Application for an Environmental Authorisation for the Proposed Development of a Tyre Storage and Pre-Processing Depot Located on Olyvenhoutsdrift Plot 1298 Dawid Kruiper Local Municipality, ZF Mgcawu District Municipality, Northern Cape

Draft Basic Assessment Report (Draft BAR)

DENC Reference Number:

Report Prepared for

Magogudi Construction Projects CC

Report Prepared by

GEOLOGICAL CONSULTING SERVICES PTY (LTD)

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Executive Summary

Introduction

Who is conducting the impact assessment and compiling the EMPr?

Ndi Geological Consulting Services (Pty) Ltd (Ndi Geological) has been appointed by Magogudi Construction Projects CC as the independent Environmental Assessment Practitioner (EAP) to conduct the application for an Environmental Authorisation (EA) for the proposed waste tyre temporary storage and pre-processing depot. The footprint of the proposed waste tyre storage and pre-processing depot will be approximately 4 ha and will be located on Olyvenhoutsdrift Plot 1298 Dawid Kruiper Local Municipality, ZF Mgcawu District Municipality, Northern Cape.

The reports and documentation for the EA application process will be compiled and finalised for submission to the Northern Cape Department of Environment and Nature Conservation (DENC) in terms of the NEMA for consideration and decision making.

Who will evaluate the Draft BAR and EMPr?

Before the construction and operation of the proposed waste tyre temporary storage and pre-processing depot can proceed, approval has to be obtained from the regulatory authorities. The Basic Assessment Report (this report) will be submitted to the Competent Authority (CA), DENC, for review and decision making as to whether the proposed waste tyre temporary storage and pre-processing may proceed or not.

Description of the Proposed Development

The activities to be undertaken on the site involve temporary storage and pre-processing (baling) of waste tyres at the proposed depot that has a total operational footprint of ±4 ha. The types of tyre waste to be handled on site will include passenger vehicle tyres, truck tyres, motorbike tyres, 4x4 vehicle tyres, light commercial vehicle tyres and Off-The-Road tyres (OTR).

The operation will be mechanized and involve the following process:

- *Temporary Storage: Receiving, offloading and sorting of waste tyres at the temporary storage area, according to tyre sizes. Trucks / bakkies deliver 100% of old tyres (scrap) to the depot for temporary storage. It is expected that ten deliveries per day will be received. Waste tyres will be offloaded manually or by use of support vehicles, e.g. forklift, depending on size of tyres, stacked and stored according to the requirements of the Waste Tyre Regulations, R. No. 149 of 13 February 2009.*

Once tyres have been stockpiled and stored on site, they will be subject to the following pre-processing activities:

- *Baling: Scrap tyres are cut / shred / baled in small packages of bales. The baling (compaction) will be done through a mechanised process. The baling machine will be placed on a flat base in the depot, and the tyres will be deposited in the loading chamber and compressed by twin vertical rams. When enough compressed tyres exist in the chamber to form a bale, a wire is then secured around the material and a bale material is produced. The bales will then be moved from the baling area using a forklift vehicle and baled tyres are temporally stored in the storage area.*

- *Removal of Bales and Waste Tyres The baled tyres and other tyres will be removed from site on a regular basis by approved transporters and delivered to approved processors for recycling purposes. Small packages of baled tyres are loaded onto trucks (5-7 tons) and transported to a scrap tyres storage facility.*

The required infrastructure will include:

- *A mobile office block; and*
- *Mobile chemical toilets for the staff on site.*

The required services such as electricity and roads will be provided by the Dawid Kruiper LM.

Project Need and Desirability

The municipal IDP (2017/2022) shows that waste management forms part of the development priorities (Priority 7) of the Dawid Kruiper Local Municipality. According to the IDP, sanitation, waste management and waste removal are viewed as Key Performance Areas (KPA 1) for service delivery and infrastructure development. Under this KPA, the LM intends to regulate and manage waste disposal to prevent pollution of the natural environment and natural resources. The proposed establishment of a public waste drop off depot within the area will prevent and minimize illegal dumping activities, thereby preventing pollution of the natural environment and natural resources.

