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WATER USE LICENSE APPLICATION

FOR THE

PROPOSED DUST SUPPRESSION, DEWATERING OF THE QUARRY AND WIDENING OF A BRIDGE AT GRAN SASSO QUARRY, MILNERTON, WESTERN CAPE

WULA TECHNICAL REPORT

December 2020

Prepared by:
Author: Marita Burger
Reviewer: Debbie Fordham
Sharples Environmental Services cc
Tel: 044 873 4923
Ref: WUL/GS/TR/07/20

Prepared for:
Inkokeli Trading (Pty) Ltd
2A Contermanskloof Road
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PROJECT DETAILS

e-WULAAS Project Title	Activities proposed at Gran Sasso Quarry
DWS Reference no.	WU14861
SES Reference no.	39
Consultancy	Sharples Environmental Services cc (SES) Address: 102 Merriman Street George, 6530 Tel: 044 874 5953 Fax: 086 575 2869
Primary Author	Marita Burger
Expertise	Marita is an environmental consultant and responsible for the water use applications at SES. Her highest qualification is a B.Sc. Hons degree in Environmental Science from the North West University. She joined the SES team in February 2019 and has since undertaken numerous WULA's and GA's and contributed to various aquatic specialist reports.
Reviewer	Debbie Fordham
Expertise	Debbie is a qualified aquatic ecologist and environmental scientist. Debbie holds a BA (Environmental Science and Geography), BA (Hons) and M.Sc in Environmental Science from Rhodes University. She was awarded her Master of Science degree, by thesis, in Wetland Science, entitled: The origin and evolution of the Tierkloof Wetland, a peatland dominated by *Prionium serratum* in the Western Cape. She has specialised in aquatic habitat assessment and has produced numerous aquatic habitat impact assessment reports. She is well established in her specialist field and has worked in various provinces within South Africa.
Applicant	Inkokeli Trading (Pty) Ltd Address: 2A Contermanskloof Road Potsdam Cape Town 7441 Tel: 021 557 1111
Contact Person	Mr Anthony Ciolli Email: tony@ciollibros.co.za
Decision making Authority	Department of Water and Sanitation

CHECKLIST

The table below contains a checklist of all the documents and forms submitted with this water use licence application. This includes all the documents and forms uploaded to e-WULAAS during different phases of the application process, as well as the technical documentation requested in the letter received from the Department of Water and Sanitation dated 28 July 2020. This checklist is in accordance with the Annexures to the Water Use Licence Application and Appeals Regulations, 2017.

Application checklist

Description	Submitted	Contained in	Official Use	
			Yes	No
Power of Attorney to apply on behalf of the applicant	✓	Annexure A		
Company Registration certificate	✓	Annexure A		
Title Deed	✓	Annexure A		
Proof of pre-application site visit	✓	Annexure B		
DW758: Applicant information form – Company, Partnership, Government	✓	e-WULAAS		
DW763 Section 21 (c)	✓	e-WULAAS		
DW766 Section 21 (f)	✓	e-WULAAS		
DW767 Section 21 (g)	✓	e-WULAAS		
DW768 Section 21 (i)	✓	e-WULAAS		
DW905 Supplementary form	✓	e-WULAAS		
DW901 Details of property where water use occurs	✓	e-WULAAS		
DW902 Details of property owner	✓	e-WULAAS		
Design layout in relation to the watercourse	✓	Annexure C		
Environmental Management Plan Report	✓	Annexure D		
Freshwater Report and completed Risk Assessment Matrix	✓	Annexure E		
Geohydrological & Hydrological report	✓	Annexure F		
Public Participation Advert Notice	✓	Annexure G		
Water Quality Report (Groundwater and Surface Water)	✓	Annexure H		
Water Use Licence Application Water Resource Report	✓	This report		

EXECUTIVE SUMMARY

Sharples Environmental Services cc (SES) has been appointed by *Inkokeli Trading* (Pty) Ltd to conduct a Water Use Licence Application (WULA) for the proposed activities at the Gran Sasso Quarry on the Remainder of Farm 1474 near Milnerton, Cape Town. The proposed activities include widening of an existing bridge, dewatering of the mined-out quarry area and using this water for dust suppression and Redimix production. The application also includes storing the water from the pit. If there is excess water that cannot be stored or re-used immediately, it will be discharged into a nearby watercourse through a vegetated channel. The activities require authorisation in terms of Section 21 (c), (f), (g) and (i) of the NWA (Act 36 of 1998).

An aquatic biodiversity impact assessment and geohydrological specialist impact assessment were undertaken to inform the application. The aquatic habitat study determined that that the unchanneled valley bottom wetland that flows through the property is the only watercourse that will be impacted upon by the project. The wetland HGM unit was therefore assessed further as UCVB 1. It is a small tributary to the Diep River wetland system to the west. It is seasonally inundated and dominated by depositional processes. The wetland has been subjected to significant modifications due to catchment land cover changes and direct habitat destruction from infilling and excavation. The UCVB1 wetland obtained an overall 'E' PES category under WET-Health assessment indicating that the change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognisable. The wetland buffers the impacts of the substantial amount of ongoing soil disturbance within the catchment as well as the nutrients used for cultivation. It obtained high functional importance scores for sediment trapping, phosphate trapping, nitrate and toxicant removal. The wetland obtained a 'High' EIS Score due to its functional and hydrological importance values. Although small, the wetland reduces the severity of floods downstream, sustains streamflow during low flow periods, traps sediment carried by runoff, and removes nutrients and toxicants (thereby enhancing water quality). This was evident in the water quality results which showed a huge decrease in Nitrogen levels downstream.

The following impacts associated with the project were identified by the aquatic specialist in the freshwater report:

- Disturbance and loss of freshwater habitat
- Sedimentation and erosion
- Modified flow regime
- Water quality changes

Within the aquatic biodiversity assessment, all of the water use activities proposed by the applicant obtained a Low risk rating, excepting the discharging of pit water, which is of Medium risk level. The risk assessment assumes that a high level of mitigation is implemented, and the risk rating is calculated post-mitigation. The modifications to soils and water characteristics are not completely avoidable but can be mitigated to acceptable levels of disturbance. For example, it is recommended that the discharge pit water is treated prior to entering the wetland to ensure that it complies with the General Limits and does not

significantly alter the water chemistry of the wetland. This can potentially be achieved by a catch-pit and filter strip. It is important for the bridge design to allow for unhindered longitudinal flow through the structure and erosion protection downslope with energy dissipaters such as reno mattressing/ dense baffles. It must, as far as possible, promote diffuse flow patterns. Cement must not be allowed to enter the water. The monitoring of the activities is essential to ensure the mitigation measures are implemented. Monitoring should especially focus on preventing water pollution, erosion and sedimentation. Long-term data must be accumulated and regularly analysed for compliance and future management.

The geohydrological assessment was conducted by GEOSS on the Gran Sasso Quarry to assess what the potential impact of proposed activities (listed within the WULA) will have on the groundwater of the area. It was determined that the site overlies a fractured aquifer which is made up of low permeable phyllite, greywacke and quartzitic sandstone from the Tygerberg Formation. Therefore, the infiltration rate and transmissivity within this fractured system is regarded as low. The groundwater quality based on regional data sets and onsite data is very poor resulting in very limited groundwater use in the surrounding area. Given the low to medium vulnerability of the aquifer, together with the above-mentioned factors, the risk of potential contamination due to the proposed activities in the WULA to the fractured aquifer is considered to be low.

A public participation process was also undertaken to inform the DWS decision-making. An I &AP database was compiled, which identified affected adjacent landowners, authorities, organs of state and other affected. These I&APs and the general public were then notified accordingly and provided a commenting period of more than 60 days. The following public participation has been conducted:

- Notifications via email notification, direct telephonic calls and site notices.
- Notice board fixed at the appropriate visible location.
- Written notice via emails to affected adjacent landowners, and other affected parties. Identified neighbouring I&AP's.
- The technical report and annexures were made available on the SES website, and are still available, and provided on request through bulk sharing sites such as WeTransfer.

No comments were received during the PPP process. None of the I&AP's raised any concerns regarding the water use licensing application for activities associated with Gran Sasso Quarry. There is no anticipated disturbance to any other water users.

The quarry has a positive socio-economic impact since it provides job security to numerous HDI employees. The application will not affect the amount of water available to users downstream since the water being extracted is not from a river or stream but from an enclosed quarry pit (surface runoff water). Without this water the quarry and Redimix company would have to find an alternative source in an extremely water scarce area. The use of the water from the quarry pit is in the people's best interest as the application will allow the quarry to operate legally, ensuring job security. The quarry contributes positively to the economy by providing locally sourced aggregate for developments. The authorisation of these water uses will allow for the Gran Sasso Mine to continue to operate. It will benefit the

South African economy and job security for employees. Substantial investments have already been made into this activity.

Therefore, it is recommended that the DWS authorise the water use activities of this application, under the conditions recommended by the specialists and those within this report.

The technical report provides all of the required technical information for the Department of Water and Sanitation to reach a decision. The information has been submitted to the DWS case officer via email and will be uploaded onto the e-WULAAS online portal.

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1 INTRODUCTION

Sharples Environmental Services cc (SES) has been appointed by *Inkokeli Trading (Pty) Ltd* to conduct a Water Use Licence Application for the proposed activities at the Gran Sasso Quarry on the Remainder of Farm 1474 near Milnerton, Cape Town. The proposed activities include widening of an existing bridge, dewatering of the mined-out quarry area and using this water for dust suppression and Redimix production. The application also includes storing the water from the pit. If there is excess water that cannot be stored or re-used immediately, it will be discharged into a nearby watercourse through a vegetated channel. The report is compiled in accordance with the National Water Act (Act No. 36 of 1998) and the *Regulations regarding the procedural requirements for water use licence applications and appeals* of 2017. Annexures referred to throughout this report are uploaded on the e-WULAAS system under the corresponding titles and not attached directly to the electronic copy of this document due to size constraints.

1.1 Purpose of this report

This report was compiled to inform the Department of Water and Sanitation's decision regarding whether to authorise the water use activities. It is the responsibility of the authorities to manage water resources in order to achieve sustainable use of water to the benefit of the South African public.

1.2 Project location

Gran Sasso Quarry is located northeast of the City of Cape Town, approximately 26 km by road from the Cape Town Harbour. The site is just of the N7 national road and inland of the town of Bloubergstrand (Figure 1). The quarry is mainly surrounded by agricultural land but is also close to urban development such as the Killarney Gardens Industrial Area and Dunoon settlement (Figure 2).

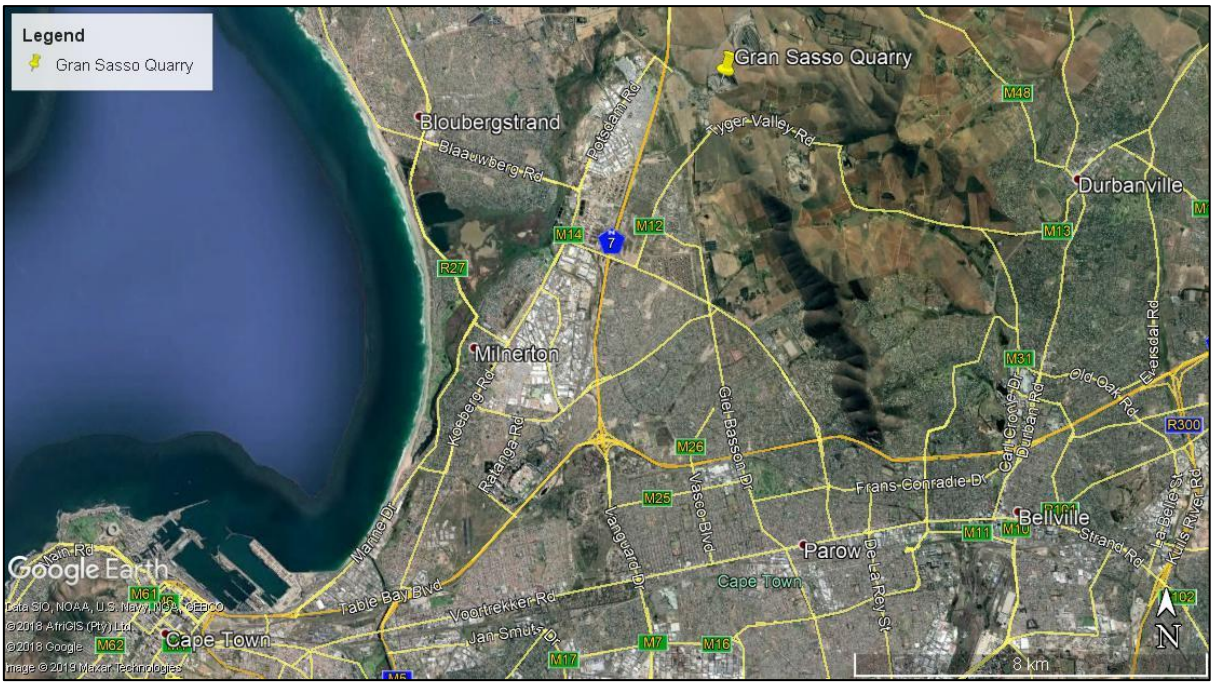

Figure 1: The location of the study area in relation to Bloubergstrand and the City of Cape Town.

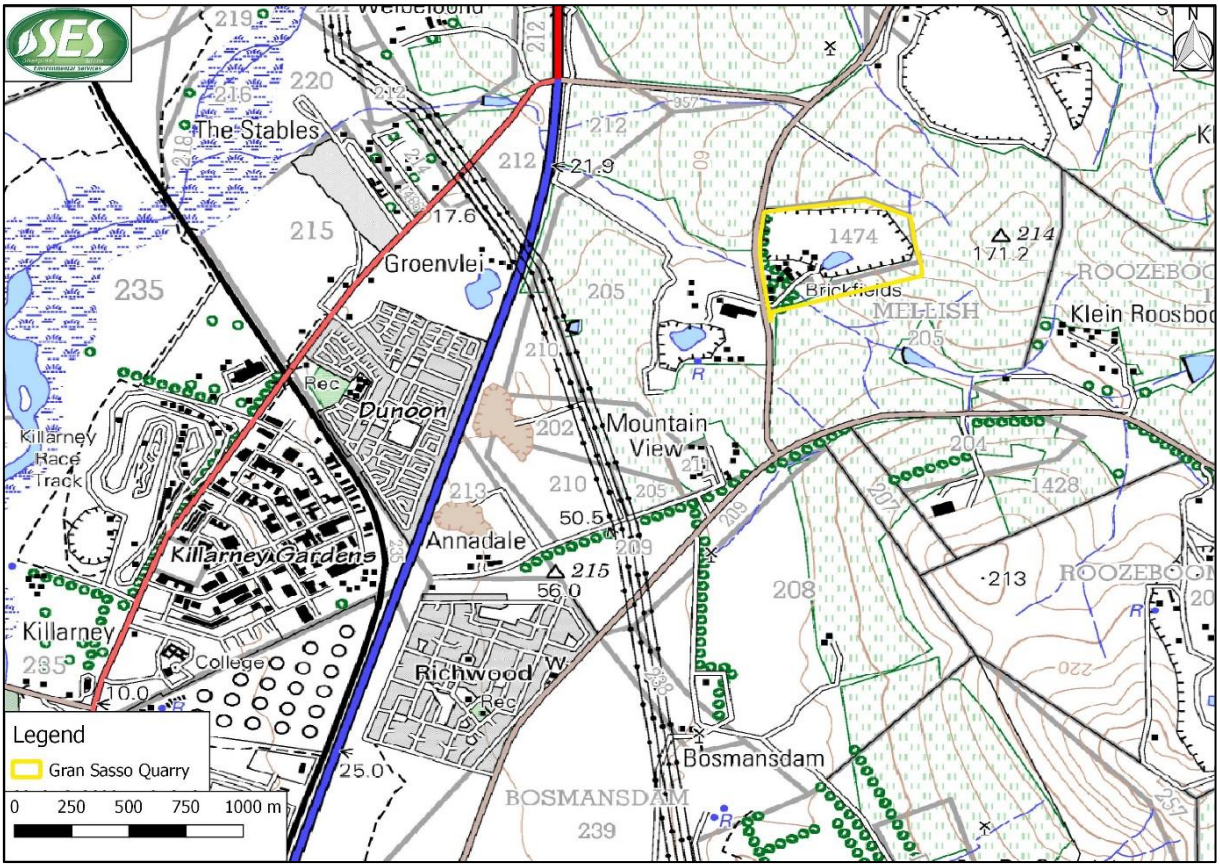

Figure 2: Cadastral map showing the location of Gran Sasso Quarry.

