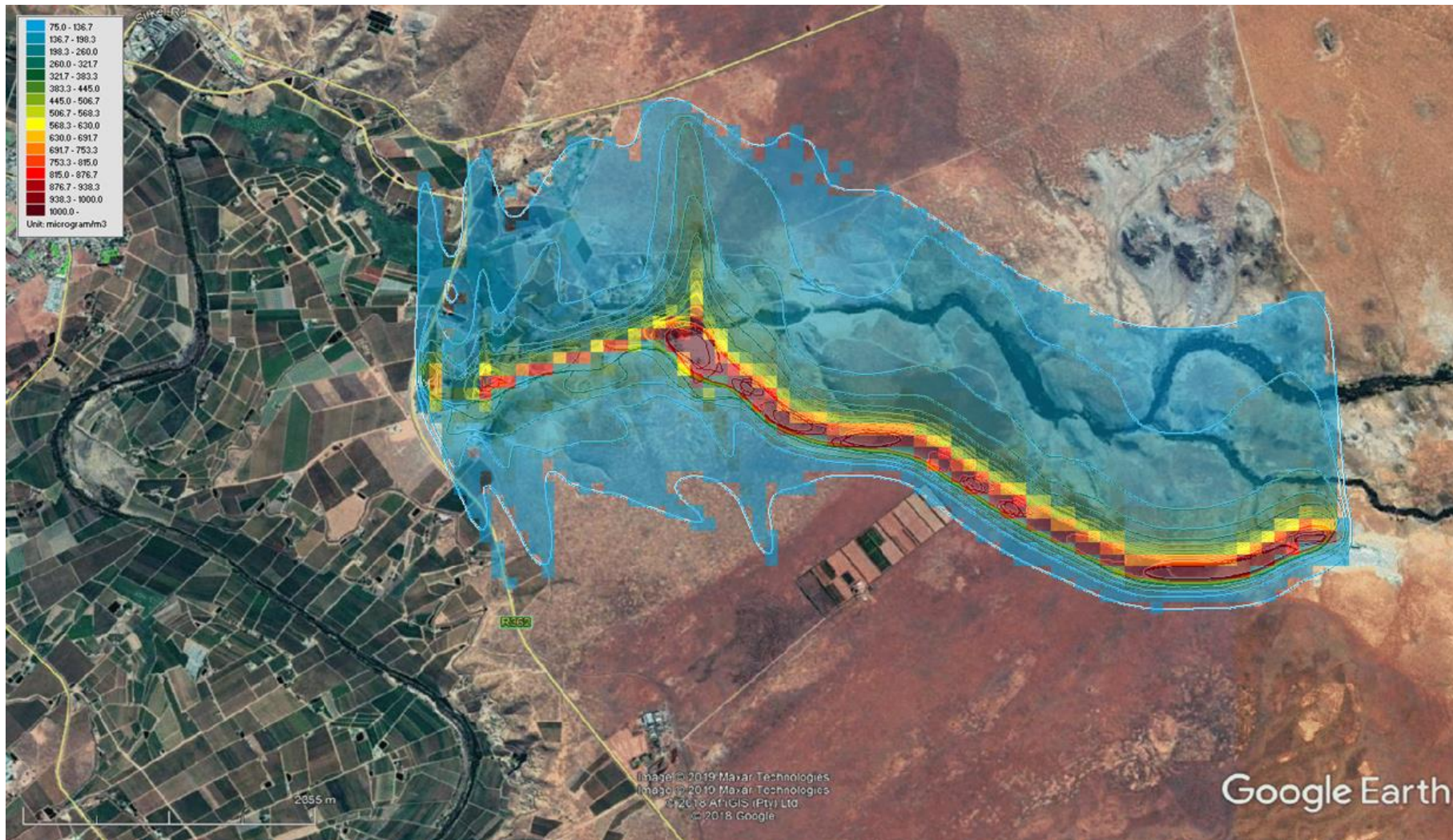


Figure 34: Maximum Emissions: 99-percentile PM₁₀ Daily Averaged Concentrations. Minimum scale is set at air quality standard (75 µg/m³). All highlighted areas indicate exceedance of air quality standard

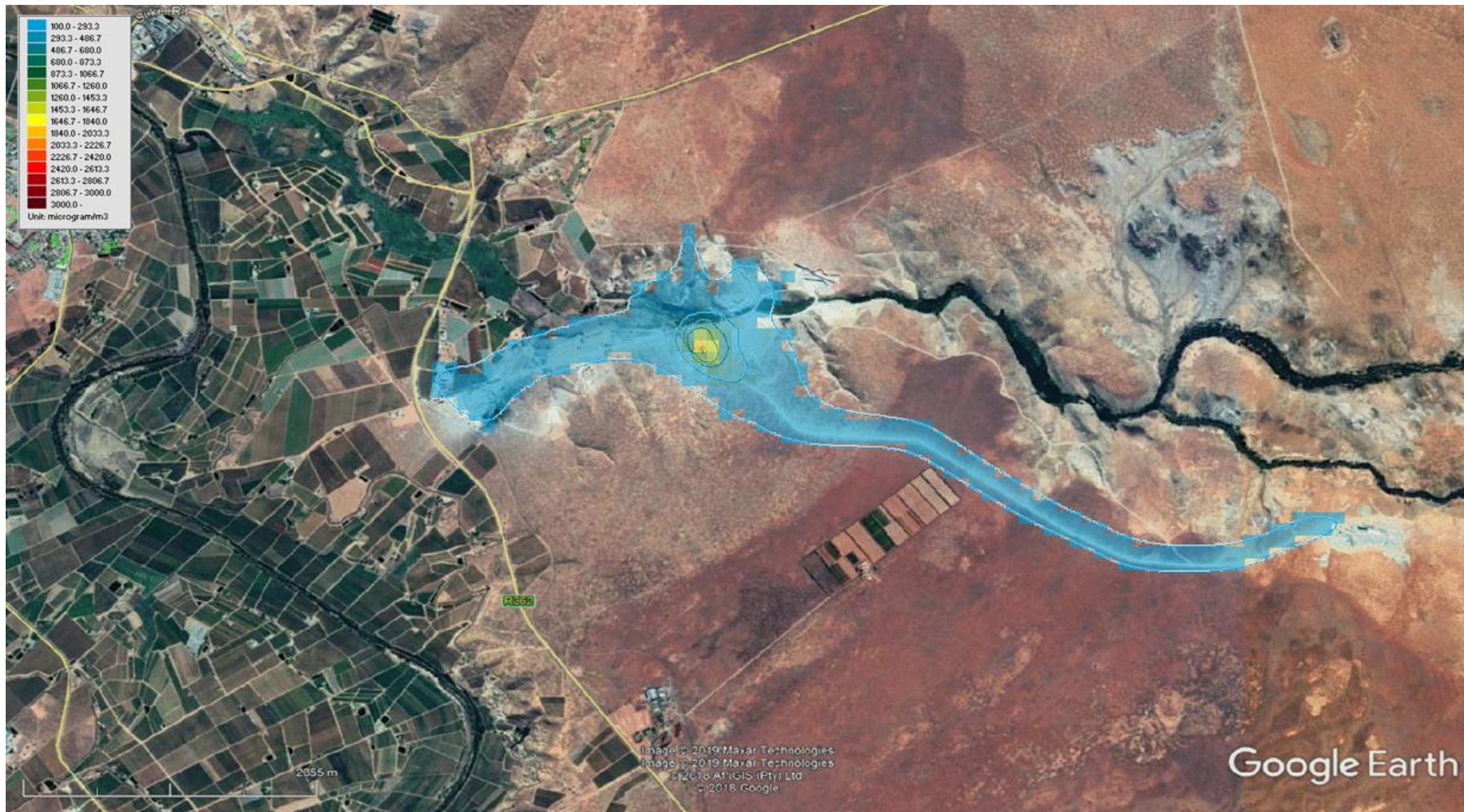


Figure 35: Maximum Emissions: Annual average TPM Concentrations. There is no air quality standard for TPM

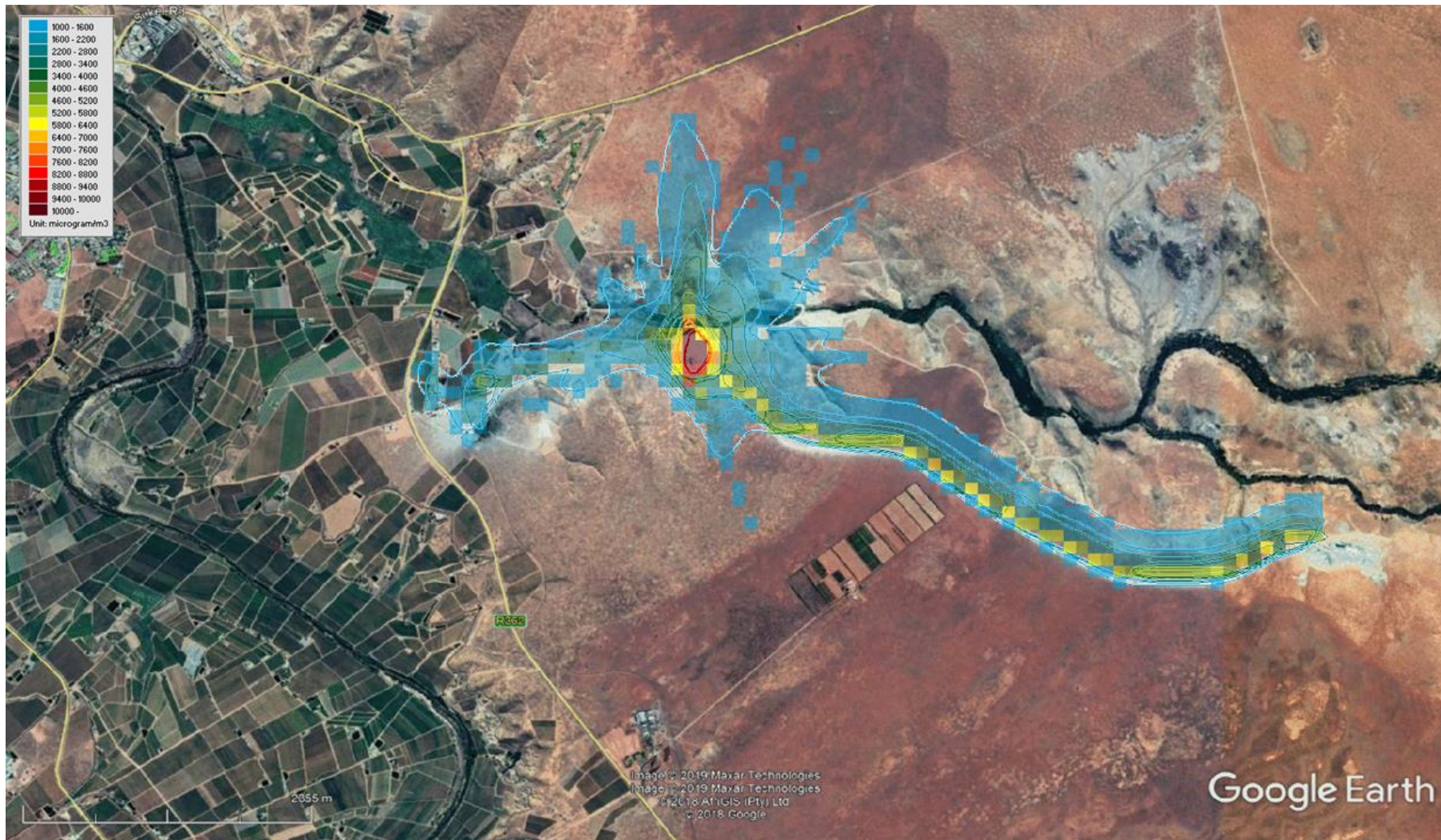


Figure 36: Maximum Emissions: 99-percentile TPM Daily Averaged Concentrations. There is no air quality standard for TPM

Estimated ground-level concentrations at maximum allowed emission rates are listed in Table 9 below.

Table 10: Results Summary, Typical Emissions, $\mu\text{g}/\text{m}^3$

	Maximum Concentrations	
	Annual average	99-percentile
PM ₁₀	0.2; N of primary crusher	1.1; N of primary crusher
TPM	2.5; N of primary crusher	37.9; N of primary crusher

From Table 9 and the Figures 21-36 above, the following can be derived:

- The primary crusher is the greatest concentrated source of particulate emissions
- Particulate emissions from road traffic impacts on the greatest area
- The annual average and daily 99-percentile air quality standards for PM₁₀ particulates is expected to be exceeded over a large area, including neighbouring vineyards.

Due to complaints by a neighbouring farmer, LAQS focused on the impact of TPM and PM₁₀ emissions in the immediate vicinity of the processing plant, i.e. excluding emissions from the mining and primary crushing operations. The sources included in the evaluation are:

- Calciner
- Secondary crusher
- Coal stockpile
- Road traffic

The results are given in Figures 37 to 46 and summarised in Table 10 below.

Figures 37 and 38 respectively show the cumulative annual average and 99-percentile daily ground-level concentrations of PM₁₀ particulates from all of the selected sources.

Figures 39 and 40 respectively show the cumulative annual average and 99-percentile daily ground-level concentrations of TPM from all of the selected sources.

Figure 41 and 42 respectively show the cumulative annual average ground-level concentrations of PM₁₀ and TPM particulates from all sources directly relating to Cape Lime's operations, i.e. calciner, secondary crusher, coal stockpile and road traffic transporting raw material to site.

Figure 43 and 44 respectively show the cumulative annual average ground-level concentrations of PM₁₀ and TPM particulates from all sources not directly relating to Cape Lime's operations, i.e. road traffic removing materials sold to external clients.

Figure 45 and 46 respectively show the cumulative annual average ground-level concentrations of PM₁₀ and TPM particulates from all road traffic sources.



Figure 37: All Sources: Cumulative Annual Averaged PM10 concentrations. Minimum scale is set at air quality standard ($40 \mu\text{g}/\text{m}^3$). All highlighted areas indicate exceedance of air quality standard

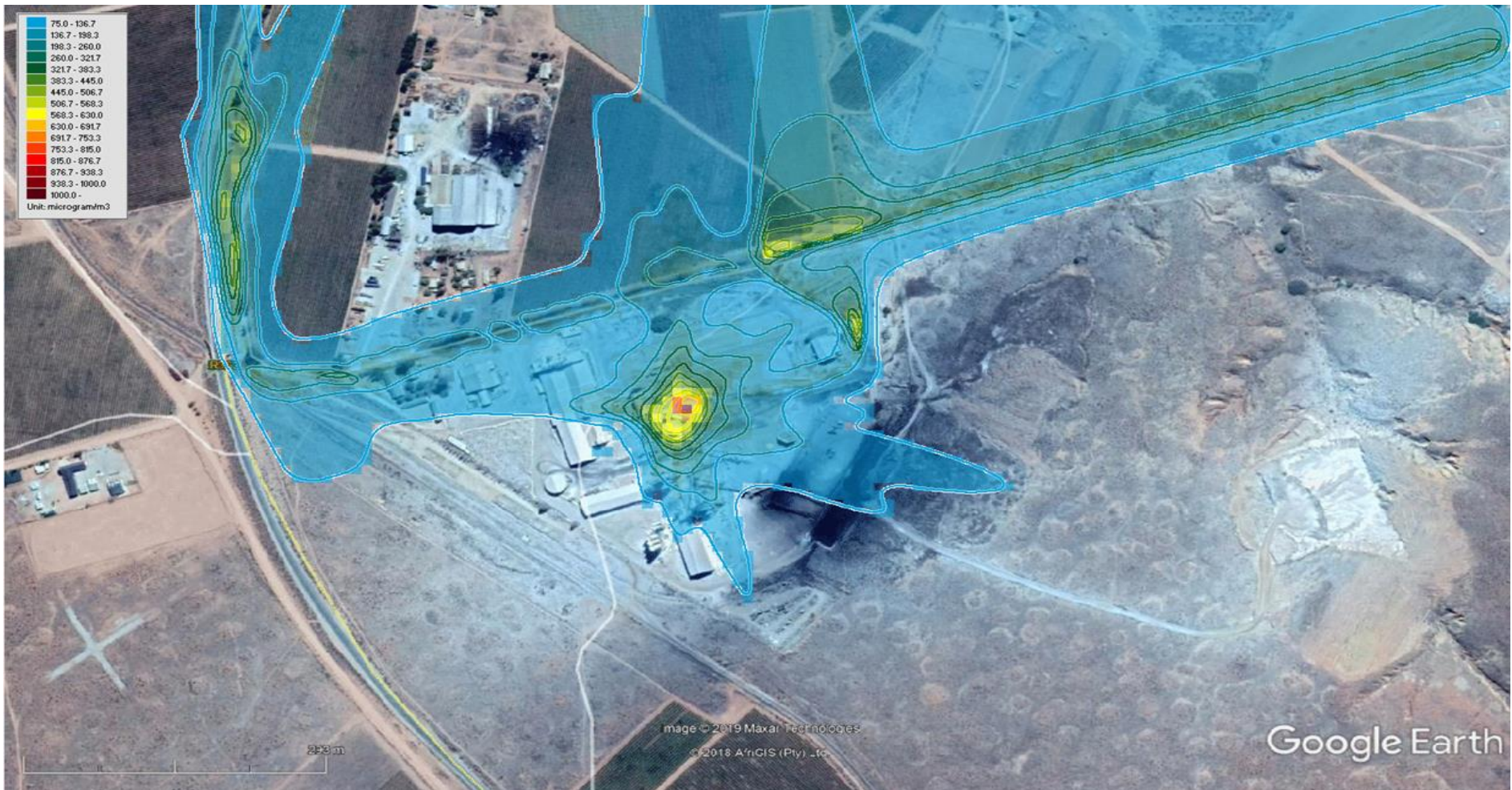


Figure 38: All Sources: Cumulative 99-percentile PM10 concentrations. Minimum scale is set at air quality standard (75 µg/m³). All highlighted areas indicate exceedances of air quality standard



Figure 39: All Sources: Cumulative Annual Averaged TPM concentrations



Figure 40: All Sources: Cumulative 99-percentile TPM concentrations.



Figure 41: All Cape Lime Sources: Cumulative Annual Averaged PM10 concentrations. Minimum scale is set at air quality standard (40 µg/m³). All highlighted areas indicate exceedances of air quality standard



Figure 42: All Cape Lime Sources: Cumulative Annual Averaged TPM concentrations.

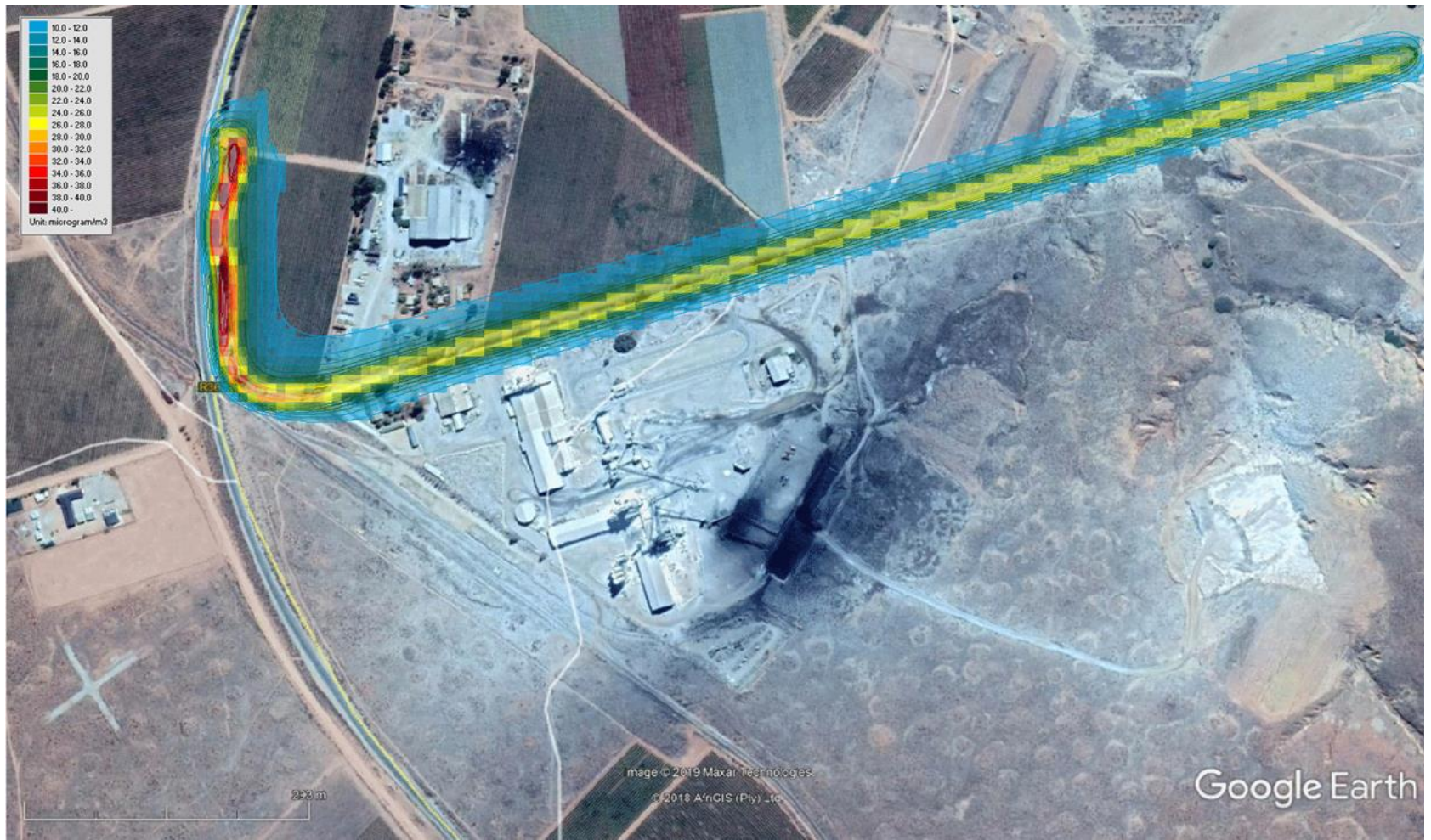


Figure 43: All External Sources: Cumulative Annual Averaged PM10 concentrations. Maximum scale is set at air quality standard (40 µg/m³). All burgundy areas indicate exceedance of air quality standard



Figure 44: All External Sources: Cumulative Annual Averaged TPM concentrations



Figure 45: All Road Traffic: Cumulative Annual Averaged PM10 concentrations. Maximum scale is set at air quality standard (40 $\mu\text{g}/\text{m}^3$). All burgundy areas indicate exceedances of air quality standard



Figure 46: All Road Traffic: Cumulative Annual Averaged TPM concentrations

LAQS selected a receptor point situated on the neighbouring farm's fence line where the turnoff of vehicles to Cape Lime's site is located. This point is located in the area of the highest particulate concentrations.

