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AGRICULTURAL AGRO-ECOSYSTEM SPECIALIST ASSESSMENT FOR A SECTION 102 MINING RIGHT AMENDMENT APPLICATION FOR ADDITIONAL MINING AREAS ON ERF RE/1412 AND ERF 3264, HEIDELBERG, WESTERN CAPE

Report by
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7 October 2025

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EXECUTIVE SUMMARY

Despite some climate and soil constraints (limited rainfall and shallow soils), the site is of high enough agricultural potential to be suitable for viable, rainfed field crop and irrigated crop production of the crops that have been grown on site and are cultivated in the surrounding area (rotations of oats, wheat, canola, and lucern plus irrigated vegetables and orchards).

The screening tool classifies the assessed footprint as being entirely very high agricultural sensitivity. The very high sensitivity classification by the screening tool is due to irrigated crop status. This assessment confirms the very high agricultural sensitivity classification of the mining areas on Erf 3264 by the screening tool. It disputes the very high agricultural sensitivity classification of the mining areas on Erf RE1412 by the screening tool and verifies that site as being of high agricultural sensitivity because of its assessed cropping potential.

The focus of an agricultural assessment for mining is to determine whether or not the proposed mining will cause a significant, long-term reduction in agricultural production potential. A reduction in agricultural production potential results from the integrated effect of a number of different mechanisms, the most important of which, on this site, is loss of topsoil.

All of these mechanisms can be mitigated and managed so that the land is rehabilitated to its pre-mining agricultural potential. However, this is only possible if a high degree of rehabilitation management is applied throughout the mining and rehabilitation processes. There is a risk that the rehabilitation falls short of this standard, with the result that the long-term agricultural potential of the land is compromised.

The total size of the additional mining areas is 12.8 hectares. The baseline production potential is suitability for cropping. The amount of potential decrease is estimated at a 10 to 40% reduction in year 1 which will decrease to zero within 4 years, provided that rehabilitation is effectively implemented.

Detailed recommendations for soil rehabilitation are provided. Ensuring a surface cover of topsoil is by far the most critical step of successful soil rehabilitation. Because of the challenge of the very thin topsoil that naturally occurs on site, double stripping is essential for effective rehabilitation.

With effectively implemented rehabilitation, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed as being of low significance and as acceptable. However, with poorly implemented rehabilitation, the overall negative agricultural impact of the development is assessed as being of high significance.

The conclusion of this assessment on the acceptability of the proposed development is therefore

subject to the following conditions:

Mine management must be held accountable for well managed and effective implementation of all the recommended rehabilitation steps above. The specific, measurable rehabilitation outcomes against which the effectiveness of completed rehabilitation must be measured are:

1. that the topography and surface have been smoothed sufficiently to allow cultivation;
2. that topsoil has been spread on the surface across all areas from which topsoil was stripped, to a minimum depth of 40 cm on Erf 3264 and 20 cm on Erf RE1412;
3. That no saline material from depth within the mining excavation occurs at less than 50 cm depth in the rehabilitated soil profile. Correctly and well implemented double stripping, as recommended in the Agricultural Statement, will ensure this.
4. that the entire disturbed area is free draining and that no ponding of water at the surface occurs.
5. That the pre-mining contour banks have been re-established to suitable specifications (height, slope, distance apart) at least as intensive as prior to disturbance, and that the integrity of the contour bank system as a whole is in place.
6. That there is no visible erosion across the area, or down-slope of it as a result of mining, and that no part of the area has been left unacceptably vulnerable to erosion.
7. That the soil chemistry, including pH, salinity, and phosphorus levels have been optimised for small grain production.
8. That a cover crop has been established, provided with a high level of nitrogen fertilisation, and grows successfully across the entire area disturbed by mining activities and that it shows no significant difference in performance when sown across the boundary between disturbed and undisturbed land.

1 INTRODUCTION

A section 102 mining right amendment is being sought for additional mining areas on Erf RE/1412 and Erf 3264, Heidelberg, Western Cape (see location in Figure 1). In terms of the National Environmental Management Act (Act No 107 of 1998 - NEMA), an application for a mining right requires an agricultural assessment. In this case, because the footprint includes high agricultural sensitivity land (see Section 7), the level of agricultural assessment required by the protocol is an Agricultural Agro-Ecosystem Specialist Assessment.

