Appendix 7: Reports

Geological Report:

STELLENRYCK ENVIRONMENTAL SOLUTIONS

SPECIALIST GEOLOGICAL REPORT FOR B.P. MHLANGANISO SITUATED ON THE REMAINING EXTENT OF PORTION 19 OF THE FARM ECOWA 102, DISTRICT OF ELLIOT, EASTERN CAPE REGION

PREPARED FOR:

B.P. MHLANGANISO

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6070

APRIL 2016

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Consultant: Oltman Swanepoel: B.Sc. (Geology & Physics), B.Sc. (Hons) Geology

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SPECIALIST DETAILS

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QUALIFICATIONS

B.Sc. 2010 (NMMU)	Geology & Physics
B.Sc. (Hons) 2011 (NMMU)	Geology
Exploration Geologist & Data Base Manager (2012 – 2012)	Handeni Gold Inc. (formerly known as Douglas Lake Minerals) Tanzania
Exploration Geologist (2012 – 2014)	Remote Exploration Services (part of the Mineral Services group businesses) Africa and Canada
Geologist & Environmental Practitioner (2014 – Present)	Stellenryck Environmental Solutions

EXPERIENCE

During the 3 years associated with Handeni Gold Inc. and Remote Exploration Services, working as an exploration Geologist in various countries in Africa and Canada, including Namibia, Tanzania, Malawi, Cameroon and Saskatchewan, Oltman Swanepoel was equipped with a vast amount of knowledge regarding the different geological systems, exploration and mining aspects of geology, as well as logistics, Health and Safety Acts, and government legislation governing exploration and mining in the various countries. The time spent gaining knowledge and experience regarding various aspects of mining and exploration, in various countries dealing with different governing bodies and legislation has provided Mr. Swanepoel with the necessary environmental skill to evaluate environmental impacts associated with exploration and mining.

During the time associated with Stellenryck Environmental Solutions (SES), Mr. Swanepoel has gained valuable experience and understanding in completing environmental impact assessments, associated with prospecting and mining related projects. Mr. Swanepoel has first-rate experience in writing environmental reports, ranging from Environmental Management Plans, Mining Work Programs and Geological Reports, including:

Amarok Quarries (Pty) Ltd: Hard rock - Specialist Geological Report (December 2014)

Blue Rock Quarries (Pty) Ltd: Hard rock - Specialist Geological Report (April 2015)

Buffalo Property Trust: Sand - Specialist Geological Report (November 2014)
- Environmental Management Plan (April 2015)

Demiclox (Pty) Ltd: Gravel - Specialist Geological Report (December 2014)

D.K. Pringle Earthworks CC: Sand - Specialist Geological Report (March 2015)

Excodor 178 CC: Hard rock - Specialist Geological Report (February 2015)
- Environmental Management Plan (February 2015)

Lolo & Lolo Development Services CC: Gravel – Specialist Geological Report (February 2015)
Sand – Specialist Geological Report (April 2015)

Irhafu Minerals: Hard rock – Specialist Geological Report (May 2015)
- Environmental Management Plan (May 2015)

JD Brown: Sand – Specialist Geological Report (October 2014)

K. Kok: Sand – Specialist Geological Report (December 2014)

Macrovest: Sand – Specialist Geological Report (May 2015)

Nexus Mining: Gravel – Specialist Geological Report (January 2015)

Potgieter Quarries (Pty) Ltd: Hard rock – Specialist Geological Report (January 2015)
- Environmental Management Plan (April 2015)

R.L. Hagemann: Sand – Specialist Geological Report (June 2015)

Green Agri Trust: Sand – Specialist Geological Report (June 2015)

Silver Ruby Trading 15 (Pty) Ltd: Sand – Specialist Geological Report (March 2015)

- Environmental Management Plan (March 2015)

Stutt Quarries CC: Hard rock – Specialist Geological Report (December 2014)

Hard rock – Specialist Geological Report (November 2014)

- Mining Work Programme (December 2014)

T&A Transport CC: Sand – Specialist Geological Report (March 2015)

Sand – Specialist Geological Report (March 2015)

- Environmental Management Plan (March 2015)

Wahloo Sands CC: Sand – Specialist Geological Report (October 2014)

- Environmental Management Plan (October 2014)

T. Lombaard: Sand – Specialist Geological Report (December 2014)

DECLARATION OF INDEPENDENCE

I, O.J. Swanepoel declare that -

General declaration:

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting specialist geological reports;
- I will have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing – any decision to be taken with respect to the application by the competent authority; and – the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will provide the competent authority with access to all information at my disposal regarding the application whether such information is favorable to the applicant or not;
- All the particulars furnished by me in this form are true and correct;

Disclosure of Vested Interest (delete whichever is not applicable)

I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

SCOPE OF REPORT

Specialist geological report for Mr. Bonisile Piet Mhlanganiso on the Remaining Extent of Portion 19 of the Farm Ecowa 102, District of Elliot, Drakensberg District Council, Eastern Cape Region, for the mining of stone/aggregate and gravel – dolerite, on a 4.922Ha area of privately owned land.