The proposed activity also forms part of an Integrated Waste Management approach aimed at reducing the amount of waste transported to the landfill site and prevent illegal dumping. In addition, the proposed activity supports the implementation of the National Waste Management Strategy (NWMS) which promotes waste recovery and waste beneficiation. Any anticipated and potential negative impacts are adequately mitigated in accordance with the Environmental Management Programme (EMPr) developed for the depot and is attached as Appendix E.

The overall benefits of the proposed activity include the following:

- *Social:*
  - *Waste management services improved; and*
  - *Public health improved from reduced pollution and illegal dumping sites that attract vectors such as rodents and flies.*

- *Economic*
  - *Temporal and permanent jobs result in increased quality of life; and*
  - *Economic development in the area.*

- *Environmental*
  - *Improved environmental well-being;*
  - *Eradication of illegal dumping sites;*
  - *Improved waste management system;*
  - *Reduced pollution from illegal dumped waste and*
  - *Improved land use management.*

Alternatives Considered

No alternatives outside of the no-go alternative were considered during the impact assessment. The selection of sites was conducted by the Department of Environmental Affairs (DEA)'s Waste Bureau during the bidding process. The identified site satisfied the requirements of the Waste Bureau in that it meets the capacity needs in the Northern Cape. Other requirements include:

- *Be at least 7 500m^2 in size, including pre-processing areas, office space etc, the site is approximately 40 000 m^2;*
- *Have electricity and water points or proof of application for the facilities should be included;*
- *Have easy access to big trucks and links. The road should be wide enough to accommodate big trucks. There should also be turning areas for these big trucks (Road width and turning ability);*
- *Have sufficient parking space for the trucks;*
- *Be within the correct zoning as per the relevant municipal land use and planning by-laws for the storage of waste tyres and pre-processing (baling, shredding, de-beading etc.); and*
- *Should be located in or within a radius of about 50km to Kimberly, Upington and/or Kuruman.*

Summary of the Baseline Environment

The baseline environment was assessed during each of the specialist studies undertaken as part of the EA application process. This was to determine the current status of the environment surrounding the proposed waste tyre storage and pre-processing depot. The baseline environment associated with the project is broadly summarised below with detailed baseline descriptions for each of the environmental aspects discussed in Section 9.

A summary of the main baseline aspects is included in Table ES-1, with more detail included in Section 9 of the report

Table ES-1: Summary of the Profile of the Receiving Environment

Aspect	***Description***
Climate	*The climate in Upington is called a desert climate, with virtually no rainfall throughout the year. In a year, the average rainfall is 180 mm. The climate is classified as BWh by the Köppen-Geiger system. The average annual temperature in Upington is 19.3 °C.* *The study area has cold winters and warm summers with temperatures ranging from an average monthly maximum of 26.2 °C in January to an average monthly minimum of 11.5 °C in July.*
Topography	*The project area is characterised by slightly undulating plains. The topography across the site varies from slightly undulating to flat plains with the elevation being 800 mamsl. The slopes of the study area are classified as being between 1 and 9 degrees.*
Geology	*The 1: 1 000 000 geological data shows that the site is underlain by predominantly granitic gneiss within the Louisvale Granite of the Keimoes Suite. These granitic rocks are deeply underlain by metamorphosed amphibolites and serpentines within the Jannelsepan Formation of the Areachap Group. Silcrete and calcrete deposits are superimposed over these formations and vary in thickness. Dolerite dyke and sheet intrusions are also sporadic in the area*
Land use, land capability and soils	*The current land-use on the project site is vacant land, although it was previously used for limestone mining and cattle farming. Neighbouring farms are being used for crop cultivation, livestock grazing and game farming.*