Three different types of sources are included in this evaluation, i.e. point, area and line sources. 99-percentile ground-level concentration from each type of source is highly dependent on weather conditions. Different weather conditions cause maximum concentrations from the various types of sources under varying weather conditions, i.e. stockpile emissions are highest at high wind speeds, maximum impact from point sources are highest at very low wind speeds, etc. It is, therefore, not meaningful to assess the contribution that each source has on 99-percentile concentration. A graphic presentation of areas where the 99-percentile PM₁₀ concentrations are expected to exceed the air quality standards is shown in Figure 43.

As a result, estimated ground-level annual averaged concentrations at the receptor point are listed in Table 9 below.

Table 11: Results Summary, Typical Emissions, µg/m³ (Values in red show that air quality standards are exceeded)

Source	Maximum Annual Averaged Concentrations	
	PM10	TPM
All sources	52.1	202
Cape Lime operations	28.6	119
All external sources	23.5	82.7
All road sources	49.5	174

The Table shows that emissions from road traffic are by far the major contributor of particulate deposition on the neighbouring property, so much so that the ambient air quality standard for PM₁₀ particulates is exceeded in some areas.

AGRICULTURAL SETTING

Soils

The soils are shallow sandy gravel and stone chips over solid rock, which precludes them from being used as arable land. The proposed development will have no effect on the physical or chemical properties of the soils. The soils at the site have a relative agricultural theme sensitivity of 1 to 2.

According to a study conducted by Bla Pau Managamenet Consulting, the entire site is covered by shallow, non-arable stony soils of the Mispah Soil Form. Topsoil depth ranged from a nominal 50

mm to 250 mm With the exception of one small area of a few hundred m². Rehabilitation of similar soils has been successfully carried out in other parts of the Karroo, the closest being at nearby Nieuwoudtville.

Table 12: Table 11: Description of Site Soil Families

Mispah	Highly erodible, exceptionally good surface water management is required. Topsoil depth is often less than 200 mm, covering a stratum of densely bedded shale or solid rock. Often found in proximity are Glenrosa soils. Mispah soils also carry a high erosion hazard.
--------	--

Table 13: Physical Properties of the Mispah soil

Soil Form / Family	Clay % of Topsoil	Water Holding Capacity (mm/m)	Water Intake Rate	Drainage Capacity	Erosion Hazard	Tillage Constraints
Mispah	6 to 35	< 80	Medium	Moderate	Moderate to high	Cr, co, mw, sh

Table 14: Tillage Constraints of the Mispah soils

Code	Restraint
Cl	Cloddy consistency, slippery when wet, hard and cloddy when dry
Co	Compaction, puddling and smearing when wet
Cr	Crusting, soft when wet, cemented and brittle when dry
Mw	Machine wear, abrasion in sharp sandy soils
Sh	Subsurface hindrance, shallow soils on rock or hard plinthite

Table 15: Chemical Properties of the Mispah soils

Soil Form / Family	Base Status	Organic matter Content	N&S Mineralisation Capacity	K Reserves	Zn Reserves	Salinity/ Sodicity Hazard
Mispah	Low to moderate	Low to moderate	Low	Low	Low	Low to moderate

The Proposed Link Road Vaderlandsche and Welverdiend

The soils constitute shallow, non-arable land, the major difference being that the new portion of road traverses steeper slopes. The river floodplains are covered by waterborne coarse sand and dense stands of Sweetthorn (*Acacia karoo* ssp. *karroo*). There is a narrow strip of arable alluvium along the upper floodplain and lower foot slopes, which is being assessed for hemp production.

The Proposed two Kilns

These will be commissioned on land within the existing Vredendal processing area. The locality is within an industrial site that is already a fully transformed industrial undertaking and therefore is outside of the terms of reference of this study.

Crops

The only crops that will grow on these soils are locally habituated grasses and shrubs that have a very shallow root concentration and woody vegetation that has strong rooting systems that will spread and look for water.

Land Capability Class Determination

- Only soils complying with Land Capability Classes I to III (LCCI to LCCIII) are readily acceptable for arable crop cultivation.
- LCC IV soils may be cultivated under certain stringent and well-managed conditions.
- LCC V usually refers to wetlands and LCC VI to non-arable land that can be used only for long-term crops due to steepness, soil depth and so forth
- LCC VII and VIII soils are limited to domestic livestock and wild game.
- Most of the profiles studied fell into LCC VII (see table 16 below). All the land under review is vacant rangeland with a Land Capability Class Value of LCC VII and LCC VIII, which equate to a Low Sensitivity Rating in terms of GN 320. The land has a carrying capacity of one 60 kg Dorper hamel per 8 to twelve ha. This equates to one Large Stock Unit (LSU), an ox of 450 kg, per 60 ha to 90 ha of grazing veld. Good quality grazing veld supports one LSU per 2 to 2.5 ha

Table 16: Description of Land Capability Classes

Class	Concepts
I	Land in Class I has few limitations that restrict its use; it may be used safely and profitably for cultivated crops; the soils are nearly level and deep; they hold water well and are generally well drained; they are easily worked, and are either fairly well supplied with plant nutrients or are highly responsive to inputs of fertilizer; when used for crops, the soils need ordinary management practices to maintain productivity; the climate is favourable for growing many of the common field crops.
II	Land in Class II has some limitations that reduce the choice of plants or require moderate conservation practices; it may be used for cultivated crops, but with less latitude in the choice of crops or management practices than Class I; the limitations are few and the practices are easy to apply.
III	Land in Class III has severe limitations that reduce the choice of plants or require special conservation practices, or both; it may be used for cultivated crops, but has more restrictions than Class II; when used for cultivated crops, the conservation practices are usually more difficult to apply and to maintain; the number of practical alternatives for average farmers is less than that for soils in Class II.
IV	Land in Class IV has very severe limitations that restrict the choice of plants, require very careful management, or both; it may be used for cultivated crops, but more careful management is required than for Class III and conservation practices are more difficult to apply and maintain; restrictions to land use are greater than those in Class III and the choice of plants is more limited.
V	Land in Class V has little or no erosion hazard but has other limitations which are impractical to remove that limit its use largely to pasture, range, woodland or wildlife food and cover. These limitations restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops; it is nearly level; some occurrences are wet or frequently flooded; others are stony, have climatic limitations, or have some combination of these limitations.
VI	Land in Class VI has severe limitations that make it generally unsuited to cultivation and limit its use largely to pasture and range, woodland or wildlife food and cover; continuing limitations that cannot be corrected include steep slope, severe erosion hazard, effects of past erosion, stoniness, shallow rooting zone, excessive wetness or flooding, low water-holding capacity; salinity or sodicity and severe climate.
VII	Land in Class VII has very severe limitations that make it unsuited to cultivation and that restrict its use largely to grazing, woodland or wildlife; restrictions are more severe than those for Class VI because of one or more continuing limitations that cannot be corrected, such as very steep slopes, erosion, shallow soil, stones, wet soil, salts or sodicity and unfavourable climate.
VIII	Land in Class VIII has limitations that preclude its use for commercial plant production and restrict its use to recreation, wildlife, water supply or aesthetic purposes; limitations that cannot be corrected may result from the effects of one or more of erosion or erosion hazard, severe climate, wet soil, stones, low water-holding capacity, salinity or sodicity.

ENVIRONMENTAL NOISE

According to a study conducted by Ebenaeser Environmental Consultants to conduct an Environmental Noise survey, the sampling results taken for the purpose of the study was to determine baseline noise levels for comparison during future mining operations indicates that no to little effect of noise pollution was measured at the boundaries of the mine, or along the access road to the new quarry site.

The reports concludes that the noise energy will be influence by the Meteorological conditions such as barometric pressure, wind speed and direction as well as clouds density.

GEOHYDROLOGY

The aquifer below the Mine site is classified by DWS as a Karst aquifer with an average yield of 0.5 - 2 L/s (DWAF, 2000) (Figure 47). Recharge occurs over much of the surface area of the aquifer through direct infiltration of rain water. The general groundwater flow direction is from north-east to south-west.

The groundwater quality according to the electrical conductivity (EC) for the regional aquifer underlying the site has been classified as average with an EC of 70 - 300 mS/m (Figure 8) (WRC 2012). During the site visit, field chemistry taken at sampling points results found the range to be between 149.2 - 537 mS/m.

Both these classifications are based on regional datasets, and therefore only provide an indication of conditions to be expected. Groundwater in the area is generally considered as being of marginal quality where yields remain fairly low.

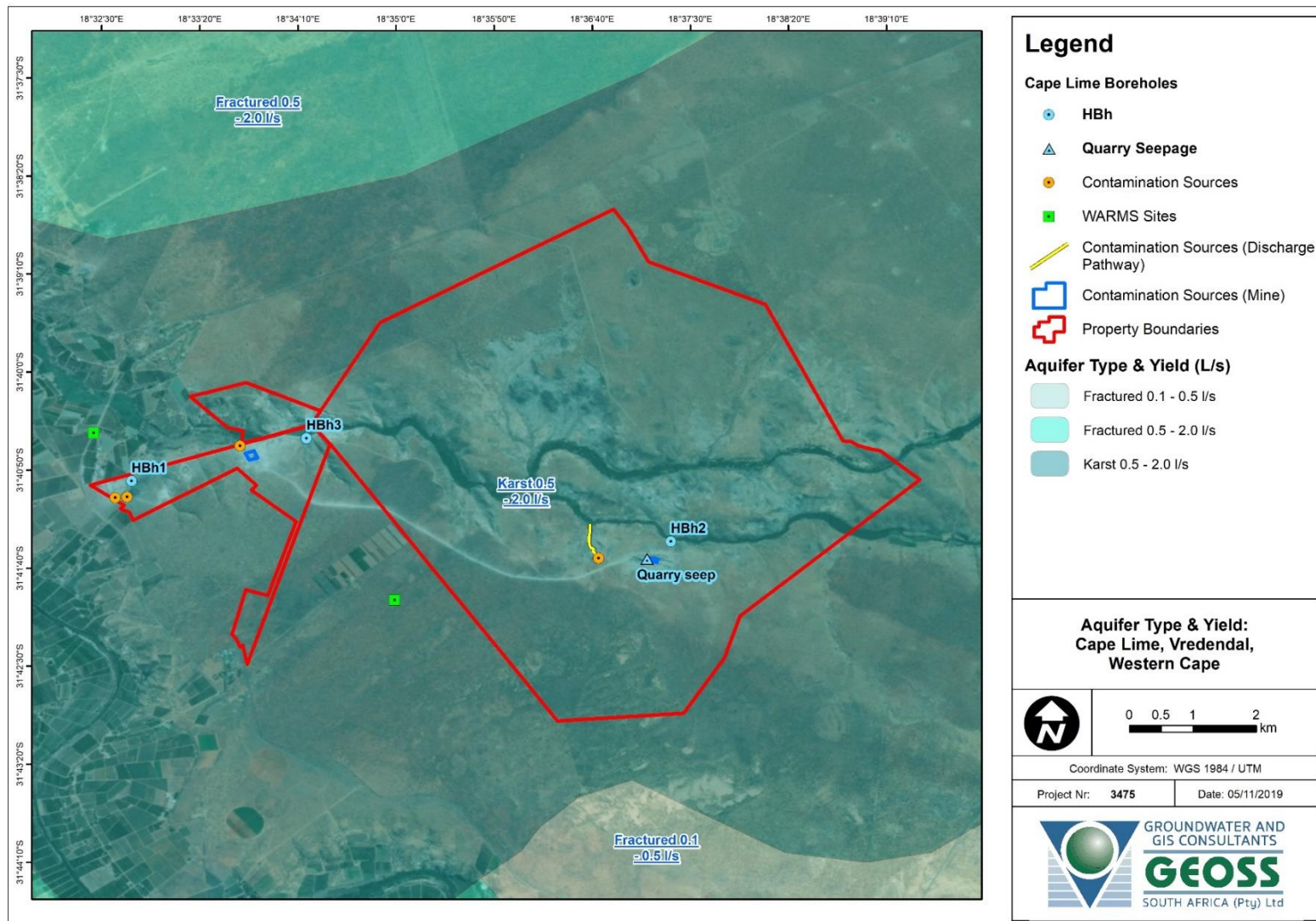


Figure 47: Average expected yield and aquifer type (1:500 000 Hydrogeology map 3118 Calvinia, DWA, 2000)

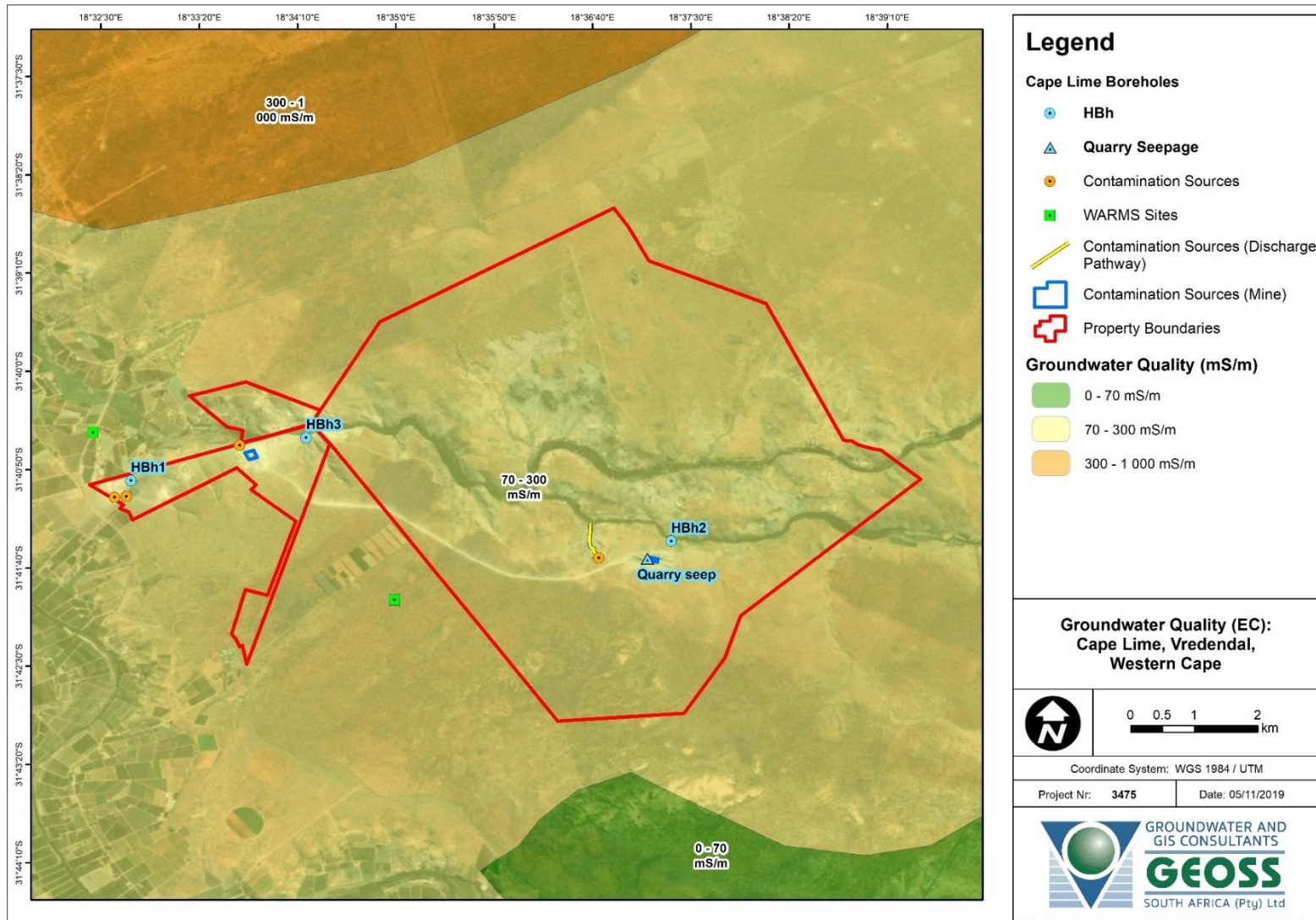


Figure 48: Regional groundwater quality (mS/m) from WRC (2012)

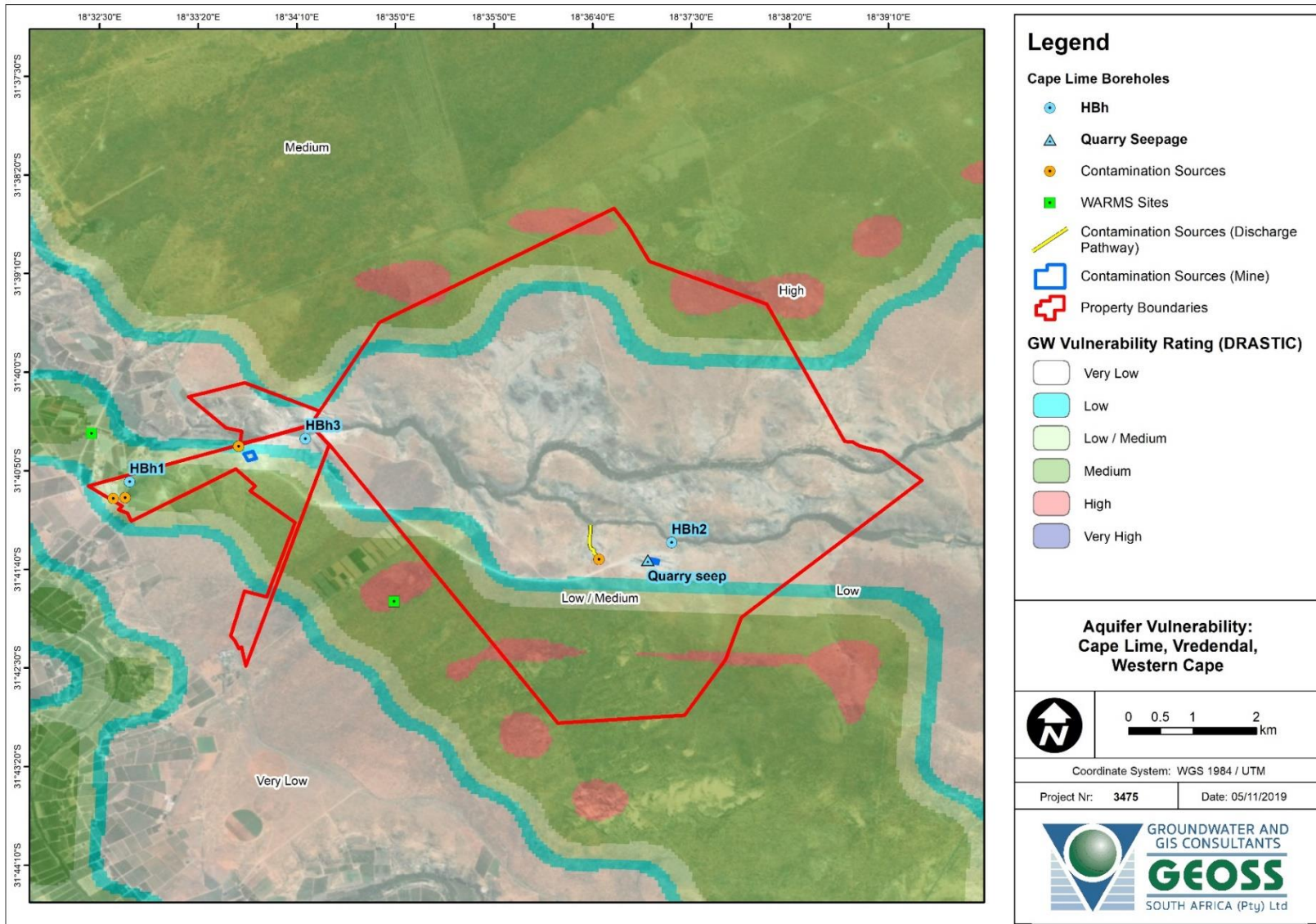


Figure 49: Regional groundwater vulnerability for the study area (DWAF, 2005)

Aquifer vulnerability classification

The national scale groundwater vulnerability map, which was developed according to the DRASTIC methodology (DWAf, 2005) for vulnerability to surface-based contaminants (Figure 49).