1.3 Applicant

The details of the applicant are as follows:

Table 1: Applicant details

Type	Company
Name	Inkokeli Trading (Pty) Ltd
Company Registration Number	2004/033810/07
Address	2A Contermanskloof Road Potsdam, Cape Town, 7441
Applicant Contact Person	Mr Anthony Ciolli Email: tony@ciolli.co.za Tel: 082 482 6248

1.4 Property

The proposed activities will occur on one property, the Remainder of Farm 1474.

Table 2: Property where water use activities occur

Property	Surveyor General Cadastral Code	Title Deed Number	Deeds Office	Registration division	Property owner	Quaternary catchment
Remainder of Farm 1474	C016000000001 47400000	T68395/ 2006	Cape Town	Cape	Tygervalley Hills Development	G21F

1.5 Water Uses

The activities associated with the proposed development requires authorisation in terms of Section 21 (c), (f), (g) and (i) of the NWA (Act 36 of 1998). See Figure 3 above for the location of water use activities.

Table 3: Activities associated with the respective water uses

Water Uses as per the NWA	Project Activity	Property
Section 21 (c): Impeding or diverting the flow of water in a watercourse & Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse	Widening of an existing bridge over a watercourse next to the quarry	Remainder of Farm 1471
Section 21 (f): Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit	Discharging water from the quarry pit into the nearby watercourse. This activity is unlikely to occur as water will be re-used. This water use is applied for as pre-caution, should a heavy rainfall event occur.	Remainder of Farm 1471
Section 21 (g): Disposing of waste in a manner which may detrimentally impact on a water resource	Re-use of water from the quarry pit for dust suppression and redimix production	Remainder of Farm 1471

1.6 WULA Process

The application follows the online e-WULAAS process as required by Regulation 3 (5) of the 2017 *Regulations regarding the procedural requirements for water use licence applications and appeals*. A pre-application enquiry was submitted on 6 September 2019. Following this, a pre-application site visit was conducted on 11 October 2019 to obtain advice from DWS regarding the water uses applicable to the proposed activities at the quarry. The site visit was attended by representatives of Inkokeli Trading, Sharples Environmental Services and the DWS. The meeting register is attached in Annexure B.

The application was advanced to Phase 1 of the WUL process on 13 February 2020 and this phase was submitted by SES on. Phase 2 was not required since the site visit was conducted during the pre-application phase. A letter stating the Technical information requirements was received on 28 July 2020 and Phase 3 was opened simultaneously. This document forms part of the Technical information/documentation to be submitted in this final application phase before the start of assessment. Please see Table 2 for an overview of the process to date.

Table 4: e-WULAAS process timeline

e-WULAAS phase	Date of Submission/Issuance	Responsible Party

Pre-application meeting	Not applicable	SES & DWS
Pre-application enquiry	6 September 2019	SES
Pre-application Site Visit	11 October 2019	SES & DWS
Phase 1: Application	21 May 2020	SES
Acknowledgment of Receipt letter	8 July 2020	DWS
Phase 2: Site Visit	11 October 2019	SES & DWS
Technical Information Request letter	28 July 2020	DWS
Public Participation	14 December 2020 - 3 March 2021	SES
Phase 3: Technical Report	5 March 2021	SES
Assessment and Decision	Before 6 August 2021	DWS

2 PROJECT OVERVIEW

The Gran Sasso Quarry was started by the Ciolli brothers in 1951. The quarry was originally part of Henry Mellish's Durbanville farm until the brothers bought 12,85 hectares of the farm in 1953. The Gran Sasso mountain is the highest mountain in the Abruzzi province of Italy. The brothers are originally from this part of Italy and therefore this name was given to the quarry. Today Ciolli Bros is a 3rd generation family business situated in the Durbanville Hills area. The business sells aggregate products to the building and construction industries. The mining right for the property is held by Inkokeli Trading (Pty) Ltd and CBS Manufacturing is the company doing the mining.

The proposed water use activities include (Figure 3):

- Widening of the existing single lane entrance bridge crossing a watercourse;
- Pumping out water that collects in the quarry pit into a storage area from where it will be re-used for dust suppression and Redimix production; and
- Pumping excess water left after re-use into a vegetated drain towards a watercourse. The excess discharge is not expected but applied for as a precaution.

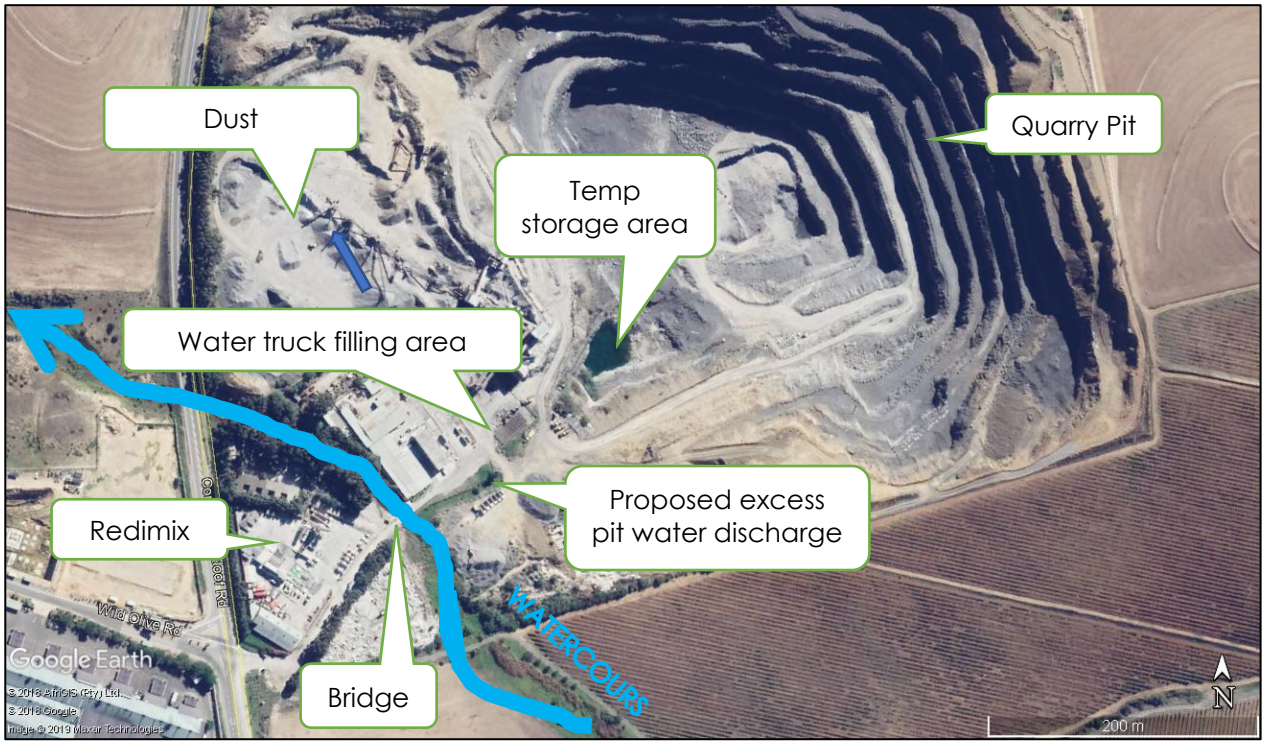

Figure 3: The relevant features and activities associated with Gran Sasso Quarry

2.1 Widening of the existing bridge

The existing bridge is proposed to be widened on the upstream (southern) side of the crossing. Figure 4 below shows the bridge that is proposed to be widened. The bridge is currently single lane which means that traffic gets held up when needing to cross here since trucks cannot pass each other on the bridge. Therefore, in order to improve traffic flow of the mine it is proposed to widen this bridge.

Figure 4: The bridge proposed to be widened

2.2 Dewatering of the quarry for re-use purposes

The applicant wishes to continue mining within the quarry pit. However, stormwater runoff accumulates in the pit and hinders further excavations. Therefore, they are proposing to dewater the pit by piping the water to the temporary storage facility, which will hold up to 50 000m^3, and re-use it from there for Redimix production and dust suppression. Figure 5 is a photograph of the quarry pit where surface runoff collects.

The water in the quarry is not used within any mining processes. It is stormwater runoff from the walls of the quarry/micro-catchment that accumulates in the lowest area. The company wants to continue with excavation activities in the pit that is sometimes inundated, and they would therefore need to dewater, mostly after rainfall events. The water from the pit was not used directly in any mining activities.

Figure 5: A photo of the quarry temporary water storage pit, during the site visit, following a rainfall event

2.3 Discharging of excess water into the watercourse

If there is excess water remaining in the pit, it is proposed to discharge this water towards the nearby watercourse (Figure 6). The discharge location will be approximately 20m upslope of the watercourse bank, where it will flow through a vegetated strip which will act as a buffer, to the aquatic habitat (Figure 7). The vegetated strip will prevent erosion and sedimentation of the watercourse. This activity is merely a precautionary measure for high rainfall events and not expected to be necessary. The amount pumped out into the environment from the pit will be up to 50 m^3 per day and 100 m^3/annum.

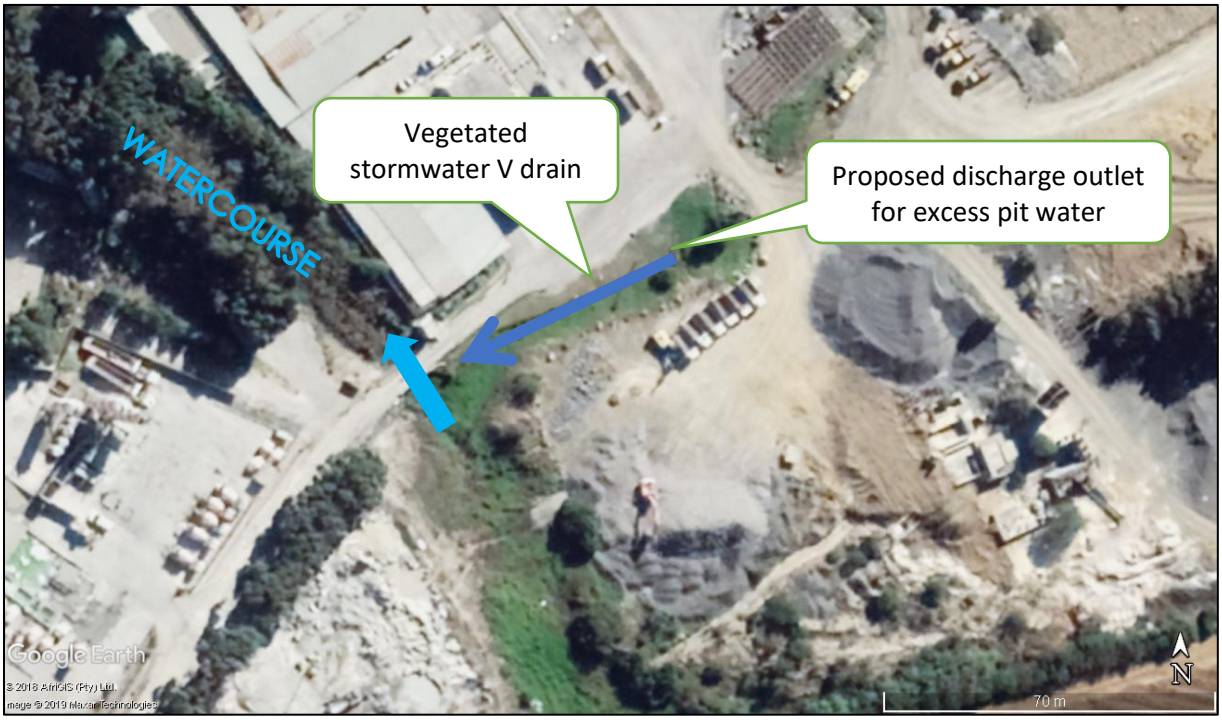

Figure 6: The location of the proposed discharge outlet for any excess quarry pit water

Figure 7: The existing vegetated stormwater drain directing stormwater towards the watercourse near the bridge

3 LEGAL FRAMEWORK

The protection of water resources is essential for sustainable development and therefore many policies and plans have been developed, and legislation promulgated, to protect these sensitive ecosystems. The proposed project must abide by the relevant legislative requirements. Table 6 below shows an outline of the environmental legislation relevant to the project. The NWA is especially relevant to this document.

Table 5: Relevant environmental legislation

Legislation	Relevance
South African Constitution 108 of 1996	The constitution includes the right to have the environment protected
National Environmental Management Act 107 of 1998	Outlines principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state.
Environmental Impact Assessment (EIA) Regulations	The 2014 regulations have been promulgated in terms of Chapter 5 of NEMA and were amended on 7 April 2017 in Government Notice No. R. 326. In addition, listing notices (GN 324-327) lists activities which are subject to an environmental assessment.
The National Water Act 36 of 1998	Chapter 4 of the National Water Act addresses the use of water and stipulates the various types of licensed and unlicensed entitlements to the use of water. The water uses under Section 21 (NWA) that are associated with the applicant's proposed activities are section 21 (c), (f), (g) and (i).
General Authorisations (GAs)	Any uses of water which do not meet the requirements of Schedule 1 or the GAs, require a license which should be obtained from the Department of Water and Sanitation (DWS). This application does not qualify for a GA due to the activities not complying with all the requirements of a GA as set out in the Government Notices applicable to Section 21(c), (f), (g) and (i) water uses.
National Environmental Management: Biodiversity Act No. 10 of 2004	This is to provide for the management and conservation of South Africa's biodiversity through the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity Institute.