Aspect	*Description*
	Land Capability Map: The site is classified as non-arable with low potential grazing land. *Agricultural Potential Map: The project site is classified as low agricultural potential.*
Hydrology	*The project area is situated within the quaternary catchments, D73F in the Lower Orange Water Management Area (WMA). The study area is drained mainly by surface run-off (i.e. sheet wash) with surface water flowing into perennial rivers and wetlands of the study area. This water eventually drains into the Orange River that occurs to the east of the site.* *The surface run-off ranges between 5.12 to 9.60 M/m^3/a (WR2012, 2015). The catchment has an annual evaporation of 2 650 mm which is high considering the MAP of the area.* *The topography on site is flat and has an elevation ranging from approximately 815 mamsl on the north-western perimeter to 806 mamsl on the south-eastern perimeter. The property is characterised by a flat slope towards the Orange river to the southeast.* *A dendritic drainage pattern dominates the surrounding areas. The property drains from northwest to southeast.*
Groundwater and Groundwater Quality	*The National Groundwater Archive (NGA) database shows that there are approximately 37 boreholes within a 15 km radius from the site. Based on historical NGA data from 1998, the water levels range from approximately 13.8 to 17.4 mbgl east of the site opposite the Orange River. Older data (1984 - 1986) suggests that the water levels south of the site ranged from approximately 4 - 8 mbgl with water levels southwest of the site approximately 4 mbgl. Vegter (1995) calculated that the water level depths for the area surrounding the site range between 11.9 and 50.1 m. The calculation by Vegter (1995) may not be highly applicable as the calculation included data more than 100 km from the property.* *The average depth of the water strikes from all of the NGA borehole data is 41.4 mbgl with and average blow yield of 1.3 ℓ/s. Vegter's (1995) calculations show an average aquifer depth of 24 m. The elevated blow yield calculated for the NGA data is due one of the boreholes approximately 11 km northeast of the property yielding 7.0 ℓ/s which elevated the average calculation. By using the P5 and P95 of the Mean Annual Precipitation (MAP) along with a recharge range of between 1 and 4 %, the average available groundwater abstraction rate was calculated between 2.89E-05 and 0.0007 ℓ/s/a for Portion 1298 of Olyvenhoutsdrift. This calculation does not take any storage into consideration and is therefore considered to be conservative.* *According to on Vegter (1995) the average TDS ranges between 585 and 3340 mg/ℓ. The TDS will fluctuate seasonally with the increases and decrease of water levels due to rainfall recharge (if sufficient recharge is received). The high evaporation will cause higher saline conditions leading to high chloride concentrations expected that will be the largest contributing constituent to the TDS.*

Aspect	*Description*
Wetlands and Aquatic Ecology	*The National Freshwater Ecosystems Priority Areas (NFEPA) database indicates that there are no wetlands located on the affected property. The perennial Orange River occurs 1 kilometre east of the site.*
Biodiversity	***Flora*** *The development footprint area is located in a Critical Biodiversity Area 2 (CBA-2).* *The biodiversity specialist assessment resulted in the identification of 2 major vegetation / ecological units. The identified vegetation units include Rhigozum trichotomum - Stipagrostis obtusa dwarf shrubveld and Senegalia mellifera - Aristida limestone quarry.* *A few individuals of the protected species Vachellia erioloba (camel thorn) were documented on site. There is one red data species Antimima mucronata (Vulnerable)) potentially occurring in the QDS of the study area.* *Three 1b Alien Invasive Plant Species (Argemone ochroleuca, Salsola kali and Prosopis glandulosa) were identified during the survey.* ***Fauna*** *The mammals in the area are mostly represented by generalised species such as rodents, scrub hare, porcupine, warthog and smaller antelope (steenbok, common duiker) that will move through the area while foraging. The connectivity[1] of the project site is low.* *Two major bird habitats were identified within the borders of the study site namely* • *Microphyllous woodland; and* • *Dwarf shrubveld / grassland.* *Typical herpetofauna species associated with arid and semi-arid habitat types occur in the study area. Venomous species such as the puff adder and cape cobra is expected to occur in the study area, although the presence of these snakes is dependent on the presence of their prey species (rodents, frogs etc.).* *According to the existing databases and field survey a number of fauna species included in the IUCN red data lists can potentially be found in the study area.*
Heritage Resources	*The Heritage Resources Assessment undertaken for the proposed project found that there are no archaeological and heritage sites that will be affected by the project. The study found that the proposed project footprint has been altered and transformed extensively by quarrying. However, a scatter of Stone Age archaeological material was noted along the more pristine northern portion of the project footprint.*

[1] C**onnectivity (habitat connectivity)** - Allowing for the conservation or maintenance of continuous or connected habitats, so as to preserve movements and exchanges associated with the habitat.

Aspect	Description
Socio-economic	This project area falls within the Dawid Kruiper Local Municipality, which was established after the August 2016 local elections by merging Mier and //Khara Hais Local Municipalities. The unemployment rate decreased significantly from 34% in 2001 to 22.1% in 2011. There was a huge decline in the youth unemployment rate too from 42.3% in 2001 to 29% in 2011, but the youth unemployment rate is still very high in comparison with the overall unemployment rate of the municipality. Although about 44.7% of the Dawid Kruiper population are between 14 and 35 years old, youths remains relatively marginalised.