The DRASTIC method considers the following factors:

- D = depth to groundwater (5)
- R = recharge (4)
- A = aquifer media (3)
- S = soil type (2)
- T = topography (1)
- I = impact of the vadose zone (5)
- C = conductivity (hydraulic) (3)

The number indicated in parenthesis at the end of each factor description is the weighting or relative importance of that factor. The majority of the site is classified as having a low vulnerability rating. This is likely due to the crystalline nature of the bedrock which has a very low pore space %. Borehole Bh1 is located on an area classified as medium, this likely due to the alluvial sediment below the site.

Hydrocensus

A total of 3 boreholes are available on site identified during the site. Two groundwater samples were collected at HBh1 and Quarry seepage, the third sample was collected from a tap that supplies water from the canal system.

It must be noted that groundwater is abstracted from a mining pit. Water is only abstracted when the level rises above a certain point which makes mining unsafe. The water is then discharged downgradient into a valley which feeds into the Wiedou River system and eventually the Olifants River. This activity triggers Section 21 (J) of the National Water Act (1998) that is the removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people. The mine site has submitted an application which is being processed.

Table 17: Hydrocensus boreholes and field chemistry.

Label_ID	Alternative name	Latitude (WGS84)	Longitude (WGS84)	Status
HBh1	Factory borehole	-31.682095	18.545957	In use
HBh2	-	-31.690672	18.622481	collapsed
HBh3	-	-31.676048	18.570688	collapsed
Quarry Seepage	-	-31.693100	18.618891	In use

Label_ID	pH	EC (mS/m)	TDS	Temp (°C)	DO (%)	DO mg/L
HBh1	7.29	532.0	3616	22.7	82.7	7.17
Quarry Seepage	8.27	149.2	1087	19.7	98.5	9.08

- * DO - Dissolved Oxygen
- * TDS – Total dissolved solids

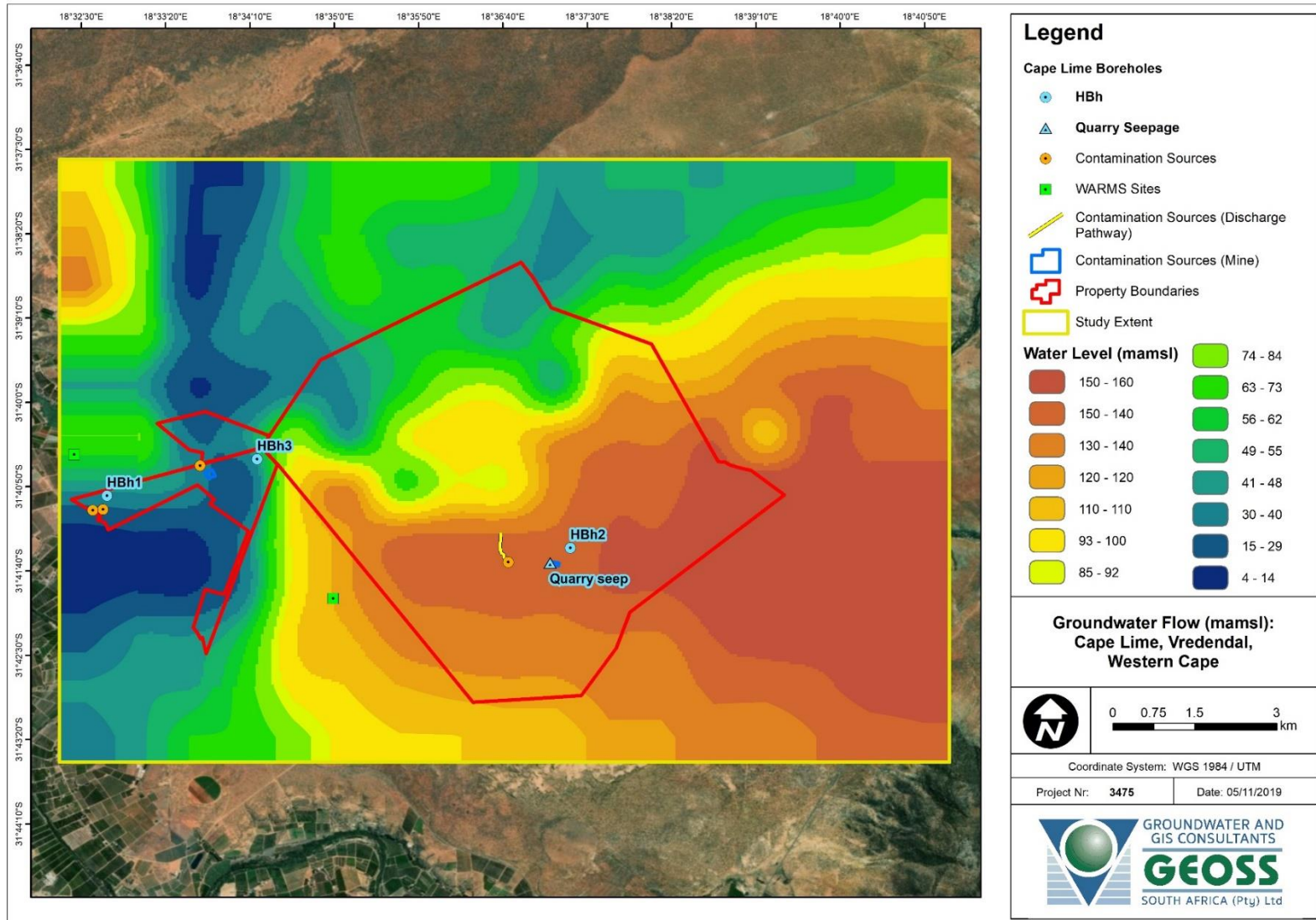


Figure 50: Ground water flow direction, indicated by black arrows.

(b) Description of the current land uses.

The current land uses for the Remainder of Portion 1 of Farm Vaderlandsche Rietkuil 308, Farm Nuwedrif 450, Portion 21 of Farm KYS 301, Portion 26 of Farm KYS 301 and Portion 162 of the Farm Karoo Vlake 299 is mining and processing of Limestone and dolomite. Cape Lime was awarded mining rights in terms of Section 22 of the Mineral and Petroleum Resources Development Act 2002 (Act No. 28 of 2002) to mining limestone and dolomite, as well as an Air Emissions License in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) for the calcination of limestone.

The site is situated next to the R362 public road, approximately 4 km south-east of the Vredendal town centre (as the crow flies). The residential as well as the industrial areas of Vredendal are situated within a 5 km radius of the site. The Kleinrivier Primary School is situated approximately 550 m west of the processing plants.

The site is surrounded by agricultural land uses, with vineyards (table as well as wine grapes) being the main agricultural activity north and west of the Cape Lime site.

The Olifants River, which, through the Olifants River Water Scheme, is the most important source of agricultural irrigation water in the area, is situated approximately 3 km west of the site. The river is bounded by vineyards along its western and eastern banks.

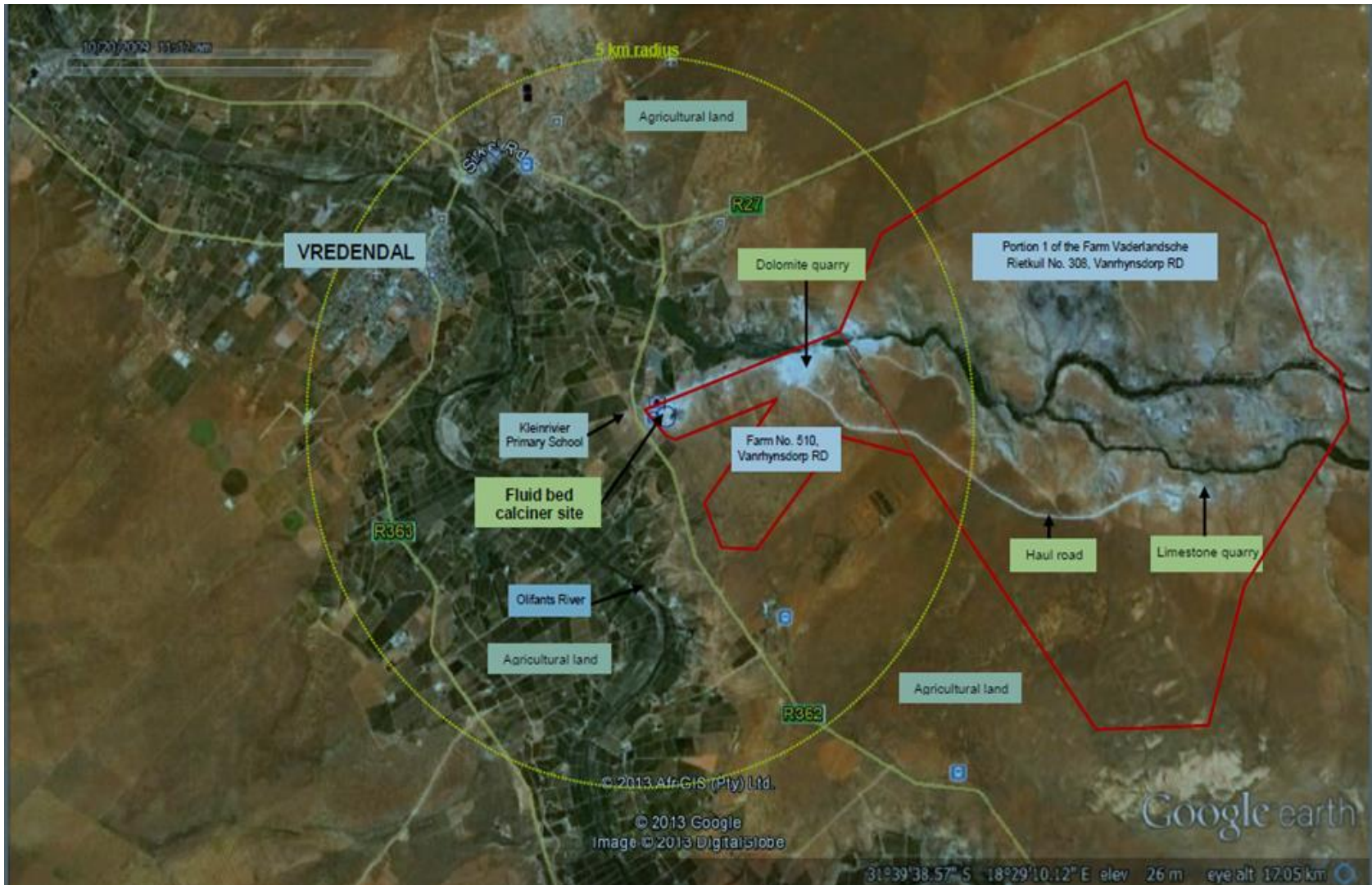


Figure 51: Google Earth Map showing surrounding land uses.

(c) Description of specific environmental features and infrastructure on the site.

Roads.

The site is accessed via the R326 national road between Klawer and Vredendal.

Railways.

Two private rail sidings, one connects to the Cape Town to Bitterfontein railway line at the Troe Troe and the latter connects to the Bitterfontein line to the Sishen/Saldanha line at Loop 4.

Infrastructure associated with the mining and processing operations includes the following:

- Offices and ablution facilities
- Parking areas
- Stores
- Old employee houses
- Eskom power line
- Water reservoir
- Boreholes
- Salvage yard
- Fuel storage facilities
- Product stockpiles
- Coal stockpile
- Conveyor systems
- Haul roads.
- Limestone and dolomite quarries
- Overburden is removed to expose the ore before drilling and blasting takes place according to a structured mine plan. Excavation of blasted material is done by an Excavator and 18 ton trucks haul the material to the primary crushing plant.
- Primary crushing plant
 - Run-of-mine material from a specific quarry (dolomite and/or limestone) is tipped into the feed bin from where the ore is fed to a jaw crusher. Thereafter the material goes through a series of screening and further crushing stages. The top size of the material may vary with respect to the product/products being produced. Crushed material is stockpiled at the primary crusher stockpile area.
- Mineral Filler Plant
 - Crushed white dolomite from the primary crushing plant is fed to the Mineral Fillers plant where the size of the white dolomite is progressively reduced using crushers, ball mills, screens and air classifier. The resultant range of micro-fine products (5 microns, 15 microns, 75 microns and 300 microns) are stored in silos from where it can be packed in small bags or bulk bags for sale.
- Dolomite Blending Plant
 - Crushed dolomite from the primary crushing plant is fed to the Dolomite Processing Plant

where it is crushed and screened to -2 mm particle size. The material is then stored in silos before being loaded into bulk road trucks.

- Limestone secondary crusher
 - Crushed limestone from the primary crushing plant is fed to the secondary crusher and subsequently screened and air classified to yield three products. The coarser fraction (+1-6mm) is stockpiled and used as feed material for the Kiln. The middle fraction (-1mm) is stored in bins from where it is subsequently blended (after analysis) to obtain a consistent product composition before being loaded into road trucks when sold. The fine fraction (-200micron) is removed from the middle fraction before it's fed to the storage bins by passing the material through an air classifier. The fine fraction (-200micron) are routed to silos for storage before dispatched in road tankers when sold.
- Fluid Bed Calciner
 - Limestone (CaCO_3) is calcined in a Kiln at $\pm 920^\circ\text{C}$ to obtain quicklime (CaO) using coal as fuel. All exhaust gas streams pass through bag filter units to be cleaned before being released into the atmosphere. The plant is fully automated to monitor all the process parameters. Quicklime is stored in silos before being bagged, sold in bulk or conveyed to the Oxide Processing Plant or Hydrator plant for further processing. The material obtained at the bag filter units are sold as a low grade quicklime or passed through the hydrating plant to produce a low grade hydrated lime product.
- Hydration Plant
 - Quicklime is mixed with water in a process reactor to yield dry hydrated lime (Ca(OH)_2), which is air classified to remove oversize material. The oversize material separated by the air classifying system passes through a milling section to reduce its particle size. The final product is then bagged or dispatched in bulk road tankers.
- Laboratory
 - All basic analysis for product composition and grading are done in a fully equipped laboratory on site to ensure compliance to Cape Lime's ISO 9002 quality system. Analysis from external laboratories are obtained annually or on special request to verify our test results.
- Workshops
 - All maintenance is done with the aid of three fully equipped workshops for electrical, mechanical and automotive disciplines.

(d) Environmental and current land use map. (Show all environmental, and current land use features)

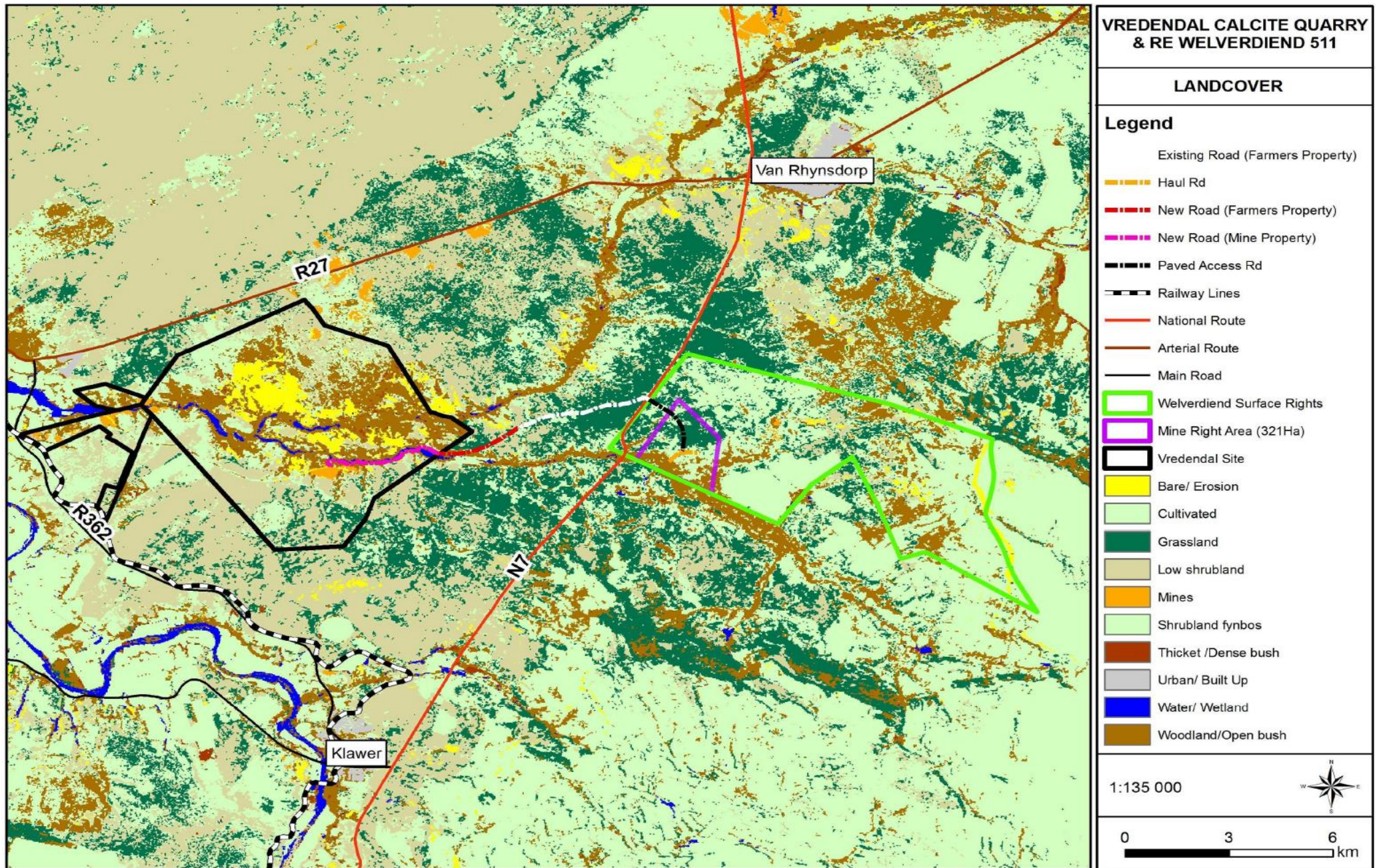


Figure 52: Land Cover Map Vaderlancshe and Welverdiend mines

h) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

Construction Phase

The construction phase for the proposed haul road and lime kilns is anticipated to last 12 months and 24 months respectively.

Impact of access road options on biodiversity.

Operational Phase

The operational phase activities for the current mining and processing operations include removal of overburden to expose the ore before drilling and blasting; loading and hauling of blasted material to the crushing plant; crushing and screening of material to reduce size; stockpiling of material; the calcination and hydrating processes; maintenance of plant and earth moving equipment; etc.

Ecology

Impact on vegetation type.

The mining area is located in a botanically diverse area with at least five vegetation types (belonging to the Succulent Karoo Biome) found on the property. Currently four of the five have been affected by mining activities, including *Vanrhynsdorp Gannabosveld*, *Knervlakte Dolomite Vygieveld*, *Knervlakte Quartz Vygieveld* and *Namaqualand Riviere*. Outside the mining areas, lime dust appears to be a problem, settling on the vegetation adjacent to the stockpile areas and roads. The remainder of the property seems to be in a good condition with conservation worthy vegetation. Past overgrazing and erosion in a few places are also evident. None of the vegetation types are currently listed as threatened. However, *Vanrhynsdorp Gannabosveld* is the most transformed vegetation type in the area, while *Dolomite Vygieveld* has a very limited distribution range. None of these vegetation types has any formal protection.

Although the impact was not quantified or assessed, lime dust on the vegetation around the mining areas, especially the stockpile areas, and along the access road to the limestone mine is noticeable. It is expected that it will impact on plant health, recruitment and eventually vegetation cover in these areas. Consideration should be given to dust containment or suppression and/or the ceasing of operations during high wind conditions.

No Species of Conservation Concern were recorded along the proposed access road.

Establishment and spread of declared weeds and alien invader plants:

As an indirect impact, soil disturbance caused by mining activities provide ideal conditions for the establishment of alien invasive vegetation. However, it is unlikely that woody aliens, such as *Prosopis glandulosa*, will become a serious problem. *Prosopis glandulosa* and *Nerium oleander* are largely confined

to the Wiedou and Troe Troe Rivers. Weedy pioneer species, such as *Atriplex species* and *Stipa capensis*, will probably be the first to establish and prevail. These will be difficult to control, but the impact is not considered significant, given the degraded condition of the mining areas.

All erosion damage, such as erosion channels and runnels, caused by mining activities should be backfilled and rehabilitated. Some progress has already been made in this regard. Alien clearing, especially *Prosopis glandulosa* and *Atriplex nummularia*, should be investigated.