4 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are relevant to this WULA:

- The information provided in this report is to the best of SES' understanding of the proposal according to the information provided by the client.
- The location of the infrastructure proposed near water courses are extrapolated from information provided by the client and not georeferenced data and therefore not completely accurate. The accuracy is however presumed to be sufficient.
- Water quality results were obtained from the client. The variables given in the DW forms on e-WULAAS are according to water quality test results provided by the client.
- The volume of water relevant to dewatering activities will vary depending on rainfall, etc. The volumes given are the result of calculations made according to available information.
- The number of boreholes identified in the surrounding area is limited.
- The groundwater quality was determined from one set of test results. Seasonal changes may occur in the chemistry of the water from the pit lakes, groundwater and stream which could not be accounted for.
- The coordinates of the NGA boreholes and WARMS sites are sometimes found to be inaccurate. Hence, it was difficult to incorporate the NGA and WARMS data accurately into the field hydrocensus.
- The exact start date of the water use activities not known. It will however not be earlier than the date given in the DW forms.
- It is assumed that the information supplied is true and correct and that the recommendations of the studies will be implemented.

5 DESKTOP ASSESSMENT

5.1 Local/regional setting

The study area falls within quaternary catchment G21F of the Berg Water Management Area (Figure 8). The catchment is 244 km^2 in size, has a mean annual precipitation of 488 mm and potential evaporation of 2070 mm. A non-perennial tributary stream is mapped directly south of the quarry and flows in a north westerly direction towards the Diep River. According to the National Biodiversity Assessment 2018 river data, the Diep River is in a seriously modified present ecological state ('E' PES category).

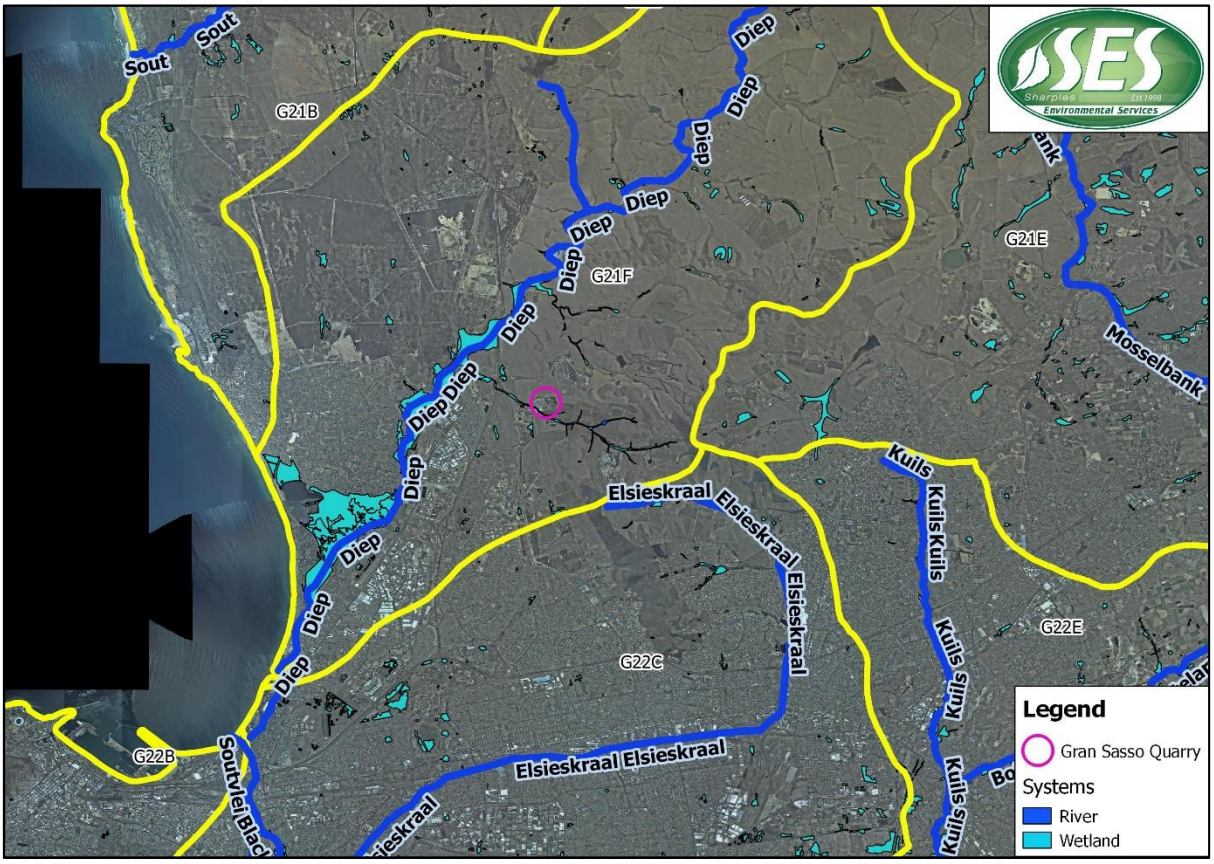

Figure 8: The drainage network including the Diep River of quaternary catchment G21F

5.2 Groundwater

Gran Sasso Quarry is within the South Western Coastal Belt ecoregion that runs along the West Coast, approximately between Cape Town and Elands Bay. There is no Strategic Groundwater area at the site. The closest is the Cape Peninsula Aquifer, approximately 4 km south of the quarry (Figure 9). According to desktop data the Aquifer Vulnerability is described as 'Most' (the most vulnerable aquifer region, which is vulnerable to many pollutants except those strongly absorbed or readily transformed in many pollution scenarios). It can be classified as Major poor aquifer region which is a low to negligible yielding aquifer system of moderate to poor water quality. It is highly susceptible as there is a high ease with which a groundwater body can be potentially contaminated by anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer. Refer to groundwater impact assessment report for detailed description.

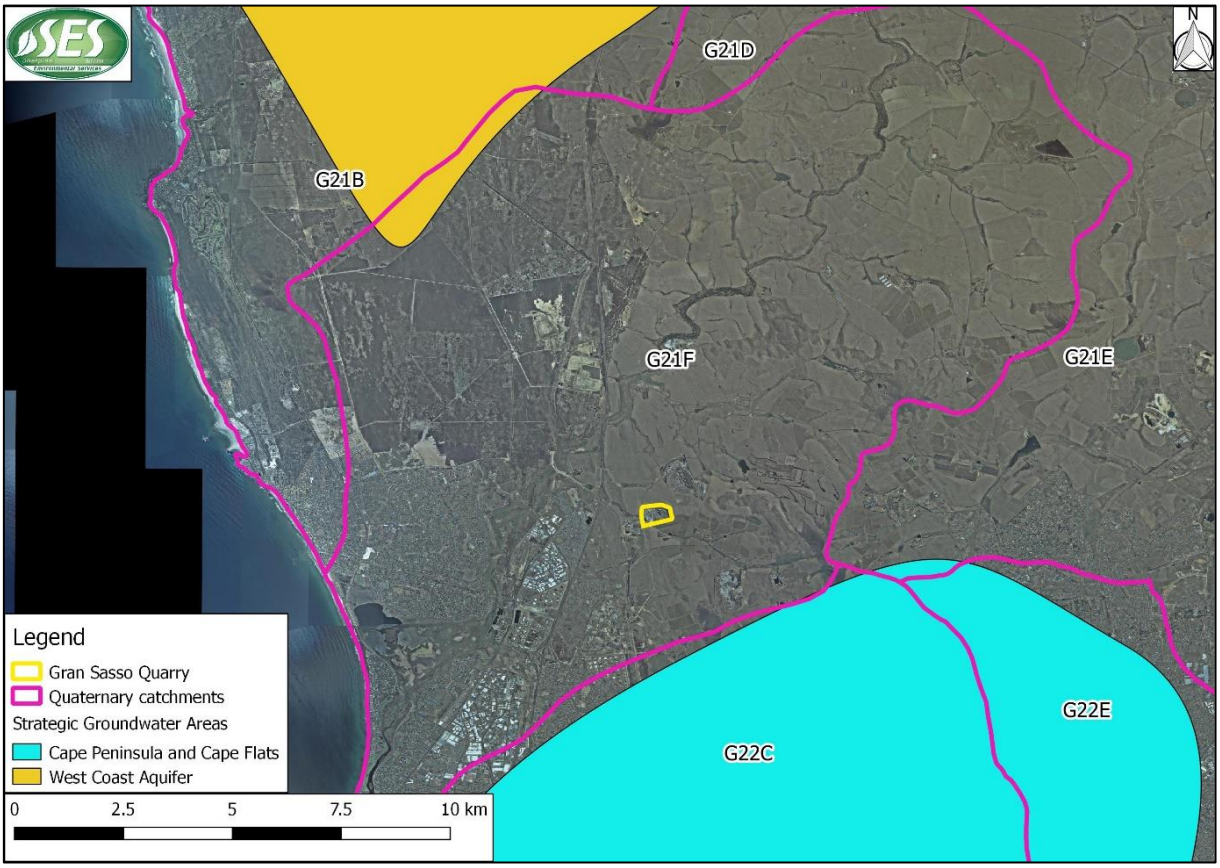

Figure 9: The site in relation to the surrounding quaternary catchments and Strategic Groundwater Areas

5.3 Geology

The geology of the quarry is mainly comprised of greywacke, phyllite and quartzitic sandstone of the Tygerberg Formation, Malmesbury Group. According to the Ciolli Bros website, the quarry is "a Malmesbury slate (Hornfels) production surface operation". In the excerpt from Geology of the Ciolli Quarry, Tygerberg Hills by EM Langenhoven, the Malmesbury Group and Tygerberg Formation is described further. According to this information, the Malmesbury Group consists mainly of sedimentary rocks deposited in a geosyncline. The Tygerberg Formation is comprised mainly of shale and arenaceous shale, with intercalations of thickly bedded, fine-grained greywache and quartzite. The so-called Malmesbury hornfels are the local name for the metamorphosed rocks of the Tygerberg group of quarries.

5.4 Conservation context

5.4.1 Cape Town Biodiversity Network

Figure 10 shows that the site itself does not form part of the Biodiversity network. The closest patches to the site are identified as Conservation area and called Welbeloond. The area is not yet proclaimed and managed for conservation without statutory protection. The northern portion of the conservation area covers part of the Klein Stink River downstream of the mining area. If pollutants from the mine enter the drainage network, such as into the Klein Stink River channel, there could be impacts on this protected area.

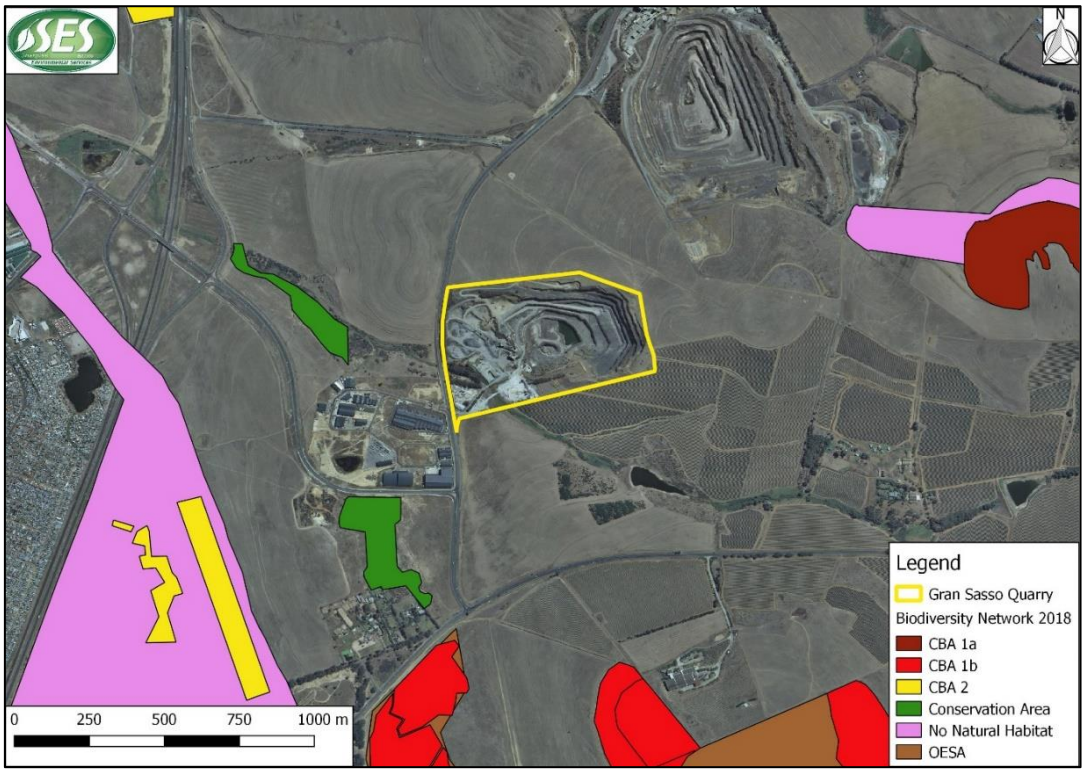

Figure 10: Map showing different areas part of the Biodiversity Network in relation to the study area.

Figure 11 shows that the inundated areas within the study area were identified as wetland. The mapping confidence were given as low, indicating that only a desktop study of the area was done. Both areas were classified as Other Ecosystem Support Area (OESA). Wetland areas classified as Critical Ecosystem Support Area (CESA) is located next to the Klein Stink River downstream of the mine. Table 7 has details on these wetland areas.

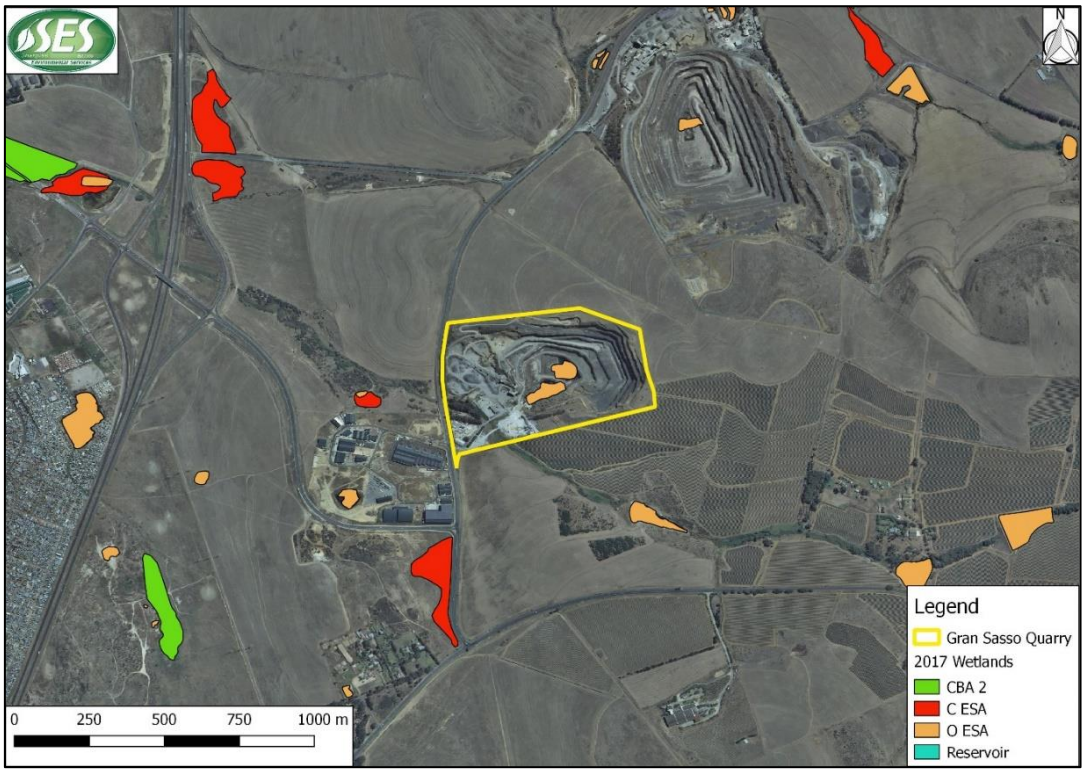

Figure 11: Wetlands in close proximity to the study site.