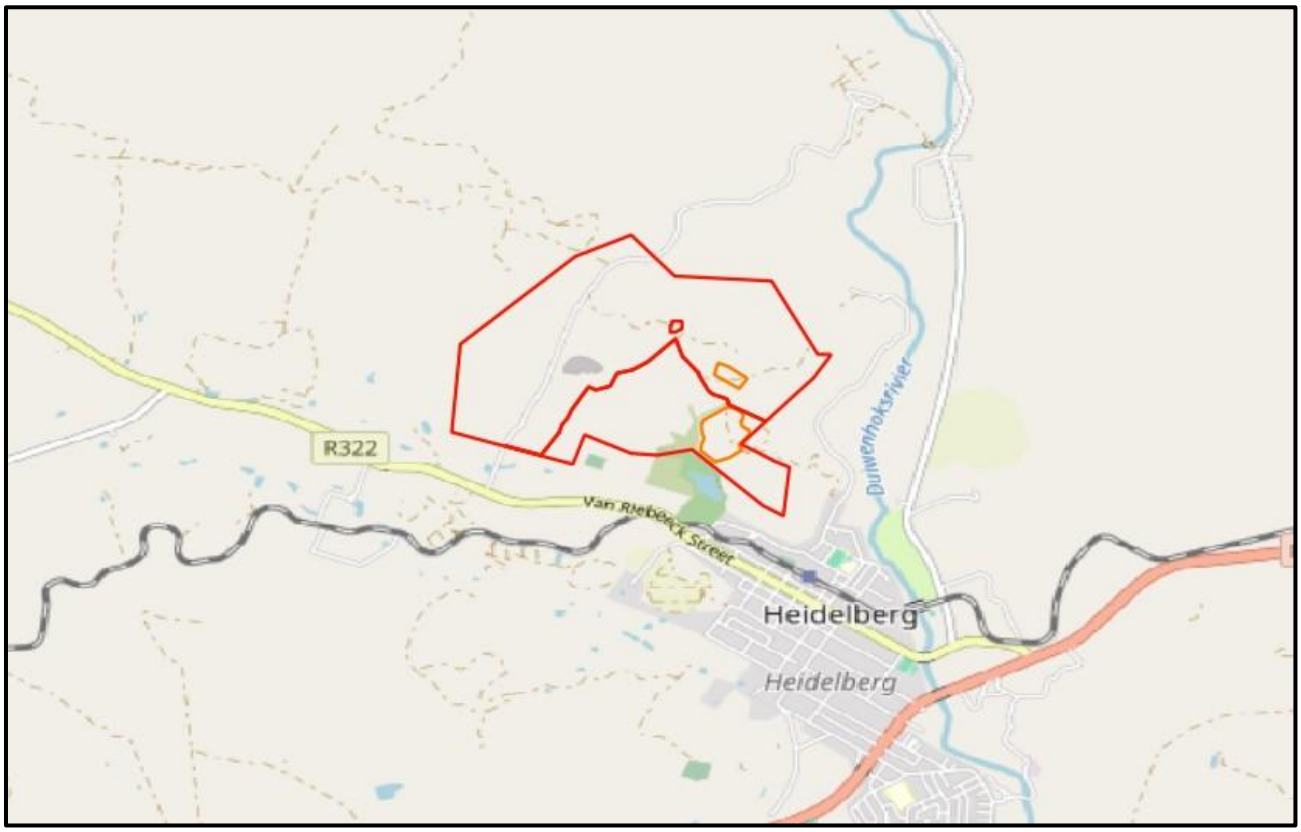


Figure 1. Locality map of the farm (red outline) *on which the mining is proposed* and the additional mining areas (orange) *northwest of* Heidelberg*.*

The main purpose of an agricultural assessment for mining is to determine whether or not the proposed mining will cause a significant, long-term reduction in agricultural production potential. This is done in Section 9 of this report. In addition, it must recommend mitigation and rehabilitation measures that will minimise any impact on agricultural production potential (Section 10). To achieve this, it is first necessary for the assessment to determine the existing agricultural production potential of the land that will be impacted, and specifically whether it is viable arable land or not (Section 7).

2 PROJECT DESCRIPTION

Mining is conducted by means of excavators, front-end loaders and 16-ton tipper trucks. The mining method comprises opencast quarrying. The topsoil and the overburden are removed and stockpiled separately along the perimeter of the quarry. As and when the bentonite is being mined, it is trucked to the Processing Plant at the head offices on Erf 1412, Heidelberg.

Overburden is mined in 20m wide and 3-4m thick benches to expose 3m of bentonite down-dip to be mined. This process is repeated until all bentonite is mined out. Through this process the quarries can reach depths of about 25-30m and no more than half of the quarry size will be open at a time.

Rehabilitation takes place on an ongoing basis as mining proceeds. As the quarry advances along strike, the overburden is progressively replaced to backfill the excavation. The backfilled area is then contoured to prevent erosion, which could be caused by rain and surface water flow. Finally, the topsoil is then spread over the disturbed surface area to restore the land to its previous state.

3 TERMS OF REFERENCE

The terms of reference for this study are to fulfill the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources*, gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998).

The terms of reference for an Agricultural Agro-Ecosystem Specialist Assessment, as copied exactly from the protocol, are listed in the table below, and included, is the place in this report where each is addressed.

Table 1. *Reporting requirements as per NEMA's Agricultural Protocol*

Number	Requirement	Where it is addressed
2.	Agricultural Agro-Ecosystem Specialist Assessment	
2.1	The assessment must be undertaken by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professionals (SACNASP).	Appendix 3
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	Figure 2
2.3	The assessment must be undertaken based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past 5 years, and must identify:	Section 4 and 7

2.3.1	the extent of the impact of the proposed development on the agricultural resources; and	Section 9
2.3.2	whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site, and in the event where it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural resources.	Section 9
2.4	The status quo of the site must be described, including the following aspects which must be considered as a minimum in the baseline description of the agro-ecosystem:	Section 7
2.4.1	the soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit and slope;	Section 7
2.4.2	where applicable, the vegetation composition, available water sources as well as agro-climatic information;	Section 7
2.4.3	the current productivity of the land based on production figures for all agricultural activities undertaken on the land for the past 5 years, expressed as an annual figure and broken down into production units;	Section 7
2.4.4	the current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure; and	Section 7
2.4.5	existing impacts on the site, located on a map (e.g. erosion, alien vegetation, non-agricultural infrastructure, waste, etc.).	Section 7
2.5	Assessment of impacts, including the following aspects which must be considered as a minimum in the predicted impact of the proposed development on the agro-ecosystem:	
2.5.1	change in productivity for all agricultural activities based on the figures of the past 5 years, expressed as an annual figure and broken down into production units;	Section 9
2.5.2	change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure; and	Section 9
2.5.3	any alternative development footprints within the preferred site which would be of “medium” or “low” sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification.	Section 8
2.6	The findings of the Agricultural Agro-Ecosystem Specialist Assessment must be written up in an Agricultural Agro-Ecosystem Specialist Report.	
2.7	This report must contain the findings of the agro-ecosystem specialist assessment and the following information, as a minimum:	
2.7.1	details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the	Appendix 1

	assessment including a curriculum vitae;	
2.7.2	a signed statement of independence by the specialist;	Appendix 2
2.7.3	the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 4
2.7.4	a description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant;	Section 4
2.7.5	a map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool;	Figure 7
2.7.6	an indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development;	Section 9
2.7.7	an indication of possible long term benefits that will be generated by the project in relation to the benefits of the agricultural activities on the affected land;	Section 11.3
2.7.8	additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc.;	Section 11.4
2.7.9	information on the current agricultural activities being undertaken on adjacent land parcels;	Section 7
2.7.10	an identification of any areas to be avoided, including any buffers;	Not applicable
2.7.11	a motivation must be provided if there were development footprints identified as per paragraph 2.5.3 above that were identified as having a “medium” or “low” agriculture sensitivity and that were not considered appropriate;	Not applicable
2.7.12	confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities;	Section 11.1
2.7.13	a substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development;	Section 12
2.7.14	any conditions to which this statement is subjected;	Section 12
2.7.15	where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr); and	Section 10