Anticipated Impacts

Risks and potential impacts were categorised according to the type of activity undertaken and the relation to each environmental variable. Findings from specialist studies have been incorporated into the BAR. The following impacts as described in Table ES-2 are anticipated because of the construction and operation phases of the project:

Table ES – 2: Anticipated Impacts

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible temporary job opportunities during the construction phase of the proposed waste tyre storage and pre-processing depot. Temporary creation and support of small informal businesses during the construction and operational phases of the project.
Hydrogeology	Possible, but limited groundwater contamination.
Surface water	Possible, but limited surface water contamination.
Air Quality	Possible, but limited impact on air quality in the area.
Noise	Possible generation of noise during the construction and operational phases of the proposed waste tyre storage and pre-processing depot.
Visual	Possible visual impacts during the construction phase of the proposed waste tyre storage and pre-processing depot.
Soils/Land Use/Land Capability	Possible impacts on soils during the construction phase of the proposed waste tyre storage and pre-processing depot.
Biodiversity	Possible loss and impacts on biodiversity due to construction activities.
Heritage	Possible impacts on graves and heritage resources during the construction phase of the proposed waste tyre storage and pre-processing depot
Wetland	Possible impacts on wetlands during the construction and operational phases of the proposed waste tyre storage and pre-processing depot

Impact Assessment Process

Approach to the Environmental Impact Assessment

An Environmental Impact Assessment (EIA) seeks to identify the environmental consequences of a proposed project from the beginning, and helps to ensure that the project, over its life cycle, will be environmentally acceptable, and integrated into the surrounding environment in a sustainable way. Two parallel processes were followed; the environmental technical and impact assessment process and the stakeholder engagement process.

Stakeholder Engagement Process

The stakeholder engagement process, which was undertaken for this project, was aimed to comply with the relevant legislative requirements of the NEMA, as prescribed in Chapter 6 of the NEMA and GNR 982. The process included:

- *Development of a stakeholder database:*
- *The stakeholder database comprises a variety of stakeholders identified using GIS cadastral data and surveyor general website (*www.deedsweb.gov.za*), from responses from the notification letters, newspaper advertisements and on-site notices placed around the project site,*
- *Providing stakeholders with the opportunity to participate in the impact assessment process and to register as an Interested and Affected Party (I&AP) as announced in May 219 through the following means:*
    - *Letter of invitations to register;*
    - *Newspaper advertisements placed in the Kathu Gazette;*
    - *Site notices were erected at several places in and around the study area; and*
    - *Collation of comments received into a Comments and Responses Report (CRR).*

The Draft BAR was compiled in terms of the requirements of GNR 982. All comments received during the announcement phase of the stakeholder engagement process were incorporated into Draft BAR and collated into a Comments and Responses Report (CRR). The initial comment period for the Draft BAR was scheduled for 16 August 2019 to 16 September 2019, however due to requests from stakeholders for more time to review and comment, the review and comment period was extended to 30 September 2019.

All issues, comments and suggestions received from stakeholders will be collated into a CRR. Where necessary, comments from stakeholders will be incorporated into the Final BAR that will be submitted to the DENC for decision-making.

Specialist Studies

The following specialist studies were conducted as part of the EA application process:

- *Biodiversity studies;*
- *Hydrological and geohydrological assessment;*
- *Soils, Landuse and Agriculture Potential; and*
- *Heritage resources.*

The findings from the specialist studies were incorporated into the BAR and EMPr. The EAP also included an assessment of the impacts on the socio-economic environment, wetlands, visual, noise, waste management, climate change and stormwater management.

Summary of the Impact Assessment Process

This section contains the assessment of potentially positive and negative environmental impacts that could possibly be as a result of the construction and operation of the waste tyre storage and pre-processing depot.

Specific emphasis was placed on any relevant environmental, social and economic impacts identified by the specialist studies, comments received during the stakeholder engagement process, issues highlighted by relevant authorities; as well as a professional judgement of the EAP team through appraisals on the project description, listed activities and the receiving environment.

The objectives of the assessment for each of the potential environmental impacts identified was to determine their significance and to identify mitigation measures that may be implemented to reduce the impacts to an acceptable level where required.