Table 6: Wetland attributes of habitat close to the Gran Sasso Quarry. Refer to map (Figure 13) for the locations.

	Wetland habitat within the study area		Wetland habitat downstream	
Attribute	**OESA North**	**OESA South**	**CESA**	**OESA**
Wetland ID	JES1925	JES 1926	JES1914	JES1913
Anthropological Type	Excavation	Excavation	Natural and Semi-natural	Dam (off-channel)
Critical Biodiversity Area Category - Biodiversity category assigned to the wetland, based on its rank and naturalness	OESA	OESA	CESA	OESA
Wetland Classification Level 1	Inland	Inland	Inland	Inland
Wetland Classification Level 2 – Regional setting	West Coast Shale Renosterveld	West Coast Shale Renosterveld	Southwest Sand Fynbos	Southwest Sand Fynbos
Wetland Classification Level 3 – Landscape unit			Slope	
Wetland Classification Level 4A - Hydrogeomorphic unit – type	Depression	Depression	Seep	Depression
Wetland Classification Level 4B - Hydrogeomorphic unit – Longitudinal zonation/ landform/ outflow drainage	Endorheic	Endorheic	Without channelled outflow	Endorheic
Wetland Classification Level 4C - Hydrogeomorphic unit – landform/ inflow drainage	Unknown	Unknown	N/A	Unknown
Wetland Classification Level 5A – Hydrological regime – period of inundation	Permanently inundated	Seasonally inundated	Unknown	Unknown
Wetland Classification Level 5B - Hydrogeomorphic unit – period of saturation	Unknown	Unknown	Unknown	Unknown
Wetland Classification Level 5C – Hydrological regime – inundation depth-class	Unknown	Limnetic	N/A	Limnetic
Wetland Classification Level 6A – Vegetation cover	Unknown	Vegetated	Vegetated	Unknown
Substrate	Clayey soil	Clayey soil	Sandy soil	Sandy soil
Impacts affecting wetland condition, but not necessarily leading to transformation of the wetland	Stormwater	Stormwater	N/A	Stormwater
Confidence in the mapping. Since 2017, using the following system: High = Site visit plus Augur was used; Low = Desktop study of wetland	Low confidence	Low confidence	Medium confidence	Medium confidence
Area (hectares)	0.470615	0.598636	0.393806	0.064691

5.4.2 National Freshwater Ecosystem Priority Areas

Although the NFEPA project identified wetlands close to and within the study area, none of them were identified as FEPAs. The bigger pit area of the quarry is classified as natural unchanneled valley-bottom wetland. The open water in the middle of the quarry was identified as artificial wetland. The non-perennial stream flowing through the site was not identified by NFEPA (Figure 12). This data is subject to inaccuracies. The 2017 City of Cape Town wetlands data is more accurate and classifies this pit water as an excavation as discussed above. Refer to specialist aquatic impact assessment for detailed, groundtruthed delineation and classification.

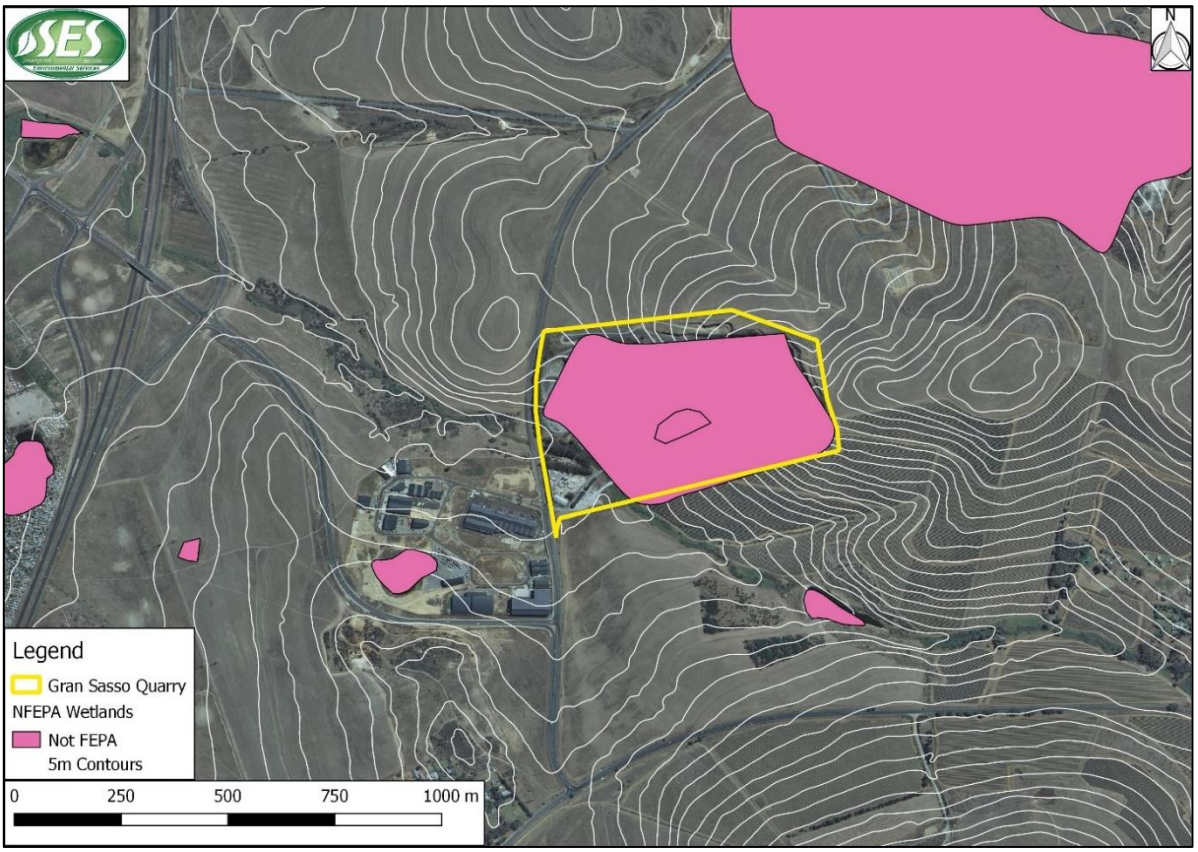

Figure 12: A map showing the study area in relation to NFEPA identified wetlands of the immediate area

6 SITE ASSESSMENT

6.1 Aquatic Biodiversity Impact Assessment

<u>The following was taken out of the Aquatic report (Annexure E):</u>

The freshwater habitats within a 500-metre radius of the quarry were identified and mapped on a desktop level utilising available data, following which, the infield site assessment confirmed the location and extent of these systems (Figure 13). Subsequent screening provided an indication of which of these systems may potentially be impacted upon by the proposed activities.

The screening assessment determined that the unchanneled valley bottom wetland that flows through the property is the only watercourse that will be impacted upon by the project. The wetland HGM unit was therefore assessed further as UCVB 1.

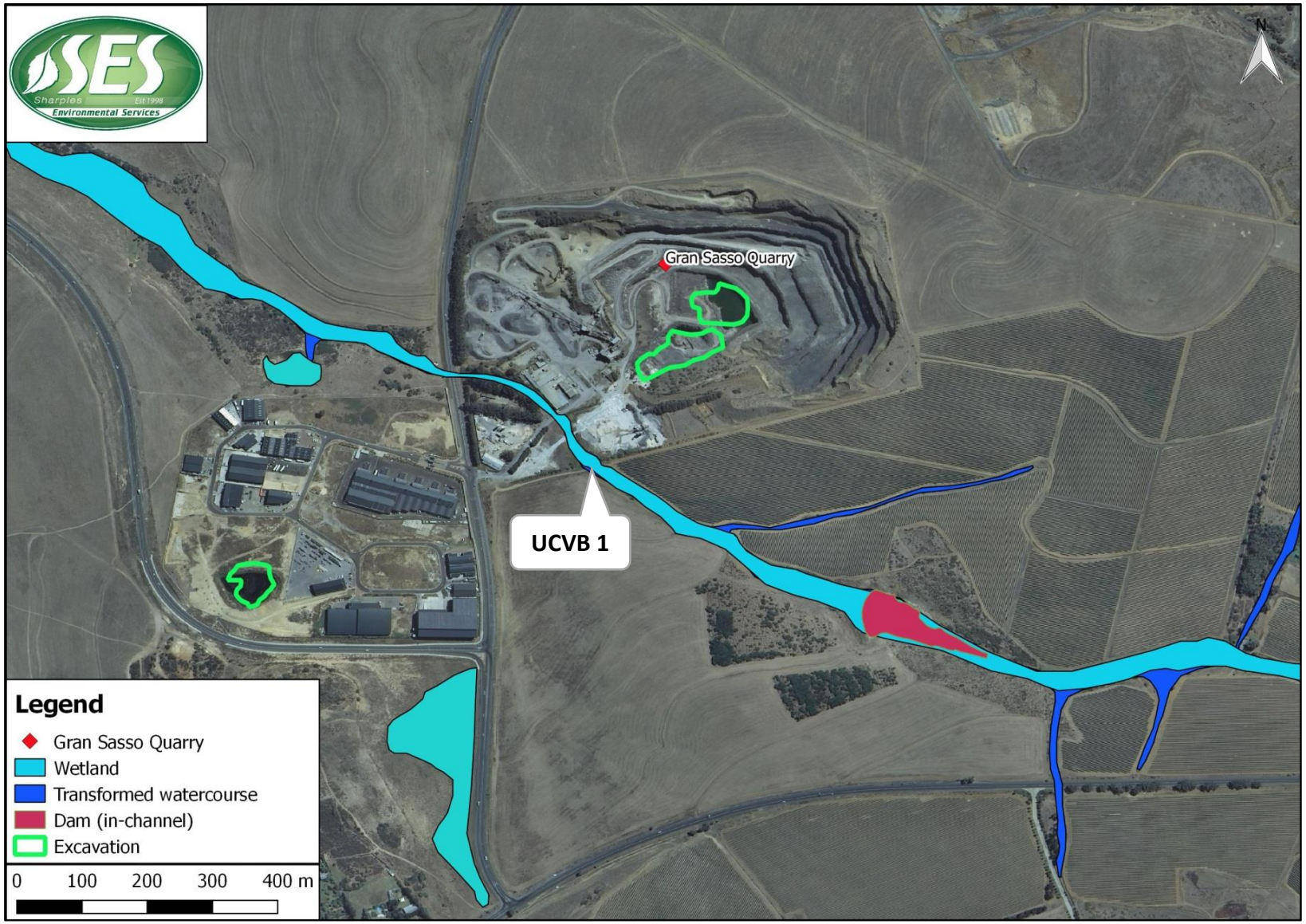

Figure 13: The water resources identified within the study area including the unchanneled valley bottom wetland (UCVB1) that will be impacted by the proposal.

6.1.1 UCVB1 Wetland Characteristics

The unnamed watercourse that traverses the property is an unchanneled valley bottom wetland. It is a small tributary to the Diep River wetland system to the west. It is seasonally inundated and dominated by depositional processes. The wetland has been subjected to significant modifications due to catchment land cover changes and direct habitat destruction from infilling and excavation. The extent of the wetland within the valley has been greatly reduced and the diffuse flow pattern typical of such systems has become confined. The system is well vegetated, where it is not transformed by infrastructure, but alien invasive species have encroached due to disturbances in the system.

Figure 14 below is a compilation of site photographs to show the characteristics of the wetland in the vicinity of the quarry. Photograph A was taken directly upstream of the Gran Sasso Quarry property where the dominant vegetation consists of *Pennisetum clandestimum* grass and *Phragmites australis* reeds. Photograph B was taken a short distance downstream, on the quarry property, directly upslope of the bridge crossing. It shows the narrowing of the wetland as it has been confined and directed toward the bridge culvert. *Typha capensis* is the dominant plant species as localized, shallow backflooding as a result of flow impedance by the bridge has increased levels of inundation. The photograph also shows the transition of catchment land use from commercial cultivation in the upper reaches to industrial and mining activities.

Photograph C is taken from the bridge crossing toward the north in a downstream direction. It shows the channelisation of the wetland through the property towards the Contermanskloof Road where the narrow wetland strip is vegetated by *Phragmites australis* reeds. There is a reach of large alien invasive Eucalyptus trees upon the infilled banks. There has been serious wetland habitat loss from this infilling and excavated channel to direct water away from the site. However, this wetland vegetation is providing an invaluable service through ecological functions such as pollutant removal, flow regulation, sediment trapping, and flood attenuation. Photograph D shows the wetland as it flows away from the property, through a culvert on Contermanskloof Road, to the north. In this reach the valley floor widens, the gradient lessens slightly, and the characteristic diffuse flows are restored. The area remains significantly degraded due to land disturbances from agriculture but has been subjected to less physical, direct manipulation. The wetland has a slightly higher level of plant diversity, with species including *Typha capensis, Phragmites australis, Nasturtium officinale, Polypogon viridis. Pennisetum clandestimum, and Acacia saligna* individuals. Although some of the species are alien invasive the ecological functioning of this reach of wetland is greater than upstream areas. However, sewage inputs were evident, likely from a pipeline failure at the nearby factory (not the Gran Sasso Quarry property), and the water quality was observably poor.