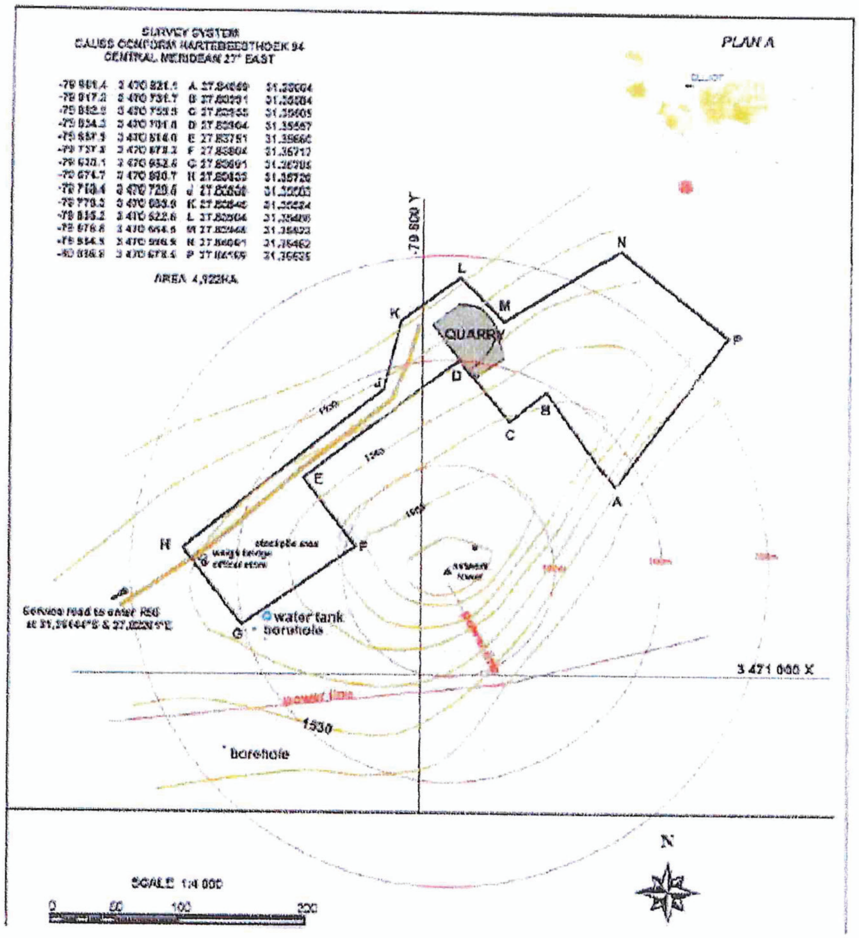
REPORT LIMITATIONS

The study area has been observed by ground and aerial reconnaissance methods by geologists, mapped between 1968 and 1976, and compiled in 1979. These studies are of a regional nature, generally limited to geological information obtained from surface outcrops and previous literature studies. Mapped units are limited by the scale of the geological map, in this case 1:250 000.

Due to the absence, or limited amount, of subsurface excavations or boreholes there is a possibility that variances might occur, as the investigation undertaken is an estimate of the general profile of the subsurface conditions. The geological model infers the subsurface conditions and their likely behavior with regards to the proposed development. The actual conditions at the study site might differ from those inferred.

No surface, or subsurface, exploration program, irrespective of how comprehensive, can reveal all subsurface structures, details and anomalies.

MINE PLAN



PLAN A
AREA 4,922HA
QUARRY
A
B
C
D
E
F
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water tank
borehole
borehole
power line
1530
3 471 000 X
-79 800 Y
SCALE 1:4 000
N

METHODOLOGY

The investigation into the geological features, structures, lithologies and systems were conducted by firstly conducting a geological desktop-study, which consisted of consulting various academic sources including, but not limited to, geological maps, scientific papers and write-ups, research papers and literature pieces.

After the desktop-study was completed an extensive site survey was conducted, collecting surface geological evidence. Where existing excavations, trenches, exposed riverbeds, exposed cross-cuts, outcrops or animal burrows are present, any and all geological data available was collected from these sites, providing insight into the sub-surface geology of the given study area.

GEOLOGY

GEOMORPHOLOGY

According to the Environmental Potential Atlas for the Eastern Cape (EPAEC), the area in which the study site is located, is classified as highly dissected hills. This type of terrain is to be expected in this part of the Eastern Cape. As can be seen from the figure below, this particular terrain morphological unit is bordered the east and south by escarpments and to the west and north by high mountains, thus strong tectonic activity occurred in this region, associated with orogeny, producing the topography observed.

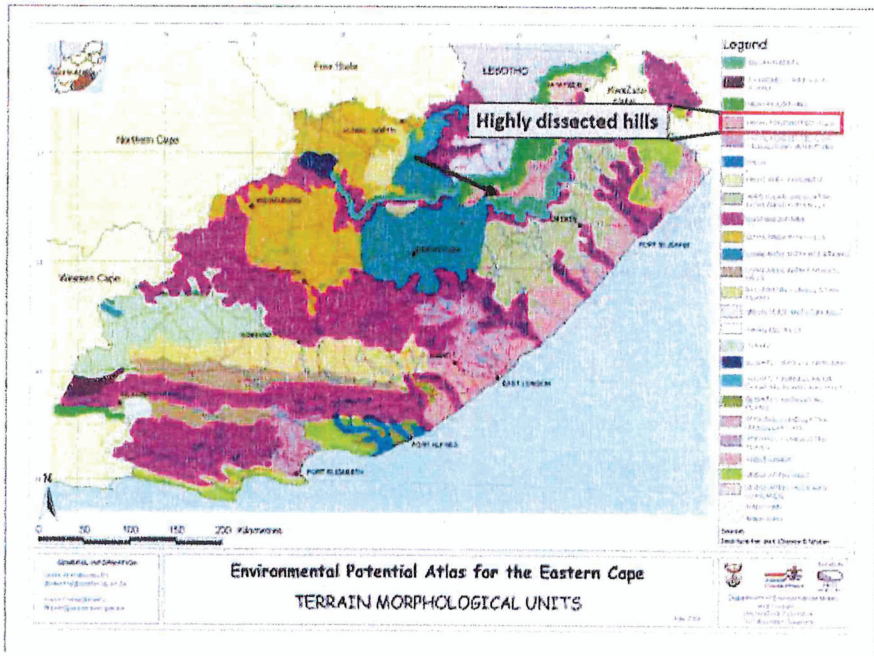


Figure 1: Geomorphological classification according to the EPAEC.

The hilly nature of the area is directly associated with the orogeny that was responsible for the production of the characteristic, very well-known highlands of Lesotho and its surrounds. Further weathering of these hilly highlands, together with inherent nature of orogenic hills, gave rise to the dissected nature of the hills observed in this area. Thus it is clear that the morphology of an area is directly related to the geology and geological features and processes, which molded the landscape.