The anticipated impacts were rated against a set impact rating methodology ranging from Low to High. The summary of the quantitative impact assessment can be found in Table ES- 1.

Table ES- 1: Summary of potential Impacts

Phase	Aspect	Impact	Environmental Impact Significance Before Mitigation	Environmental Impact Significance After Mitigation
CONSTRUCTION PHASE	Social-economic	Possible boost in short term employment and local small business opportunities.	Medium-Low (+)	Medium-Low (+)
		Generation of dust potentially resulting in a health and nuisance impact.	Medium-Low (-)	Low (-)
		Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	Medium-Low (-)	Low (-)
		Visual impact assessment as a result of movement of vehicles in the project area.	Low (-)	Low (-)
		Potential squatting of job seekers.	Low (-)	Low (-)
	Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	Medium-High (-)	Low (-)
		Improper storage and handling of hazardous materials leading to groundwater contamination.	Medium-High (-)	Low (-)
	Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery.	Medium-Low (-)	Low (-)
		Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	Medium-Low (-)	Low (-)
		Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	Low (-)	Low (-)
		Increase in silt load in runoff due to movement of vehicles on site.	Medium-Low (-)	Low (-)
		Deterioration of water quality as a result of improper handling/ of chemicals.	Medium-Low (-)	Low (-)
		Poor stormwater management leading to runoff from stockpiled material removed causing sedimentation of the water resources.	Medium-Low (-)	Low (-)

		Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	*Medium-Low (-)*	*Low (-)*
		Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site clearing occurred.	*Medium-Low (-)*	*Low (-)*
	Wetlands and Aquatic Ecosystems	*Localised changes to the riparian areas as a result of vegetation clearing.*	*Low (-)*	*Low (-)*
		Loss of habitat and wetland ecological structure as a result of site clearance activities and uncontrolled wetland degradation.	*Low (-)*	*Low (-)*
		Impact on the wetlands systems as a result of changes to the sociocultural service provisions.	*Low (-)*	*Low (-)*
		Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources.	*Low (-)*	*Low (-)*
		Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat.	*Low (-)*	*Low (-)*
		Impact on the hydrological functioning of the wetland systems.	*Low (-)*	*Low (-)*
	Air Quality	*The movement of vehicles and machinery during the construction phase may result in possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.*	*Medium-Low (-)*	*Low (-)*
		Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	*Low (-)*	*Low (-)*
	Climate change	*Emissions of Green House Gases as a result of the use of construction vehicles and machinery.*	*Low (-)*	*Low (-)*
		The proposed project has the potential to impact on local graves within the area.	*Low (-)*	*Low (-)*

	Heritage and Palaeontology Resources	*The proposed project has the potential to impact on sites of archaeological importance.*	*Low (-)*	*Low (-)*
		Construction activities have potential to impact on palaeontological resources	*Low (-)*	*Low (-)*
	Flora	*Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of the depot.*	*Medium-Low (-)*	*Low (-)*
		Loss of localised floral species diversity including RDL and medicinal protected species due to site clearance and establishment of the depot.	*Medium-Low (-)*	*Low (-)*
		Potential spreading of alien invasive species as indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.	*Medium-Low (-)*	*Low (-)*
	Fauna	*Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.*	*Medium-Low (-)*	*Low (-)*
		Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	*Medium-Low (-)*	*Low (-)*
		Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	*Medium-Low (-)*	*Low (-)*
		Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	*Low (-)*	*Low (-)*
		Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	*Low (-)*	*Low (-)*
	Visual	*Scaring of the landscape as a result of the clearance of vegetation.*	*Low (-)*	*Low (-)*
		Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	*Low (-)*	*Low (-)*
		Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	*Low (-)*	*Low (-)*
	Noise	*The use of vehicles and machinery may generate nuisance noise in the immediate vicinity*	*Low (-)*	*Low (-)*