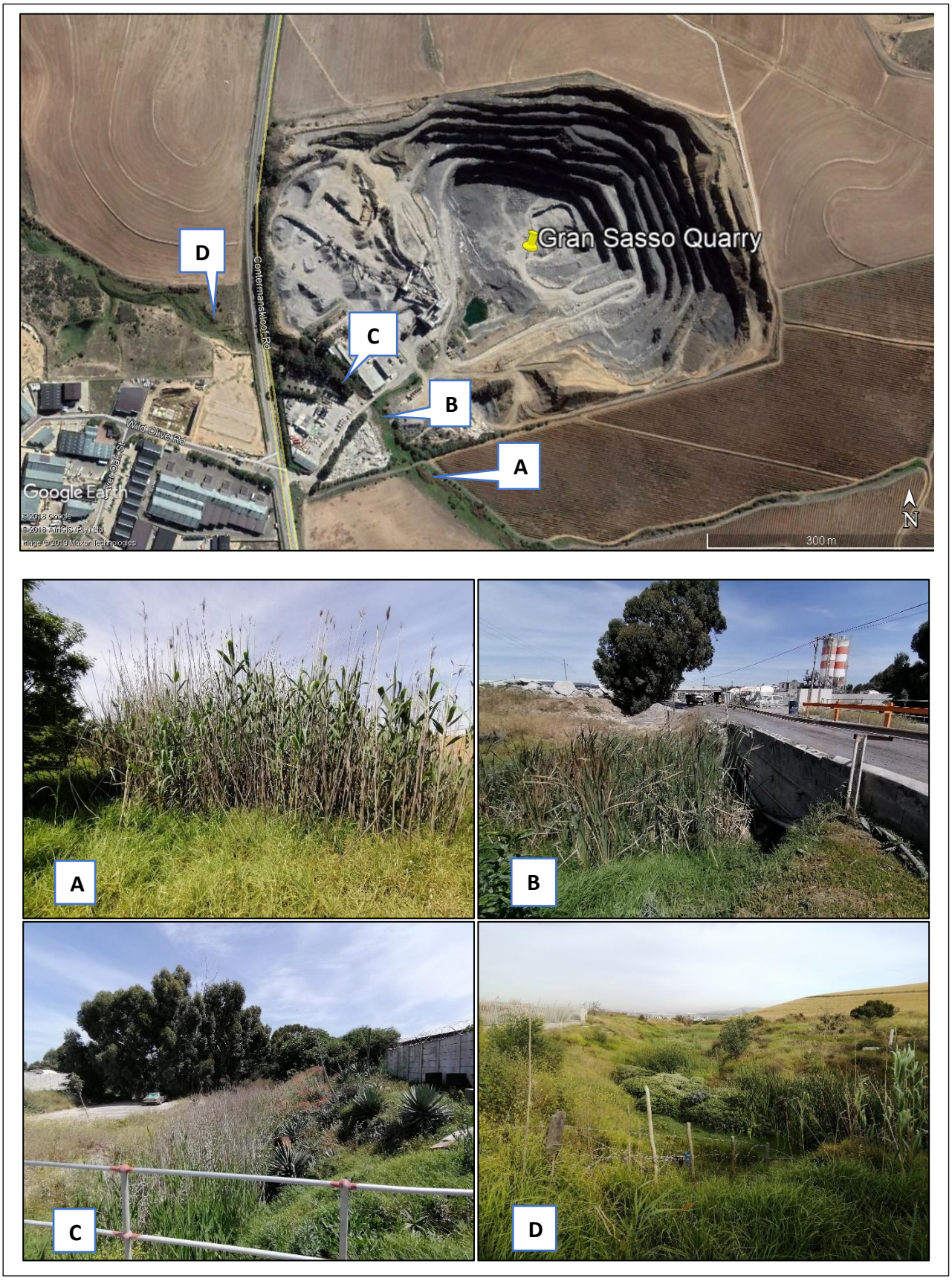

Figure 14: Photographs of the UCVB1 wetland assessed and the location of the photographs relative to the quarry

6.1.2 Present Ecological State (PES)

The UCVB1 wetland obtained an overall 'E' PES category under WET-Health assessment (Table 8) indicating that the change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognisable. Past and present impacts have resulted in significant wetland habitat loss in large sections of the system. The hydrological regime has deviated greatly from the perceived reference state due to changes in water movement and retention patterns. The geomorphological characteristics have been transformed from the natural condition largely through infilling and excavation for channel straightening. Although the remaining wetland habitat is well vegetated, the composition differs from the historic condition, and there is a moderate level of alien invasive plant species infestation.

Table 7: Summary of the UCVB1 wetland PES assessment

	Level 2: PES Outcomes			
	Wetland PES Summary			
Wetland name	Unknown			
Assessment Unit	UCVB1			
Areal extent (Ha)	24,0 Ha			
PES Assessment	Hydrology	Geomorphology	Water Quality	Vegetation
Impact Score	8,0	5,8	6,2	4,0
PES Score (%)	20%	42%	38%	60%
Ecological Category	**E**	**D**	**E**	**D**
Trajectory of change	↓	↓	→	→
Combined Impact Score	6,7			
Combined PES Score (%)	33%			
Combined Ecological Category	**E**			
Hectare Equivalents	8,0 Ha			
Confidence	Moderate: Field-based 'Level 2' assessment but relatively high probability of connection to regional aquifer			

6.1.3 Ecological Importance and Sensitivity (EIS)

6.1.3.1 Functional Importance

The UCVB1 wetland buffers the impacts of the substantial amount of ongoing soil disturbance within the catchment as well as the nutrients used for cultivation. It obtained high functional importance scores for sediment trapping, phosphate trapping, nitrate and toxicant removal (Figure 15).

The wetlands' ability to provide Ecoservices has been compromised by the decrease in the wetland health. The wetland habitat and ecological processes have been seriously impacted. However, due to the significant disturbances within the catchment, and the importance of the downstream wetlands, the remaining wetland habitat has a high functional importance. The wetland does not contribute directly to goods and services for society (excepting the use of water from the dam upstream of

the site). Functions performed by the system are however significant as it indirectly provides ecological services.

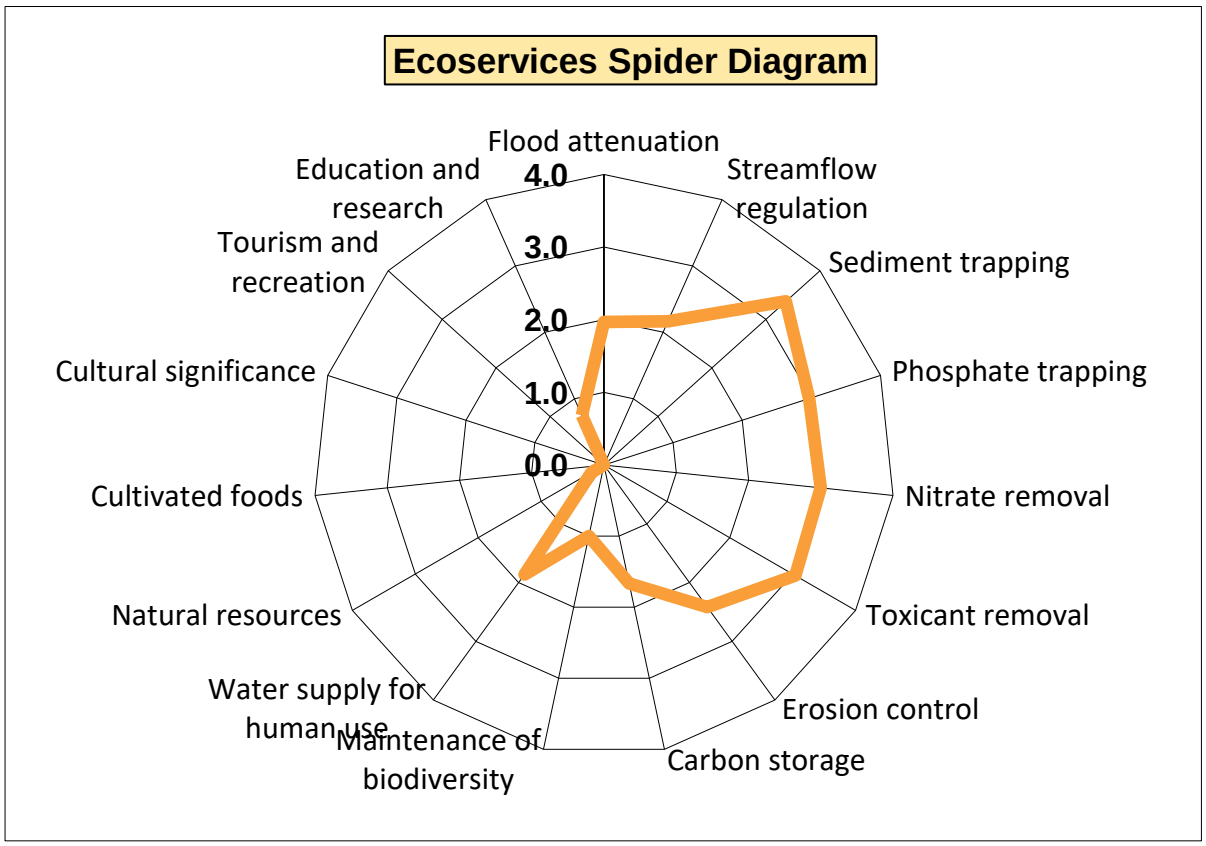

Figure 15: Functional importance results for the UCVB1 wetland

6.1.3.2 EIS

The UCVB1 wetland obtained a 'High' EIS Score (Table 9). This is due to its functional and hydrological importance values. Although small, the wetland reduces the severity of floods downstream, sustains streamflow during low flow periods, traps sediment carried by runoff, and removes nutrients and toxicants (thereby enhancing water quality). This was evident in the water quality results which showed a huge decrease in Nitrogen levels downstream. The wetland is in a degraded state which has reduced the amount of habitat and processes needed to support biodiversity, but it is sensitive to changes in flow regime. It is not formally protected and does not directly contribute to society.

Table 8: A summary of the wetland EIS assessment

SUMMARY	UCVB1 Wetland	
	Score (out of 4)	**Rating**
BIODIVERSITY IMPORTANCE	2,67	Moderate
FUNCTIONAL/HYDROLOGICAL IMPORTANCE	3,13	High
DIRECT BENEFITS TO SOCIETY	0,50	Low
Ecological Importance and Sensitivity (EIS)	**3,13**	**High**

6.1.4 Recommended Ecological Category

The recommended ecological management category of the UCVB1 wetland indicates that management should strive to improve the system. However, it is probably more realistic for the scope of this project to maintain the wetland in its present state without any further loss of integrity. It is recommended that catchment based rehabilitation projects are undertaken by the responsible authorities and landowners to improve the wetland as a whole.

Groundwater specialist findings

A geohydrological assessment was conducted by *GEOSS* on the Gran Sasso Quarry to assess what the potential impact of proposed activities (listed within the WULA) will have on the groundwater of the area. It was determined that the site overlies a fractured aquifer with a classified yield of 0.5– 2.0 L/s. This fractured aquifer is made up of low permeable phyllite, greywacke and quartzitic sandstone from the Tygerberg Formation. Therefore, the infiltration rate and transmissivity within this fractured system is regarded as low. The groundwater quality based on regional data sets and onsite data is very poor (EC: >~300 mS/m) resulting in very limited groundwater use in the surrounding area. Given the low to medium vulnerability of the aquifer, together with the above-mentioned factors, the risk of potential contamination due to the proposed activities in the WULA to the fractured aquifer is considered to be low.

Part of the groundwater specialist assessment was also to give an opinion on whether the water within the quarry is groundwater or rain water. To establish this the walls of the quarry were searched for water seeps since water on the wall of the quarry would indicate groundwater seeping into the quarry. No seeps were identified on the walls of the quarry indicating that there is no groundwater seeping into the quarry pit from the walls. Based on the stable isotope analysis and the chemistry analysis, it is clear that the water within the pit is completely different form the groundwater obtained from the borehole HBH2 and the stream. Therefore, the water within the quarry is considered to be rainwater and not groundwater. Based on the field chemistry measurements taken during the site visit it is seen that the water within the two pit lakes is of good quality (~177 mS/m) compared to the groundwater in the area (~489 mS/m).

Based on the chemical analysis completed in this study the only potential contaminants to groundwater is the elevated nitrate in the pit lake water (~25 mg/L). However, due to the low potential for surface water to seep into the ground and the poor groundwater quality this risk is very low.

6.2 Water quality

The applicant has conducted water quality sampling got them tested at a SANAS accredited laboratory. The results of two of these sampling occasions were supplied

to SES. The tests were conducted in July 2019 and November 2019. The July tests were done for samples from three locations: one in the wetland upstream of the quarry property, one in the excavated quarry pit, and one in the wetland downstream of the quarry. The November tests were done only on a sample from the quarry. The laboratory reports with the results are attached in Annexure H.

Table 5 shows the water quality of the samples in comparison to the water quality limits set for discharging wastewater into a watercourse as per Section 2 of GN No. 665 of 2013. The water found within the quarry, which is what will be discharged if required, largely complies with the limits. The non-complying variables of the pit water (nitrate and EC) have fairly similar concentrations to the wetland. The water quality differs between July and November but can be due to numerous variables and therefore cannot be compared. The effect of these variables on the aquatic habitat is explained below as described in the South African Water Quality Guidelines for Aquatic Ecosystems (1996).

Table 9: Water quality test results of samples the applicant had analyzed on two occasions

Variable	Unit	Jul-19			Nov-19	General Discharge limits as per Government Gazette 36820
		River entrance	Quarry	River Exit	Quarry dam	
Ammonia as N	mg/l	0.1	0.12	0.15	0.05	**6**
Nitrate + Nitrite as N	mg/l	70	84	4.9	52	**15**
Ortho Phosphate as P	mg/l	<0.1	<0.1	<0.1	<0.05	**10**
Electrical Conductivity	mS/m	340	385	365	260	**70**
pH (Lab) (20C)		7.6	8.0	7.3	8.0	**5,5 - 9,5**
Chemical Oxygen Demand	mg/l	16	7	26	<5	**75**
Suspended Solids	mg/l	130	<2	103	2	**25**
Fluoride as F	mg/l				2	**1**
Chloride as Cl Dissolved	mg/l	236	270	458	133	
Alkalinity as CaCO3	mg/l	101	92	71	89	

Inorganic nitrogen is rarely present in high concentrations in unimpacted waters. Natural concentrations are below 0.5 mg/L. Sources of inorganic nitrogen that enter aquatic systems include surface runoff from the catchment, the discharge of effluent containing human and animal excrement, agricultural fertilizers and organic industrial wastes. Single measurements of nitrogen are a poor basis for assessment due to occasional increases to above TWQR (Target Water Quality Range) not being as important as continuous high concentrations (DWAF, 1996). This variable is non-compliant with the general limits as set out in GN No 665 of 2013, within the quarry pit in both July and November even though the concentration was almost double in July compared to November.

Unimpacted natural waters have a N:P ratio of 25-40:1 compared to the much lower 10:1 ratio of impacted (eutrophic to hypertrophic) systems. The norm used to assess the impacts of inorganic nitrogen on aquatic ecosystems are changes in the trophic status that is accompanied by algae and other aquatic plant growth in rivers, lakes and reservoirs. The effects associated with high levels of nitrogen are all related to eutrophication, such as algae bloom. Average summer concentrations of above 10 mg/L relates to hypertrophic conditions with algae blooms of species that are toxic to man, livestock and wildlife (DWAF, 1996). The N:P ratio in all the tested areas is high meaning no eutrophic conditions.

