STORMWATER MANAGEMENT PLAN: CAPE LIME VREDENDAL/MASKAM

AUGUST 2020

1. Introduction

This stormwater management plan was developed to identify possible sources of stormwater after heavy rains at Cape Lime Vredendal operations (Vredendal and Maskam) as well as mitigation measures to handle the stormwater in the correct manner.

2. Background

Cape Lime has obtained a Mining Rights (WC 30/5/1/2/2/294MR) to mine limestone and dolomite on the remaining extent of portion1 of the farm Vederlandsche Rietkuil 308, farm Nuwedrift 450, remainder of portion farm 510 and portion 40 of the farm 301, situated in the magisterial district of Vredendal, Western Cape Region. The site is situated next to the R362, approximately 8 km south-east of the Vredendal town centre (by road), in the Western Cape Province. The size of the site is 4002.5 ha.

Cape Lime has a further Mining Right (WC 30/5/1/2/2/401MR) to mine limestone on the remaining extent of the farm Welverdiend 511, situated in the magisterial district of Van Rhysndorp, Western Cape Region. The site is situated next to the N7, approximately 8km south of the Van Rhynsdorp town centre (by road), in the Western Cape Province. The size of the site is 321.11 ha.

The current activities entail, drilling and blasting as well as excavation and hauling of limestone and dolomite; the crushing and screening of all mined material as well as calcination of limestone in a Fluid Bed Lime Kiln.

2.1 Process description

2.1.1 Mining

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.

2.1.2 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.

2.1.3 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.

2.1.4 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.

2.1.5 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.

2.1.6 Fluid Bed Kiln

Limestone ($CaCO_3$) is calcined in a Kiln at ± 920˚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 is sold as a low-grade quicklime or passed through the hydrating plant to produce a low grade hydrated lime product.

2.1.7 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.

2.1.8 Service departments

Laboratory:

All basic analysis for product composition and grading is done in a fully equipped laboratory on site to ensure compliance to Cape Lime's ISO 9001 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 services.

3. Area Rainfall

Vredendal lies at 37m above sea level and the climate is very much like the desert. During the year, there is virtually no rainfall in Vredendal. Vredendal's climate is classified as BWh (desert climate).

In Vredendal, the average annual temperature is 18.4 °C | 65.2 °F. In a year, the rainfall is 170 mm.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	22.5	22.5	21.9	19.8	16.5	14.5	13.7	14.2	16	18	20.1	21.3
Min. Temperature (°C)	15.1	14.8	14.2	12.4	9.6	7.9	7	7.6	8.9	10.8	12.7	13.9
Max. Temperature (°C)	29.9	30.3	29.6	27.3	23.5	21.2	20.4	20.9	23.1	25.3	27.6	28.8
Avg. Temperature (°F)	72.5	72.5	71.4	67.6	61.7	58.1	56.7	57.6	60.8	64.4	68.2	70.3
Min. Temperature (°F)	59.2	58.6	57.6	54.3	49.3	46.2	44.6	45.7	48.0	51.4	54.9	57.0
Max. Temperature (°F)	85.8	86.5	85.3	81.1	74.3	70.2	68.7	69.6	73.6	77.5	81.7	83.8
Precipitation / Rainfall (mm)	1	3	7	17	27	31	29	20	11	10	8	6

The desert climate (in the Köppen climate classification BWh and BWk), is a climate in which there is an excess of evaporation over precipitation. The typically bald, rocky, or sandy surfaces in desert climates hold little moisture and evaporate the little rainfall they receive.

4. Stormwater Management Measures

Current stormwater mitigation and management measures employed at Cape Lime are summarised in Table 1.

Source	Description	Management Measures	Responsibilities
Rainfall	Water build up in Quarry pits	▪ Make use of the diesel pump to reduce the level of rainwater build up in the quarry. The diesel pump takes approximately 2 days to drop the high-water level to manageable levels. ▪ Manage the quarry so that rainwater gets directed to the current water collection areas.	Quarry Supervisor and Quarry team
	Water build up on haul roads	▪ During and after the rainy season, road maintenance is conducted making use of the inhouse grader ad grader operator. The roads are scraped and any potholes are filled with mined road material. ▪ During the rainy season, haul truck speeds are reduced to cater for wet and slippery conditions.	Quarry Supervisor and Quarry team
	Water build up in roads around processing plants and stockpiles	▪ During and / or after the rainy season, smaller stockpiles of crushed stone are deposited around the site and used to cover water laden areas. These large puddles of water are removed by placing stone on top of it. This	Production Supervisor and Shift Foreman

Source	Description	Management Measures	Responsibilities
		allows for safer access of trucks and other vehicles.	
	Water build up in Limestone and Coal tunnels	▪ Water is pumped out of the tunnels using small submersible pumps, left to dry and then removed and disposed of at the waste site.	Production Supervisor and Shift Foreman
	Water build up or water flow near Coal bunded area	▪ During and / or after the rainy season, the Coal dust that covered the ground is collected and disposed of. Quarry crushed stone is deposited around the Coal storage area and used to cover water laden areas. These large puddles of water are removed by placing stone on top of it. This allows for safer access of trucks and other vehicles.	Production Supervisor and Shift Foreman

There is not enough rain to cause flowing rivers on site.