	Soils, land use and land capability	*Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.*	*Medium-Low (-)*	*Low (-)*
		Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	*Medium-Low (-)*	*Low (-)*
		Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	*Medium-Low (-)*	*Low (-)*
		Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	*Medium-Low (-)*	*Low (-)*
	Traffic	*Increase in traffic volumes as a result of transportation of materials to site which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.*	*Medium-Low (-)*	*Low (-)*
		The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	*Medium-Low (-)*	*Low (-)*
	Waste Management	*Poor waste management could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.*	*Medium-Low (-)*	*Low (-)*
		Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	*Medium-Low (-)*	*Low (-)*
		Stockpiling material may result in secondary pollution and contamination of the watercourses.	*Medium-Low (-)*	*Low (-)*
OPERATIONAL PHASE	*Socio-Economic*	*Uncontrolled access of private property during operation may result in conflict with affected landowners and occupiers.*	*Low (-)*	*Low (-)*
		Negative impact as a result of additional trucks on the roads, impacting on local communities' health and safety.	*Low (-)*	*Low (-)*
		Negative impact on, local community health and safety due to potential influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation.	*Low (-)*	*Low (-)*

		Possible boost in short term employment and local small business opportunities.	*Medium-Low (+)*	*Medium-Low (+)*
	Groundwater	*Seepage of mass into the groundwater environment leading to pollution of groundwater resources*	*Low (-)*	*Low (-)*
		Water supply from groundwater for domestic and fire-fighting purposes	*Medium-Low (-)*	*Low (-)*
		The use of vehicles during the operational phase may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the soils and groundwater resources.	*Medium-Low (-)*	*Low (-)*
		Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	*Medium-Low (-)*	*Low (-)*
		On-site septic tank leakage resulting in pollution of groundwater resources	*Medium-Low (-)*	*Low (-)*
	Surface Water	*Temporary storage of tyres in close proximity to a water course has potential for soil and river water contamination from leachate originating from the tyres stored on site.*	*Medium-Low (-)*	*Low (-)*
		Heavy rainfall events and associated sheet run-off towards the Vaal River has potential for contamination of off-site surface water due to uncontained on-site surface water run-off .	*Medium-Low (-)*	*Low (-)*
		Accidental fires and extinguishing of on-site fires results in potential contamination of soil, groundwater, and surface water run-off during a fire event if contact fire-fighting water is not contained	*Low (-)*	*Low (-)*
	Biodiversity	*Continued destruction of potential floral habitats for species of conservational concern as a result continual disturbance of soils leading to altered floral habitats, erosion and sedimentation.*	*Low (-)*	*Low (-)*
		Impact on floral species of conservational concern as a result of an increased in alien species proliferation and ineffective rehabilitation of exposed areas	*Low (-)*	*Low (-)*
		The use of vehicles during for dropping off and collection of waste tyres may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils.	*Medium Low (-)*	*Low (-)*

		Loss of faunal habitat and ecological structure as a result of increased fires during operation and introduction of alien species, leading to transformation of the natural habitat	*Low (-)*	*Low (-)*
	Wetlands and Aquatic Ecosystems	*Loss of habitat and wetland ecological structure as a result of continual wetland disturbance and uncontrolled wetland degradation.*	*Low (-)*	*Low (-)*
		Impact on the wetlands systems as a result of changes to the sociocultural service provisions through continued uncontrolled waste management and wetland disturbance.	*Low (-)*	*Low (-)*
		Impact on the hydrological functioning of the wetland systems as a result of reduced wetland footprints and uncontrolled disturbance.	*Low (-)*	*Low (-)*
	Soils Land use and Land Capability	*Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from vehicles).*	*Low (-)*	*Low (-)*
	Air Quality	*The operational phase of the project will require vehicular movement which may result in Possible increase in dust generation, PM10 and PM2.5 as a result of use of heavy machinery, and material movement.*	*Medium-Low (-)*	*Low (-)*
		Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	*Medium-Low (-)*	*Low (-)*
	Visual	*The temporary storage of waste tyres on site may result in visual impacts as the waste tyres may be visible from the nearby residents and properties.*	*Medium-Low (-)*	*Low (-)*
	Noise	*The use of vehicles and machinery during the operational phase may generate noise in the immediate vicinity*	*Low (-)*	*Low (-)*
	Traffic	*Increase in traffic volumes as a result of movement of vehicle to and from the waste tyre storage and pre-processing depot.*	*Low (-)*	*Low (-)*
	Climate	*Emissions of Green House Gases as a result of the use of vehicles and, heavy moving machinery, generators etc.*	*Low (-)*	*Low (-)*
	Waste Management	*Inadequate waste management may result in contamination of water resources and the environment in general.*	*Low (-)*	*Low (-)*

Environmental Management Programme

The EMPr for the construction and operation of the waste tyre storage and pre-processing depot has been included in Appendix E. The mitigation measures listed in the EMPr are deemed adequate to avoid further degradation of the environmental features. In the long term, effective implementation of mitigation measures (as recommended in the EMPr) may also result in positive impacts in terms of control of alien vegetation as well as erosion control.