2.7.16	a description of the assumptions made and any uncertainties or gaps in knowledge or data.	Section 5
2.8	The findings of the Agricultural Agro-Ecosystem Specialist Assessment must be incorporated into the Basic Assessment Report or Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which are to be contained in the EMPr.	

4 METHODOLOGY OF STUDY

The assessment was based on an on-site investigation of the soils and agricultural conditions conducted on 11 September 2025. It was also informed by existing climate, soil, and agricultural potential data for the site (see references). The aim of the on-site assessment was to assess and determine the cropping potential across the site. Soils were assessed based on the investigation of auger samples in combination with existing soil exposures and indications of the surface conditions and topography. Soils were classified according to the South African soil classification system (Soil Classification Working Group, 2018).

An assessment of soils and long-term agricultural potential is in no way affected by the season in which the assessment is made, and therefore the date on which this assessment was done has no bearing on its results. The level of agricultural assessment is considered entirely adequate for an understanding of on-site agricultural production potential for the purposes of this assessment.

5 ASSUMPTIONS, UNCERTAINTIES OR GAPS IN KNOWLEDGE OR DATA

There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of this study.

6 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

This section identifies all applicable legislation and permit requirements over and above what is required in terms of NEMA. In the case of a mining right or permit application, there are no additional approvals required in terms of agriculture. Rehabilitation after disturbance to agricultural land must meet the requirements stipulated in the Conservation of Agricultural Resources Act (Act 43 of 1983 - CARA).

7 BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM

The purpose of this section is firstly to present the baseline information that controls the agricultural production potential of the site and then, most importantly, to assess that potential. Agricultural production potential, and particularly cropping potential, is one of four factors that determines the significance of an agricultural impact, together with magnitude of impact, size of footprint, and duration of impact. (see Section 9). Cropping potential also directly determines the true agricultural sensitivity of the land and therefore informs the site sensitivity verification.

All the important parameters that control the agricultural production potential of the site are presented in Table 2. Soil data are provided in Appendix 4. A map of the development site is shown in Figure 2 and photographs of site conditions are shown in Figures 3 to 6.

It is not necessary to consider climate and terrain in an assessment of the cropping potential of the site because the suitability of both for crop production is indisputable given that the area has been and is currently used extensively for successful crop production. This section therefore focuses on the on-site soil suitability.

Table 2: Parameters that control and/or describe the agricultural production potential of the site.

	Parameter	**Value**
Soil	Geology (DAFF, 2002)	Conglomerate, sandstone and mudstone of the Uitenhage Group as well as shale of the Bokkeveld Group, occasionally overlain by Tertiary silcrete.
	Land type (DAFF, 2002)	Db14

	Parameter	Value
	Description of the soils	The soils of Erf 3264 are all moderately deep (500 to 800 mm), heavy textured, dark coloured, reasonably drained Melanic soils of the Darnall 1110 and Mayo 1100 soil families that are high potential for crop production. The soils of Erf RE/1412 are very typical (for the area) shallow, medium to heavy textured residual soils on underlying weathered shale of the Glenrosa soil form. Despite their shallow depth they are suitable for the crops of the area. Although there is variation of soil form and available rooting depth within short distances, the soils are fairly uniform in terms of cropping potential and management and are worked with a standard, shallow (300 mm) depth that allows effective cropping.
	Dominant soil forms	Darnall, Mayo, Glenrosa
	Soil capability classification (out of 9) (DAFF, 2017)	2 (low-very low) to 3 (low)
	Soil limitations	Limited soil depth, high stone content (in places)
Land use	Agricultural land use in the surrounding area	Rotations of oats, wheat, canola, lucern plus irrigated vegetables and orchards
	Agricultural land use on the site	Rotations of oats, wheat, canola, lucern plus irrigated orchards under netting
General	Land capability classification (out of 15) (DAFF, 2017)	3 (low-very low) to 6 (low-moderate)
	Within Protected Agricultural Area (DALRRD, 2020)	No