Impact on biological linkage and CBA's

The mining area falls within the Matzikama Biodiversity Network. The dolomite mines and stockpile areas in the western part of the study area encroach onto an aquatic/river CBA (Troe Troe River) and supporting aquatic ESA's (minor watercourses). The limestone mines are surrounded by both terrestrial and aquatic ESA's. The terrestrial ESA forms part of an extensive ESA that cuts through the property and extends eastwards towards the Matsikamma and Bokkeveld Mountains. It provides support for two large terrestrial CBA's which encroach the property from the northeast and southeast, respectively.

A buffer area of suitable width (at least 100 m) should be maintained between mining activities, including stockpiling, and the riparian areas. No stockpiling must be allowed inside and directly adjacent to the riparian areas.

Impact on fauna

Impact on fauna is of low to medium significance. Mammals dwelling inside or visiting the riverine areas (such as grysbok) do so away from the mining areas. Mining currently affects a 1.6 km long section of the Troe Troe in the western part of the study area. The proposed new access road will impact on an additional 2.4 km passage along the Wiedou east of the limestone mine. Faunal movement between the river and the veld to the south of the river will be affected. One can expect that large fauna will move away from this area with the commencement of truck movement and associated dust problems.

It is recommended that the proposed access road be setback further away from the river (for the section between the limestone mine and river crossing) to lessen the impact on mammal fauna dwelling inside the riverine area.

With regards to the access road options to the Maskam mine, consideration should be given to the preferred route option, which is set back furthest away from the Wiedou River. It will result in the least impact on the river and its fauna due to dust, traffic and noise related issues. With mitigation, the impact on the local biodiversity and biodiversity network will be of low-medium significance. The impact will be long term to permanent, depending on rehabilitation success after the completion of mining activities.

Archaeological resources

The footprint of the proposed upgrades does not lie on pristine ground but occurs in area already affected by modern developments that include farming quarrying and access roads. The archaeology of the area is concentrated along the valleys outside the proposed development footprint where 10 lithic clusters were

reported. Those lithic artefacts that occur in the area, appear in isolated clusters and are of low significance. Four historical structures and features (cemetery, farm house, stonewalled fencing and a stonewalled fort) were also reported but much further away from development path.

The potential for chance finds, still remains a possibility, the applicant and his contractors are requested to be diligent and observant during development. The archaeologists has indicated that any of the chosen alternative routes to connects the two mines is suitable as none have no impacts on the archaeological resources.

Surface water

The mine abstracts water from the limestone mine. Water is only abstracted when the level rises above a certain point which makes mining unsafe. The water is then discharged downgradient into a valley which feeds into the Wiedou river system and eventually the Olifants River. This can result in an increased risk of introducing contaminants into surface water body, should vehicle and equipment break downs and leaks occur in mine pit. The impact can be managed and mitigated if all vehicles and machinery are serviced regularly and checked for leaks. Drip trays must be placed under pumps in close proximity to dewatering pit.

The activity triggers Section 21 (J) of the National Water Act (1998) that is the removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people. The mine site has submitted an application which is being processed. Once the license has been approved, in respect of 21 (j) of the NWA, all license conditions in this regard will also be implemented if not done so already.

To prevent contamination as a result of the cleaning of earth moving machineries near river, the mine should consider Installing wash bays with correct runoff drainage into collection tanks with water systems including settling ponds, sand filtration to remove sediment and contaminants. Use of environmentally safe detergents.

Ground water

Contamination of groundwater by leaching of coal stock piles. The impact can be managed and mitigated if the regular clean ups are undertaken on the coal stockpiles. Currently, coal piles are underlain by concrete bunds, however overflow of coal is occurring onto areas without lining. The mine should consider an extension or additional concrete bunds to accommodate overflow of coal stock piles.

Noise

Noise generated from drilling and blasting, crushing and screening and movement vehicles on and off site could potentially be a nuisance to neighboring farmers. However, the above mentioned activities are restricted to normal working hours (7:00 am to 17:30 pm) hours per day.

Air Quality

The results of the dispersion modelling study conducted by LAQS shows that the estimated maximum ground-level concentrations of all controlled pollutants emitted from the existing calciner are well below

the relevant ambient air quality standards. Should cape Lime expand its operations by installing two additional calciners, the combined impact of the three calciners is expected to result in ground-level concentrations that will still be below the official air quality standards. However, as is shown in this report, the major sources of particulate emissions are the primary crusher and road traffic, and emission from these sources will have a major impact on air quality in the area.

Consideration should be given to more effective mitigation measures to reduce particulate emissions from the major sources to minimise the deposition of particulate matter on neighboring areas. Such additional measures will have to be an essential component of all future expansion plans. Some potential mitigation measures and typical efficiencies, as extracted from in NPIET for mining, are:

Table 18: NPIET Mitigation Measures

Loading trucks	No control
Hauling	50% for level 1 watering (2 litres/m ² /h) 75% for level 2 watering (> 2 litres/m ² /h) 100% for sealed or salt-encrusted roads
Unloading trucks	70% for water sprays
Loading stockpiles	50% for water sprays 25% for variable height stacker 75% for telescopic chute with water sprays 99% for total enclosure
Unloading from stockpiles	50% for water sprays (unless underground recovery then, no controls needed)
Wind erosion from stockpiles	50% for water sprays 30% for wind breaks 99% for total enclosure 30% for primary earthworks (reshaping/profiling, drainage structures installed) 30% for rock armour and/or topsoil applied
Miscellaneous transfer and conveying	90% control allowed for water sprays with chemicals 70% for enclosure 99% for enclosure and use of fabric filters
Wind erosion	30% for primary rehabilitation 40% for vegetation established but not demonstrated to be self-sustaining. Weed control and grazing control.

According to the USEPA, the following particulate emission reductions can be achieved:

- Roads: Paving of surface: 85%
- Aggregate stockpiles: Continuous spraying of chemical suppressant on material going to stockpile: 90%

Surfacing of roads is an expensive activity, but would result in a significant decrease in particulate emissions.

Various types of chemical dust suppressants are available, but added chemicals could have an impact on Cape Lime's production process and quality of product. As chemical dust suppressants are not 100% effective, chemically enhanced particulate matter being deposited on vineyards may have a detrimental effect on plant material.

IMPACT ON OVERALL AIR QUALITY

Ambient air quality standards for some pollutants were published by the Department of Environmental Affairs (DEA) in Government Notice No. 1210 on 24 March 2009 (GN1210). The standards are defined as "a level fixed on the basis of scientific knowledge, with the aim of reducing harmful effects on human health (or the environment (or both)) to be attained within a given compliance period and not to be exceeded once attained".

Of the pollutants discussed in this study, ambient air quality standards for Hg are not available, there are standards for; PM₁₀, CO, NO₂ (a sub-set of NO_x) are included and the limits are:

PM₁₀

Annual average: 40 µg/m³, no exceedances
Maximum daily concentration: 75 µg/m³, 4 exceedances

SO₂

Annual running average 50 µg/m³, no exceedances
1-hour maximum 350 mg/m³, 88 exceedances

NO_x (as NO₂)

Annual average limit 40 µg/m³, no exceedances
1-hour maximum 200 µg/m³, 88 exceedances

TPM: No official ambient air quality standards exist in South Africa.

The number of exceedances mentioned is approximately 1% of the time, i.e. daily exceedances of 4 times per year are marginally more than 1% of the time (3.65). Similarly, 88 exceedances of hourly limits form approximately 1% of the total number of hours per year (1% of 8 760 is 87.6). As a result, LAQS modelled 99-percentile concentrations to reflect the maximum level below which concentrations may occur for 1% of the time.

PM₁₀ PARTICULATE MATTER

All sources:

The highest annual average ground-level concentration of PM₁₀ is estimated to be 1 598 µg/m³, i.e. significantly higher than the current ambient air quality level. This estimated maximum annual average concentration will occur immediately north of the primary crusher.

The maximum 99-percentile daily ground-level concentration was shown to be 2 863 µg/m³, also significantly higher than the current ambient air quality level. This estimated maximum annual average concentration will also occur immediately north of the primary crusher.

Calciner only:

Should emissions from the calciner be at the maximum allowed, the highest annual average ground-level concentration of PM₁₀ is estimated to be 0.6 µg/m³, i.e. well below the current ambient air quality level. This estimated maximum annual average concentration will occur approximately 600 m north-east of the calciner stack. The maximum annual average concentration, based on typical emissions, is estimated to be 0.4 µg/m³.

The maximum 99-percentile daily concentration was shown to be 4.9 µg/m³, i.e. also well below the current ambient air quality level. This estimated maximum annual average concentration will occur approximately 1 860 m north-east of the calciner stack. The maximum annual average concentration, based on typical emissions, is estimated to be 3.5 µg/m³.

SULPHUR DIOXIDE

Should emissions from the calciner be at the maximum allowed, the highest annual average concentration of SO₂ is estimated to be 4.5 µg/m³, i.e. well below the current ambient air quality level. This estimated maximum annual average concentration will occur approximately 600 m north-east of the calciner stack. The maximum annual average concentration, based on typical emissions, is estimated to be 0.6 µg/m³.

The maximum 99-percentile daily concentration was shown to be 61.0 µg/m³, i.e. also well below the current ambient air quality level. This estimated maximum annual average concentration will occur approximately 1 860 m north-east of the calciner stack. The maximum annual average concentration, based on typical emissions, is estimated to be 4.8 µg/m³.

NITROGEN DIOXIDE

Should emissions from the calciner be at the maximum allowed, the highest annual average concentration of NO₂ is estimated to be 6.3 µg/m³, i.e. well below the current ambient air quality level. This estimated maximum annual average concentration will occur approximately 600 m north-east of the calciner stack. The maximum annual average concentration, based on typical emissions, is estimated to be 1.7 µg/m³.

The maximum 99-percentile daily concentration was shown to be 70.8 µg/m³, i.e. also well below the current ambient air quality level. This estimated maximum annual average concentration will occur approximately 1 860 m north-east of the calciner stack. The maximum annual average concentration, based on typical emissions, is estimated to be 13.0 µg/m³.

PROPOSED EXPANSION

Cape Lime is considering expensing its operation by installing an additional two calciners, effectively increasing the production capacity three-fold. Such an increase will imply a three-fold increase in all activities, excluding the quantity of material removed from site by external clients (aggregate and dolomite). In effect, virtually all emissions will increase three-fold, i.e. three times more mining activity, primary crushing activity, materials handling activities, stockpile activities, road transportation, secondary

crushing activities, etc.

Bearing in mind the linear relationship between emissions and ground-level concentrations, a three-fold increase in emissions will imply a three-fold increase in all of the ground-level concentrations mention in this report, with concomitant impact on air quality in the area around Cape Lime's operations.

As far as the calciners are concerned, i.e. the only activities regulated under Section 21 of the Air Quality Act, the estimated ground-level concentrations of the three pollutants are expected to be below that ambient air quality standards published in GN1210, should two additional calciners be commissioned.

Socio-economic

New and existing mines across South Africa continue to attract job seekers into the areas in which they operate. More often than not, this results in the development of informal settlements in the vicinity of these mines. The applicant currently employs about 70 permanent employees, 8 learnerships, 1 Intern and 20 contractors of which the majority were sourced from the local area. It is anticipated that the construction and operation of the proposed kilns will result in the creation of 18 new permanent employment opportunities for local people. It must be noted the creation of more employment opportunities is highly dependent on the economic conditions of the area which is in turn triggered by the demand of the material.

However, the community will still benefit from the proposed expansion through a Social Labour Plan. SLP covers Human Resource Development (Adult Basic Education Training (ABET); Learnerships; Bursaries; Internships and Core business skills & Portable skills); Local Economic Development, Housing and Living Conditions and Downscaling (for mine employees). Cape Lime will liaise with the local Municipality to identify a Local Economic Development (LED) project that will benefit the community and the project should be aligned with the Municipality's IDP.

The social and labour plan project initiates Local Economic Development Programmes for local communities in an effort to boost the socio-economic status of the area.

Cape Lime (Pty) Ltd contributes numerous positive impacts to local communities with regard to socio-economic aspects such as:

- Work opportunities to local residents
- Provision of bursaries and learnerships to those in need;
- Skills development plan for employees;
- Local economic development plan that entails skills development training programme for local communities in an effort to boost the socio-economic status of the area,
- Contribution to the construction industry that is an important economic sector in Vredendal and surrounding areas.

i) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

Specialist studies identified key issues and impacts that required thorough investigation. All identified potential impacts and risks were assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria for the description and assessment of environmental impacts were drawn from the EIA Regulations 2014 as amended. The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

The significance of both positive and negative potential impacts were determined through the evaluation of impact consequence and likelihood of occurrence. The significance of potential impacts that may result from the proposed project was determined in order to assist decision-makers

The significance of both positive and negative potential impacts were determined through the evaluation of impact consequence and likelihood of occurrence.

The significance of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The following risk assessment model has been used for determination of the significance of impacts.

SIGNIFICANCE = CONSEQUENCE X PROBABILITY

WHERE Consequence = Extent + Intensity + Duration

The criteria used to determine impact consequence are presented on the table below. Each rating has been allocated a score weighting.

Table 19: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. Extent - the area over which the impact will be experienced		
Local	limited to the immediate area(s) around the project site -	1
Regional	extends over a larger area that would include a major portion of an area or province	2
National/International	nationally or beyond	3
B. Intensity - the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1

Rating	Definition of Rating	Score
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
<i>C. Duration– the lifetime of the impact, that is measured in relation to the lifetime of the proposed development and its reversibility</i>		
Short-term	(0 to 3 years)	1
Medium-term	(3 to 10 years) confined to the construction period	2
Long-term	(more than 10 years)	3
Permanent	beyond the anticipated lifetime of the project	4

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 20: Method used to determine the Consequence Score

Combined Score (A+B+C)	3 - 4	5	6	7	8 - 9
Consequence Rating	Very low	Low	Medium	High	Very high

Once the consequence was derived, the probability of the impact occurring was considered. Probability of impact occurrence - this describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time

- Improbable (very low to low likelihood).
- Possible (likely).
- Probable (distinct possibility).
- Definite (the impact would occur regardless of prevention or mitigation measures)

The probability of the impact using is presented in the table below.

Table 21: Probability Classification

<i>Probability– the likelihood of the impact occurring</i>	
Improbable	1
Possible	2
Probable	3
Definite	4

The overall significance of impacts was determined by considering consequence and probability using the rating system prescribed below

Table 22: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH

Practicable mitigation and optimisation measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of mitigation and optimisation measures.

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** the proposed activity should only be approved under special circumstances

ii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Specialist studies assessed the site based on the current/existing layout of the site which is considered as the final layout. The proposed project layout is preferred from the environmental perspective as the mining occurs within a heavily transformed and disturbed area. In general, the proposed expansion will not take place on a sensitive environment, no direct impact on fauna and flora is expected.

Refer to Section V above for the positive and negative impacts that the proposed Vaderlandsche Project (final layout) may have on the biophysical and socio-economic environment.

iii) The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

The I&APs highlighted the following proposal to be considered during the operation of the mine:

- Knersvlakte Dolomite Vygieveld has a very limited distribution range and are mostly threatened by mining activities and road construction. Any loss of designated CBA's must be avoided. A search and rescue plan and activity must be compiled and executed to remove and recover ant plants and animals before road construction commences. This should be done in partnership with Cape Nature
- New and existing roads and maintenance/improvements thereof, including dust suppression measures, need to be done by mining company (Cape Lime (Pty) Ltd).
- Best practices must be included in the Environmental Management Plan to manage all potential sources of pollution during the construction and processing phases in order to prevent any negative impacts on the surrounding environment. Dust management and monitoring must be done in accordance with the National Dust Control Regulations (No 827 of 1 November 2013 as amended)
- An updated fugitive dust management plan, containing dust preventative measures and control in respect of nearby land owners and agricultural activity during construction, production and abnormal conditions, must be submitted to the Air Quality Officer. The plan must be adapted to accommodate the existing operations as well as proposed upgrades
- Dust mitigation measures must be implemented and maintained at all times and in all areas where dust could be generated in order to prevent negative impacts on the surrounding environment
- A stormwater management plan that will address the impacts of storm water on both surface and groundwater resources must be put in place
- No pollution of Troe-Troe and Wiedou Rivers or any surface water or groundwater resources may occur due to the proposed activity

- All the requirements of the National Water Act, 1998 (Act 36 of 1998) regarding water use and pollution management must be adhered to at all times
- Furthermore, it is recommended that the proposed Monitoring Programme emanating from the Geohydrology Impact Assessment, consider and investigate potential adverse impacts to ground – and surface water due to the abstraction and discharge of water from the limestone mining area. Alternatively, if measures are already in place to mitigate potential impacts associated with discharge, kindly provide a description thereof. In addition, it is requested that more information on this practice and the “valley” and “discharge point” referred to, are identified on a map and included in the Draft EIA Report.

iv) Motivation where no alternative sites were considered.

The application is for an upgrade of an Environmental Management Programme with respect to the current on-going mining and operating activities at Vaderlandsche. On the 3rd of August 2018, the Department of Mineral resources advised Cape Lime that their Environmental Management Plan must be amended to comply with the requirements of NEMA EIA regulations as amended. No alternative outside the current mining rights were therefore assessed as the site is already established.

The location for the mine is constrained to the location of the mineral resource. The project is therefore very site specific. With regard the expansion, the kilns will be constructed on an open area (bare soil) next to the existing processing facilities in order to centralise the processing facilities, ensure optimal production efficiency, and to prevent the removal of natural vegetation. This will also eliminate the need to have a new coal stockpile for the new kilns. The old coal stockpile currently used to feed the current kiln will be used for the new kilns thus minimizing environmental impacts.

v) Statement motivating the alternative development location within the overall site. (Provide a statement motivating the final site layout that is proposed)

As mentioned above, the purpose of this project is to upgrade an Environmental Management Plan for existing mining and operation activities. The site was in the beginning, dictated by the locality of the limestone reserve. The new kilns are required in order to increase production capacity and to be able to meet customer’s demands for high quality lime products. The kilns will not be constructed on a sensitive environment. With regards to the proposed access road, no Species of Conservation Concern occur along the proposed road.

i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity. (Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

The process utilised to identify the impacts of the proposed activity included:

- Observations based on site visits;

- Input from the specialist baseline assessments and recommendations;
- Input from public participation;
- Consultation and discussions with the project team and Applicant;
- Application of previous knowledge and experience by the EAP for these types of projects in; and
- Knowledge and experience in the implementation of the EIA Regulations (2014).

In terms of assessing and ranking the impacts, the EAP identified all environmental activities, aspects and impacts pertinent to the area and activity. This was supported by the identification of receptors and resources, which allowed for an understanding of the impact pathway and an assessment of the sensitivity to change. The identification and degree of assessment was based on the understanding of the following:

- An **activity** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are controlled by an organisation;
- An **environmental aspect** is an 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an impact;
- **Environmental risks / impacts** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity;
- **Receptors** comprise but are not limited to people or man-made structures;
- **Resources** include components of the biophysical environment;

The significance of the impact was then assessed by rating each variable according to defined criteria provide is **section (iv) above**. The purpose of the rating was to develop a clear understanding of influences and processes associated with each impact, both with and without mitigation.

j) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table 23: Assessment of identified significant impacts

ACTIVITY whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors,	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	SIGNIFICANCE if not mitigated	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control through management and monitoring through rehabilitation..	SIGNIFICANCE if mitigated
Demarcation of the mining area	Disturbance outside the mining area	Land outside the mining area	Operation	Medium	<ul style="list-style-type: none"> • Demarcate the corners of the Mining area with coloured steel droppers or wooden stakes. • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas 	Low
Clearance of land for the construction of new access road to connect Vanderlandsche and Welverdiend mines.	Dust emissions	Air quality	Construction	Medium - High	<ul style="list-style-type: none"> • Implement dust suppression measures. • Speed Limits on unsurfaced access roads must be set at appropriate low speed, and enforced. • Control through monitoring of dustfall to determine if measures are effective 	Low

Soil erosion, compaction and contamination	Soil		Medium-High	<ul style="list-style-type: none"> Prevent through restricting construction activities to the dedicated activity area as far as possible. All vehicles and Machines must be serviced regularly, and inspected daily for leaks. Re-fueling of machines must take place at designated fueling stations. 	Moderate/Low
Invasion by alien invasive species	Vegetation	Construction and Operation	Medium	<ul style="list-style-type: none"> Control through alien invasive eradication programme. Alien clearing, especially <i>Prosopis glandulosa</i> and <i>Atriplex nummularia</i>, should be investigated. 	Low
Impact on vegetation type, habitat and CBAs	Fauna	Construction and Operation	Medium	<ul style="list-style-type: none"> It is recommended that the proposed access road be setback further away from the river (for the section between the limestone mine and river crossing) to lessen the impact on mammal fauna dwelling inside the riverine area. 	Low

Stripping and stockpiling of topsoil.	Soil erosion	Soil	Operational	Medium	<ul style="list-style-type: none"> • Control through restricting the footprint to be used. • Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted. • Control through implementation of storm water management measures. • All erosion damage, such as erosion channels and runnels, caused by mining activities should be backfilled and rehabilitated. 	Low
Drilling and Blasting	Dust resulting from blasting. Fly rock Noise resulting from blasting	Air Quality	Operation	Medium	<ul style="list-style-type: none"> • Control by evacuating all persons within 500m of a blast site. • Control utilising drill rigs fitted with a dust extraction unit and equipped with a water tank. • Control by limiting lasting operations to daylight hours when ambient noise levels are highest. • Maintaining good public relations with the surrounding neighbours, i.e. warning the local communities in advance before blasts • Conduct Seismograph calibration tests to ensure that blasting standards are met. 	Low

Excavation & stockpiling of material from blasting operation.	Dust emissions	Air Quality	Operation	Medium-High	<ul style="list-style-type: none"> Control through dust containment or suppression and the ceasing of operations during windy conditions. 	Low
	Impact on vegetation type, habitat and CBAs	Vegetation	Operation		<ul style="list-style-type: none"> A buffer area of suitable width (at least 100 m) should be maintained between mining activities, including stockpiling, and the riparian areas. No stockpiling must be allowed inside and directly adjacent to the riparian areas. 	Low
<p>Loading and hauling to processing plants.</p> <p>Dispatch of final product by clients.</p>	<p>Dust Emission.</p> <p>Pedestrian safety on site</p>	Air quality	Operational	Medium - high	<ul style="list-style-type: none"> Control through minimisation of vehicle movement. Control by monitoring trucks that collect material to ensure that they are covered. A speed limit of 40km/h must not be exceeded. Control through dust suppression. Control through traffic management plan. 	Low

Crushing and screening activities.	Fugitive dust (containing TSP, as well as PM ₁₀ and PM _{2.5}).	Air quality	Operational	Medium -high	<ul style="list-style-type: none"> • ROM bins fitted with mist sprays • Enclosed ROM Bins • The crushing unit and set of screens at the secondary crushing unit are enclosed to prevent the spreading of dust. • The screens are fitted with extraction hoods and a dust collector. • Managed through adhering to conditions of the Air Emissions Licence. 	
Burning of Limestone inside a kiln.	Fugitive emissions. PM ₁₀ and PM _{2.5} . Sulphur dioxide Oxides of nitrogen Carbon monoxide		Operational	Medium- high	<ul style="list-style-type: none"> • Controlled through the installation of baghouses. • Managed through adhering to conditions of the Air Emissions Licence. 	