The geomorphology of an area is forever changing due to geological processes such as plate tectonics, orogeny and erosion. However, these changes in morphology does not appear overnight, changes on such a large scale is created over thousands, and even millions of years.

The mine area is situated on a relatively steep hill and can be divided into two areas, namely the excavation area and the stockpile area. The excavation area, due to it extending over the crest of the hill, reveals two slope gradients of approximately 1:7 (14%) sloping towards the northwest (± 320°) and 1:8 (13%) sloping towards the southeast (± 85°), while the stockpile area reveals a slope gradient of approximately 1:18 (6%) towards the west (± 270°).

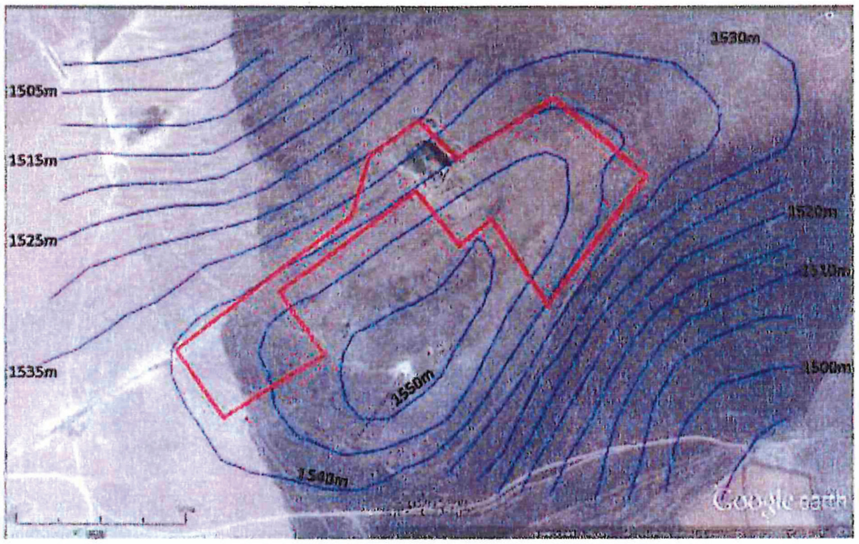


Figure 2: Topography of the study area, showing 5 meter contour lines.

REGIONAL GEOLOGICAL SETTING

According to the Geological Survey Sheet 3126 Queenstown, the site is situated in a dolerite intrusion, having intruded the Molteno Formation of the Karoo Supergroup.

STRATIGRAPHY AND PALEONTOLOGY

The Molteno Formation reaches a maximum thickness of approximately 600m in the southern section of its outcrop area, compared to a thickness of 10m and less in the extreme north. According to Turner (1975) and Christie (1981) the Molteno Formation can be divided into five Members, namely the Bamboesberg, Indwe Sandstone, Mayaputi, Qiba and Tsomo Members, chronologically from bottom to top Member. The stratigraphy of the Formation is made up of alternating medium- to coarse-grained sandstones and grey mudrocks. The sandstones display a very recognizable "glittering" appearance, given by secondary quartz growths within the sandstones.

The Molteno Formation does host very sporadic coal seams, while it hosts well-preserved insect and plant fossils.

The Bamboesberg Member attains a maximum thickness of approximately 130m and is a combined succession of coarsening-downward (fining-upward) sequences made up of erosively based, fine- and medium-grained sandstone units, as well as thin, lenticular mudrock intercalations. This Member hosts two coal seams.

At about 60m the Indwe Sandstone Member is significantly thinner than the abovementioned Member. The Indwe Sandstone Member consists of very coarse-grained – commonly pebbly – to medium-grained sandstones with an erosively based cobble and pebble bed at its base.

The Mayaputi Member does not exceed in 50m in thickness and is a dominantly argillaceous unit. The overlying Qiba Member reaches 60m and is made up of fine- to medium-grained sandstone beds with thin mudrock partings. Lastly, the Tsomo Member attains a thickness of approximately 300m and displays a repetitive pattern of erosively based, coarse-grained, pebbly sandstone up to 25m thick. This grades upwards into mudrock units which may reach 60m in thickness. Thin, lenticular coal seams are sporadically developed.

DEPOSITIONAL HISTORY

The source area was located to the south and southeast, which was tectonically active, resulting in primarily bedload-dominated rivers flowing across extensive braid-plains. In the south the Molteno Formation comprises of the Bamboesberg Member at the base. Throughout the remainder of the extent of the Formation the Indwe Sandstone Member establishes the base of the Member, which my rest unconformably on the Beaufort Group. In the northern part of the extent of the Molteno Formation, the Indwe Sandstone Member is the only representative of the Formation.

Deposition of the Bamboesberg Member occurred in channels and floodplains of shallow and broad temporary streams. The prevailing climate was cool and wet, with peat accretion in alluvial-plain swamps which was distanced from the locus of fluvial activity. In contrast, the Indwe Sandstone Member was deposited in high-energy, merging, braided streams. Extensive floodplains developed as the abovementioned river size and sediment supply decreased, allowing for the deposition of the Mayaputi Member.The depositional environment of the

Qiba Member was very similar to that of the Bamboesberg Member. The Tsomo Member represents the the deposition of coarse-grained, braided river sheet sandstones interchanging with periods of low fluvial activity, during which extensive floodplain and lacustrine clays and silts were deposited. The presence of green and maroon mudstones at the top of the unit in places are evident of an increasingly arid, warm environment. However environments remained favorable for the formation of localized peat swamps.

The sandstones of the Molteno Formation are relatively quartz-rich when compared to the underlying units, and only exhibit clasts of quartzite. According to Johnson (1991) these two factors indicate that rocks of the Cape Supergroup which has been uplifted in the Cape Fold Belt had at this time already replaced the magmatic arc as the leading provenance for the Karoo Supergroup. The northward-tapering wedges in the Molteno Formation was attributed by Turner (1983) to the fault-controlled uplift of granitic provenances along the southeastern margin of the basin.