Mitigation measures from specialist studies have also been incorporated into the Environmental Management Programme compiled for the project.

Conclusion

Ndi Geological has undertaken the impact assessment and EMPr for the proposed waste tyre storage and pre-processing depot in accordance with the requirements of the NEMA. This has included a comprehensive stakeholder engagement process which has sought to provide stakeholders with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the impact assessment of this study. Specialist input has been included for all key environmental aspects.

To date, there are no fatal flaws or red flags that have been identified for the proposed project. Findings from specialist studies have been incorporated into the BAR and EMPr.

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to successfully mitigate the majority of the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr will assist the project in striving towards the principles of the NEMA.

The majority of the impacts identified were classified as low (-) to medium (-) without mitigation. All the identified impacts can be mitigated to low (-) significance impact rating.

The project team believes that the impact assessment undertaken for the proposed project fulfils the process requirements of the NEMA. The EAP recommends that an Environmental Authorisation be issued by the DENC and that the project should be conducted under duty of care and must be in accordance with the recommendations that were included in this BAR and the accompanying EMPr.

It is therefore recommended that the construction and operation of the waste tyre storage and pre-processing depot is allowed to proceed.

YOUR COMMENT ON THE DRAFT BASIC ASSESSMENT REPORT (DRAFT BAR)

An electronic copy can be downloaded from http://www.ndigeoservices.co.za/ and will also be available on Dropbox on request from the Independent Environmental Assessment Practitioner (EAP). Interested & Affected Parties (I&APs) are requested to provide comments and information on the following aspects of the proposed project:

An electronic copy will also be available on Dropbox on request from the Independent Environmental Assessment Practitioner (EAP). Interested & Affected Parties (I&APs) are requested to provide comments and information on the following aspects of the proposed project:

1. Information on how I&APs consider that the proposed activities will impact on them or their socio-economic conditions;
2. Written responses stating their suggestions to mitigate the anticipated impacts of each activity;
3. Information on current land uses and their location within the area under consideration;
4. Information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied; and
5. How to mitigate the potential impacts on their socio-economic conditions and to make proposals as to how the potential impacts on their infrastructure can be managed avoided or remedied.

DUE DATE FOR COMMENT

The Comment Period for the Draft BAR has been extended to 30 September 2019

Please submit comments to the EAP:

Ndivhudzannyi Mofokeng
Ndi Geological Consulting Services (Pty) Ltd
38 Ophelia Street
Kimberley, 8301
Cell: 082 760 8420
Tel: 053 842 0687
Fax: 086 538 1069
atshidzaho@gmail.com
ndi@ndigeoservices.co.za

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to Ndi Geological Consulting Services (Pty) Ltd by Magogudi Construction Projects CC. The opinions in this Report are provided in response to a specific request from Magogudi Construction Projects CC to do so. Ndi Geological Consulting Services (Pty) Ltd has exercised all due care in reviewing the supplied information. Whilst Ndi Geological Consulting Services (Pty) Ltd has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. Ndi Geological Consulting Services (Pty) Ltd does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features, as they existed at the time of Ndi Geological Consulting Services (Pty) Ltd 's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which Ndi Geological Consulting Services (Pty) Ltd had no prior knowledge nor had the opportunity to evaluate.

List of Abbreviations

BA:	Basic Assessment
BAR:	Basic Assessment Report
CA:	Competent Authority
CARA:	Conservation of Agricultural Resources Act (No. 43 of 1983)
CBA:	Critical Biodiversity Area
CRR:	Comments and Responses Report
DAF:	Department of Agriculture, Forests and Fisheries
DEA:	Department of Environmental Affairs
DEAT:	Department of Environmental Affairs and Tourism
DENC:	Northern Cape Department of Environment and Nature Conservation
DMR:	Department of Mineral Resources
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Independent Environmental Assessment Practitioner
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EMPr:	Environmental Management Programme
ENPAT:	Environmental Potential Atlas of South Africa
ESA:	Ecological Support Area
GPS:	Geographical Positioning System
IBA:	Important Bird Area
IDP:	Integrated Development Plan
IUCN:	International Union for the Conservation of Nature
IWMPs:	Integrated Waste Management Plans
LM	Local Municipality
MAP:	Mean Annual Precipitation
NCBCP:	Northern Cape Biodiversity Conservation Plan
NDP:	National Development Plan
NEM: AQA:	National Environmental Management: Air Quality Act (Act No. 39 of 2004)