	Destruction of Heritage Resources	Archaeological or heritage features	Construction and operation	Medium	<ul style="list-style-type: none"> • Prevent through establishing buffer zones around potentially significant archaeological remains that occur outside the footprint of the proposed mining and processing plant area. • Continually monitor excavations any fossil material be unearthed the excavation must be halted • Fossiliferous material has been disturbed during the excavation process it should be put aside to prevent it from being destroyed • Prevent through reporting of substantial fossil remains (e.g. vertebrate teeth, bones, petrified wood, stromatolites, shells, trace fossils) be exposed during mining, the ECO should safeguard these, preferably in situ, and alert Heritage Western Cape (Mr Andrew September 021 483 9543) as soon as possible so that appropriate action 	Low
<p>Removing and discharge of groundwater into a surface water body (river).</p> <p>Cleaning of mine vehicle near river.</p>	Surface water contamination	Surface water	Operation	Medium-High	<ul style="list-style-type: none"> • Prevent through regular maintenance on vehicles and machinery and drip trays underneath of standing vehicles and equipment. • Once the license has been approved, in respect of 21 (j) of the NWA, all license conditions in this regard should also be implemented if not done so already. • Prevent through Installation of wash bays with correct runoff drainage into collection tanks with water systems including settling ponds, sand filtration to remove sediment and contaminants. • Use of environmentally safe detergents. 	

Coal storage	Soil and groundwater contamination	Soil	Operational	Medium	<ul style="list-style-type: none"> Control by storing coal on a concrete floor and contained storage pad with storm water collection. Quarterly clean up around coal stockpile to make sure it is contained within the current bunded area. 	Low
Stream crossings	Water Flow in the Wiedou River	Impact of Layout & Design on Hydrology	Design	Insignificant	<ul style="list-style-type: none"> Control by designing stream crossings to allow the free flow of water following runoff generating rainfall events; Infill of, narrow confined channels must be with large rocks to ensure water can pass freely in between the voids of the fill; Roads passing through broad unconfined channels/valleys must be level with the stream bed and must not cause a physical barrier to water flow; In the event that barriers to flow cannot be avoided, then culverts must be placed at low points in the stream crossing to allow flow of water through the crossing. Culverts must be placed so that the invert is level with the bed of the channel and must avoid drop offs into the channel downstream of the crossing 	Insignificant
		Impact of Layout & Design on Geomorphology	Design	Insignificant	<ul style="list-style-type: none"> Stream crossings must be designed to allow the free flow of water following runoff generating rainfall events; Erosion protection must be placed on the downstream side of the road crossing on incised channels. This can be in the form of loosely packed rock or a reno mattress. Alternatively, the run of mine infill can be sloped at an angle down towards the river-bed on the downstream side of the crossing. 	Insignificant
	Impacts on Hydrology	Hydrology	Construction	Insignificant	<ul style="list-style-type: none"> Avoid unnecessary diversion or impedance of flow in watercourses by timing construction activities to coincide with low rainfall probability 	Insignificant

Stream crossings	Impacts of Geomorphology	Soil	Construction	Insignificant	(dry season) to <ul style="list-style-type: none"> • Time construction activities to coincide with low rainfall probability (dry season) to avoid erosion; • Clear and remove all construction debris and materials, as well as any blockages of drainage structures; and • Shape the road surface to avoid concentrated flow paths into watercourses. 	Insignificant
	Impacts on Water Quality	Water quality	Construction	Insignificant	<ul style="list-style-type: none"> • All potentially hazardous substances (e.g. diesel, oil etc.) should be stored in existing secure facilities in an appropriately bounded area that falls outside of the direction of preferential flow paths; • Vehicles and machinery must be stored and maintained in existing mine facilities designated for the purpose; • No refuelling of vehicles within close proximity to watercourses; • Implementation of rapid response emergency spill procedures to deal with spills immediately, including the provision of a spill kit and training of staff to deal with such instances; • Vehicles and equipment must be regularly serviced and maintained; • Excavators and all other machinery and vehicles must be checked for oil and fuel leaks daily. No machinery or vehicles with leaks are permitted to work in the watercourse; and • Watercourses should be inspected on a regular basis (at least weekly) for signs of pollution (e.g. fuel or oil spills). If signs of pollution are noted, immediate action should be taken to remedy the situation and, if necessary, a freshwater ecologist should be consulted for advice on the most suitable remediation measures. 	Insignificant

Stream crossings	Disturbances (e.g. from construction vehicles and machinery)	Impacts on Aquatic Habitat & Biota	Construction	Insignificant	<ul style="list-style-type: none"> • Construction activities should be timed to coincide with low rainfall probability (dry season) so as to avoid disturbance of biota that may take advantage of temporarily inundated habitats; • Clearly demarcate instream construction activities with danger tape or brightly coloured beacons • Weekly inspection of watercourses for signs of disturbance. Take immediate action should disturbance be noted, to remedy the situation and, if necessary, a freshwater ecologist should be consulted for advice on the most suitable remediation measures; and • Routinely monitor all new watercourse crossings for the establishment of Alien Invasive of Plants (AIPs) and eradicated if necessary. 	Insignificant
	Accumulation of sediment and debris at road crossings	Impact on Hydrology	Operational	Insignificant	<ul style="list-style-type: none"> • Routinely inspect watercourse crossings following large rainfall events to ensure that there are no obstructions that may impede or divert flow in the Wiedou River and its tributaries during subsequent rainfall events. 	Insignificant
		Impact on Geomorphology	Operational	Very low	<ul style="list-style-type: none"> • Routinely inspect watercourse crossings inspected following large rainfall events to ensure that road crossings are not causing erosion upstream or downstream of the crossing • Rehabilitate any signs of erosion as soon as possible. 	Insignificant
		Impacts on Aquatic Habitat	Operational*	Very Low	<ul style="list-style-type: none"> • Routinely monitored all watercourse crossings for the establishment Alien Invasive of Plants (AIPs) and eradicated if necessary. 	Insignificant

Fuel and oil storage	Soil and groundwater contamination		Operational and Decommissioning		<ul style="list-style-type: none"> • Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron and an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Control by maintain and servicing vehicles and machineries to minimise leaks and spills. • Control through use of drip trays during the servicing as well as parked leaking vehicles and machineries • Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products. 	
Waste management	<ul style="list-style-type: none"> • Land pollution • Hazardous Leachate • Illegal dumping 	Land pollution	Construction, Operation and Decommissioning	Medium	<ul style="list-style-type: none"> • No burning of refuse wastes allowed on the premises or on surrounding premises • All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site • Locate waste bins and skips throughout the site. • No littering will not be permitted on site and general housekeeping should be enforced • Separate waste skips/ bins for the different waste streams must be available on site. 	Low

Rehabilitation	Soil erosion	Soil	Operational and closure	Medium	<ul style="list-style-type: none"> Prevent through restricting the disturbance rehabilitated area 	Low
	Establishment of alien invasive vegetation	Alien invasive plant	Operational and Closure	High	<ul style="list-style-type: none"> Alien clearing, especially <i>Prosopis glandulosa</i> and <i>Atriplex nummularia</i>, should be investigated. Control through ongoing alien invasive eradication programme Control by replacing topsoil on the stripped land before the next strip is opened and mined. The primary means of rehabilitation should involve the replacement of topsoil and hydro-seeding with an indigenous grass seed mixture at the start of the rainfall season (June). A suitably experienced landscaping contractor should be appointed to undertake rehabilitation. Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels 	Medium

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix E**

k) **Summary of specialist reports.**

Table 24: Summary of specialist reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Heritage Impact Assessment Study	<p>Based on the findings of the assessment undertaken by Integrated Specialist Services, the following was recommended.</p> <ul style="list-style-type: none"> The potential for chance finds, still remains, and the developer and his contractors are requested to be diligent and observant during development. The procedure for reporting chance finds has clearly been laid out in the report and if report is adopted, development may continue. 	X	Section 14 of the Heritage Impact Assessment Report attached as Appendix D1.
Paleontology Study	<p>According to the desktop study conducted by Integrated Specialist Services (Pty) Ltd, the study area is mostly underlain by aeolian, alluvium, colluvium, elluvium and calcareous and gypsiferous deposits that were set down during the Cenozoic on the Neoproterozoic Aties and Widow Formations of the Gifberg Group of the Gariep Supergroup. The Cenozoic deposits are removed to mine the underlying Widow Formation.</p> <p>The Widow Formation and the overlying Aties Formation are considered to be non-fossiliferous, while the Cenozoic deposits have a moderate potential to yield fossils.</p> <p>An overview of the literature on the palaeontology and associated geology of the area is given. Although no publications exist that mention fossils from the study site, several geological studies and palaeontological assessments have been done elsewhere on the same geological formations that occur at the study site. The ECO should take responsibility for supervising the development and should follow the Chance Find Procedure (p.12) if in the unlikely event a significant fossil discovery is made.</p>	X	Section 14 of the Heritage Impact Assessment Report attached as Appendix D2.

<p>Ecological Impact Assessment Study</p>	<p>The following conclusions were drawn from the results and findings of Ecological Impact Assessment study:</p> <p>The mining area is located in a botanical diverse area with at least five vegetation types (belonging to the Succulent Karoo Biome) found on the property. Currently four of the five have been affected by mining activities, including <i>Vanrhynsdorp Gannabosveld</i>, <i>Knersvlakte Dolomite Vygieveld</i>, <i>Knersvlakte Quartz Vygieveld</i> and <i>Namaqualand Riviere</i>.</p> <p>Outside the mining areas, lime dust appears to be a problem, settling on the vegetation adjacent to the stockpile areas and roads. The remainder of the property seems to be in a good condition with conservation worthy vegetation. Past overgrazing and erosion in a few places are also evident. None of the vegetation types are currently listed as threatened. However, <i>Vanrhynsdorp Gannabosveld</i> is the most transformed vegetation type in the area, while <i>Dolomite Vygieveld</i> has a very limited distribution range. None of these vegetation types has any formal protection.</p> <p>The impact on the local biodiversity is expected to be long term to permanent, depending on rehabilitation success after the completion of mining activities. Consideration should be given to the following mitigation measures to lessen the impact:</p> <ul style="list-style-type: none"> • A buffer area of suitable width (at least 100 m) should be maintained between mining activities, including stockpiling, and the riparian areas. No stockpiling must be allowed inside and directly adjacent to the riparian areas. • It is recommended that the proposed access road be setback further away from the river (for the section between the limestone mine and river crossing) to lessen the impact on mammal fauna dwelling inside the riverine area. • All erosion damage, such as erosion channels and runnels, caused by mining activities should be backfilled and rehabilitated. Some progress has already been made in this regard. • Consideration should be given to dust containment or suppression and/or the ceasing of operations during windy conditions. • Alien clearing, especially <i>Prosopis glandulosa</i> and <i>Atriplex nummularia</i>, should be investigated. 	<p>X</p>	<p>Ecological Impact Assessment Report has been attached as Appendix D3</p>
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<p>Air Quality Impact Assessment Study</p>	<p>The following conclusions were drawn from the results and findings of the Air Quality Impact Assessment;</p> <p>Major sources of particulate emissions are the primary crusher and road traffic, and emission from these sources will have a major impact on air quality in the area.</p> <ul style="list-style-type: none"> • Consideration should be given to more effective mitigation measures to reduce particulate emissions from the major sources to minimise the deposition of particulate matter on neighbouring areas. Such additional measures will have to be an essential component of all future expansion plans. • No continuous emission monitoring equipment will be required to monitor the various calciner emissions addressed by the report, but emissions should be verified by a reputable and independent contractor on an annual basis, as required by GN893. All results obtained over time should then be used to calculate more representative average pollutant emission values for the stack. • Care should be exercised that these annual emissions verification tests are conducted strictly according to the emission methods listed in Annexure A, "Methods for Sampling and Analysis", to GN893 as results thus obtained will be representative, reliable and defensible, albeit applicable to a very short period's measurements only. • Table 12 of the report list particulate emission mitigation measures from various industrial activities and serious consideration should be given to the application of such measures to reduce current particulate emissions from the major sources highlighted in the report. 	<p>X</p>	<p>Air Quality Impact Assessment Report as attached Appendix D3</p>
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Environmental Noise Impact Assessment	<p>According to a survey conducted by Ebenaeser Environmental Consultants to determine baseline noise levels for comparison during future mining operations. The results of the noise measurements performed on the boundary at different positions to determine the extent of the noise levels emitted from the plant indicates that no to little effect of noise pollution was measured at the boundaries of the mine, or along the access road to the new quarry site.</p>	X	Environmental Noise Impact Assessment Report as attached Appendix D4
Agricultural Impact Assessment	<p>There are no apparent agronomic or agribusiness reasons for refusing the proposed change of land use.</p> <p>This assessment concurs with the Agricultural Theme Sensitivity Map provided by the DEA website. This map reflects the proposed mining site and link road as falling into a low sensitivity area, numerically defined as land having a score of between 1 and 5. The empirical evidence gathered at site suggests that the appropriate numerical sensitivity rating for the study is between 1 and 2.</p> <p>It is therefore recommended that approval for the proposed mining operation and associated infrastructure be approved.</p>	X	Agricultural Impact Assessment Report as attached Appendix D4

I) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

The Environmental Impact Assessment studies undertaken illustrates both the benefits and potential negative impacts anticipated because of the proposed and existing Vanderlandsche project.

The applicant is committed to fulfilling their cooperate responsibility, which includes social and environmental responsible practices. Ongoing monitoring is undertaken and annual performance assessments are conducted. The findings conclude that, provided that the recommended mitigation measures proposed as part of this report, as well as in the attached Impact Assessment and Environmental Management Programme (EMPr) be implemented, there are no environmental fatal flows that should prevent the proposed project from proceeding.

(ii) Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attach as **Appendix**

Final Site Map has been attached as **Appendix B 4.**

(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

A number of significant impacts associated to the proposed activities have been identified in previous section in this report as part of the EIA process. In the review of the specialist assessment reports highlighted in section j) specific environmental and social sensitive receptors were identified. The table below summarises the high significant potential impacts associated to the proposed limestone mine extension.

Activity	Potential Impact
	CONSTRUCTION PHASE
Clearance of land for establishment of the access road, lime kilns and associated infrastructure.	<ul style="list-style-type: none">• Dust emissions• Soil erosion, compaction and contamination• Invasion by alien invasive species• Impact on vegetation type, habitat and CBAs• Noise impact• Destruction of heritage resources
Social impacts	<ul style="list-style-type: none">• Employments opportunities• Health, Safety and Security issues

OPERATIONAL PHASE

Topsoil and subsoil stripping & stockpiling for mining operation area.	<ul style="list-style-type: none"> • Erosion • Destruction of heritage resources • Vegetation and habitat loss • Alien vegetation
Drilling and blasting.	<ul style="list-style-type: none"> • Dust emissions • Fly rock • Noise
Loading and hauling to processing plants. Transport material from mining area to clients	<ul style="list-style-type: none"> • Dust emissions • Pedestrian safety on site
Crushing and screening	<ul style="list-style-type: none"> • Dust • Noise
Stockpiling of crushed material.	<ul style="list-style-type: none"> • Dust • Impact on vegetation type, habitat and CBAs
Operations of the Kilns	<ul style="list-style-type: none"> • Fugitive emissions.
Fuel storage Coal storage	<ul style="list-style-type: none"> • Hydrocarbon Contamination • Contamination of water sources • Fires • Degradation of soil resources • Coal dust emissions
Social Impacts	<ul style="list-style-type: none"> • Employment opportunities • Health, Safety and Security issues
Waste management	<ul style="list-style-type: none"> • Land pollution • Soil contamination

DECOMMISSIONING PHASE

Demolition / removal of portable and related infrastructure	<ul style="list-style-type: none"> • Erosion • General Waste generation and Littering
Rehabilitation of the lay down, stockpile and mining areas	<ul style="list-style-type: none"> • Erosion • Influx of alien invasive vegetation • Degradation of soil resources

Demolition of workshops, waste storage facilities, fuel storage facilities etc.

- Hydrocarbon contamination
- Degradation of soil resources
- General waste generation & Littering

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.

The purpose of the EMPr is to provide relevant management measures to conduct activities with due care and diligence, as well as avoid / limit any adverse impacts of the operation. The EMPr is compiled to help control impacts that may occur to meet acceptable standards, both as a legal and social responsibility to the environment within which the activity takes place. The purpose of the EMPr is to provide relevant management measures to conduct activities with due care and diligence, as well as avoid / limit any adverse impacts of the operation. The EMPr is compiled to help control impacts that may occur to meet acceptable standards, both as a legal and social responsibility to the environment within which the activity takes place.

The objectives for the EMPr are:

- To develop, implement and maintain effective management systems for the environmental aspects of the mine extension;
- To document details of environmental protection infrastructure and controls so that they are able to provide long term protection for the natural environment;
- Ensuring compliance to legislation, regulations, and national standards throughout the life cycle of the project;
- Ensure that activities are carried out so as to aid rehabilitation;
- All Environmental Management considerations are implemented during the construction, operational and decommissioning phases of the project.

The following socio-economic objectives should be attained during the entire life cycle of the proposed activities:

- Adhere to an open and transparent communication procedure with stakeholders at all times.
- Ensure that accurate and regular information is communicated to I&APs in a manner which is understandable and accessible.
- Mitigate negative impacts.
- Enhance project benefits and minimise negative impacts through intensive consultation with stakeholders.
- Assemble adequate, accurate, appropriate, and relevant socio-economic information relating to the context of the operation.
- Ensure that recruitment strategies for the mine, prioritise the sourcing of local labour, and share in gender equality.
- Ensure an atmosphere of equality and non-discrimination among the workforce.
- Contribute to the development of functional literacy and numeracy among employees.
- Empower the workforce to develop skills that will equip them to obtain employment in other sectors of the economy.

- Contribute to the development of a self-reliant (not dependent on the mine) community surrounding the area of operation.
- Ensure that decommissioning and retrenchments take place in a legally compliant and humane manner.

n) Final proposed alternatives.

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

Proposed road haul road Alternative 2 is regarded as the preferred option as this option crosses fewer tributaries, avoids the alluvial fans associated with tributaries draining from the south into the Wiedou River and also avoids a large section of the bed and banks of the Wiedou River. This alternative is consistent with the management objectives of aquatic CBAs which are to be maintained in a natural or near-natural state, with no further loss of natural habitat (the habitat loss associated with widening the existing road crossing is considered to be negligible). Only low-impact, biodiversity-sensitive land uses are appropriate.

Alternative 1, which would involve widening an existing section of 2.3 km jeep track road in the bed of the Wiedou River, is not consistent with the management objectives for aquatic CBAs and is therefore not recommended.

Crossings over the small drainage channels are also consistent with the management objective of ESAs which is to maintain them in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised. In this respect, road crossings in broad unconfined valleys are expected to be negligible. The lack of any serious erosion or other disturbances at existing road crossings (e.g. CL_5 and CL_9 to CL_11) provides evidence of this statement.