AGE

The Molteno Formation is Late Triassic (230 – 200 Ma) in age.

DOLERITE SUITE

A very common sight throughout the whole Karoo Supergroup is the Karoo Dolerite Suite, which forms part of the Karoo Igneous Province. The intrusive Karoo dolerite suite represents a shallow feeder system to the flood basalt eruptions. This feeder system is best developed in the main Karoo Basin and occurs as an interconnected network of dykes, sills and saucer-shaped sheets, thus it is almost impossible to single out any particular intrusive or tectonic event. The inclined sheets and sills can range from a few meters to 200m in thickness, and typically form resistant capping on hills, resulting in the characteristic flat-topped Karoo hills. On the other hand, the dykes are normally 2 – 10m wide, and can range in length from 5 – 30km. However, the two east-west "gap dykes" North of East London extend for a staggering 80km inland from the Transkei coast near Mazeppa Bay.

Although thick sheets and sills show slight internal variation that resulted due to processes such as gravity settling and flow differentiation, dykes are compositionally homogeneous throughout their lateral extent, even the "gap dykes" which extends for approximately 80km.

The majority of the dykes in the Karoo Igneous Province are not orientated in a systematic manner, however in the main Karoo Basin they commonly form a complex three-dimensional interconnected plexus with sills, saucer-shaped intrusions and discordant sheets. There are two distinctive dolerite intrusion networks in the Karoo Igneous Province. Firstly, the diffuse dyke and sill network, which is the dominant hypabyssal expression of Karoo magmatism. Secondly, there are two well-developed linear dyke swarms, consisting of tens to hundreds of sub-parallel dykes in each swarm.

Older available age data suggested that the magmatic activity leading to the intrusion of the Karoo Igneous Province was sporadic over a period of 40 – 50 million years, starting at c. 190 – 195 Ma (Fitch and Miller (1984)). There is however a significant lack in geological evidence to support the long time interval. Using newer $^{40}Ar/^{39}Ar$ dating techniques, Duncan *et al.* (1997) confirmed the short-lived nature of the Karoo Igneous event. Additional age studies conducted on the Karoo Igneous Province by e.g. Encarnacion *et al.* (1996), Richardson (1984), Duncan and Pyle (1988), Renne *et al.* (1992) and Baksi (1994) indicated an age of emplacement at 182 ± 2 Ma, with a short time-span of approximately 1 – 3 Ma.

SITE GEOLOGY

As can be seen from the figure below, according to the Geological Survey Sheet 3126 Queenstown, the study area is situated in a dolerite intrusion, which intruded strata of the Molteno Formation of the Karoo Supergroup. The 3126 Queenstown Survey Sheet defines the Molteno Formation as consisting of grey mudstone, shale, gritty sandstone and occasional coal seams.