TDS and Electrical Conductivity (EC) are related in that the one will increase as the other increases. EC is therefore often used to get an indication of TDS. EC is a measure of the ability of water to conduct an electrical current. TDS varies in natural waters due to the concentrations being in part dependent on the characteristics of the geological formations that the water has been in contact with. Increased TDS compared to natural conditions could be due to domestic and industrial effluent discharges, and surface runoff from urban, industrial and cultivated areas. Evaporation could also lead to higher total salts in water. Changes in TDS levels can affect individuals, community structure or microbiological and ecological processes of aquatic organisms. Rate and duration of change appears to be more significant then absolute changes in TDS. TWQR for TDS is case and site-specific. Therefore, guideline values suggest that TDS concentrations should not be changed by more than 15 % from the normal cycles of the waterbody under unimpacted conditions and the amplitude and frequency of the natural cycles for that water body should also not change (DWAF, 1996).

Chlorine is not normally a constituent of natural waters. It occurs in aquatic ecosystems as a result of anthropogenic activities such as chlorination of drinking water, sewage treatment, cooling waters and swimming pools. Effluents that contain ammonia, organic matter or cyanides react with chlorine to perform persistent chloramines that pose a long-term threat to aquatic life. Free chlorine is more toxic but less persistent than combined chlorine. The effects of chlorine on fish include avoidance behaviour, damage to gills, decreased growth rate and death (DWAF, 1996). The lab tests for Chloride which is a chlorine ion and occurs naturally in the form of neutral salts such as Sodium chloride. This form is not as harmful as chlorine. Chloride seems to be consistently present in the quarry and the adjacent watercourse.

The integrity of the samples and results cannot be guaranteed as SES were not involved in sampling. A few potential problems were noted. The sampling was done on the 10th of July 2019 and received by the laboratory on 15 July 2019. This delay of five days could have an effect on the integrity of the results. Another potential cause for concern is that the water samples were at room temperature when received by the lab. This could indicate that the samples were not kept on ice as it should have been.

1. *Geohydrological water chemistry findings*

The hydrogeological report states that "based on the field chemistry measurements taken during the site visit it is seen that the water within the two pit lakes is of good quality (~177 mS/m) compared to the groundwater in the area (~489 mS/m) and the stream (222 mS/m)." The water quality analysis conducted during this study determined that the nitrate and nitrite-nitrogen and fluoride for the two pit lakes are above the Gazetted guidelines and also above that of the Stream sample. Thus, disposing of the pit lake water in to the river will result in elevated levels of nitrate and nitrite-nitrogen and fluoride downstream.

Based on the chemical analysis completed in this study the only potential contaminants to groundwater is the elevated nitrate in the pit lake water (~25 mg/L). However, due to the low potential for surface water to seep into the ground and the poor groundwater quality this risk is very low. It is important to note that the pit lake water is considered as waste water and is of poorer quality than the natural groundwater in terms of nitrate, sulphate and fluoride. However, for the remainder of parameters tested for in this study, it was shown that the pit lake water is of better quality water than then surrounding groundwater in terms of sodium, chloride, manganese and iron resulting in very little groundwater use in the area. Contamination of the fractured aquifer is unlikely to occur due to the low permeability of the Tygerberg Formation.

7 SPECIALIST ASSESSMENT METHODS

Geohydrological Assessment Methods

The main objectives of the geohydrological specialist study were to:

- Obtain all relevant data to the project and its surroundings. Complete a geohydrological characterization of the groundwater, in the vicinity of the property.
- Complete a hydrocensus by visiting boreholes on the property and within 1 km of the property. Collect water samples from the quarry and if possible, from hydrocensus boreholes for analysis of major chemistry and isotopes.
- Complete an assessment of the importance of groundwater (both socio-economic and environmental) in the area by means of a public participation hydrocensus.
- Document the above findings in a format fully compatible with the requirements for a Water Use License Application (which is to be submitted to Department Water and Sanitation (DWS).

For the purpose of the WULA, emphasis is placed on the findings of the aquatic study and therefore the methods used by the aquatic specialist are detailed here. The assessment was done according to the following scope of work:

Aquatic Biodiversity Assessment Methods

- Desktop delineation was conducted in QGIS (v2.16.0) and Google Earth Pro using available imagery and datasets to identify and screen water resources within a 500m radius (Department of Water and Sanitation, DWS, regulated area) of the proposed mining extent (Table 10).
- Various data sources were consulted to develop an understanding of the biophysical characteristics of the study area and its conservation context (Table 9).
- Infield verification and refinement of the extent of the pan was undertaken with a Garmin Montana 600 GPS. The whole day site visit occurred on the 1st of June 2017. The infield delineation was conducted in accordance with *A Practical Field Procedure for Identification and Delineation of Wetland and Riparian areas -Edition 1* (DWAF 2005) and specialist knowledge (Table 10).
- The delineated aquatic habitat was then classified in accordance with the 'National Wetland Classification System for Wetlands and other Aquatic Ecosystems in South Africa' (Ollis *et al.,* 2013) and WET-Ecoservices (Kotze *et al*. 2009) (Table 11).

- The water resources within the 500m radius study area that were identified as likely to be impacted by the project were assessed further using the appropriate tools (Table 11). The assessment was derived by evaluating the level of ecosystem functioning and ecological integrity/condition of the identified wetland habitat. Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) and Recommended Ecological Category (REC) analyses were conducted for the impacted wetland. This is in order to establish a baseline of the current state of the systems. Water quality testing was conducted to inform this.

- The anticipated impacts of the proposed mining on the associated aquatic habitat were identified and evaluated based on a significance rating scale encompassing factors such as extent, magnitude, duration and significance of impacts (Annexure 12.6 of the freshwater report).
- Recommendations for impact management and mitigation to avoid and reduce impacts were determined.

Table 10: Utilised data and associated source relevant to the proposed project

DATA	SOURCE
Google Earth Pro™ Imagery	Google Earth Pro™
DWS Eco-regions (GIS data)	DWS (2005)
South African Vegetation Map (GIS Coverage) 2018	SANBI (2018)
National Biodiversity Assessment Threatened Ecosystems (GIS Coverage)	SANBI (2018)
South African Geological Map	Council of Geoscience's (2019)
Contours (elevation) - 5m intervals	Surveyor General
NFEPA river and wetland inventories (GIS Coverage)	CSIR (2011)
NEFPA river, wetland and estuarine FEPAs (GIS Coverage)	CSIR (2011)
City of Cape Town Biodiversity Network 2018	City of Cape Town
City of Cape Town Wetlands 2017	City of Cape Town
National Wetland Map 5 Ecosystem threat status and protection level of the South African Inventory of Inland Aquatic Ecosystems	CSIR (2018)
Artificial wetlands of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	CSIR (2018)
River ecosystem threat status and protection level of the South African Inventory of Inland Aquatic Ecosystems	CSIR (2018)
Surface and Groundwater Strategic Water Source Areas (SWSAs)	WRC (2017)

Table 11: Tools utilised for the assessment of water resources impacted upon by the proposed project.

METHOD/TOOL*	SOURCE	REFERENCE
Delineation of wetland and/or Riparian areas	*A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas.*	(DWAF 2005)
Classification of wetlands and/ or other aquatic ecosystems	*National Wetland Classification System for Wetlands and other Aquatic Ecosystems in South Africa & WET-Ecoservices*	(Ollis *et al.*, 2013), Kotze *et al.*, 2009)
Present Ecological State (PES) Assessment (Wetland)	*WET-Health Assessment*	(McFarlane *et al.* 2009)
Functional Importance Assessment (Wetland)	*WET-Ecoservices Assessment*	(Kotze *et al.*, 2009)
Ecological Importance & Sensitivity (EIS) Assessment (wetland)	*DWAF Wetland EIS Tool*	(Duthie 1999)

8 IMPACTS AND RISKS

Socio-Economic Impacts

The quarry has a positive socio-economic impact since it provides job security to numerous HDI employees. These employees also benefit from the transfer of skills which will make them more marketable should they wish to get a new job in future. The application will not affect the amount of water available to users downstream since the water being extracted is not from a river or stream but from an enclosed quarry pit. Without this water the quarry and Redimix company would have to find an alternative source in a water scarce area. The use of the water from the quarry pit is in the people's best interest as the application will allow the quarry to operate legally, ensuring job security. The quarry contributes positively to the economy by providing locally sourced aggregate for developments. Please see the Section 27 motivation in Section 9 of this report for more information.

The authorisation of these water uses will allow for the Gran Sasso Mine to continue to operate. It will benefit the South African economy and job security for employees. Substantial investments have already been made into this activity. It is unlikely to impact any other water users and is in the public interest.

Aquatic Biodiversity Impacts

The freshwater report (Sharples, 2019) discusses the type and significance of the impacts associated with the proposed activities on the freshwater habitat. The following impacts associated with the preferred alternative were identified by the aquatic specialist in the freshwater report:

- Disturbance and loss of freshwater habitat
- Sedimentation and erosion
- Modified flow regime
- Water quality changes

Regarding the proposed widening of the bridge, during construction there will be excavations, infilling, diversion of flows, and potential for fuel spills within the system. However, in the operational phase fewer impacts are anticipated. The wetland is highly degraded in the bridge locality and the impacts are unlikely to decrease the PES score of the system.

Regarding the proposed discharge of quarry pit water upslope of the same reach of wetland, the construction impacts will have minimal impact upon the wetland health but during the operational phase there will be an increase in flow volumes and the water quality characteristics of the wetland may be altered. However, this is proposed to be an infrequent activity and has a low likelihood of occurring.

8.1 Disturbance/loss of aquatic vegetation and habitat

The disturbance or loss of aquatic vegetation and habitat refers to the direct physical destruction or disturbance of aquatic habitat caused by vegetation clearing,

disturbance of riparian habitat, encroachment and colonisation of habitat by invasive alien plants.

8.1.1 Construction Phase

The removal of vegetation and soil disturbance by machinery and workers for site clearing and access will impact the area of the wetland located directly upstream of the bridge. The movement of topsoil and incorrectly placed stockpiles could bury aquatic habitat. Due to construction, alien invasive species may encroach further into any disturbed areas and outcompete indigenous vegetation thereby reducing biodiversity.

8.1.2 Operational Phase

There is less risk to wetland habitat during the operational phase. However, the project may promote the establishment of disturbance-tolerant biota, including colonization by invasive alien species, weeds and pioneer plants if there is any ongoing disturbance near the riparian zone. Although this impact is initiated during the construction phase it is likely to persist into the operational phase.

8.2 Sedimentation and erosion

Sedimentation and erosion refers to the alteration in the physical characteristics of the wetland as a result of increased turbidity and sediment deposition, caused by soil erosion and earthworks that are associated with construction activities, as well as instability and collapse of unstable soils during project operation. These impacts can result in the deterioration of aquatic ecosystem integrity and a reduction/loss of habitat for aquatic dependent flora & fauna.

8.2.1 Construction Phase

The excavation and infilling of the wetland, as well as the disturbance from machinery and workers, will cause soil movement. These activities will negatively impact remaining biota, geomorphology, water quality, and flow within the watercourses as well as downstream habitat. Measures must consider the likelihood of high rainfall periods that may wash the mobile soils and construction materials downslope during construction. Vegetation clearing and exposure of bare soils directly adjacent to the wetland habitat during construction will decrease the soil binding capacity and cohesion of the upslope soils and thus increase the risk of erosion and sedimentation downslope. This activity may cause the burying of aquatic habitat. Ineffective site stormwater management, particularly in periods of high runoff, can lead to soil erosion from confined flows. Formation of rills and gullies from increased concentrated runoff. This increase in volume and velocity of runoff increases the particle carrying capacity of the water flowing over the surface. Soil compaction resulting in reduced infiltration and increased surface runoff together with the artificial creation of preferential flow paths due to construction activities, will result in slightly increased quantities of flow entering the systems.

8.2.2 Operational Phase

Where soil erosion problems and bank stability concerns initiated during the construction phase are not timeously and adequately addressed, these can persist

into the operational phase of the development project and continue to have a negative impact downstream. It will alter the river morphology and could result in further channel incision and erosion. There may be lateral erosion and sedimentation when the quarry pit water is discharged into the stormwater channel that directs surface runoff into the wetland downslope.

8.3 Water Pollution

Water and/or soil pollution cause negative changes in the physical, chemical and biological characteristics of water resources (i.e. water quality). This can result in possible deterioration in aquatic ecosystem integrity and a reduction in, or loss of, species of conservation concern (i.e. rare, threatened/endangered species). Additionally, litter indirectly decreases the aesthetic value of the wetland.

8.3.1 Construction Phase

During construction there are a number of potential pollution inputs into the river (such as hydrocarbons and raw cement). These pollutants alter the water quality parameters such as turbidity, nutrient levels, chemical oxygen demand and pH. These alternations impact the species composition of the systems, especially species sensitive to minor changes in these parameters. Sudden drastic changes in water quality can also have chronic effects on aquatic biota in general and result in localised extinctions. Hydrocarbons including petrol/diesel and oils/grease/lubricants associated with construction activities (machinery, maintenance, storage, handling) may potentially enter the system by means of surface runoff or through dumping by construction workers. Raw cement entering the system through incorrect batching procedure and/or direct disposal. The incorrect positioning and maintenance of the portable chemical toilets and use of the surrounding environment as ablution facilities may result in sewage and chemicals entering the systems.

8.3.2 Operational Phase

Pumping the quarry pit water into the stormwater channel when there it is in excess will impact the water quality and quantities. The physio-chemical composition of the pit water differs from the wetland water characteristics. The activity is unlikely to occur, and the impact would be buffered by the vegetated slope to the wetland, but it could alter the Chemical Oxygen Demand, Temperate, pH, and Total Dissolved and Suspended Solids. If not prevented, road debris, litter, and contaminants, including sand, silt, and dirt particles, will enter the wetland.

8.4 Flow Modification

The changes in the quantity, timing and distribution of water inputs and flows within the watercourse. Possible ecological consequences associated with this impact may include deterioration in freshwater ecosystem integrity, reduction/loss of habitat for aquatic dependent flora & fauna, and a reduction in the supply of ecosystem goods & services.

8.4.1 Construction Phase

During construction the flows will be significantly impacted through impoundment and/or flow diversions to install the additional bridge components. Dewatering and

flow diversion will be required to allow for excavations and curing of concrete within the permanent zone. However, the hydrological integrity of the system has already been modified by the existing bridge which has confined flow. There will be negative impacts if the structure is not designed and constructed appropriately. Land clearing and earth works adjacent to the wetland will reduce infiltration rates and increase the surface runoff volume and velocity. Such changes in surface roughness and runoff rates may lead to some rill and gully erosion. Altered water inputs from upslope disturbances as well as modified water distribution and retention patterns will ultimately affect the hydrological integrity of water resource.