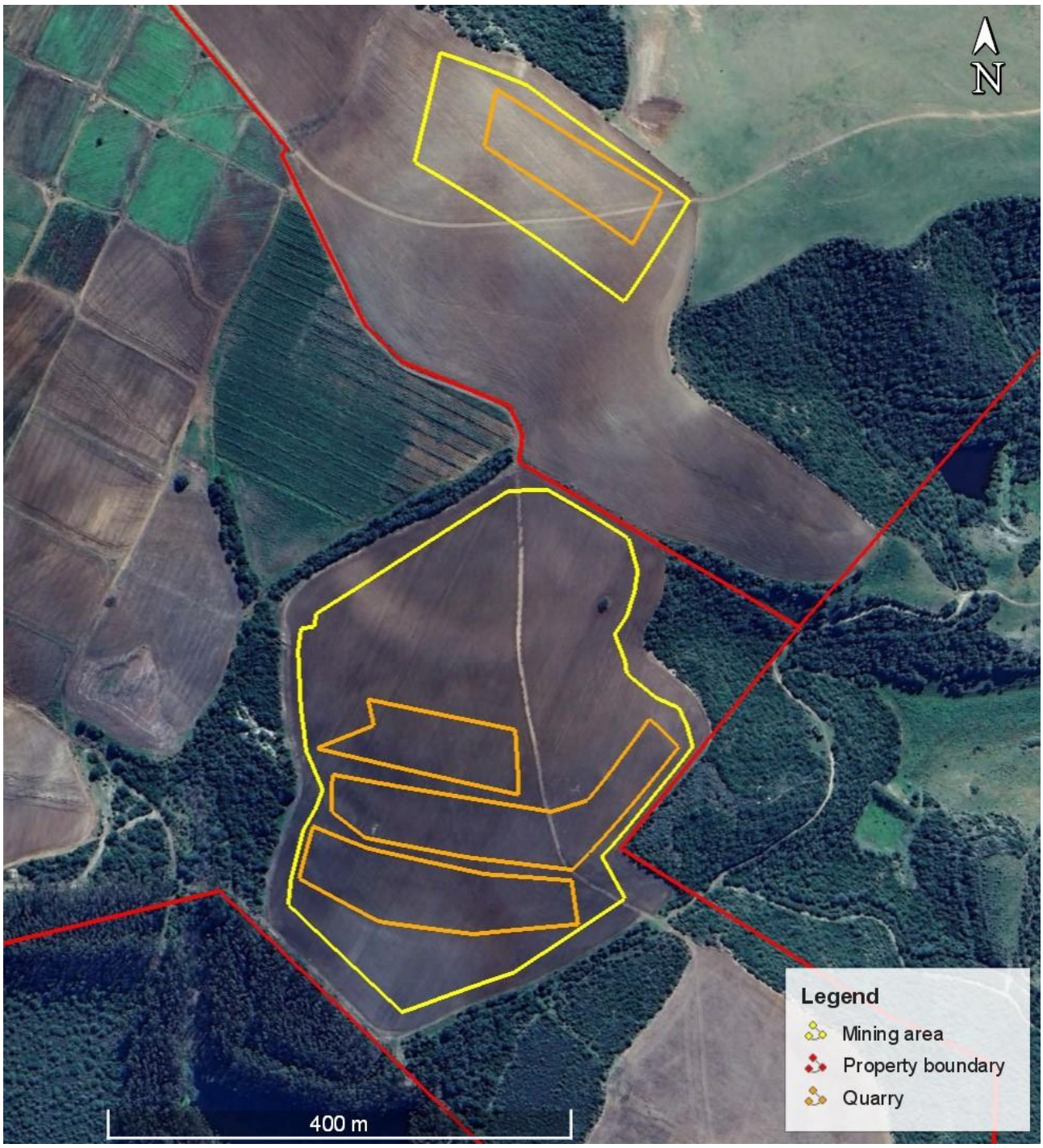


Figure 2. Satellite image map of the assessed additional mining areas.

The agricultural protocol requires the current productivity of the land based on detailed production figures and it requires the current employment figures. However, yield details are notoriously hard to get and are not considered necessary for this assessment of agricultural impact. What is relevant is simply that the site is suitable for small grain and lucern regardless of what yields have been, and the loss of the site is therefore a loss of future potential for production of these crops. Employment figures are also not important because mining will only affect a small proportion of the total farming enterprise at any one time and is therefore extremely unlikely to affect employment within that

enterprise.

There are no existing impacts on the site that are relevant to agricultural impact.

Figure 3. Typical site conditions on Erf 3264 showing the dark coloured, melanic soils.

Figure 4. Typical site conditions on Erf 3264 showing the dark coloured, melanic soils.

Figure 5. Typical site conditions on Erf RE/1412, showing the shallow, stony, Glenrosa soils.

Figure 6. Typical site conditions on Erf RE/1412, showing the shallow, stony, Glenrosa soils.

7.1 Assessment of the agricultural production potential

This assessment of the agricultural production potential of the site is based on an integration of the different parameters in Table 2 above and the on-site soil investigation.

Despite some climate and soil constraints, the site is of high enough agricultural potential to be suitable for viable, rainfed field crop production of the crops that have been grown on site and are cultivated in the surrounding area (rotations of oats, wheat, canola, and lucern plus irrigated vegetables and orchards). Erf 3264 has irrigation water and irrigation infrastructure.

8 SITE SENSITIVITY VERIFICATION

A specialist agricultural assessment is required to include a verification of the agricultural sensitivity of the development site as per the sensitivity categories used by the web-based environmental screening tool of the Department of Forestry, Fisheries and the Environment (DFFE). The screening tool's classification of sensitivity is merely an initial indication of what the sensitivity of a piece of land might be, as indicated by the only data that is available. What the screening tool attempts to indicate is whether the land is suitable for crop production (high and very high sensitivity) or unsuitable for crop production (low and medium sensitivity). To do this, the screening tool uses three independent criteria, from three independent data sets, which are all indicators of suitability for crop production but are limited and were not designed for this purpose. The three criteria are:

1. Whether the land is classified as cropland or not on the field crop boundary data set (Crop Estimates Consortium, 2019). All classified cropland is, by definition, either high or very high sensitivity.
2. Its land capability rating as per the Department of Agriculture's updated and refined, country-wide land capability mapping (DAFF, 2017). Land capability is defined as the combination of soil, climate, and terrain suitability factors for supporting rain-fed agricultural production. The direct relationship between land capability rating, agricultural sensitivity, and rain-fed cropping suitability is summarised by this author in Table 2.
3. Whether the land is classified as a protected agricultural area (PAA) or not (DALRRD, 2020). All classified PAAs are, by definition, either high or very high sensitivity.

The limitations for determining cropping suitability based on these data are as follows:

1. The field crop boundary data set used by the screening tool is very outdated.
2. Land capability mapping is fairly coarse, modelled data which is not accurate at site scale.
3. PAAs are demarcated broadly, not at a fine scale, and there is therefore much variation of cropping suitability within a PAA. All land within these demarcated areas is not necessarily of sufficient agricultural potential to be suitable for crop production, due to finer scale terrain,

soil, and other constraints, and therefore not all land within a PAA necessarily deserves to be classified as more than medium agricultural sensitivity.