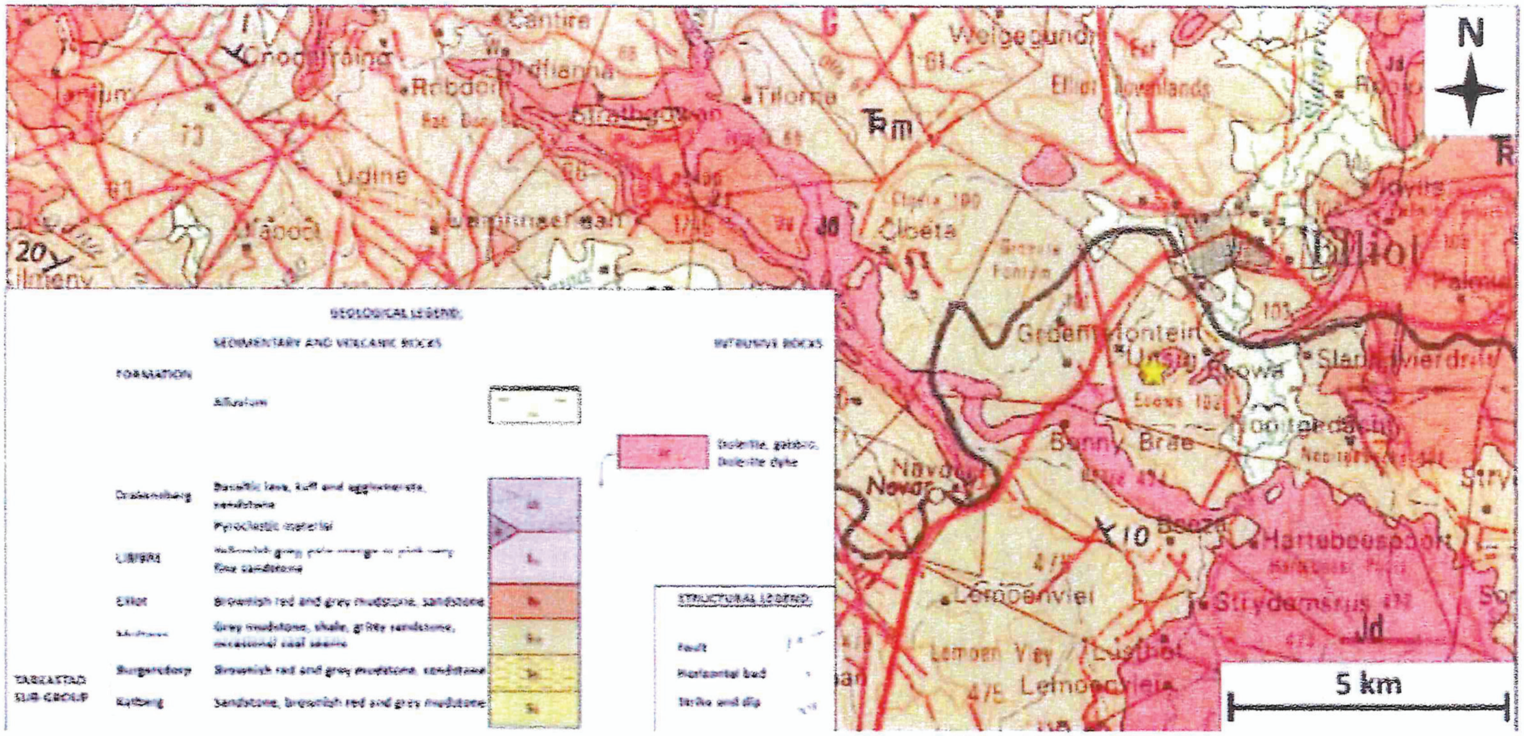


Figure 3: Geological setting of the study site, according to the Geological Survey Sheet 3126 Queenstown. Note that the yellow star only indicates the locality of the site, and is not to scale.

Dolerite has a specific gravity (SG) of 2.70 – 3.05g/cm^3, a porosity of 0.0 – 0.5% and a uniaxial compressive strength (UCS) of 100 – 350MPa, where an UCS of 160 – 320MPa is classified as very strong. The chemical composition of dolerite consists of mainly plagioclase feldspar (±62%) and the clinopyroxene (CPX), augite (20 – 29%), with minor olivine (±3%), magnetite (±2%) and ilmenite (±2%). The plagioclase feldspar is present as laths, which can be a few centimeters in length, nestled in a matrix of fine minerals, which contributes to the hardness and strength of dolerite. Due to the hardness of dolerite, it is commonly used in road construction, particularly as crushed aggregate in tarred roads. It is not very abrasive, thus it has an extended lifetime when used in road construction when compared to other material.

As mentioned, and can be seen from the figure above, the 3126 Queenstown Geological Survey Sheet indicates that the proposed mining area comprises of a dolerite body, which intruded the Molteno Formation of the Karoo Supergroup. The dolerite intrusion is the target material.

An existing excavation in the study area, which is the result of previous mining by the Department of Roads for road building projects, was used to illustrate the sub-surface features of this study area. The figures below shows the subsurface geology of the study area, although for only a limited depth. As can be seen from the figure, the study area hosts a relatively limited topsoil layer - approximately 10cm to 15cm thick, depending on topographical and environmental factors.

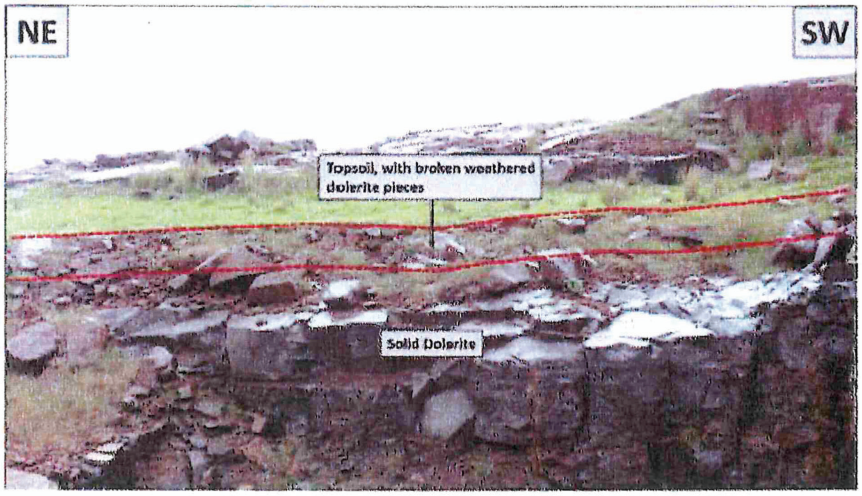


Figure 4: Exposed subsurface geology indicating lithological units in the study area.

The topography observed in the proposed excavation area of the study area comprises of a relatively steep hill, with the excavation area displaying a slope gradient of approximately 1:7 and 1:8, sloping towards the northwest and southeast respectively. The stockpile area exhibits a much flatter slope gradient of approximately 1:18 sloping towards the west. The topographical relief is displayed by the sub-surface lithological units as well. The subsurface dolerite intrusion which is visible in the existing excavation on the northwestern aspect of the associated hill, was found to have a measured dip/incline of 11°, which is relatively similar to the ±1:7 and ±1:8 slope gradient of the hill, taking into account a inherent degree of error associated with general elevation measurements.

The fact that the dolerite intrusion exhibits the same slope gradient, together with the lateral extent and data provided by the geological map, all points towards the dolerite intrusion being a smaller sill, or even more likely a saucer-shaped sheet.

Figure 5 a-b: Slope gradient exhibited by the sub-surface geological units – dolerite.

As mentioned in the beginning of the document, the entire existing excavation was observed and studied to obtain all available geological data and information of the study area, to best understand and delineate the geological structure. This will result in a more accurate conclusion and recommendations regarding the site specific geology.

Various stress/deformation related structures are observed in the study area, which includes joints.

Jointing is a structural feature recognized by a fracture along which any shear displacement is too small to be visible to the naked eye. Vertical and near-vertical joints are common in rocks. In the figures above, vertical and near-vertical joints are present, which resulted from the deformation associated with tectonic events. The age of the joints are unknown, although it is evident that the joints are the youngest structural feature, as they dissect all the lithologies and structures present in the area.

A Brunton Transit Com-Pro Compass was used to measure the joints found throughout the extent of the existing excavation. However, the magnetic interference in the study area was too high to obtain accurate, usable readings on the joints, thus only a general strike direction can be obtained for the joints in the study area. Two distinctive joint sets were observed in the study area, namely Joint Set 1 (J1) and Joint Set 2 (J2). A Joint Set is defined as a group of joints with similar orientation and morphology – i.e. the individual joints in a particular joint set displays similar joint spacing and physical properties.