8.4.2 Operational Phase

The existing bridge has confined the naturally diffuse and unhindered flow patterns. The proposed infrastructure in the wetland to widen the bridge will have the same dimensions of the existing structure. Therefore, there will be a negligible change in flow pattern through the bridge. Flow may be altered if the structure has not been designed to prevent scouring and sedimentation, or erosion downslope. The surface roughness will be decreased in this localised area which may slightly increase flow velocities and cause erosion on the downstream side of the bridge. However, these impacts from the bridge widening are small and localised and unlikely to cause significant changes to the flow pattern within the wetland.

The potential discharge of quarry pit water upslope of the edge of the valley bottom wetland will have a significant impact. The increase in flow quantities during discharge events will temporarily alter the soil moisture regime. Vegetation is quick to respond to soil wetness characteristics and therefore the plant species composition of the wetland may change and/or deteriorate. For example, *Typha Capensis* could replace the *Phragmites australis* downstream of the bridge due to increased inundation levels, or disturbance-tolerant alien plant species may encroach and outcompete the indigenous vegetation. Additionally, the increase in flow may cause further erosion downstream if not mitigated against. However, the impacts are buffered by the vegetated stormwater channel (approximately 20m of vegetated slope) that will slow flows prior to entering the wetland habitat. The impact is also unlikely to occur, and the activity would be temporary in nature.

8.5 Aquatic Risk Assessment Matrix

All of the water use activities proposed by the applicant obtained a Low risk rating, excepting the discharge water which is of Medium Risk. These results are summarised in the table below. The risk assessment assumes that a high level of mitigation is implemented and thus the risk rating provided in the table below is calculated post-mitigation. The modifications to soils and water characteristics are not completely avoidable but can be mitigated to acceptable levels of disturbance. Therefore, the mitigation measures and monitoring plan within this report must be implemented and adhered to (Sharples, 2019).

The change to flow regime in the operational phase is minimal as the bridge design and cross section will remain the same so through-flow will not be modified significantly. The potential for pollutants to enter the wetland also remains the same

as prior to bridge upgrades. This is because the number of vehicles (risk of hydrocarbon spills etc.) on the bridge will not increase.

Geohydrological Impacts

The risk is associated to the construction phase and the remaining operation phase of the Gran Sasso Quarry. The construction phase relates to the construction of the extending part of the current single lane bridge. The operational phase relates to dust suppression with the pit lake water and discharging of the pit lake water into the stream to the south of the quarry. It is important to note that the pit lake water is considered as waste water and is of poorer quality than the natural groundwater in terms of nitrate, sulphate and fluoride. However, for the remainder of parameters tested for in this study, it was shown that the pit lake water is of better quality water than then surrounding groundwater in terms of sodium, chloride, manganese and iron resulting in very little groundwater use in the area.

Contamination of the fractured aquifer is unlikely to occur due to the low permeability of the Tygerberg Formation. However, it is was seen that the water within the pit lakes does have elevated concentrations of nitrate, sulphate and fluoride, and contamination of the stream will occur if the pit lake water is discharged without treatment into the stream.

Please refer to the impact tables of the Geohydrological report for significance ratings of each activity. The tables show that the proposed activities have a Low to Very Low potential impact upon groundwater resources. The report states that the discharging of the pit water towards the stream may have a Medium impact upon the stream. Refer to aquatic biodiversity report for specialist wetland assessment results.

Table 12: Evaluation of aquatic biodiversity impacts of the proposed project upon UCVB1 wetland

No	Phases	Activity	Aspect	Impact	Flow Regime	Physio & Chem	Habitat (Geo + Veg)	Biota	Significance	Risk Rating
1	CONSTRUCTION PHASE	**Clearance of vegetation within the wetland**	Removal of vegetation and soil disturbance by machinery and workers for site clearing and access	Loss of aquatic habitat & deterioration in aquatic ecosystem biodiversity and integrity	1	2	3	2	32	**LOW**
			Spills from machinery, maintenance, storage, handling activities or through dumping by construction workers							
			Colonisation by invasive alien plants							
		Excavations and infilling within the wetland	Removal of soils and infilling with building material for constructing foundations resulting in altered bed and banks	Habitat loss, geomorphological modifications, and indirect degradation through the initiation of erosion and sedimentation, as well as reduced biodiversity due to poor water quality	1	2	4	1	36	**LOW**
			Post construction re-profiling of slopes in the vicinity of the new culverts							
			Movement of construction machinery causing increased turbidity and sedimentation as well as possible spills / leaks causing pollution							
		Temporary flow diversion within the wetland and concrete mixing	Dewatering and flow diversion to allow for excavations and curing concrete within the permanent zone	Habitat deterioration due to changes in the physical, chemical and biological characteristics of the water; and altered soil wetness regime causing fatalities of dependant biota	4	3	2	1	40,5	**LOW**
			Pollutants from cement, machinery, maintenance, storage, handling activities may potentially enter the wetland							
2	OPERATIONAL PHASE	**Maintenance of the upgraded bridge**	Similar aspects to construction, such as vegetation clearance, flow diversion, sedimentation and potential water pollution.	Potential loss of aquatic habitat & deterioration in aquatic ecosystem biodiversity and integrity	1	1	1	1	30	**LOW**
		Impacts initiated in the construction phase	Colonisation by invasive alien plants and continued erosion and sedimentation.	Potential loss of aquatic habitat & deterioration in aquatic ecosystem biodiversity and integrity	1	1	2	1	42	**LOW**
		Inputs from emergency quarry pit discharge water	Risk of changes in the physical, chemical and biological characteristics of the water and altered soil wetness regime in affected reach of wetland	Deterioration in aquatic ecosystem biodiversity and integrity	2	3	1	2	57	**MEDIUM**

9 MITIGATION AND MONITORING

The following mitigation and monitoring recommendations are required to mitigate negative impacts on groundwater resources and aquatic habitat.

9.1 Mitigation

- The discharge water must undergo primary treatment prior to entering the wetland. This can potentially be achieved by a catch-pit and filter strip. The discharge water must be tested prior to entering the wetland to ensure that it complies with the General Limits and does not significantly alter the water chemistry of the wetland.
- The bridge design must allow for unhindered longitudinal flow through the structure and erosion protection downslope with energy dissipaters such as reno mattressing/ dense baffles. It must, as far as possible, promote diffuse flow patterns.
- Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the working corridor must be kept to a minimum and identified and demarcated clearly before any construction commences to minimise the impact. No indigenous vegetation may be cleared outside the working corridor. A maximum construction working servitude width of 25m should be allowed from the upstream side of the bridge and only 10m on the downstream side of the bridge. The servitude includes the temporary bypass road required for access.
- The longitudinal gradient must not be altered in a way that results in erosion downstream or impoundment of flows upstream. The cross sectional profile of the bed and banks must either be restored to pre-construction shape or a wider bed/gentler bank slope.
- Sedimentation must be minimised with appropriate measures. At least one silt fence should be placed on the downstream side of the bridge to trap disturbed sediments. This fence must be cleaned regularly to be effective (when de-silting takes place silt must not be returned to the watercourse). Figure 17 and 18 below provide an example of silt fences.
- A demarcated site at least 10 m away from water/wetland edge will be used for cement
- Vegetation removal must be avoided as far as possible. Bare areas must be covered with geotextiles or revegetated to prevent sediments eroding into the watercourse. Remove any alien plant species within the working corridor.
- Stockpiles must not be located within 20 metres of the riparian zone. The furthest threshold must be adhered to. Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles.
- Where possible, construction activities should be conducted during the drier months of the year to minimise the possibility of erosion, sedimentation and transport of suspended solids associated with disturbed areas and rainfall events. Planning for such a situation must be undertaken. See Figures 17 and 18 below.
- Any diversions must be temporary in nature and no permanent walls, berms or dams may be installed within the river. Sandbags used in any diversion or for any activity

within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns.

- Any bypass roads or working areas must be fully rehabilitated to the preconstruction condition.
- It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed.
- The stormwater channel and wetland area must be maintained through alien invasive plant species removal and the establishment of indigenous vegetation cover to filter run-off before it enters the freshwater habitat.
- The pit water discharge pipe outlet and stormwater channel must be designed to slow flows, trap nutrients and sediments, and be reinforced with robust indigenous vegetation and/or rip rap/reno mattressing/ check dams etc. to prevent erosion. See examples in Figure 16 below. No material placed within the stormwater drain must be able to enter the wetland during any phases of the project.

Figure 16: Examples of erosion protection and pollution control measures for consideration in pit water discharge management through the existing stormwater drain towards the wetland.

- All post-construction building material and waste must be cleared in accordance with the EMPr. The solid domestic waste must be removed and disposed of offsite.
- Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed.
- Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use, for the necessity, type proposed to be used, effectiveness and impacts of the product on aquatic biota.
- Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from stormwater.
- Cement/concrete batching is to be located in an area of low environmental sensitivity away from the wetland. No batching activities shall occur on unprotected ground. Adequate surface protection will be required. Concrete batching should be restricted to a level and bunded/sealed surface above the bank.

- Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site. In the event of a spillage that cannot be contained, and which poses a serious threat to the local environment, the following Departments must be informed of the incident in accordance with Section 30 of the National Environmental Management Act, Act 107 of 1998, within forty-eight (48) hours:
    - The Local Authority
    - Department of Water and Sanitation
- If any concrete, cast-in-place concrete, or grouting works are to be undertaken, a high potential exists for concrete and/or concrete leachate to enter the watercourse. Concrete, concrete leachate, grout and other uncured concrete substances (e.g. concrete bags for headwall construction) are highly toxic to aquatic organisms. To perform any concrete-related works, all water must be completely isolated prior to the commencement of any instream works. In addition, measures must be taken to prevent the incidence of concrete from entering a watercourse for a minimum of 48 hours after the works have been completed. This is to ensure that the concrete has fully cured.
- Construction must be immediately followed by rehabilitation. The landscape profile must be restored, as closely as possible, to the original land form prior to construction. For example, the pre-construction gradient of the wetland must be reinstated as accurately as possible, without humping or hollowing over the construction right of way so as to limit erosion. Maintenance must be undertaken as sensitively as possible (minimal footprint and minimal clearance) to prevent adverse impacts to the environment during widening.
- A monitoring programme shall be in place, not only to ensure compliance with the EMPr throughout the construction phase, but also to monitor any post-construction environmental issues and impacts such as increased erosion. It is recommended that monitoring be at least once a week during any significant work in the wetland.

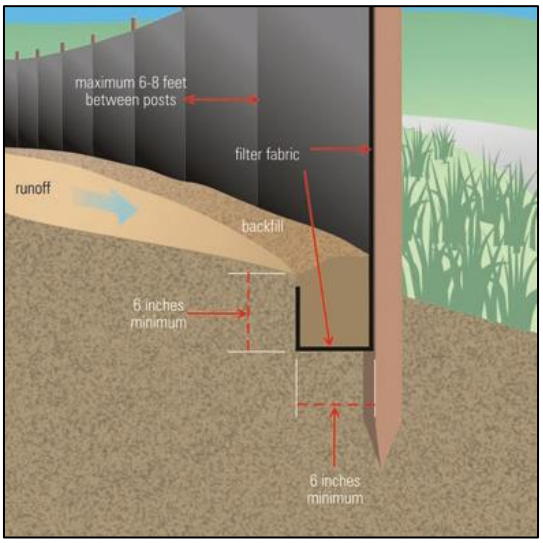

Figure 17: A diagram detailing technical details regarding the proper implementation of a silt fence

Figure 18: An example of a silt fence placed securely, directly downstream of construction to trap sediment that will then be removed from the riparian habitat

Recommendations from the geohydrological study:
From a geohydrological perspective the proposed activities in the WULA will have a minimal impact on the groundwater of the area however the same cannot be said for the surface water within the stream. It is recommended that pit lake water is not discharged into the stream. Ideally a fresh water specialist needs to assess the potential impact the pit lake water will have on the ecosystems downstream of the mine if this proposed activity is to proceed. (Refer to aquatic habitat assessment)

9.2 Monitoring

The monitoring of the activities is essential to ensure the mitigation measures are implemented. Monitoring for non-compliance must be done on a daily basis by the contractors. Monitoring should especially focus on preventing water pollution, erosion and sedimentation.

Compliance with the mitigation recommendations must be audited by a suitably qualified Environmental Control Officer with an appropriately timed audit report. It is imperative that an ECO monitor the site once before and then during construction, at least every week, or when especially high risk activities are being undertaken (such as concrete curing within the wetland). Photographic records of all incidents and non-compliances must be retained for at least 5 years. This is to ensure that the impacts on the aquatic habitat are adequately managed and mitigated against and the successful rehabilitation of any disturbed areas within the wetland occurs.

It is recommended that an audit focusing on wetland habitat be undertaken one year following project completion to ensure no long term impacts such as channel incision have occurred. If there is an event where the quarry pit water is discharged, it is recommended that an ECO monitor the site and develop further mitigation recommendations if the wetland is being impacted upon. The water quality of the pit water should be sampled prior to any discharge activities that may impact the wetland. The water quality of the wetland must be sampled and sent for analysis annually and it is recommended that these results also be included and interpreted in the annual audit report. A plan must be developed to investigate the source of the pollutants within the wetland and to manage any polluting activities

appropriately. For example, the Chloride levels increase substantially in the reach downstream of the quarry. This could be an indication of pollution from the property and must be remedied. This audit, with relevant photographs, must then also be sent to the Department of Water and Sanitation for review.

10 SECTION 27 MOTIVATION

The consideration of factors in Section 27 of the National Water Act, 1998 is necessary to assess all license applications for water use. These involve factors such as the National Water Resource Strategy, Catchment Management Strategies, the Reserve, existing lawful water use, the need to redress the results of past racial and gender discrimination, the socio-economic impact, the strategic importance of the use and others. The most important factor, the public interest, is essentially a synthesis of the other considerations (Perkins, 1998). The sub sections below discuss these considerations in terms of water use for the proposed project:

10.1 Section 27 (1) (A): Existing lawful water uses

Existing lawful water use is dealt with in this sub paragraph of section 27(1) and in sub paragraph (f), which refers to "the likely effect the water use to be authorized on the resource and on the other water users". The reasoning for this consideration is that it is necessary to know the amount of water currently being used in the catchment and by water users and the applicant. The result is the ability to determine the amount of remaining available water and therefore the amount available for allocation.

There is no known existing lawful water uses on the proposed properties. The amount of water currently being used within this catchment is also unknown. There are dams upstream and irrigation within the catchment that would probably require authorisation by the DWS. Therefore, DWS is responsible for determining the amount available for allocation.

However, the activities associated with this application will not affect the amount of water available to users downstream since the water being extracted is not from a watercourse but from an enclosed quarry pit that is largely fed by surface water runoff.

The Section 21 (c) and (i) Water Uses applied for do not involve water abstraction and will not have a detrimental impact after mitigation is implemented.

10.2 Section 27 (1) (B): The need to redress the result of past racial and gender discrimination

The allocation of water in the past, under the old act, discriminated against people from former homelands. In order to rectify past imbalances, it is necessary to consider the needs of all stakeholders in the catchment to ensure equity of allocation policy. According to Perkins (1998) "the human reserve must be met first, followed by the ecological reserve. Thereafter, other demands should be addressed in an equitable manner, with a view to addressing past imbalances". Therefore, it is necessary to accommodate previously

disadvantaged users and promote projects which actively reverse race and gender discrimination and empower and uplift historically disadvantaged individuals.