These three inputs operate independently, and the screening tool's agricultural sensitivity is simply determined by whichever of these gives the highest sensitivity rating. The agricultural sensitivity of the site, as classified by the screening tool, is shown in the map below.

Table 3: *Relationship between land capability, agricultural sensitivity, and rain-fed cropping suitability.*

<table>
<tr><th rowspan="2">Land capability value</th><th rowspan="2">Agricultural sensitivity</th><th colspan="2">Rain-fed cropping suitability</th></tr>
<tr><th>Summer rainfall areas</th><th>Winter rainfall areas</th></tr>
<tr><td>1 - 5</td><td>Low</td><td rowspan="3">Unsuitable</td><td rowspan="2">Unsuitable</td></tr>
<tr><td>6</td><td rowspan="2">Medium</td></tr>
<tr><td>7</td><td rowspan="3">Suitable</td></tr>
<tr><td>8 - 10</td><td>High</td><td rowspan="2">Suitable</td></tr>
<tr><td>11 - 15</td><td>Very High</td></tr>
</table>

The true agricultural sensitivity of any land is equivalent to its actual suitability for crop production on the ground, rather than being determined by a parameter that serves as a proxy for crop suitability in a dataset, which is how the screening tool determines sensitivity. The land's suitability for cropping directly determines how important it is to conserve that land as agricultural production land. To determine suitability for crop production, and hence sensitivity, requires a site-specific assessment, which has been conducted in this assessment, rather than a reliance on data sets that have significant limitations.

Despite the detail in this section above, the determinants of agricultural sensitivity are actually very straightforward and may be summed up as follows. If land is suitable for viable crop production - that is, if it has the capability to deliver an above break-even crop yield on a sustainable basis - then it is of high or very high agricultural sensitivity. If it has limitations that prevent it from being able to deliver an above break-even crop yield on a sustainable basis, then it is of medium or low agricultural sensitivity.

Figure 7. The assessed mining areas overlaid on agricultural sensitivity, as classified by the DFFE screening tool (green = low; yellow = medium; red = high; dark red = very high).

The screening tool classifies the assessed footprint as being entirely very high agricultural sensitivity. The very high sensitivity classification by the screening tool is due to the irrigated cropping status of the land. As has been shown in the previous section, the site is suitable for rainfed crop production and parts of it have irrigation infrastructure. The mining area on Erf 3264 is verified as very high sensitivity because of its irrigated cropping potential and that on RE/1412 is verified as high sensitivity because of its rainfed cropping potential.

9 ASSESSMENT OF AGRICULTURAL IMPACT

9.1 Impact identification and assessment

As noted above, the focus of an agricultural assessment for mining is to determine whether or not the proposed mining will cause a significant, long-term reduction in agricultural production potential. There are likely to be impacts that are related to the surrounding farmers and agricultural landscape, such as visual, noise, and traffic disturbance, but such impacts are beyond the scope of an agricultural impact assessment because they do not cause a reduction in the agricultural

production potential of the land, and therefore fall into other specialist disciplines such as social or economics.

The only significant agricultural impact is likely to occur only on the mining site. There may be some dust deposition on surrounding farmland, but that can be managed so as not to cause a reduction in agricultural production potential. There will be a temporary cessation of agricultural production for the duration of mining activity on the site, but the potential impact of concern is a reduction in the long-term agricultural production potential of the site. Its significance is a direct function of the following four factors:

1. the size of the footprint of land that will have its potential decreased
2. the baseline production potential (particularly cropping potential) of that land
3. the amount by which potential is decreased
4. the length of time for which potential will be decreased.

The total size of the additional mining areas is 12.8 hectares. The baseline production potential is suitability for cropping. To assess the amount of potential decrease and the length of time it will be decreased requires further consideration of the mechanisms. A reduction in agricultural production potential results from the integrated effect of the following different mechanisms.

1. **Loss of topsoil.** Poor topsoil management during mining may result in the loss of topsoil for rehabilitation through burial, dilution with other overburden, or erosion from stockpiles. This mechanism poses the most risk in this case.
2. **Loss of topsoil fertility.** Disturbance and dilution of topsoil can cause loss of fertility as a result of reduced organic carbon and biological activity.
3. **Reduction in soil depth.** This is not likely in this case because the material is mined from well below the useable soil depth and so the existing soil depth is likely to be retained.
4. **Impaired soil drainage.** This is not likely in this case because the surface level is not significantly lowered and there are good slopes that will facilitate natural drainage.
5. **Erosion.** Can be effectively managed.
6. **The creation of steep slopes and uneven surfaces.** Can be effectively managed.
7. **Alien vegetation encroachment.** Can be effectively managed.
8. **Soil contamination from fuel spills.** Can be effectively managed.

All of these mechanisms can be mitigated and managed so that the land is rehabilitated to its pre-mining agricultural potential (see Section 10). However, this is only possible if a high degree of rehabilitation management is applied throughout the mining and rehabilitation processes. There is a risk that the rehabilitation falls short of this standard, with the result that the long-term agricultural potential of the land is compromised. For this reason, conditions relating to rehabilitation are recommended to be included as part of the environmental authorisation (see Section 12).

With effectively implemented rehabilitation, the overall negative agricultural impact of the development (loss of future agricultural production potential), taking all of the above discussion into account, is assessed here as being of low significance and as acceptable. However, with poorly implemented rehabilitation, the overall negative agricultural impact of the development is assessed here as being of high significance.

Although there is likely to be some reduction in yields from the rehabilitated land in the first few seasons after rehabilitation due to reduced biological activity in the topsoil, yields are likely to be restored within approximately four years.

9.2 Cumulative impact assessment

Specialist assessments for environmental authorisation are required to include an assessment of cumulative impacts. The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present, or reasonably foreseeable future activities that will affect the same environment.