J1 and J2 displays strike directions of approximately northwest-southeast and northeast-southwest respectively. It must be noted that J1 and J2 are arbitrary classifications given to the two distinctive joint sets in order to distinguish between them, and is thus not an indication of chronological order.

When two or more joint sets are present together in an exposure, it composes a joint system. The joint sets in a joint system commonly intersect at constant dihedral angles. For dihedral angles of 30° - 60° the joint system is classified as conjugate, whereas for dihedral angles of approximately 90°, the joint system is described as orthogonal. The dihedral angle between J1 and J2 in the study area is approximately 90°, with intersecting strike directions of northwest-southeast and northeast-southwest, classifying this as an orthogonal joint system (figures below).

The formation of joints in different lithological bodies can be attributed to a range of probable formation processes which include regional tectonics (e.g. The compressive stresses in front of a mountain belt), folding (due to the curvature of bedding), faulting, or internal stress release during uplift or cooling. Joints in igneous rocks, or intrusive bodies, most often result from stresses set up during the cooling of the rock mass within or out of a regional stress field. The joint system observed in such an intrusive body may be quite different from the joint systems in the surrounding rock. Unfortunately, no nearby outcrops or excavations of the surrounding Molteno Formation was visible to compare the joint system in dolerite to.

The primary joint systems of plutonic rocks are dilatant veins and dykes directly associated with the emplacement and flow fabric of plutonic bodies. They commonly consist of igneous differentiates and veins coated by hydrothermal and deuteric minerals. Four main systems are found in plutonic rocks, of which the joint system observed in the study area is classified as cross-joints. Cross-joints are consistently normal to the flow line and plane, and are considered as standard extension fractures and many may exhibit vein fillings, however the cross-joints observed in the study area do not host any filling. Put simply, the joints observed in the dolerite in the study area formed as a result of the cooling of the intrusive plutonic rock, as it flowed horizontally, jointing perpendicular to the flow plane.

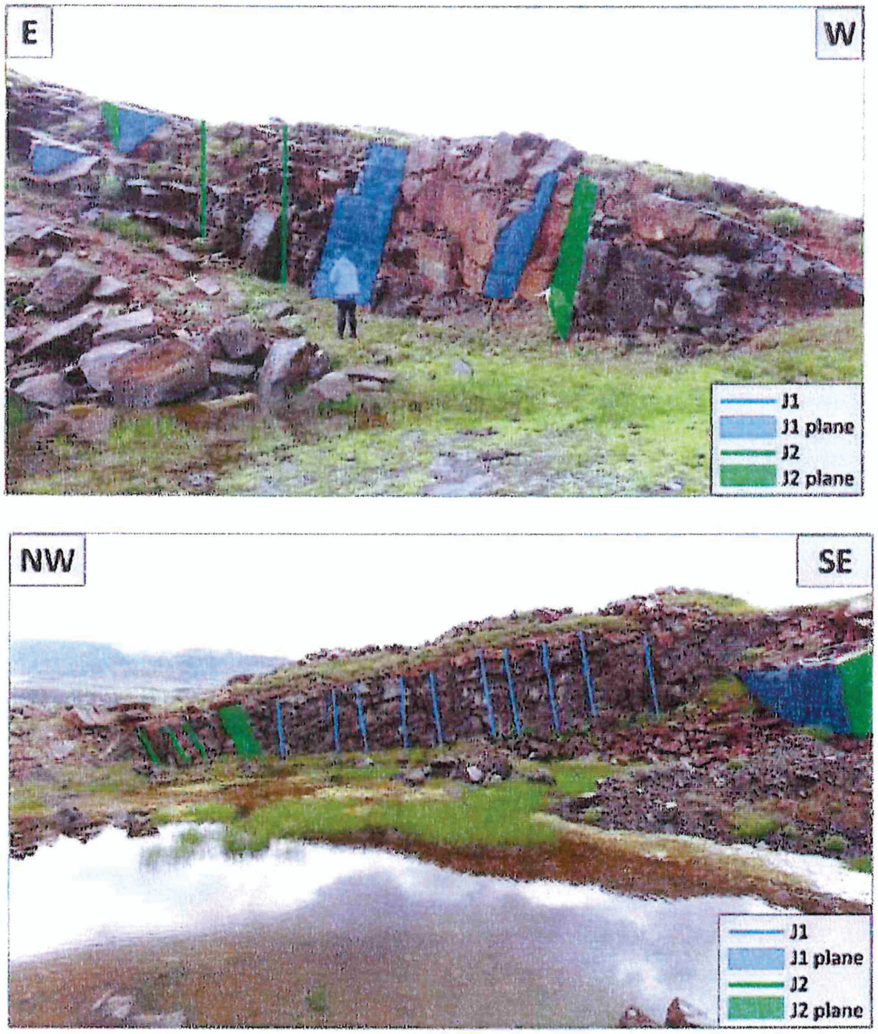
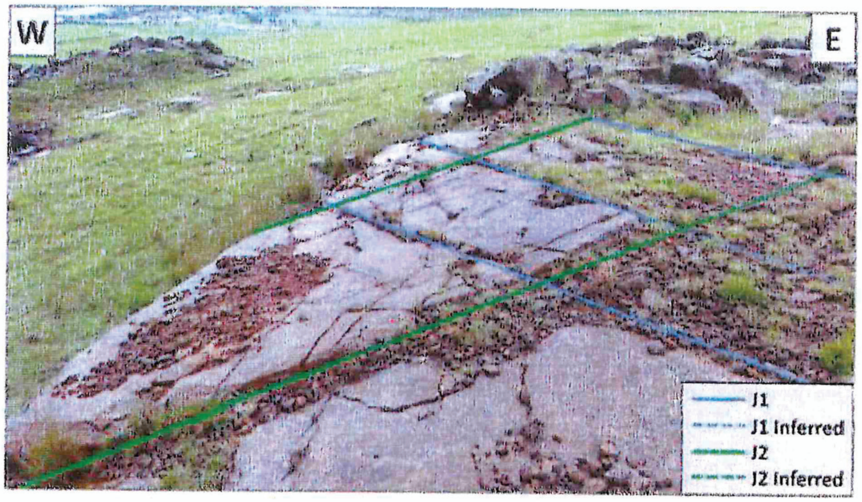


Figure 6 a-c: Joints and joint planes of both J1 and J2 observed in the study area.