Specialists assessed the potential impacts of the preferred final layout. The findings indicated that the preferred final layout adopted from the existing mine layout would not result in any fatal flaws in terms of environmental and socio-economic impacts as all of the impacts can be fully mitigated and managed, and where possible prevented.

o) Aspects for inclusion as conditions of Authorisation.

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

The conditions for authorisation are recommended to include the following:

- All mitigation measures and management of identified impacts recommended by the Specialists as part of this report and EMPr must be adhered to and implemented during the construction and operational phases of the project;

- Obtain other permits and authorisations as may be required, including, but not limited to, water use license, air emission license, Conservation of Agricultural Resources Act, 1983 (ACT NO 43 OF 1983) (CARA) application for clearing or removal of topsoil and land-use zoning;
- Conditions stipulated in all other permits or authorisations must be implemented;
- In terms of NEMBA, alien eradication and monitoring plans need to be compiled to address existing alien vegetation on the property and to control invasive species on the whole mining right area;
- A dust monitoring system is to be established and managed by the Applicant to determine the dust fallout generated on site by activities;
- Maintain lines of communication with the neighbors of properties close to the mine;
- Undertake continual closure and rehabilitation concurrently with active mining;
- Revise closure cost assessment on annual basis as required by NEMA;
- Conditions stipulated in the final EMPr and closure plan must be adhered to;
- In terms of monitoring, it is recommended that an independent Environmental Control Officer (ECO) audit the activity against the EMPr annually for the first three to five years of operation and once every two years thereafter until the existing Mining Right expires. Should the EMPr be audited by the applicant then an independent EAP as per Regulation 13 (2) of the NEMA EIA Regulations 2014 should be appointed to review all the work; and
- All mitigation measures provided in this report must be implemented. Should the mitigation measures be deemed impractical, ineffective or cost prohibitive, Cape Lime may apply to the DMR to alter such mitigation measures accordingly. Any change in mitigation measures must be approved by the competent authority.

p) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

Limitations of the Air Quality Study.

The main assumptions and limitations for the air quality study is the reliability of the model. The results of any computer model are only as reliable as the quality of the input data.

1 Emissioner:

The annual emissions used in this air quality impact assessment are subject to a degree of uncertainty as a result of the following:

Calciner emissions:

The annual emissions of all pollutants included in this study were calculated from official emission limits, as stipulated in GN R.533, using measured flue gas conditions. These conditions are variable due to variations in process operating conditions, production rates, etc. and may, therefore, vary from time to time. Measured pollutant concentrations were used to calculate typical annual emissions, but the measured concentrations are also subject to variation from time to time.

Mining and material handling emissions:

Annual emissions were calculated from emission factors obtained from the NPIEET for mining and annual production capacities calculated from monthly production data provided by Cape Lime.

Emission factors are subject to a degree of uncertainty and are generalised to accommodate a variety of materials.

The monthly production figures are regarded as average values and will vary from month to month, depending on on-site operating conditions. As there is no set pattern to such variations, it is not possible to compensate for the monthly variations so that variations in seasonal weather patterns can play its due role.

Stockpiles:

Several factors play a role in the emission of particulate matter due to winds, including wind speed, particle size distribution, particle density, age of a stockpile, etc. In the absence of the necessary data, especially wind gusts, an empirical emission factor from the NPIEET for mining was used.

Road traffic:

An empirical equation to estimate the emissions of particulate matter from heavy vehicles on industrial roads, published in the USEPA's AP-42, was used to estimate annual emissions from road traffic.

The reliability of this equation is rated by AP-42 as "B", which is defined as "Tests are performed by a generally sound methodology, but lacking enough detail for adequate validation". A degree of uncertainty is, therefore, associated with the equation.

It is, unfortunately, not possible to quantify the overall degree of uncertainty associated with the estimated annual emissions. As there is a linear relationship between emission quantities and ground-level concentrations, i.e. a change in emissions will result in a change of equal proportion in ground-level concentrations, the uncertainty in emissions implies an uncertainty in the estimated ground-level concentrations.

Throughout estimation of emissions LAQS attempted to reduce the uncertainties as much as possible by attempting to simulate operations as closely as allowed by available data.

2. EnviMet:

The meteorological data assembled by LAQS is comprehensive and gaps in the data are less than 3.6% of the total amount of data. The dataset was collected at the Vredendal aerodrome, approximately 20 km from Cape Lime's site, consists of validated data and contains all of the necessary parameters required for dispersion modelling purposes. LAQS is, therefore, of the opinion that the weather data set is reliable. The distribution of winds in the Vredendal area is shown graphically in Figure 23 below. It shows that the most frequent wind directions, and the highest wind speeds, are from a north-easterly direction.

Limitations of the Ecological Study.

Since fieldwork was carried out during the spring season, flowering plants that only flower at other times of the year (e.g. autumn), such as certain amaryllids, may have been missed. Due to the large extent of study area (>4 000 ha), only a representative area was surveyed. The overall confidence in the completeness and accuracy of the botanical findings is therefore considered to be moderate to good.

q) Reasoned opinion as to whether the proposed activity should or should not be authorised.

i) Reasons why the activity should be authorized or not.

Although the existing mine operations and proposed expansion will result in unavoidable adverse environmental impacts, no fatal flaws in the project have been identified thus far through the EIA process. The mine is located in area that is not considered particularly sensitive or vulnerable, none of these adverse impacts are considered unacceptably significant and all can be managed to tolerable levels through the effective implementation of the recommended mitigation measures.

The EAP believes that specialist studies have shown that the mining is generally acceptable. The Environmental Impact Assessment Study has outlined key environmental and social issues associated with the proposed project, and described the potential environmental and social benefits and impacts, described mitigation measures, outlined the final layout and provided the environmental impact statement.

The EAP together with the EIA Team are of the opinion that a thorough and due environmental process, as outlined in Government Notices R982 and R984, promulgated under National Environmental Management Act (NEMA, Act 107 of 1998) as amended, was followed in undertaking the Environmental Impact Assessment and associated Public Participation Process. The analysis of key environmental impacts assessed during both the Scoping and EIA phases has shown that there are no negative impacts that can be classified as fatal flaws. The findings conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental fatal flaws that post the provided mitigation, should prevent the proposed project from proceeding. Therefore, based on the above-mentioned factors, it is recommended that the proposed for Environmental Impact Assessment Authorisation for the construction of haul road and lime kilns be authorised.

ii) Conditions that must be included in the authorisation

(1) Specific conditions to be included into the compilation and approval of EMPr

The following conditions should form part of the environmental authorisation:

- All mitigation measures and management of identified impacts recommended by the Specialists as part of this report and EMPr must be adhered to and implemented during the construction and operational phases of the project;
- Obtain other permits and authorisations as may be required, including, but not limited to, water use license, air emission license, Conservation of Agricultural Resources Act, 1983 (ACT NO 43 OF 1983) (CARA) application for clearing or removal of topsoil and land-use zoning;
- Conditions stipulated in all other permits or authorisations must be implemented;
- In terms of NEMBA, alien eradication and monitoring plans need to be compiled to address existing alien vegetation on the property and to control invasive species on the whole mining right area;
- All CBA area should be considered no-go area and demarcated as buffer area where no mining should be allowed

- A dust monitoring system is to be established and managed by the Applicant to determine the dust fallout generated on site by activities;
- Maintain lines of communication with the neighbors of properties close to the mine;
- Undertake continual closure and rehabilitation concurrently with active mining;
- Revise closure cost assessment on annual basis as required by NEMA;
- A dust monitoring system is to be established and managed by the Applicant (or delegated down as appropriate) to determine the dust fallout generated on site by activities;
- Conditions stipulated in the final EMPr and closure plan must be adhered to;
- In terms of monitoring, it is recommended that an independent Environmental Control Officer (ECO) audit the activity against the EMPr annually for the first three to five years of operation and once every two years thereafter until the existing Mining Right expires. Should the EMPr be audited by the applicant then an independent EAP as per Regulation 13 (2) of the NEMA EIA Regulations 2014; and
- All mitigation measures provided in this report must be implemented. Should the mitigation measures be deemed impractical, ineffective or cost prohibitive, Cape Lime may apply to the DMR to alter such mitigation measures accordingly. Any change in mitigation measures must be approved by the competent authority.

(2) Rehabilitation requirements

The overall rehabilitation objectives for the proposed project are as follows:

- Ensure adherence to all statutory and other legal requirements
- Re-establishment of the pre-mining land capability to allow for suitable post mining land use;
- Ensure that closure supports productive uses considering pre-mining conditions;
- Promote bio-diversity and biological sustainability to the maximum extent practicable
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas; requiring minimum maintenance to facilitate a walk away situation; and
- To in-fill and slope ramps and voids to be free draining

r) Period for which the Environmental Authorisation is required.

The Environmental Authorisation is required to be in line with Mining Right Approval in line with the MPRDA, for which end of Life of Mine is 2043.

s) Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report.

The EAP undertakes that the information provided in PART A is correct, and that the comments and inputs from stakeholders and IAPs have been correctly recorded in the report. This is only applicable to the Environmental Impacts Assessment Report and EMPr as a Basic Assessment Process has not been undertaken.

Refer to PART B: Section 2 for the EAP's signed undertaking.

t) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

The Financial Provision for the current mining and processing of limestone and dolomite at Cape Lime Vanderlandsche has been determined at a value of **R1712 928.60 (Incl. VAT)**.

i) Explain how the aforesaid amount was derived.

The Financial Provision was determined utilising the Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (2006). Please refer to calculations as provided below.

ii) Confirm that this amount can be provided for from operating expenditure.

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

Cape Lime will provide a bank guarantee to ensure the financial provision.

u) Deviations from the approved scoping report and plan of study.

i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

The methodology used to rate the impacts and risks or the plan of study detailed in this Environmental Impact Assessment Report have not deviated from those described in the Scoping Report.

ii) Motivation for the deviation.

No deviations have been made from the approved scoping report.

v) Other Information required by the competent Authority

i) Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the: -

(1) Impact on the socio-economic conditions of any directly affected person.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12. herein).

As mentioned in the above sections, the social-economic impacts of the proposed and existing mining operations relate to the current employment of 70 permanent employees, 8 learnerships, 1 Internship and 20 contractors of which the majority were sourced from the local area. The construction and operation of the proposed kilns is anticipated to result in 18 new permanent employment opportunities for local people.

The surrounding communities also benefits through a Social Labour Plan. The social and labour plan project initiates Local Economic Development Programmes for local communities in an effort to boost the socio-economic status of the area.

Furthermore, the product from the mining activity will feed into the greater socio-economy of the surrounding area and South Africa as whole in terms of supplying of high quality white lime products to potential new projects in South Africa, for which Cape Lime does not have the current production capacity as well as providing raw materials to the construction industry, which is currently experiencing positive growth and is improving employment prospects. The markets currently served with calcinised limestone are:

- Water treatment (potable and effluent)
- Glass Industry (Flat glass and container glass)
- Aggregates
- Chemical Industries (Calcium Mineral Fillers)
- hypochlorite, mineral separation processes and tanneries)

- (2) **Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.** (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(j)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The footprint of the proposed upgrades does not lie on pristine ground but occurs in area already affected by modern developments that include farming quarrying and access roads. The desktop study revealed that, the archaeology of the area is concentrated along the valleys outside the proposed development footprint where 10 lithic clusters were reported. Those lithic artefacts that occur in the area appear in isolated clusters and are of low significance. Four historical structures and features (cemetery, farmhouse, stonewalled fencing and a stonewalled fort) were also reported but much further away from development path.

The following procedure must be considered in the event that previously unknown fossils or fossil sites are exposed or found during the life of the project:

- Surface excavations should continuously be monitored by the ECO and any fossil material be unearthed the excavation must be halted.
- If fossiliferous material has been disturbed during the excavation process it should be put aside to prevent it from being destroyed.
- The ECO then has to take a GPS reading of the site and take digital pictures of the fossil material and the site from which it came.
- The ECO then should contact a palaeontologist and supply the palaeontologist with the information (locality and pictures) so that the palaeontologist can assess the importance of the find and make recommendations. 14
- If the palaeontologist is convinced that this is a major find an inspection of the site must be scheduled as soon as possible in order to minimise delays to the development.
- From the photographs and/or the site visit the palaeontologist will make one of the following recommendations:
 - The material is of no value so development can proceed, or:
 - Fossil material is of some interest and a representative sample should be collected and

put aside for further study and to be incorporated into a recognised fossil repository after a permit was obtained from SAHRA for the removal of the fossils, after which the development may proceed, or:

- The fossils are scientifically important, and the palaeontologist must obtain a SAHRA permit to excavate the fossils and take them to a recognised fossil repository, after which the development may proceed.
- If any fossils are found then a schedule of monitoring will be set up between the developer and palaeontologist in case of further discoveries.

w) Other matters required in terms of sections 24(4)(a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4**).

As discussed in previous sections in this report, no alternatives were considered. The proposed upgrade is located within the Cape Lime's existing mining operations.

Information regarding the baseline and potential impacts for the project are based on the information available, comments and discussions with stakeholders, specialists, the Applicant and discussions with authorities. The EAP has included all identified impacts, based on the current scope, in this report and has assigned appropriate management measures to reduce and manage each identified impact, which are included in the EMPr provided as per Part B of this report.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

The purpose of this section is to provide a baseline Environmental Management Programme (EMPr) to essentially form part of Vanderlandsche Mine Environmental Management System (EMS). The information provided in this section describes guidelines, operating procedures and rehabilitation/pollution control requirements. The EMPr is a legally binding document that the holder of the Environmental Authorisation is responsible for implementing.

The recommendations and procedures stipulated in the EMPr are based on the findings discussed in Part A of this report. It is therefore essential that this portion be carefully studied, understood, implemented and adhered to at all times.

Part B of this report should be considered as a “living” document, to be reviewed and amended as deemed necessary.

The reasons for review and/or amendments may be the following:

- Failure to identify certain risk or impacts during the initial EIA process; and
- The inability of the EMPr to sufficiently provide for the avoidance, management, and mitigation of environmental impacts associated with the undertaking of authorised activities.

In the event that additional activities, not specified in the EIR and EMPr, are to take place, the impacts associated to those activities must be assessed according to the requirements stipulated by GN R. 982. Therefore, this EMPr is only applicable to the listed activities stipulated in **Part A section d) i)** and/or those authorised in terms of the Environmental Authorisation.

1) Draft environmental management programme.

- a) **Details of the EAP**, (Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

The details and expertise of the EAP are detailed in PART A: 3 (a) (i) and (ii) above.

- b) **Description of the Aspects of the Activity** (Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

The details of aspects of the activity covered by the EMPr are detailed in Part A, Section 5.

c) Composite Map

(Provide a map (**Attached as an Appendix**) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers)

Refer to **Appendix A4** attached.

d) Description of Impact management objectives including management statements

Throughout Part A and Part B of this report, a number of possible environmental and social impacts/risks have been identified. The sections to follow will provide the management approach related to each potential impact/risk by defining management and outcome based objectives.

i) Determination of closure objectives. (ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The closure objectives, identified for the Vaderlanche limestone and construction of lime kilns, Closure and Liability plan (Appendix E). The main objective for the Cape Lime project proposal for the end land use of the mining area is to rehabilitate the land to a non-hazardous waste disposal site or a recreational dam.

By ensuring the following, a physically stable and sustainable landscape post-mining is achievable:

- All temporary infrastructure, foreign material and stockpiles will be removed, reshaped and de-compacted as close to the original landscape profile as to ensure the capability to sustain indigenous vegetation.
- Ensure that community safety is not adversely impacted (i.e. the pit area is adequately fenced off to restrict entry by humans and animals).
- Maintain and restore biodiversity levels as to provide appropriate habitats.
- Shape all channels and drains to smooth slopes and integrate into natural drainage patterns.
- Remove alien and/or invasive vegetation.
- The stockpiles around the opencast pit will be shaped and re-vegetated only on the outward facing sides of the stockpiles. A security fence will be constructed on top of these stockpiles to ensure no trespassing or dangerous access to the open pit and the steep pit section of the stockpiles.

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

This section describes the approach taken by the EAP in preparation of Part B of this report.

Environmental Management Approach

Globally, there are a number of tools or guideline documents available to assist or describe environmental management. The purpose of an EMPr (Part B of this report) is to describe the process for managing the identified potential environmental impacts or risks

described in Part A of this report (EIR) throughout the entire life cycle (from design, to implement, operation, and decommissioning) of the Cape Lime Vaderlandsche Mine. The IEM (Integrated Environmental Management) tool used for managing the identified environmental impacts by the EAP in this document is the Environmental Management System (EMS). This approach will assist the Cape Lime Vaderlansche Mine to achieve continual improvement in environmental performance.

The EMPr in essence will be adopting the approach of the internationally recognised ISO 14001 Environmental Management System (EMS) standard that is essentially based on the Deming Cycle rationale which is a simplified continuous improvement model consisting of four main iterative steps.

These steps are described as follows:

- Plan – Establish objectives and processes necessary to deliver results in accordance with the developed organisational environmental policy.
- Do – Implement the process.
- Check – Monitor and measure processes against environmental policy, objectives legal and other requirements and report the results.
- Act – Take action to continually improve environmental performance.

Continual improvement is achieved by periodically monitoring and reviewing the EMPr and implementing corrective actions when required. Therefore, this document should be considered as a living document that must be continuously updated and possibly improved.

This approach taken in the development of the EMPr (Part B of this report) is in line with the requirements stipulated in GN R. 982 (2014 EIA regulations).

Legislative compliance

Throughout the development of management measures, all legislative and other requirements associated to the proposed Cape Lime Vaderlandsche Mine activities were considered and highlighted.

Specialist recommendations

A number of specialist investigations formed part of the EIA process and resulted in a number of findings and recommendations (Part A section 1) j) summarises the findings). These reports provided specific mitigation and management measures as a recommendation. These findings have been considered throughout the development of the EMPr.

- iii) **Potential risk of Acid Mine Drainage.** (Indicate whether or not the mining can result in acid mine drainage).

The mine activities do not pose any risks to the occurrence of acid mine drainage, as the mining process does not use water, which can react with rocks. There is limited risk to

acid mine drainage given that the material being mined is limestone.

iv) **Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.**

Based on the result described above, no further steps were taken to investigate, assess, and evaluate the impact of acid mine drainage, as this potential risk is not foreseen as part of dolomitic limestone related mining activities and the construction of 4 Fluid Bed Lime Calciners.

v) **Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.**

Due to the nature of the project as indicated above, there is a low probability of acid mine drainage occurring, therefore it is unlikely that design solutions to avoid or remedy acid mine drainage will be required.

vi) **Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.**

Not a potential risk.

vii) **Volumes and rate of water use required for the mining, trenching or bulk sampling operation.**

It is anticipated that that 10m³ per day will be sufficient for the operation and this extracted water will be stored in 10 cubic meter tanks. However, permitted volume and rate of water use required for the mining and lime kilns operations might be increased in the future as production increase.

The water consumption will depend heavily on the degree of beneficiation of the lime to be produced. If lime is to be sold as quicklime (which is the expectation at this stage), no process water will be needed. The water requirements will thus be for dust suppression and human consumption only.

viii) **Has a water use license has been applied for?**

An integrated application approach has been taken by Cape Lime. Therefore, an application for a water use license will be submitted to the Western Cape Department of Water Affairs and sanitation.