Agricultural land throughout South Africa is under inevitable pressure from various non-agricultural land uses, including mining and urban expansion. The potential cumulative agricultural impact of importance is a regional loss of future agricultural production potential. This cumulative impact is significant. However, provided that rehabilitation is effectively implemented, the assessed development will not contribute to the cumulative impact. The cumulative agricultural impact of the proposed development with effective rehabilitation is therefore assessed here as being of low significance and therefore as acceptable.

9.3 Losses in agricultural production and employment

The agricultural protocol requires an indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development. For the duration of mining activity on each mining area, all agricultural production from that land will be lost. It is almost impossible to quantify a potential reduction in production for the first few years after rehabilitation. A rough estimate is a 10 to 40% reduction in year 1 which will decrease to zero within 4 years.

The expected losses in employment are zero because the active mining area at any one time represents a small proportion of the total farming enterprise and is financially compensated and is therefore highly unlikely to affect employment within that enterprise.

10 RECOMMENDED MITIGATION AND REHABILITATION PLAN

A very important factor affecting the success of rehabilitation, and consequently the significance of direct impacts, is the level of care that is taken to rehabilitate effectively. This is dependent on the level of environmental management of all mining activities that can impact on rehabilitation, both during the mining process and during the rehabilitation phase.

The following is the sequence of recommended rehabilitation steps:

1. Prevent dust by means of damping down surfaces when required.
2. Prevent erosion by means of temporary banks and ditches that will direct run-off water. Any occurrences of erosion must be attended to immediately and the erosion control at that point must be amended to prevent further erosion from occurring there.
3. Because of the challenge of the very thin topsoil that naturally occurs in the area, double stripping is essential. The thin topsoil gets easily diluted and contaminated by the underlying subsoil, during the mining and stockpiling process. Any lack of topsoil at the surface after rehabilitation is a serious problem that will have a significant, on-going, detrimental effect on crop performance. Topsoil must be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.
4. Double stripping is a rehabilitation technique that is recommended by the Chamber of Mines. It involves stripping a layer of topsoil, and then a second additional layer below the topsoil. These two layers are stockpiled separately and during rehabilitation are spread separately on the surface in their original sequence. In other words, the subsoil layer is spread immediately on top of the profiled overburden, and the topsoil layer is then spread on top of that. The recommended stripping depths on Erf 3264 are 40cm for the topsoil and then a further 35cm for the subsoil. The recommended stripping depths on Erf RE1412 are 20cm for the topsoil and then a further 35 cm for the subsoil. All overburden is stripped and stockpiled separately from both the topsoil and subsoil stockpiles.
5. Topsoil stockpiles should be protected against losses by water and wind erosion. Stockpiles should be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants on the stockpiles will help to prevent erosion. Stockpiles should be no more than 2 metres high.
6. Overburden must be backfilled into the mined-out pit.
7. After mining and backfilling of overburden, any steep slopes must be reduced to a minimum and profiled to blend with the surrounding topography. A slope, even if minimal, must be ensured across all rehabilitated quarry areas so that they are naturally free draining.
8. The stockpiled subsoil must then be evenly spread and smoothed across the backfilled overburden. The depth should be monitored during spreading to ensure that coverage is even.
9. Thereafter, the stockpiled topsoil must be evenly spread and smoothed across the subsoil.

The depth should be monitored during spreading to ensure that coverage is even.

10. Any parts of the existing contour bank system that has been disturbed must be re-established to the same specifications (height, slope, distance apart) as prior to disturbance, and the integrity of the entire system must be returned to full functionality.
11. Soil sampling and chemical correction should be done following the re-spreading of the topsoil. Combined, representative samples should be taken from across the site to a depth of 20cm. Soil chemical deficiencies must be corrected, based on these samples. A chemical analysis from an agricultural laboratory will include a recommendation of the appropriate quantities of chemical ameliorants (for example lime, phosphate etc) that should be applied to optimize the soil chemistry for the relevant crop. Pre-mining soil chemistry is not important. What is important is to ensure that the rehabilitated soil is optimized to within the norms for the relevant crop.
12. Sow a crop in the first season of the rehabilitated soil that is a hardy, annual crop that is sown primarily for soil stabilisation and biomass and not necessarily for economic production (eg korog). It should be dosed with a high level of nitrogen (N), phosphorus (P) and potassium (K) fertilser in order to maximise vegetative growth and therefore biomass production (both above and below ground). High nitrogen will encourage high biomass production. The amount of required fertilser will therefore be a higher level of fertilisation than would be determined for economic viability in terms of input costs versus production. The increased fertilisation costs should therefore be borne by the mine's rehabilitation budget, and not by the farmer.
13. **Monitoring:** it is impossible, by way of a soil analysis, to evaluate, with any degree of certainty, whether a significantly disturbed soil will support crop growth or not. The final proof of effective rehabilitation must always be in the reaction of the crop that is planted on the rehabilitated soil. If the crop grows adequately, then the soil is effectively rehabilitated. If it does not, then the soil is not effectively rehabilitated. The best way to test this is to sow a crop across the boundary between the rehabilitated land and the undisturbed soil. The reaction of the crop will very obviously demonstrate a problem and a difference, if there is one.

11 ADDITIONAL ASPECTS REQUIRED IN AN AGRICULTURAL ASSESSMENT

11.1 Micro siting

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. Due to the dependency of the mining activities on the location of the ore body, micro-siting is not considered relevant in this case.

11.2 Confirmation of linear activity exclusion

If linear infrastructure that is located on land of high agricultural sensitivity has been given exclusion from requiring an Agricultural Agro-Ecosystem Specialist Assessment because of its linear nature, and therefore only requires an Agricultural Compliance Statement, the protocol requires confirmation that the land impacted by that linear infrastructure can be returned to the current state within two years of completion of the construction phase. No such exclusion applies because this project does require an Agricultural Agro-Ecosystem Specialist Assessment, anyway, due to non-linear infrastructure on land of high agricultural sensitivity.