Joints forming the same joint sets, and subsequently joint systems, were observed in solid dolerite outcrops in the immediate vicinity of the existing excavation in the study area. This serves as evidence that the dolerite body observed in the existing excavation extends further throughout the study area, for the reasons pertaining to the emplacement and formation of the joints as explained above. This can be stated with a relative high degree of confidence when considering the geological data.



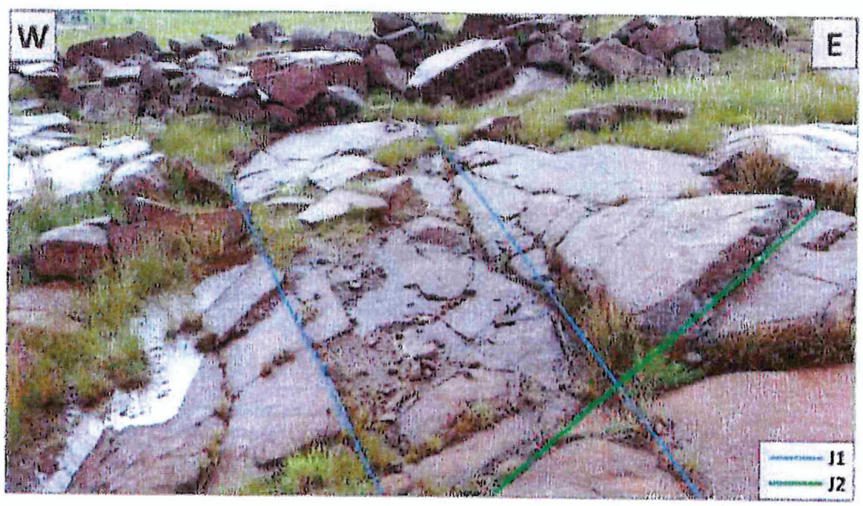


Figure 7 a-b: Joints observed in solid dolerite outcrops in the surrounding study area.

The hill which comprises the study area hosts numerous solid dome-like dolerite outcrops, which is generally indicative of a solid dolerite body subsurface. Several of these outcrops were observed and recorded in the study area surrounding the existing excavation, which will be used as starting point for the commencement of mining.

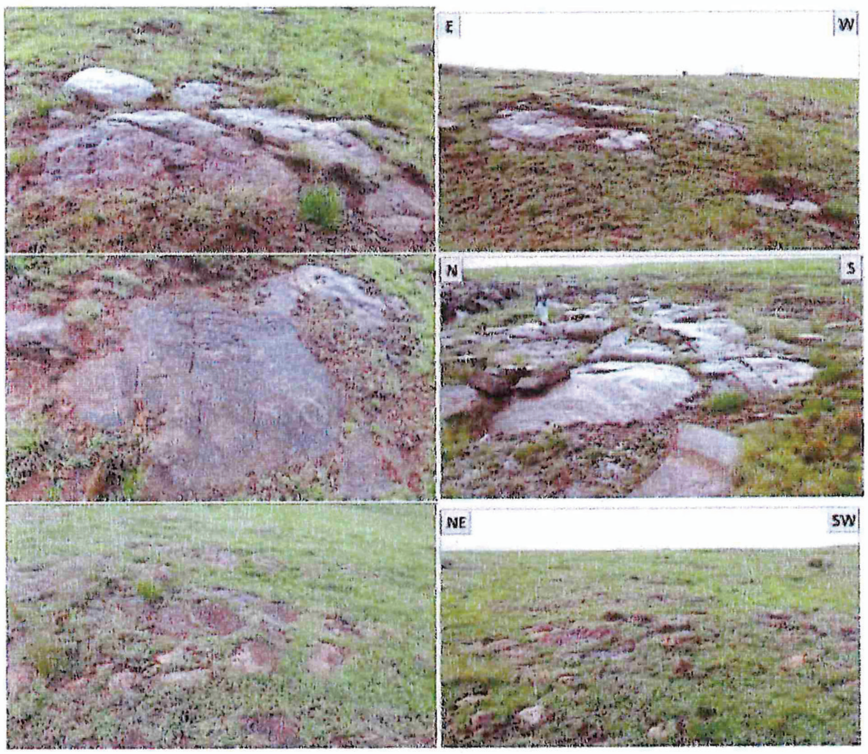


Figure 8 a-f: Solid dome-like dolerite outcrops observed in the surrounding study area.

The below figure is a very rudimentary illustration of an igneous intrusion, with its several varieties of associated structures. The sedimentary sequences for this specific study area would be the cycle of alternating mudstone and sandstone lithological units associated with the Molteno Formation of the Karoo Supergroup. It is important to note that the below figure is not a model for the emplacement of the dolerite present in the study area, it is simply an illustration of some of the structures associated with such an emplacement.