The following water uses are included in the submitted application:

- Section 21 (a) - taking water from a water resource (water will be sourced via a borehole);
- Section 21 (c) - Impeding or diverting the flow of water in a watercourse

- Section 21 (g) - disposing of waste in a manner which may detrimentally impact on a water resource

A Replacement of General Authorisation (GA) in term of Section 39 of the National Water Act, 1998 (Act 36 of 1998) has been granted for the site in 05/10/2015 for the following water use activities:

- Section 21 (j) - altering the bed, banks, course or characteristics of a watercourse
- Section 21 (i) - removing, discharging, or disposing of water found underground if it is necessary for efficient continuation of an activity or for the safety of people

Therefore, the two water activities were not included for the integrated water use license application.

ix) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

Table 25: Impact to be mitigated in their respective phases

ACTIVITIES (as listed in 2.11.1)	PHASE of operation in which activity will take place. State; Planning and design, Pre- Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	SIZE AND SCALE of disturbance (volumes, tonnages and hectares or m ²)	MITIGATION MEASURES (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	COMPLIANCE WITH STANDARDS (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either: -. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Demarcation of mining area	Construction and Operation	4002.5 ha	<ul style="list-style-type: none"> • Demarcate the corners of the mining area with coloured steel droppers or wooden stakes. • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining. • Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these as no-go areas. 	Mining is only allowed within the boundaries of the approved mining area: compliance with the MHSA 1996 and OHS Act 1993	During construction and throughout operation
Clearance of land for the expansion of the pit (GNR 984, Listing Notice 2, Activity 15) as amended	Construction and Operational	11ha	<ul style="list-style-type: none"> • It is recommended that a search and rescue of succulents and bulbs be undertaken ahead of mining activities. These plants must be properly bagged and transplanted in the Vygjeveld adjacent to the mining site, a safe distance away from the mining area. Search and rescue and relocation of the bulbs should be undertaken early in spring at the beginning of the flowering season. An experienced contractor should be appointed to undertake search and rescue. 	National Environmental Management: Biodiversity Act No. 10 of 2004	Mitigation can cease upon cessation of the individual activity (clearing of land and excavations)

<p>Stripping and stockpiling of topsoil</p> <p>clients (GNR 984, Listing Notice 2, Activity 17) as amended</p>	<p>Construction and Operational</p>	<p>±42ha (pit and infrastructure area)</p>	<ul style="list-style-type: none"> • Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Control keeping topsoil separate for use on disturbed land • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted • Control through implementation of storm water management measures • Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Soil stripping should forbidden on areas not required for mining work or on areas of retained vegetation • Separately stockpiling subsoils and overburden to be returned for backfilling in the correct soil horizon order 	<p>National Environmental Management Act 1998 as amended and meet rehabilitation standards/objectives</p>	<p>During construction and throughout operational phase</p>
<p>Calcination stack emissions</p> <p>GNR 984, Listing Notice 2, Activity 6 as amended</p>	<p>Operational</p>	<p>±2ha</p>	<ul style="list-style-type: none"> • Install bag filter units to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License. • Monitor stack emission daily, and the bag filters are regularly inspected to make sure it is in good working condition. • NB: Taking the above mentioned into consideration the control efficiency of up to 99 % can be achieved. 	<p>Dust generated must fall below the threshold as per the The National Dust Control Regulations, no R827 dated 1 November 2013</p>	<p>During construction; mitigation can cease at cessation of individual activity (construction)</p>

<p>The development of a 15m wide new road (of which 2.17km will be on Farmers Property and 3,30km will be on the applicants property) that will connect Vaderlanche and Welverdiend</p> <p>GN R 983, Listing Notice 1, Listing Notice 2(as amended) Activity 24</p> <p>GNR 984, Listing Notice 3, Activity 4 of the EIA Regulations, 2014 (as amended)</p>	Construction	±11km	<ul style="list-style-type: none"> • The proposed access road must be setback further away from the river (for the section between the limestone mine and river crossing) to lessen the impact on mammal fauna dwelling inside the riverine area. • Limit construction activities to the proposed access road site as far as possible. • Control dust through implementing dust suppression measures. • Speed limits on un-surfaced access roads must be set at an appropriate low speed, and enforced. • All vehicles and Trackless Mobile Machines must be serviced regularly and inspected daily for leaks, re-fuelling of machines must take place at designated fuelling stations, hydrocarbon spills must be cleaned immediately and contaminated material (soil, etc.) must be disposed at licensed sites only. • Vehicles should be fitted with efficient and well-maintained silencers. 	National Environmental Management: Biodiversity Act No. 10 of 2004.	Construction and throughout operation.
<p>Construction of the fluid bed calciners.</p> <p>GNR 984, Listing Notice 3, Activity 4 of the EIA Regulations, 2014 (as amended)</p>	Construction	1ha	<ul style="list-style-type: none"> • Restrict construction activities to the dedicated activity area as far as possible. • Speed limits on un-surfaced access roads must be set at an appropriate low speed, and enforced. • Implement dust suppression measures. • All vehicles and Trackless Mobile Machines must be serviced regularly and inspected daily for leaks, re-fuelling of machines must take place at designated fuelling stations, hydrocarbon spills must be cleaned immediately and contaminated material (soil, etc.) must be disposed at licensed sites only. • Vehicles should be fitted with efficient and well-maintained silencers. 	Dust generated must fall below the threshold as per the The National Dust Control Regulations, no R827 dated 1 November 2013	Construction.

<p>The widening of the 3,49km existing road occurring on the farmer's property to connect with the proposed new road that will connect Vaderlanche and Welverdiend</p> <p>GN R 983, Listing Notice 1, Listing Notice 2(as amended) Activity 56</p> <p>GNR 984, Listing Notice 3, Activity 18 , of the EIA Regulations, 2014 (as amended)</p>	<p>Construction</p>	<p>3.9km</p>	<ul style="list-style-type: none"> • Limit construction activities to the proposed access road site as far as possible. • Control dust through implementing dust suppression measures. 		
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<p>Stream crossings on proposed construction of new haul road and widening of existing road</p> <p>GNR 983, Listing Notice 1, Activity 19, of the EIA Regulations, 2014 (as amended)</p>	<p>Construction and operational phases</p>	<p>15m wide at various sections</p>	<ul style="list-style-type: none"> • Control by designing stream crossings to allow the free flow of water following runoff generating rainfall events; • Infill of, narrow confined channels must be with large rocks to ensure water can pass freely in between the voids of the fill; • Roads passing through broad unconfined channels/valleys must be level with the stream bed and must not cause a physical barrier to water flow; • Clearly demarcate instream construction activities with danger tape or brightly coloured beacons • Erosion protection must be placed on the downstream side of the road crossing on incised channels. This can be in the form of loosely packed rock or a reno mattress. Alternatively, the run of mine infill can be sloped at an angle down towards the river-bed on the downstream side of the crossing. • Time construction activities to coincide with low rainfall probability (dry season) to avoid erosion; • Clear and remove all construction debris and materials, as well as any blockages of drainage structures; and • Shape the road surface to avoid concentrated flow paths into watercourses. • All potentially hazardous substances (e.g. diesel, oil etc.) should be stored in existing secure facilities in an appropriately bounded area that falls outside of the direction of preferential flow • Weekly inspection of watercourses for signs of disturbance. Take immediate action should disturbance be noted, to remedy the situation and, if necessary, a freshwater ecologist should be consulted for advice on the most suitable remediation measures; and • Routinely monitor all new watercourse crossings for the establishment of Alien Invasive of Plants (AIPs) and eradicated if necessary. 	<ul style="list-style-type: none"> • National Water Act (Act 36 of 1998) to prevent pollution of water resources 	<p>During design, construction and operational phases</p>
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e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ());

Table 26: Impact Management Outcomes

ACTIVITY whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc....)	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post- closure)	MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm- water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring • Remedy through rehabilitation.. 	STANDARD TO BE ACHIEVED (Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
Demarcation of mining area	Disturbance outside the mining area.	Land outside the mining area.	Construction and operation	<ul style="list-style-type: none"> • Demarcate the corners of the mining area with coloured steel droppers or wooden stakes. • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining. • Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas 	Avoid mining within anauthorised boundaries avoided. Maintain natural vegetation and reduce disturbance on functioning of rivers.

Site establishment and site clearance for the construction of 2 kilns and a new haul road to connect the Vaderlandsche and Welverdiend mines.	Faunal movement between the river and the veld to the South will be affected due to the proposed access road. Large fauna expected to move away from the river area due to truck movement and associated dust.	Biodiversity.	Construction and operation	<ul style="list-style-type: none"> The proposed access road must be setback further away from the river (for the section between the limestone mine and river crossing) to lessen the impact on mammal fauna dwelling inside the riverine area. Limit construction activities to the proposed access road site as far as possible. No trapping or hunting of fauna. Control dust through implementing dust suppression measures. Consideration should be given to ceasing of activities during windy conditions. Speed limits on un-surfaced access roads must be set at an appropriate low speed, and enforced. Vehicles should be fitted with efficient and well maintained silencers. 	Avoid disturbance of fauna.
	Soil erosion, compaction and contamination.	Soils	Construction and operation	<ul style="list-style-type: none"> Restrict construction activities to the dedicated activity site as far as possible. All vehicles and Trackless Mobile Machines must be serviced regularly and inspected daily for leaks. Re-fuelling of machines must take place at designated fuelling stations. Hydrocarbon spills must be cleaned immediately. Contaminated soil must be disposed of at licensed site. Implement storm water management. Prevent through the establishment of runoff cut off trenches and detention ponds on the down slope of the mine. 	Rehabilitation standards.
	Invasion by alien invasive species.	Vegetation	Construction and operation	<ul style="list-style-type: none"> Control through Alien invasive eradication programme. Alien clearing, especially <i>Prosopis glandulosa</i> and <i>Atriplex nummularia</i>, should be investigated. 	
	Dust generation	Air quality	Construction and operation	<ul style="list-style-type: none"> Control through implementing dust suppression measures. Speed limits on un-surfaced access roads must be set at an appropriate low speed, and enforced. Monitor dust fallout to determine if measures are effective. 	Fallout dust standards.

Stripping and stockpiling of topsoil.				<ul style="list-style-type: none"> Control through restricting the footprint to be used. Control through restricting the disturbed area. Control through determining the correct depth of topsoil before removal. Control through restricting topsoil stockpiles to 1 m in height and must not be compacted. Control through vegetating stockpiles with indigenous species to prevent erosion and maintain viability. Control through implementation of storm water management measures. Soil stripping should be forbidden on areas not required for mining work or on areas of retained vegetation. Stockpile topsoil and overburden separately, to be returned for backfilling in the correct soil horizon order. 	
Drilling and blasting.	Vibration			<ul style="list-style-type: none"> Maintain good public relations with the surrounding communities, i.e warning the local communities in advance before the blast. Evacuate all persons within the 500m of a blast site. Conduct seismograph calibration tests to ensure that blasting standards are met. Blasting must take place during daylight hours when ambient noise levels are highest. 	
Excavating and loading of material.			Construction	<ul style="list-style-type: none"> Prevent through reporting of substantial fossil remains (e.g. vertebrate teeth, bones, petrified wood, stromatolites, shells, trace fossils) exposed during mining. In the event that substantial fossil remains are accidentally exposed, work must be ceased and the incident must be reported to the quarry foreman. SAHRA Burial Ground Unit or Heritage Specialist must immediately be notified of the discovery in order to take the required further steps. 	
Hauling of excavated materials to processing plants. Transporting of material by clients from mining area.	Dust generation	Air quality.	Operation	<ul style="list-style-type: none"> Controlled as per fugitive emissions management plan. Implement dust suppression on haul roads. 	

	Noise	Ambient Noise	Operation	<ul style="list-style-type: none"> Vehicles should be fitted with efficient and well maintained silencers. Regular servicing of vehicles and machines. 	
Crushing and screening activities.	Noise	Ambient Noise	Operation	<ul style="list-style-type: none"> Control through regular maintenance and servicing of plant equipment. Noise surveys. 	
	Dust generation	Air quality.	Operation	<ul style="list-style-type: none"> Controlled as per fugitive emissions management plan. Implement dust suppression measures. Consider ceasing of operations during extreme wind conditions. Control through fallout dust monitoring. 	
Material stockpiles.	Lime dust on vegetation	Biodiversity.		<ul style="list-style-type: none"> A buffer area of suitable width (atleast 100m) should be maintained between mining activities, including stockpiling, and riparian areas. No stockpiling must be allowed inside and directly adjacent to the riparian areas. 	
Calcination of Limestone in a kiln.	Fugitive emissions	Air quality	Operation	<ul style="list-style-type: none"> Controlled as per fugitive emissions management plan. Control as per conditions of the Air Emissions License. Regular maintenance and inspection of bag filter units. Daily monitoring of stack emissions. Annual stack emissions testing. 	
Removing and discharging of groundwater into a surface water body (river).	Surface water contamination.	Surface water quality.	Operation	<ul style="list-style-type: none"> Regular servicing of vehicles and machinery. Daily checks for leaks. Drip trays must be placed under pumps in close proximity of dewatering pit. Once the has been approved, in respect of 21 (j) of the NWA, all licence conditions in this regard should be implemented. 	

Washing of vehicles and machinery.	Surface water contamination.	Surface water quality.	Operations	<ul style="list-style-type: none"> Control through installing wash bays with the correct runoff drainage into collection tanks with water systems including setting ponds, sand filtration to remove sediments and contaminants. Use environmentally friendly safe detergents. 	
Coal storage	Groundwater contamination by leaching of coal stockpiles	Ground water	Operation	<ul style="list-style-type: none"> Regular clean up around coal stockpile to make sure it is contained within the current bunded area. Extension or additional bunds to accommodate overflow of coal stockpiles. 	
Waste Management.	<ul style="list-style-type: none"> Land pollution Hazardous Leachate Illegal dumping 	Land pollution	Construction, Operation and Decommissioning	<ul style="list-style-type: none"> Ensure segregation of hazardous wastes from non-hazardous. During the construction phase, temporary storage of construction waste to be stored in a bunded designated area. No burning of refuse wastes are on the premises or on surrounding premises All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site Sealable bins and containers must be made available for the storage of all streams of waste throughout the site. Waste bins must be emptied on a regular basis as to ensure bins do not overflow. No littering will not be permitted on site and general housekeeping should be enforced Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof. Separate waste skips/ bins for the different waste streams must be available on site DO not dump waste of any nature, or any foreign material into any drainage line or stream All waste to be disposed off at a suitably registered waste disposal facility A suitable and registered waste service provider must remove all waste materials off site. Proof of disposal to be obtained and kept on record 	To avoid land and contamination of ground water resources

Employment of Workers, skills training and procurement of construction materials	Job creation	Job creation	Construction and Operational	<ul style="list-style-type: none"> • During community engagement/information dissemination, emphasis must be placed on the fact that permanent employment is directly related to the feasibility of the mine operations. • Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made. • Maximise and monitor local recruitment where required. • Promote employment of women and youth. • Train locally recruited construction workers for longer-term employment where possible. • Support economic diversification through development of alternative markets. 	<ul style="list-style-type: none"> • Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area. • Promotion of social and economic development and improvement in the overall well-being of the community
Fuel storage and oil storage.	Ground water contamination.	Ground Water.	Operation	<ul style="list-style-type: none"> • Store fuel in banded tank able to contain 110% of the stored volume and with a concrete apron. • Quarterly check up on storage infrastructure and leak detection. • Establish a waste storage facility with concrete floor, sloping concrete apron. • Maintenance and servicing of vehicles and machineries must be conducted on a concrete and roofed floor. • Regular maintenance and servicing of vehicles and machineries to minimise leaks and spills. • Used parts like filters should be contained and disposed of at a licenced site. 	

Health, Safety and Security	Crime and Illnesses of employees	Health, Safety and Security	Construction, Operational and Decommissioning phases	<ul style="list-style-type: none"> • Security fence is to be inspected continuously to ensure no illegal entry points are created. • Ensure that PPE is always worn on site. • Opened trenches and pits must remain demarcated to avoid injuries to employees • Ensure the contacts details of the police or Security Company, fire fighters, ambulance services are available on the site. • Limit access to the construction crew camp only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Emergency contact details for the police, Security Company, ambulance and fire department must be readily available onsite • Emergency facilities must be available and adequately supplied for use by staff and customers • Ensure that only suitably qualified personnel use vehicles and machineries • Ensure that the handling of equipment and materials is supervised and adequately instructed. • Security fence is to be inspected continuously to ensure no illegal entry points are created. • Limit access to the site only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Appropriate notification signs must be erected, warning the residents and visitors about the hazards around the site and presence of heavy vehicles. • Ensure that employees are regularly checked for illnesses. • 	Maintain good health and safety of employees, customers, visitors and the general public
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f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

Table 27: Impact Management Actions

<p>ACTIVITY whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).</p>	<p>POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...)</p>	<p>MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. <ul style="list-style-type: none"> • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.. </p>	<p>TIME PERIOD FOR IMPLEMENTATION Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:- .. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.</p>	<p>COMPLIANCE WITH STANDARDS (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</p>
<p>Demarcation of mining area</p>	<p>Disturbance outside the mining area</p>	<ul style="list-style-type: none"> • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control by maintaining a buffer area of 250 to 300 meters between the Wiedou River and mining activities at all times • The area of the site that protrudes into the CBA must be excluded as an offset for conservation purposes 	<p>Construction and Operational Phase</p>	<p>Mining is only allowed within the boundaries of the approved mining area: National Environmental Management: Biodiversity Act No. 10 of 2004</p>

<p>Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)</p>	<p>Dust resulting in a decrease in ambient air</p>	<ul style="list-style-type: none"> • Control through dust suppression • Control through limiting the speed of vehicle movement to a maximum speed of 40km/h • Control through monitoring of dustfall to determine if measures are effective • Progressive rehabilitation will be implemented to minimise exposed areas on mining areas and haul roads • Covered conveyors will be used for transporting the crusher ROM and calcination plant feed • The irrigation system will be utilised at the outlet of the product (agricultural lime). • Calcination stack emissions - Several bag filter units will be installed to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License 	<p>Construction and Operational Phase</p>	<p>Compliance with the MSHA 1996 and OSHA 1993</p>

<p>Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)</p>	<p>Destruction of natural vegetation including plant species of conservation concern</p>	<ul style="list-style-type: none"> • Control by keeping the area to be disturbed to a minimum • Control by searching and rescuing indigenous plants should be undertaken ahead of mining • Control by properly storing indigenous plants in bags and then transplant in rehabilitation areas or taken to a nursery for later replanting • Search and rescue of Aloe species should be undertaken ahead of mining activities. These plants must be properly bagged and transplanted at a safe distance away from the disturbance area. An experienced contractor should be appointed to undertake search and rescue. • Where possible, topsoil containing indigenous seeds should be transferred immediately to rehabilitation areas rather than being stockpiled as stockpiling kills important fungi, microbes, seeds and soil fauna. Topsoil stockpiles must not exceed a height of 0.5m and must not be compacted. • Control by keeping the area to be disturbed to a minimum • Control through monitoring of alien plants during the life of the mine and within the decommissioned area for at least 2 years after construction or until an effective cover of indigenous perennial plants has been established. 	<p>Construction and Operational Phase</p>	<p>National Environmental Management: Biodiversity Act No. 10 of 2004</p>
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Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)	Impact on vegetation type, habitat and CBA's	<ul style="list-style-type: none"> • Avoid or minimise by moving mining activities slightly further away (northwards) from the Wiedou River. A buffer of 250-300 m between the river and mining activities should be maintained. • Manage through search and rescue of succulents and bulbs be undertaken ahead of mining activities. These plants must be properly bagged and transplanted in the vygieveld adjacent to the mining site, a safe distance away from the mining area. Search, rescue, and relocation of the bulbs should be undertaken early in spring at the beginning of the flowering season. 	Construction and Operational	National Environmental Management: Biodiversity Act No. 10 of 2004
	Soil erosion, compaction and contamination	<ul style="list-style-type: none"> • Prevent through restricting the disturbed area • Prevent through restricting spillage from haulage vehicles • Control through removal of all utilisable soil and storage of the same • Control through implementation of storm • Prevent through establishment of runoff cut-off trenches and detention ponds on the down-slope side of mine. • Progressive rehabilitation will be implemented to minimise exposed areas 		National Environmental Management Act 1998 as amended
	Aesthetics	<ul style="list-style-type: none"> • Avoid/prevent leaving any building material or waste on site • Proper upkeep and maintenance of the site must be done. • Vegetation cover should be maintained at the periphery to reduce the visual impact. 		National Environmental Management Act 1998 (as amended)

		<ul style="list-style-type: none"> • Where necessary, vegetated areas should not be disturbed until existing quarried areas are exhausted. • Use overburden to create berms to reduce impact of excavations in the pit • Avoid using shiny material on the kilns 		
	Employment Opportunities and income	<ul style="list-style-type: none"> • Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area. • Promotion of social and economic development and improvement in the overall well-being of the community 	Construction and Operational	Matzikama IDP and Planning policies to create conducive environment for sustainable economic growth and empowerment for the business and broader communities
	Destruction of Heritage Resources	<ul style="list-style-type: none"> • Prevent through establishing buffer zones around potentially significant archaeological remains that occur outside the footprint of the proposed Mine Area and the proposed Plant Area • Prevent through reporting of substantial fossil remains (e.g. vertebrate teeth, bones, petrified wood, stromatolites, shells, trace fossils) be exposed during mining, the ECO should safeguard these, preferably in situ, and alert Heritage Western Cape (Mr Andrew September 021 483 9543) as soon as possible so that appropriate action (e.g. recording, sampling or collection) can be taken by a professional palaeontologist at the developer's expense • If during the construction/mining, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, 	Construction and Operational	Compliance with the National Heritage Resources Act 25 of 1999 and South African Heritage Resource Agency

		<p>contractors and subcontractors, or service provider, finds any artefact of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.</p> <ul style="list-style-type: none">• The senior on-site Manager must then make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area before informing SAHRA/PHRA.• If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or HWC are informed. If the burial is deemed to be over 60 years old and no foul play is suspected, an emergency exhumation permit may be issued by SAHRA for an archaeologist to exhume the remains.		
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Stripping and stockpiling of topsoil	Soil erosion	<ul style="list-style-type: none"> • Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted • Control through implementation of storm water management measures • Soil stripping should be forbidden on areas not required for mining work • Separately stockpiling subsoils and overburden to be returned for backfilling in the correct soil horizon order 	Construction and Operational	National Environmental Management Act 1998 (as amended) and meet rehabilitation standards/ objectives
	Stormwater	<ul style="list-style-type: none"> • Adequate storm water drainage system must be designed and maintained to adequately control the volume, speed, location of runoff, to avoid soil erosion and siltation. • All construction areas should be suitably topsoiled and vegetated as soon as is possible after construction; • Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. • Manage drainage and runoff from dumps using clean and dirty water system • A suitable soil conservation work shall be constructed and thereafter be maintained in order to divert run-off water from other land or to restrict the run-off water if applicable • Ensure that the haul road verges are allowed to vegetate to ensure that erosion of these is minimised • Construct any necessary erosion 	Construction, Operational and Decommissioning	<p>National Environmental Management Act 1998 as amended and meet rehabilitation standards/ objectives</p> <p>Conservation of Agricultural Resources Act, (CARA) 43 OF 1983</p>