11.3 Long term benefits versus agricultural benefits

The development will generate income and provide employment and bentonite and zeolite products. The farmer will be compensated for the loss of production for the time that the land is kept out of production by mining.

It is outside of the scope and expertise of an agricultural assessment to determine the value of the potential benefits that the proposed development will provide to the area in order to be able to compare them to the value of the agricultural production. That assessment is applicable to the social and economic specialist assessment for the development.

11.4 Additional environmental impacts

There are no additional environmental impacts of the proposed development that are relevant to this agricultural assessment.

12 CONCLUSION

Despite some climate and soil constraints (limited rainfall and shallow soils), the site is of high enough agricultural potential to be suitable for viable, rainfed field crop and irrigated crop production of the crops that have been grown on site and are cultivated in the surrounding area (rotations of oats, wheat, canola, and lucern plus irrigated vegetables and orchards).

The screening tool classifies the assessed footprint as being entirely very high agricultural sensitivity. The very high sensitivity classification by the screening tool is due to irrigated crop status. This assessment confirms the very high agricultural sensitivity classification of the mining areas on Erf 3264 by the screening tool. It disputes the very high agricultural sensitivity classification of the mining areas on Erf RE1412 by the screening tool and verifies that site as being of high agricultural sensitivity because of its assessed cropping potential.

The focus of an agricultural assessment for mining is to determine whether or not the proposed mining will cause a significant, long-term reduction in agricultural production potential. A reduction in agricultural production potential results from the integrated effect of a number of different mechanisms, the most important of which, on this site, is loss of topsoil.

All of these mechanisms can be mitigated and managed so that the land is rehabilitated to its pre-mining agricultural potential. However, this is only possible if a high degree of rehabilitation management is applied throughout the mining and rehabilitation processes. There is a risk that the rehabilitation falls short of this standard, with the result that the long-term agricultural potential of the land is compromised.

The total size of the additional mining areas is 12.8 hectares. The baseline production potential is suitability for cropping. The amount of potential decrease is estimated at a 10 to 40% reduction in year 1 which will decrease to zero within 4 years, provided that rehabilitation is effectively implemented.

Detailed recommendations for soil rehabilitation are provided. Ensuring a surface cover of topsoil is by far the most critical step of successful soil rehabilitation. Because of the challenge of the very thin topsoil that naturally occurs on site, double stripping is essential for effective rehabilitation.

With effectively implemented rehabilitation, the overall negative agricultural impact of the development (loss of future agricultural production potential) is assessed as being of low significance and as acceptable. However, with poorly implemented rehabilitation, the overall negative agricultural impact of the development is assessed as being of high significance.

The conclusion of this assessment on the acceptability of the proposed development is therefore

subject to the following conditions:

Mine management must be held accountable for well managed and effective implementation of all the recommended rehabilitation steps above. The specific, measurable rehabilitation outcomes against which the effectiveness of completed rehabilitation must be measured are:

1. that the topography and surface have been smoothed sufficiently to allow cultivation;
2. that topsoil has been spread on the surface across all areas from which topsoil was stripped, to a minimum depth of 40 cm on Erf 3264 and 20 cm on Erf RE1412;
3. That no saline material from depth within the mining excavation occurs at less than 50 cm depth in the rehabilitated soil profile. Correctly and well implemented double stripping, as recommended in the Agricultural Statement, will ensure this.
4. that the entire disturbed area is free draining and that no ponding of water at the surface occurs.
5. That the pre-mining contour banks have been re-established to suitable specifications (height, slope, distance apart) at least as intensive as prior to disturbance, and that the integrity of the contour bank system as a whole is in place.
6. That there is no visible erosion across the area, or down-slope of it as a result of mining, and that no part of the area has been left unacceptably vulnerable to erosion.
7. That the soil chemistry, including pH, salinity, and phosphorus levels have been optimised for small grain production.
8. That a cover crop has been established, provided with a high level of nitrogen fertilisation, and grows successfully across the entire area disturbed by mining activities and that it shows no significant difference in performance when sown across the boundary between disturbed and undisturbed land.

13 REFERENCES

Crop Estimates Consortium, 2019. Field Crop Boundary data layer, 2019. Pretoria. Department of Agriculture, Forestry and Fisheries.

Department of Agriculture, Forestry and Fisheries (DAFF). 2017. National land capability evaluation raster data layer, 2017. Pretoria.

Department of Agriculture, Forestry and Fisheries (DAFF). 2002. National land type inventories data set. Pretoria.

Department of Agriculture, Land Reform and Rural Development (DALRRD). 2020. Protected agricultural areas – Spatial data layer. 2020. Pretoria.

Soil Classification Working Group. 2018. Soil Classification: A Natural and Anthropogenic System for South Africa. ARC-Institute for Soil, Climate and Water, Pretoria.

APPENDIX 1: SPECIALIST CURRICULUM VITAE

Johann Lanz
Curriculum Vitae

Education

M.Sc. (Environmental Geochemistry)	University of Cape Town	1996 - 1997
B.Sc. Agriculture (Soil Science, Chemistry)	University of Stellenbosch	1992 - 1995
BA (English, Environmental & Geographical Science)	University of Cape Town	1989 - 1991
Matric Exemption	Wynberg Boy's High School	1983

Professional work experience

I have been registered as a Professional Natural Scientist (Pri.Sci.Nat.) in the field of soil science since 2012 (registration number 400268/12) and am a member of the Soil Science Society of South Africa.

Soil & Agricultural Consulting **Self employed** **2002 - present**

Within the 23 years of running my soil and agricultural consulting business, I have completed more than 1000 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, electrical grid infrastructure, urban, and agricultural developments. I was the appointed agricultural specialist for the nation-wide SEAs for wind and solar PV developments, electrical grid infrastructure, and gas pipelines. My regular clients include: Zutari; CSIR; SiVEST; SLR; WSP; SRK; Environamics; Royal Haskoning DHV; ABO; Enertrag; WKN-Windcurrent; JG Afrika; Mainstream; Redcap; G7; Mulilo; and Tiptrans. Agricultural clients for soil resource evaluations and mapping include Cederberg Wines; Western Cape Department of Agriculture; Vogelfontein Citrus; De Grendel Estate; Zewenwacht Wine Estate; and Goedgedacht Olives.
In 2018 I completed a ground-breaking case study that measured the agricultural impact of existing wind farms in the Eastern Cape.