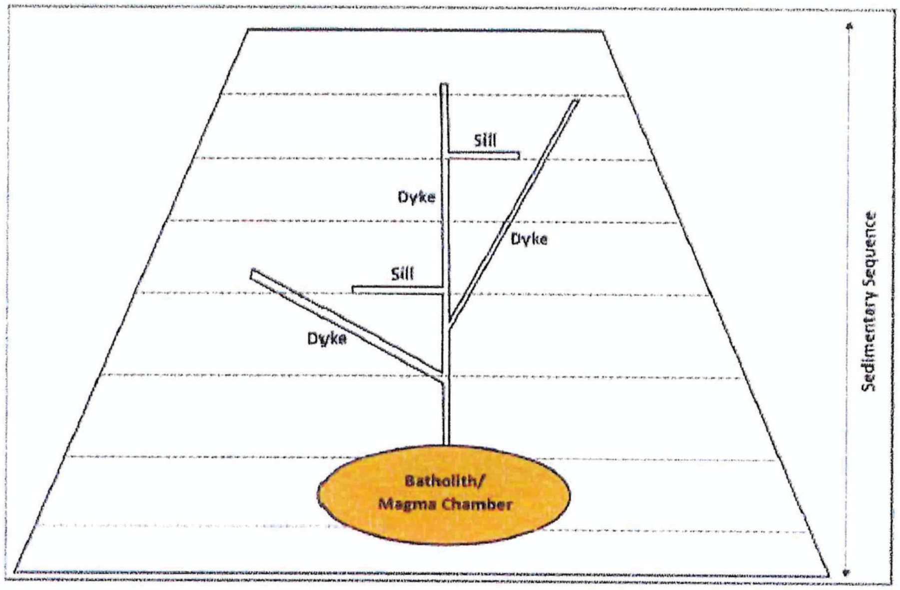


Figure 9: Illustration of an igneous intrusion. Note that this is not a model for the emplacement of the intrusions present in the study area.

The general emplacement model for dolerite bodies of the Karoo Basin consists of initially molten magma, which was emplaced as a liquid which rose through the basement rocks into the older sedimentary rocks of the Karoo Supergroup. Due to the inherent nature of movement of fluids, the molten magma would follow the path of least resistance as it rose to the surface. Geological structures such as bedding planes, joints, fractures and faults would most likely make up the path of emplacement of the molten liquid. As the molten liquid would near the surface lithologies and come into contact with the cooler host rock, a temperature reduction would occur, resulting in the crystallization of the molten magma. This cooling rate of the magma is proportional to the grain sizes of the individual crystals. The slower the cooling rate of the magma, the larger the crystals, and vice versa. Newer geological studies indicate that the emplacement of the igneous bodies took place over a time span of 1 – 3 million years, with an emplacement age of approximately 182 Ma.

RECOMMENDATIONS

Taking into consideration the limited amount of geological data available due to the absence of a proper, systematic sub-surface geological investigation, only limited recommendations can be made in this regard.

Firstly, all topsoil removed ahead of the production face should be stockpiled and not sold. Replacing the topsoil during rehabilitation plays an important role in the preservation of the now exposed sub-surface lithological unit. Replacing the topsoil will result in better establishing vegetation, which will in turn mimic the sub-surface conditions, limiting exposure to climatic conditions which could accelerate weathering and erosion processes. From field observations made during the site visit, it was established that the topsoil is at most 10-15cm thick, which is insufficient for viable rehabilitation. It is therefore recommended that additional topsoil from developments in the immediate area – i.e. the upgrading of roads – be sourced and used in the rehabilitation of the mine.

It would be advisable to utilize minimum-energy blasts to obtain the most efficient blasting events. Over-charging of blast holes should be avoided. The existing excavation displays jointing and fracturing, which will most likely be worsened by over-charging of blast holes. Increased fracturing in especially the upper section of the solid dolerite unit could lead to water infiltration which could lead to accelerated weathering and erosion processes. It is however important to note that these timeframes should be taken into consideration with geological timeframes. Geological processes can take place and mature over millions of years, thus it is relative. More importantly however, minimum-energy blasts should be directed away from the south where a network tower is located. This should assist in directing the propagation of waves through the solid sub-surface lithologies away from the said infrastructure.

The height of the faces created during mining should be kept to a minimum, safe working height. Although dolerite is a very competent rock, joint and fracturing is observed throughout the study area, thus unnecessarily high faces may tend to be slightly unstable. It is therefore recommended to restrict face heights to 10m. Currently the faces created during previous mining is approximately 15-25m high, and does not show instability. However the sub-surface geological structures are unknown outside the excavation area.

Oversized boulders, if any, can be used during the rehabilitation phase to assist with profiling of the production faces or filling of holes in the floor which may result of the mining. By using over-sized boulders to assist with the rehabilitation of the excavation created, limits the amount of profiling blasting that needs to be done. Additionally, this will assist in recreating sub-surface conditions and eventually result in the formation of sub-soil layers.

As mentioned numerous times, the exact sub-surface geological features are not known due to various factors pertaining to this study area. Therefor it is recommended that mining commence in the existing excavation where the target material is proven to occur, mining progressively east and southeast, to where the target material deposit is projected to occur.

CONCLUSION

In conclusion, there is a definite dolerite deposit present in the study area, although the exact depth thereof is unknown. From all the geological, topographical and environmental data available, the likelihood that the dolerite intrusion present is in the form of a sill or a saucer-shaped sheet, is high. This is supported by the topographical factors, dip of the dolerite, lateral extent (present, although limited) of the intrusion and by the 3126 Queenstown Geological Survey Sheet. Two distinctive sets of joints were observed in the study area, striking northwest-southeast and northeast-southwest respectively, with constant dihedral angles of approximately 90°, resulting in an orthogonal joint system.

The mining of the dolerite deposit will permanently alter the geology of the study area, due to the nature of mining, this is inevitable. However, considering the relative small scale of the area to be affected compared to the larger extent of the geology, and the fact that the material is not a strategic mineral, mining of the dolerite will not have any detrimental impact and/or effect on the regional geology. Thus from a geological viewpoint, in the opinion of the author the activity can be authorized, provided that the recommendations made in this report and the mitigation measures as prescribed by the Environmental Assessment Practitioner are adhered to.

Botanical Report:

STELLENRYCK ENVIRONMENTAL SOLUTIONS

BOTANICAL REPORT FOR MR. B.P MHLANGANISO FOR A DOLORITE QUARRY ON THE REMAINING EXTENT OF PORTION 19 OF THE FARM ECOWA102 IN THE ELLIOT DISTRICT, DRAKENSBERG DISTRICT COUNCIL, EASTERN CAPE REGION.

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