		<p>protection works in the mining pit and overburden Gabions, reno mattresses or other stabilising structures and materials could be considered</p> <ul style="list-style-type: none"> • Avoid development in drainage zones by staying outside of demarcated buffer zones 		
Hauling and Transportation material from mining area to clients	Generation of dust	<ul style="list-style-type: none"> • Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers) • Control generation of excess dust by limiting speed limit to 40km/h • Monitor by equipping mine vehicles with silencers • Mineral transportation shall be carried out through covered trucks only and vehicles carrying the mined material must not be overloaded. • It is recommended that a wheel washing facility be installed and used. • Control through minimisation of vehicle movement • Control by monitoring trucks that collect material to ensure that they are covered 	Throughout operational phase	Dust generated must fall below the threshold as per NEM:AQA National Dust Control Standards for industrial areas
Coal storage	Soil contamination	<ul style="list-style-type: none"> • Control by storing coal on a concrete floor and contained storage pad with storm water collection. 	Operational Phase	Best standards of practice
Placement of mobile ablution facility/ies within the boundaries of the site	Contamination of soil and groundwater resources	<ul style="list-style-type: none"> • Control through regular servicing/emptying chemical toilets. Proof of this must be obtained and kept on record. 	Construction Phase	National Water Act No. 36 of 1998

Traffic	Congestion of vehicles and impact on pedestrians	<ul style="list-style-type: none"> • Turning lanes into and out of the site have been created on the N7 • The additional traffic that will be generated by the constructional and the operational activities of the proposed mine expansion and kilns will have a minimal impact on the traffic on N7 and the pedestrians as none were observed on the surrounding network. The additional traffic volumes will not create any conflict. • Limit or reduce traffic congestions for road users when transporting abnormal loads must be ensured. 	Construction and Operational Phase	National Roads Traffic Act (Act No. 93 of 1996)
Noise generation	Noise pollution to surrounding neighborhood	<ul style="list-style-type: none"> • Limit operation time to daylight hours between 07h00 and 18h00. • Regular servicing of mining equipment to ensure noise suppression mechanisms are effective e.g. install exhaust mufflers • Switching off equipment when not in use • Employees be obliged to use individual protective equipment against exaggerated noise in the work environment • Conduct high level noise activities during the day to avoid the inconvenience caused by noise during the night in locations occupied by humans, or sensitive to noise. 	Construction and Operational Phase	South African National Standard SANS10103:2008: The measurement and rating of environmental noise with respect to annoyance and to speech communication

Drilling and Blasting	<ul style="list-style-type: none"> • Dust resulting from blasting • Fly rock • Noise resulting from blasting 	<ul style="list-style-type: none"> • Maintaining good public relations with the surrounding communities, i.e warning the local communities in advance before blasts • Control by evacuating all persons within 500m of a blast site • Control by blasting during daylight hours when ambient noise levels are highest • Conduct Seismograph calibration tests to ensure that blasting standards are met • Control by limiting blasting operations to daylight hours when ambient noise levels are highest 	Operational Phase	Compliance with the MHSA 1996 and OHS 1993
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<p>Waste generation, storage and disposal</p>	<ul style="list-style-type: none"> • Land pollution • Hazardous Leachate • Illegal dumping 	<ul style="list-style-type: none"> • Ensure segregation of hazardous wastes from non-hazardous. • During the construction phase, temporary storage of construction waste to be stored in a bunded designated area. • No burning of refuse wastes are on the premises or on surrounding premises • All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site • Separate sealable waste skips/ bins for the different waste streams must be available on site • Waste bins must be emptied on a regular basis as to ensure bins do not overflow. • No littering will not be permitted on site and general housekeeping should be enforced • Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof. • Separate waste skips/ bins for the different waste streams must be available on site • Solid and chemical waste generated from construction and operational phases and the development must be kept away from drainage line • DO not dump waste of any nature, or any foreign material into any drainage line or stream • All waste to be disposed off at a suitably registered waste disposal facility • A suitable and registered waste service provider must remove all waste materials off site. • Proof of disposal to be obtained and kept on record 	<p>Operation and decommissioning</p>	<p>National Environmental Management: Waste Act No. 59 of 2008 as amended</p>
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<p>Employment of Workers, skills training and procurement of construction materials</p>	<p>Job creation</p>	<ul style="list-style-type: none"> • During community engagement/information dissemination, emphasis must be placed on the fact that permanent employment is directly related to the feasibility of the mine operations. • Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made. • Maximise and monitor local recruitment where required. • Promote employment of women and youth. • Train locally recruited construction workers for longer-term employment where possible. • Support economic diversification through development of alternative markets. 	<p>Construction and Operational</p>	<p>Matzikama IDP and Planning policies to create conducive environment for sustainable economic growth and empowerment for the business and broader communities</p>
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Health, Safety and Security	Crime and Illnesses of employees	<ul style="list-style-type: none"> • Security fence is to be inspected continuously to ensure no illegal entry points are created. • Ensure that PPE is always worn on site. • Opened trenches and pits must remain demarcated to avoid injuries to employees • Ensure the contacts details of the police or Security Company, fire fighters, ambulance services are available on the site. • Limit access to the construction crew camp only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Emergency contact details for the police, Security Company, ambulance and fire department must be readily available onsite • Emergency facilities must be available and adequately supplied for use by staff and customers • Ensure that only suitably qualified personnel use vehicles and machineries • Ensure that the handling of equipment and materials is supervised and adequately instructed. • Security fence is to be inspected continuously to ensure no illegal entry points are created. • Limit access to the site only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Appropriate notification signs must be erected, warning the residents and visitors about the hazards around the site and presence of heavy vehicles. 	Construction, Operational and Decommissioning phases	Mine Health and Safety Act No. 29 of 1996 (as amended)
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		<p>visitors about the hazards around the site and presence of heavy vehicles.</p> <ul style="list-style-type: none"> • Ensure that employees are regularly checked for illnesses. 		
Fuel and oil storage	Soil and groundwater contamination	<ul style="list-style-type: none"> • Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Oil spill kit must be kept on a clearly visible area • Oil spills to be cleaned immediately and affected ground/soil to be uplifted and bagged for removal off site to approved dump facility for hydro carbons or treat affected soil accordingly • All personnel must wear issued PPE at all times as indicated by safety signs. • Fuel storage facilities must be inspected on a regular basis. • Spill prevention measures to be implemented at all times. • Fire fighting equipment such as fire extinguishers must be made available and be inspected on a regular basis. • A spill kit must be made available at all time. • All spills to be cleaned immediately. • Inspect storage facilities on a regular basis. • All leaks to be repaired immediately • Chemical storage must be designed with a 110% capacity of the stored fuel to reduce the possibility of soil and water contamination. Alternatively, use drip trays if portable fuel tanks are used when refueling & maintain tanks integrity 	Operation and decommissioning	<ul style="list-style-type: none"> • National Environmental Management Act 1998 as amended • Comply with South African National Standards, SANS 10131: Above-ground storage tanks for petroleum products

Rehabilitation	Soil erosion	<ul style="list-style-type: none"> • Prevent through restricting the disturbed area • Adequate storm water drainage system must be designed and maintained to adequately control the volume, speed, location of runoff, to avoid soil erosion and siltation. • All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; • Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. • Manage drainage and runoff from dumps using clean and dirty water system • A suitable soil conservation work shall be constructed and thereafter be maintained in order to divert run-off water from other land or to restrict the run-off water if applicable 	Construction, Operational and decommissioning	<ul style="list-style-type: none"> • National Environmental Management Act 1998 as amended and meet rehabilitation standards/ objectives • Conservation of Agricultural Resources Act, (CARA) 43 OF 1983
	Establishment of alien invasive vegetation	<ul style="list-style-type: none"> • Control through ongoing alien invasive eradication programme • Prevent through restricting the disturbed area • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Regular follow up clearing of alien invasive species would be required in order to obtain successful rehabilitation • Mining should be phased, starting at the lowest point (closest point to the Wiedou River). • Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • The primary means of rehabilitation should involve the replacement of topsoil and hydro-seeding with an 		

		<p>indigenous grass seed mixture at the start of the rainfall season (June). A suitably experienced landscaping contractor should be appointed to undertake rehabilitation.</p> <ul style="list-style-type: none">• Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels• Phased restoration reclamation and rehabilitation of the land affected by mining must be completed prior to the final decommissioning of the mine		
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i) Financial Provision
(1) Determination of the amount of Financial Provision.

As part of the extension of Welverdiend Mine and construction of lime kilns Rehabilitation closure and Liability plan (**attached as Appendix E**), the financial provision for the mining operations were determined based on information currently available. The cost estimate has been included for the current and future activities.

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.

The closure of the mine is guided by the closure vision that was developed for the mine's conceptual closure plan, with the closure objectives and post closure strategy developed to support the vision. The closure objectives, identified in the extension Welverdiend dolomitic limestone and construction of lime kilns, Closure and Liability plan, which will drive the closure criteria and which have been developed to support the closure vision are:

- Ensure adherence to all statutory and other legal requirements;
- Re-establishment of the pre-mining land capability to allow for suitable post mining land use;
- Ensure that closure supports productive uses considering pre-mining conditions;
- Promote bio-diversity and biological sustainability to the maximum extent practicable
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas, requiring minimum maintenance to facilitate a walk away situation;
- To in-fill and slope ramps and voids to be free draining;
- Remove mine infrastructure that cannot be used by the applicant or a third party. Where buildings can be used by a third party, arrangements will be made to ensure their long term sustainable use; and
- Ensure that community safety is not adversely impacted (i.e. the pit area is adequately fenced off to restrict entry by humans and animals).

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with and interested and Landowner affected parties.

The above environmental objectives with regards to closure and rehabilitation have been incorporated into this report and will be made available to the landowner and I&APs. The EIA and EMP, and the Closure Plan are available during this EIA phase, for comment during the period 12 October 2017 and 12 November 2017. This information will also be made available to the landowner (in this the applicant) and all registered I&APs.

- (c)** Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

Find in **Appendix E**

- (d)** Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

Find in **Appendix E**

- (e)** Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

Section 24(P)(1) of NEMA states that an Applicant for an environmental authorisation relating to mining or related activities on a mining area must make the prescribed financial provision for the rehabilitation, management and closure of environmental impacts, before the Minister responsible for mineral resources issues the environmental authorisation.

In order to ensure that the Applicant provides sufficient funds for the total quantum to cover the rehabilitation, management and remediation of negative residual environmental impacts, the quantum for closure-related financial provision in terms of Regulation 4 of the NEMA Regulations on Financial Provision (GN940 of 2014) has been determined.

Determination of the financial provision (closure costing) has been undertaken, aligned to these requirements. The estimated closure cost for unscheduled closure as of 2018 is R 437 562.85 including Vat. The details of the closure costing can be found on the table below.

The detailed mine closure cost assessment report is attached as an **Appendix F**.

Table 28: Summary of the quantum calculation

CALCULATION OF THE QUANTUM							
Applicant :		Cape Lime			Location:		Vredendal
Evaluator:		Tali Tshikhovhokhovho			Date:		Dec 2019
Reference :		WC 30/5/1/2/3/2/1 (294) MR					
		Environmental Parameters					
Risk Class		B					
Area sensitivity		Low					
Nature of terrain		Undulating					
Proximity to Urban Ara		Urban					
No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	640	R 15.87	1	1.1	R 11 170.11
2 (A)	Demolition of steel buildings and structures	m2	0	R 221.02	1	1.1	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	R 325.71	1	1.1	R 0.00
3	Rehabilitation of access roads	m2	0	R 39.55	1	1.1	R 0.00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	R 383.87	1	1.1	R 0.00
4 (B)	Demolition and rehabilitation of non-electrified railway lines	m	0	R 209.38	1	1.1	R 0.00
5	Demolition of housing and/or administration facilities	m2	0	R 442.03	1	1.1	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	34	R 224 971.28	0.04	1.1	R 336 557.04
7	Sealing of shafts adits and inclines	m3	0	R 118.65	1	1.1	R 0.00
8 (A)	Rehabilitation of overburden and spoils	ha	0.5	R 154 478.73	1	1.1	R 84 963.30
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	R 192 400.46	1	1.1	R 0.00
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	R 558 822.15	0.55	1.1	R 0.00
9	Rehabilitation of subsided areas	ha	0	R 129 352.67	1	1.1	R 0.00
10	General surface rehabilitation	ha	5	R 122 373.21	1	1.1	R 673 052.65
11	River diversions	ha	0	R 122 373.21	1	1.1	R 0.00
12	Fencing	m	0	R 139.59	1	1.1	R 0.00
13	Water management	ha	0	R 46 529.74	0.41	1.1	R 0.00
14	maintenance and aftercare	ha	3	R 16 285.41	1	1.1	R 53 741.85
15 (A)	Specialist study	Sum	1	R 27 917.84	1	1.1	R 30 709.63
15 (B)	Specialist study	Sum	1	R 27 917.84	1	1.1	R 30 709.63
						Sub Total 1	R 1 220 904.21
1	Preliminary and General	R 146 508.50		weighting factor 2		R 146 508.50	
				1			
2	Contingencies	R 122 090.42				R 122 090.42	
						Subtotal 2	R 1 489 503.13
						VAT (15%)	R 223 425.47
						Grand Total	R 1 712 928.60

(f) Confirm that the financial provision will be provided as determined.

Cape Lime has the technical and financial ability to manage and rehabilitate the environment. Details of their technical ability was included in the Mine Works Programme, whilst the financial ability has been provided in Appendix F. The financial provision will be provided by means of a bank guarantee.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

- g) Monitoring of Impact Management Actions**
- h) Monitoring and reporting frequency**
- i) Responsible persons**
- j) Time period for implementing impact management actions**
- k) Mechanism for monitoring compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Demarcation of the mining area	Disturbance outside the mining area	Land outside the mining area	Site Manager and Environmental Control Officer (ECO)	<ul style="list-style-type: none"> • Throughout the construction and Operational Phase • Daily compliance monitoring by site management • ECO Annual Environmental Reports

Operations of the mine plant fluid bed lime kilns	Generation of noise	Noise monitoring to detect deviations from predicted noise levels to be generated from activities related to the Welverdiend Project and to enable corrective measures to be taken where warranted	Site Manager and Environmental Control Officer (ECO)	Noise monitoring and reporting to be conducted monthly throughout the operation of the mine
Placement of ablution facility within the boundaries of the site Coal storage	Soil contamination	To ensure that the chemical toilet is working properly with no leakages to the soil	Site Supervisor and Environmental Control Officer (ECO)	During construction and operational phases
Clearing of vegetation/disturbance of soil	Establishment of alien invasive species	<ul style="list-style-type: none"> • Regular follow-up clearing of aliens • No spraying of herbicides as it also kills many adjacent non-target species 	Site Manager and appointed specialist service provider	Alien invasive vegetation species monitoring and reporting to be conducted throughout the life of the mine and for two years after post-closure

<p>Fuel and oil storage</p> <p>Waste management</p>	<p>Hydrocarbon contamination of soil and groundwater</p>	<p>Regular inspections of areas prone to hydrocarbon spills and contamination must be inspected on a regular basis.</p> <p>Contamination the affected environment will require remediation actions.</p> <p>Soil contamination After completion of remediation actions it is recommended that samples be taken to ensure the soil quality comply with the rehabilitation objectives.</p> <p>Water contamination Water samples must be taken to ensure compliance with legal thresholds and the baseline data. Records to be kept of monitoring activities.</p>	<p>All staff, Environmental Control Officer/Environmental Officer/</p>	<ul style="list-style-type: none"> • Annual review of the Emergency preparedness and response plan or review after occurrence of emergency incident • Review of vehicle/plan/equipment maintenance plan as or when required • The boreholes should be sampled quarterly throughout the life of the mine and post- closure. • Daily inspections of vehicles/plant/equipment • Weekly inspections of hazardous substances storage facilities • Weekly inspections of spill prevention equipment
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I) Indicate the frequency of the submission of the performance assessment report.

Section 34 of GN R. 982 (published under the National Environmental Management Act (NEMA), Act 107 of 1998) stipulates requirements for auditing compliance with the Environmental Authorisation (EA), the Final EMPr, and the Rehabilitation plan.

It requires the holder of the authorisation, for the period during which the EA, EMPr, and closure plan (if applicable) are valid, to ensure compliance with all the conditions stipulated in these documents and that is be audited. This audit report must then be submitted to the competent authority.

The EMPr audit must be undertaken annually until such time as the existing Mining Right expires. A report must be compiled and submitted to the competent authority.

The purpose of this audit report is defined as follows:

- On an ongoing basis, determine the ability of the EMPr (and where applicable the closure plan) to sufficiently provide for:
 - the avoidance;
 - management; and
 - mitigation of environmental impacts; and
- To determine the level of compliance with the provisions of:
 - Environmental Authorisation (EA);
 - EMPr; and
 - where applicable the closure plan.

In the event that findings of the environmental audit report indicate insufficient mitigation of environmental impacts of the activity or insufficient levels of compliance with the requirements, the holder of the EA must:

- Submit recommendations to amend the EMPr or closure plan in order to rectify the shortcomings identified in the audit report.
- Allow for a public participation process (which process has been agreed to by the competent authority and was appropriate) to access the proposed amendment to the EMPr (and where applicable the closure plan); and
- Allow for the potential and registered interested and affected parties (I&AP), including organs of state which have jurisdiction in respect of any aspect of the relevant activity and the competent authority, to comment on these changes.

Operational internal environmental inspections will need to be done once a month by the Applicant's Environmental Representative. All findings and data are to be recorded in an on-site Environmental File.

m) Environmental Awareness Plan

(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

General environmental awareness must be promoted among everyone working on the Welverdiend Mine (including consultants and contractors) to encourage the implement environmentally sound practices throughout its duration.

This will ensure that environmental incidents are minimised and environmental compliance maximised.

The objectives of the Environmental Awareness Plan are as follows:

- To inform employees, contractors of any environmental risks which may result from their work;
- To inform employees and contractors of the relevant environmental procedures and actions required to be taken;
- To improve the knowledge of employees and provide the relevant training

Environmental requirements will be included in any operational contracts, thereby making employees aware of the potential environmental risks associated with the quarrying and limestone calcining activities and the necessity to prevent potential environmental incidences by the implementation of good housekeeping practices.

The environmental awareness plan must at least communicate the following:

- Importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- The significant environmental impacts and risks of an individual's work activities and the environmental benefits of improved performance;
- Individual's roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- The potential consequences of not complying with environmental procedures.

All employees and contractors are to undergo induction, a part of which is environmental awareness training. At the end of this training, personnel will be required to sign a register noting their completion of the training and their understanding thereof.

All personnel performing tasks which can cause significant or major environmental impacts shall be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

Environmental awareness training will include the identification of significant environmental impacts, actual or potential, which their work activities could result in, as well as mitigation and prevention measures. Training is appropriate to the activity of individual employees.

Monthly environmental topics will be generated to raise awareness of employees on environmental issues.

(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The EMPr details commitments in order to avoid pollution or the degradation of the environment. Compliance to and implementation of the management and mitigation measures contained in the EMPr. Compliance with the EMPr commitments will form part of the daily operations of the mine, and a copy of the EMPr commitments will be provided to the contractors. Employees will also be briefed regarding the EMPr commitments prior to the commencement of operations. In addition to this, monitoring by internal Environmental Representative as well as by the external auditor.

Site Inductions

All employees are required to undergo environmental awareness induction training on appointment. All records of such training must be kept. Refresher induction training must periodically take place.

Toolbox talks

Regular meetings (recommended to be done daily, at least once a week) communicating the following is recommended:

- Findings of environmental performance reports;
- Awareness raising campaigns discussing environmental topics; and
- Information of any environmental risk which may result from employee's work.

Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

Should, however, circumstances lead to unacceptable risks, emergency systems and procedures need to be designed and implemented in the case of an emergency to prevent or minimise the consequential environmental damage. The environmental emergency contingency plan must address any reasonably anticipated failure (most probable risk) for the entire mining area as well as the additional infrastructure that could cause environmental emergencies.

Emergencies and risks that should be listed here, as a minimum, include: accidents, fires, spillages (hydrocarbon).

Communication is vital in an emergency and thus communication devices, such as mobile phones, radios, pagers or telephones, must be available around the site. A checklist of emergency response participants must be consulted and the relevant units notified. In this case, many of the emergency services will be sourced from Vredendal.

- fire department;
- police;
- emergency health services such as ambulances, paramedic teams, poisons centres;
- hospitals, both local and for evacuation for specialist care;
- public health authorities; and
- environmental agencies, especially DWS;.

n) Specific information required by the Competent Authority
 (Among others, Confirm that the financial provision will be reviewed annually).

The Financial Provision will be reviewed on an annual basis. This Financial Provision assessment will be accompanied by an annual Performance Assessment Audit.

The WULA and AEL processes are underway and will be submitted to respective departments in due course.

2) UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports
- b) the inclusion of comments and inputs from stakeholders and I&APs ;
- c) the inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) the acceptability of the project in relation to the finding of the assessment and level mitigation proposed;

-END-