Equity Status: HAI (Historically Advantaged Individuals)
The water uses are applied for in order for Gran Sasso Quarry to continue to operate legally. The quarry provides permanent jobs to a number of HDI's and facilitate the transfer of skills. The jobs created by the quarry will contribute to reducing poverty in the affected households. The skills labourer's develop through working on the mine will make them more marketable in future and will potentially enable them to secure future jobs in the industry. The development will not discriminate against any race or gender group.

10.3 Section 27 (1) (C): Efficient and beneficial use of water in the public interest

Water needs to be allocated equitably and used beneficially for the public interest, while protecting the environment. As public trustee of the nation's water resources, the National Government, acting through the Minister, is ultimately responsible for this. Section 152 and 153 of the constitution of the Republic of South Africa and The National Spatial Development Perspective (2003) puts forward the objective that local government has an obligation to provide sustainable basic services to all citizens wherever they reside and to give priority to such basic needs of communities.

The application will not affect the amount of water available to users downstream since the water being extracted is not from a river or stream but from an enclosed quarry pit. Without this water the quarry and Redimix company would have to find an alternative source in a water scarce area. The use of the water from the quarry pit is in the people's best interest as the application will allow the quarry to operate legally, ensuring job security for a number of HDI's. The quarry also contributes positively to the economy by providing locally sourced aggregate for developments.

10.4 Section 27 (1) (D): The socio-economic impact of the water use

This sub section of the water use application considers the socio-economic impact of water use to be authorised or failure to authorise the water use. It is important to compare the two impacts in order to balance the benefits of allocating the licence with the advantages.

The application for a water use licence is applied with relation to the operation of Gran Sasso Quarry. The socio-economic impact of the water uses to be authorised will result in the improved job security for a number of employed individuals who are HDI. The Quarry also supports the local economy by providing the necessary aggregate required for development. If the application had rejected, the potential closure of the quarry would render the individuals un-employed and indirectly affect the families that these individuals support. Although the rejection will not threaten the economy, there will be less competition which would negatively affect the economy by reducing the availability of aggregate.

10.5 Section 27 (1) (E): Any catchment management strategy applicable to the relevant water resource

This is not applicable to the quarry pit water. To the applicant's knowledge, there is no catchment management strategy. The watercourse where the bridge is proposed to be

widened is not a major system but does feed the Diep River. It is assumed that the DWS official responsible for the area will know whether the water resources form part of any catchment management strategy.

10.6 Section 27 (1) (F): The likely effect of the water use to be authorised on the water resource and on other water users

It is necessary to consider the impact of the water use on the quantity and quality of the water resource being assessed. Again, this must be understood in the context of the equitable treatment of existing and potential water users in the catchment.

The quarry pit water that is proposed to be used for dust suppression and Redimix is not going to affect any water resource or other water users. But, the proposed emergency discharge of this pit water into the nearby watercourse may alter the physio-chemical characteristics if not monitored. Decreased water quality could affect downstream users if not prevented. However, there are few/no downstream users abstracting the water from the watercourse and the discharge of pit water is only anticipated during emergency events and is unlikely to occur.

Regarding the Section 21 (c) and (i) water uses, involving the widening of the existing road crossing, there will not be detrimental impacts upon the watercourse. If the mitigation measures are adopted during construction and operational phases, the activity will not change the PES and ecological processes will be maintained.

According to the Freshwater Habitat Assessment completed by Sharples Environmental Services (2019), the impact caused by applied water uses C & I during construction will result in an impact to the area of the wetland located directly upstream of the bridge. Potentially resulting in alien invasive species encroaching further into any disturbed areas and outcompeting indigenous vegetation thereby reducing biodiversity. The excavation and infilling of the wetland, as well as the disturbance from machinery and workers, will cause soil movement. These activities will negatively impact remaining biota, geomorphology, water quality, and flow within the watercourses as well as downstream habitat. Flows will also be significantly impacted through impoundment and/or flow diversions to install the additional bridge components. There is less risk to wetland habitat during the operational phase. However, the project may promote the establishment of disturbance-tolerant biota, including colonization by invasive alien species, weeds and pioneer plants if there is any ongoing disturbance near the riparian zone. These impacts can result in the deterioration of aquatic ecosystem integrity and a reduction/loss of habitat for aquatic dependent flora & fauna. The remaining water uses applied for relating to the pumping of the quarry pit water into the stormwater channel when it is in excess will impact the water quality and quantities. The physio-chemical composition of the pit water differs from the wetland water characteristics. The activity is unlikely to occur, and the impact would be buffered by the vegetated slope to the wetland, but it could alter the Chemical Oxygen Demand, Temperate, pH, and Total Dissolved and Suspended Solids. If not prevented, road debris, litter, and contaminants, including sand, silt, and dirt particles, will enter the wetland. The potential discharge of quarry pit water upslope of the edge of the valley bottom wetland will have an impact. The increase in flow quantities during discharge events will temporarily

alter the soil moisture regime. Vegetation is quick to respond to soil wetness characteristics and therefore the plant species composition of the wetland may change and/or deteriorate. Additionally, the increase in flow may cause further erosion downstream if not mitigated against.

However, the assessment of these potential impacts determined that they are of low significance.

10.7 Section 27 (1) (G): The class and the resource quality objectives of the water resource

Please see Section 7.5 of this report for information on the water resources at the site.

10.8 Section 27 (1) (H): Investments already made and to be made by the water user in respect of the water use

As Gran Sasso Quarry is an operational Quarry, the applicant has already made substantial financial investments in the development over the past 50 years. The Gran Sasso Quarry was started by the Ciolli brothers in 1951. The quarry was originally part of Henry Mellish's Durbanville farm until the brothers bought 12,85 hectares of the farm in 1953. Today Ciolli Bros is a 3rd generation family business situated in the Durbanville Hills area. The business sells aggregate products to the building and construction industries. The mining right for the property is held by Inkokeli Trading (Pty) Ltd and CBS Manufacturing is the company doing the mining.

The applicant has created a successful business through mining here but also for the Redimix company that uses water from the quarry pit. Without this water for Redimix, alternative sources would have to be used, in a water scarce area and great cost.

The pit water requires management and use in order for mining to continue. The bridge requires widening as there are traffic impacts from large vehicles crossing with only one lane.

Without authorisation in terms of the NWA (Act 36 of 1998) the mining will not be able to continue, and all investments will be lost.

10.9 Section 27 (1) (I): The strategic importance of the water uses to be authorised

The Municipal Spatial Development Framework released by the City of Cape Town in 2018 states various sub-strategies and land use policy guidelines that will be used to build an inclusive integrated and vibrant city. Policy 27 notes "Adopt a proactive planning approach to mining resource management". It is imperative that the City should proactively manage mining areas, this is done by ensuring that the mines are operating legally in order to ensure that the impacts on the areas surrounding the mines are mitigated and controlled. This is done by conducting the required studies and assessments which form part of this application.

The activity supports the regional economy and employment of previously disadvantages individuals. Both being of critical importance in the context of South Africa. It is therefore of national strategic importance.

10.10 Section 27 (1) (J): The quality of the water in the water resource which may be required for the reserve and for meeting international obligations

Water quality within the quarry pit and the watercourse is sampled and sent for laboratory analysis by the applicant. The results were compared to the South African Water Quality Guidelines for Aquatic Ecosystems. There are variables that exceed the targets, but these are likely to be elevated by upstream water pollution. The quality of the water within the operational phase is unlikely to change due to these activities. It is assumed that this section will also be addressed by the Department of Water Affairs as it is the authority's responsibility to determine the reserve of this catchment.

10.11 Section 27 (1) (K): The probable duration of any undertaking for which a water use is to be authorised

The probable duration of the undertaking of the water uses to be authorised will parallel the lifespan of the mine. Water uses (c & i) would have an indefinite/permanent duration as the water uses are related to the widening of a bridge.

11 PUBLIC PARTICIPATION PROCESS

The public participation process (PPP) forms part of the WULA process. The WULA public participation process was conducted in terms of Section 41 (4) of the National Water Act (Act No. 36 of 1998) (NWA) and Regulation 17 of the *Regulations regarding the procedural requirements for water use licence applications and appeals (2017)*. This report was compiled in accordance with Regulation 19.

The WULA 60-day PPP commenting period ended on 3 March 2021. The goal of PPP is to enable Interested and Affected Parties (I&AP's) to voice their opinions and concerns regarding the proposed activities associated with the water uses. The comments provided by I&AP's are valuable contributions to the decision-making process since it enables the evaluation of all aspects of the activity and its effect on the environment. Therefore, for the public participation process to be adequate, the application should be brought to the attention of all relevant organs of state, interested persons and the general public.

An I &AP database was compiled, which identified affected adjacent landowners, authorities, organs of state and other affected (Table 13). These I&APs and the general public were then notified accordingly. No comments were received during the PPP process.

Table 13: Register of I&APs

REGISTER OF INTERESTED AND AFFECTED PARTIES			
AUTHORITIES	**CONTACT PERSON**	**DATE REGISTERED**	**CONTACT DETAILS**
STATE DEPARTMENTS			

Department of Water, Sanitation and Human Settlements Region: Berg-Olifants – Belville	Official: Mrs Firdous Rhoda	Automatically registered	021 941 6311 RhodaF@dws.gov.za
ORGANS OF STATE			
City of Cape Town Municipality: Municipal Manager	Achmat Ebrahim	Automatically registered	Private Bag X9181, CAPE TOWN, 8000 Phone: 021 400 1111 Fax: 021 400 1313 E-mail: Lungelo.mbandazayo@capetown.gov.za city.manager@capetown.gov.za
Ward Councillor - Ward 105	Mr Ruan Beneke	Automatically registered	Cell number: 084 509 5599 Email: Ruan.Beneke@capetown.gov.za

AFFECTED LANDOWNERS / OCCUPIES			
PORTION/ ERF	**NAME**	**PROPERTY DETAILS**	**CONTACT DETAILS**
Portion	Andre Wilson	Name: TYGERVALLEY HILLS Farm Nr: RE/1474 SG Code: C01600000000147400000	021 557 1112 info@ciollireadymix.co.za minemanager@ciollibros.co.za
Portion	Andrew Mellish	Name: TYGERVALLEY HILLS Farm Nr: RE/1537 SG Code: C01600000000153700000	welbeloond@gmail.com 082 509 0224
Portion	Emira Property Fund	Name: MELLISH Farm Nr: 17/205 SG Code: C01600000000020500017	aread@broll.com bmart@broll.com sreiley@emira.co.za
Portion	AP Pretorius Family Trust	Name: n/a Farm Nr: 1534 SG Code: C01600000000153400000	icam1@mweb.co.za juan@vhgroup.co.za atlasgardenswc@gmail.com

The following public participation has been conducted:

- Notifications via email notification, direct telephonic calls and site notices.
- Notice boards (See photograph below) were fixed at the appropriate visible location.
- Written notice via emails to affected adjacent landowners, and other affected parties. Identified neighbouring I&AP's are shown in the register below.
- The public participation commenting period of more than 60 days was provided for the WULA.
- The technical report and annexures were made available on the SES website, and are still available, and provided on request through bulk sharing sites such as WeTransfer.

Below is a picture of the email notifications sent out (Figure 19).

From: lloyd@sescc.net
Sent: Wednesday, 06 January 2021 2:48 PM
To: lloyd@sescc.net
Subject: PUBLIC PARTICIPATION PROCESS FOR THE WATER USES ASSOCIATED WITH GRAN SASSO QUARRY ON THE REMAINDER OF FARM TIGERVALLEY HILLS 1474.

Dear Commenting Authorities, Organs of State and Identified Interested & Affected Parties (I & AP's).

RE: THE 60-DAY COMMENTING PERIOD ON THE WATER USE LICENCE ON THE REMAINDER OF FARM TIGERVALLEY HILLS 1474.

Sharples Environmental Services cc (SES) has been appointed to undertake the WULA process in terms of the National Water Act, 1998 (Act No. 36 of 1998), as amended and the National Water Act, 1998-Regulations regarding the procedural requirements for Water Use Licence Applications and Appeals for activities proposed by Inkokeli Trading (Pty) Ltd at the Gran Sasso Quarry.

Inkokeli Trading (Pty) Ltd proposes to:

- Dewater the quarry pit for continued gravel mining;
- Temporarily store this water for use in mining operations (e.g. dust suppression);
- Discharge surplus water following high rainfall events; and
- Widen an existing road crossing over a watercourse

WATER USES: Section 21 (f), (g), (c) and (i) water uses in terms of the NWA (Act 36 of 1998)

This email serves to inform you that the **Technical document** is now being made available for comment.

The document is available for download from our website https://www.sescc.net

The **Technical document** is available for comment until 03 March 2021. Comment on the document and proposed water uses must therefore be submitted in writing on or before 03 March 2021 by means of the following: Fax: 044 874 5953, email: debbie@sescc.net or postal address: P.O Box 9087, George, 6530.

Please do not hesitate to contact me if you have any queries.

Kind regards,

Lloyd Barnes
Environmental Assessment Practitioner

TEL: (021) 554 5195 | **FAX:** 086 575 2869
EMAIL: lloyd@sescc.net

Tableview | Cape Town

WEB: www.sescc.net

Figure 19: Picture of the notification email sent to all identified I&APs

The Notice board is shown in the photograph below. The relevant information such as: location, project description, water uses, applicable legislation, invitation to register and comment, 60 day commenting period, as well as contact details for the consultant, were all displayed on the Notice Boards. See Figure 20 below.

Figure 20: Photographs of Notice Board.

No comments were received during the PPP process. None of the I&AP's raised any concerns regarding the water use licensing application for activities associated with Gran Sasso Quarry. There is no anticipated disturbance to any other water users.

12 CONCLUSION

The proposed activities require authorisation in terms of Section 21 (c), (f), (g) and (i) of the NWA (Act 36 of 1998) and include widening of an existing bridge, dewatering of the mined-out quarry area and using this water for dust suppression and Redimix production. The application also includes storing the water from the pit. This report was compiled to inform the decision of the Department of Water and Sanitation regarding the authorisation of the proposed water uses.

Following aquatic ecologist and geohydrologist assessment, it was determined that the only water resource at risk of being impacted upon by the project is the unchanneled valley bottom wetland that flows through the property. It is highly unlikely that any groundwater contamination will occur. Both studies deem the activities as acceptable, following the adoption of the recommended mitigation measures, especially the pre-treatment of the discharged pit water prior to it entering the watercourse.

A public participation process was conducted to obtain comment from I&AP's. No issues were raised by any stakeholders. There are significant positive socio-economic implications to the authorisation of these water uses. It is recommended that the DWS authorise the water use activities of this application, under the conditions recommended by the specialists and those within this report.

All the technical information requested is contained in annexures and will be uploaded onto e-WULAAS.