Soil Science Consultant **Agricultural Consultors International (Tinie du Preez)** **1998 - 2001**

Responsible for providing all aspects of a soil science technical consulting service directly to clients in the wine, fruit and environmental industries all over South Africa, and in Chile, South America.

Contracting Soil Scientist **De Beers Namaqualand Mines** **July 1997 - Jan 1998**

Completed a contract to advise soil rehabilitation and re-vegetation of mined areas.

Publications

- Lanz, J. 2012. Soil health: sustaining Stellenbosch's roots. In: M Swilling, B Sebitosi & R Loots (eds). *Sustainable Stellenbosch: opening dialogues*. Stellenbosch: SunMedia.
- Lanz, J. 2010. Soil health indicators: physical and chemical. *South African Fruit Journal*, April / May 2010 issue.
- Lanz, J. 2009. Soil health constraints. *South African Fruit Journal*, August / September 2009 issue.
- Lanz, J. 2009. Soil carbon research. *AgriProbe*, Department of Agriculture.
- Lanz, J. 2005. Special Report: Soils and wine quality. *Wineland Magazine.*

I am a reviewing scientist for the *South African Journal of Plant and Soil*.

forestry, fisheries
& the environment
Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Private Bag X447, Pretoria, 0001, Environment House, 473 Steve Biko Road, Pretoria, 0002 Tel: +27 12 399 9000, Fax: +27 86 625 1042

APPENDIX 2: SPECIALIST DECLARATION FORM

Specialist Declaration form for assessments undertaken for application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

REPORT TITLE: AGRICULTURAL AGRO-ECOSYSTEM SPECIALIST ASSESSMENT FOR A SECTION 102 MINING RIGHT AMENDMENT APPLICATION FOR ADDITIONAL MINING REAS ON ERF RE/1412 AND ERF 3264, HEIDELBERG

Kindly note the following:

1. This form must always be used for assessment that are in support of applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting, where this Department is the Competent Authority.
2. This form is current as of August 2023. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.dffe.gov.za/documents/forms.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with '*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 act, when applying for environmental authorisation - GN 320/2020)'*, where applicable.

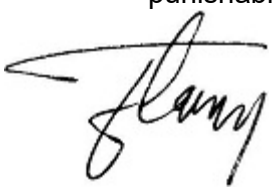
1. SPECIALIST INFORMATION

Title of Specialist Assessment	Agricultural Assessment
Specialist Company Name	SoilZA (sole proprietor)
Specialist Name	Johann Lanz
Specialist Identity Number	6607045174089
Specialist Qualifications:	M.Sc. (Environmental Geochemistry)
Professional affiliation/registration:	Registered Professional Natural Scientist (Pr.Sci.Nat.) Reg. no. 400268/12 Member of the Soil Science Society of South Africa
Physical address:	2 Roeland Terrace, CAPE TOWN, 8001
Postal address:	Postnet Suite #500, Private Bag X16 Constantia, 7848
Telephone	Not applicable
Cell phone	+27 82 927 9018
E-mail	johann@soilza.co.za

2. DECLARATION BY THE SPECIALIST

I, **Johann Lanz** declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements 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 (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I 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;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.



Signature of the Specialist

SoilZA (sole proprietor)

Name of Company:

8 September 2025

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Johann Lanz**, swear under oath that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

SoilZA – sole proprietor

Name of Company

8/9/2025

Date

Signature of the Commissioner of Oaths

08/09/2025

Date

I certify that the DEPONENT has acknowledged that he/she knows and understands the content of this affidavit; that he/she does not have any objection to taking the oath, and that he/she considers it to be binding on his/ her conscience, and which was sworn to and signed before me at CONSTANTIA on this 08 day of SEPT 2025 and that the administering oath complied with the regulations contained in Government Gazette No R1258 of 21 July 1972, as amended.

COLIN POULTNEY
COMMISSIONER OF OATHS
BY APPOINTMENT – REPUBLIC OF SA
POSTNET CONSTANTIA, SHOP 6, OLD VILLAGE S/C,
MAIN ROAD, CONSTANTIA, 7806
TEL: 021 794 0447

APPENDIX 3: SACNASP REGISTRATION CERTIFICATE

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Johan Lanz

Registration Number: 400268/12

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Soil Science (Professional Natural Scientist)

Effective **15 August 2012** Expires **31 March 2026**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

APPENDIX 4: SOIL DATA

Land type	Soil series (forms)	Depth (mm)			Clay % A horizon			Clay % B horizon			Depth limiting layer	% of land type
Db14	T											25,0
Db14	Va	200	-	350	6	-	15	0	>	40	vp	16,9
Db14	Ss	200	-	350	6	-	15	0	>	40	pr	11,8
Db14	Ms	0	<	100	6	-	15				si	11,3
Db14	Es	250	-	400	6	-	15	0	>	40	pr	10,6
Db14	Va	200	-	350	6	-	15	0	>	40	vp	7,3
Db14	R											4,4
Db14	Ms	0	<	100	6	-	15				hp	3,8
Db14	Oa	0	>	1000	6	-	15	15	-	35	U	3,0
Db14	Es	250	-	400	6	-	15	0	>	40	pr	2,5
Db14	Du		>	1000	6	-	15				U	1,2
Db14	We	200	-	300	6	-	15	15	-	35	sp	0,9
Db14	Sw	200	-	350	15	-	20	35	>	55	vp,so	0,9
Db14	Gs	200	-	300	6	-	15	20	-	30	so,R	0,7