NEM: BA:	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM: PAA:	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM: WA:	National Environmental Management: Waste Act (Act No. 59 of 2008)
NEMA:	National Environmental management Act, 1998 (Act 107 of 1998)
NFEPA:	National Freshwater Ecosystems Priority Areas
NGA:	National Groundwater Archive
NHRA:	National Heritage Resources Act (Act No. 25 of 1999)
NPAES:	National Protected Areas Expansion Strategy
NWA:	National Water Act, 1998 (Act No. 36 of 1998)
NWMS:	National Waste Management Strategy
OTR:	Off-The-Road tyres
PAIA:	Promotion of Access to Information Act (Act No. 2 of 2000)
POSA:	Plants of Southern Africa
PPP:	Public Participation Process
QDS:	Quarter degree grid square
REDISA:	Recycling and Economic Development Initiative of South Africa
SANBI:	South African National Biodiversity Institute
SDF:	Spatial Development Framework
TDS:	Total Dissolved Solids
WTRs:	Waste Tyre Regulations
WUA:	Water Use Authorisation

1 Introduction

1.1 Background

Magogudi Construction Projects CC was appointed by the Department of Environmental Affairs (DEA)'s Waste Bureau to provide facilities for the temporary storage and pre-processing of waste tyres over a 5 year period. The activities to be undertaken on the site involve storage and pre-processing (bailing) of waste tyres at the proposed depot. The total operational footprint of the proposed depot will be ±4 ha portion of total 5.788ha of the affected property. The types of tyre waste to be handled on site will include passenger vehicle tyres, truck tyres, motorbike tyres, 4x4 vehicle tyres, light commercial vehicle tyres and Off-The-Road tyres (OTR).

The operation will be mechanized and involve the following process:

- Temporary Storage: Receiving, offloading and sorting of waste tyres at the temporary storage area, according to tyre sizes. Waste tyres will be offloaded manually or by use of support vehicles, e.g. forklift, depending on size of tyres, stacked and stored according to the requirements of the Waste Tyre Regulations, R. No. 149 of 13 February 2009.
- Once tyres have been stockpiled and stored on site, they will be subject to the following pre-processing activities:
    - Baling: The baling (compaction) will be done through a mechanised process. The baling machine will be placed on a flat base in the depot, and the tyres will be deposited in the loading chamber and compressed by twin vertical rams. When enough compressed tyres exist in the chamber to form a bale, a wire is then secured around the material and a bale material is produced. The bales will then be moved from the baling area using a forklift vehicle and baled tyres are temporally stored in the storage area.
    - Removal of Bales and Waste Tyres The baled tyres and other tyres will be removed from site on a regular basis by approved transporters and delivered to approved processors for recycling purposes.

The required infrastructure will include:

- A mobile office block; and
- Mobile chemical toilets or the staff on site.

The required services such as water, electricity and roads will be provided by the Dawid Kruiper Local Municipality (LM).

The construction and operation of the temporary tyre storage and pre-treatment depot triggers activities listed in GNR 983 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and will require an Environmental Authorisation (EA) from the Northern Cape Department of Environment and Nature Conservation (DENC).

Ndi Geological Consulting Services (Pty) Ltd was appointed by Magogudi Construction Projects CC as the Independent Environmental Assessment Practitioner (EAP) to undertake the application for an EA to be submitted to the DENC, the Competent Authority (CA).

The reports and documentation for the EA application process have been compiled and finalised for submission to the DENC for the EA in terms of the NEMA for consideration and decision-making.

1.2 Purpose of this study

An Environmental Impact Assessment (EIA) is defined as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. The aim of an EIA is to prevent substantial damage to the environment. The objectives of this study are to:

- Comply with the requirements of NEMA and associated Regulations;
- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of the construction and operation of the proposed project. The cumulative impacts of the proposed development will also be identified and evaluated;
- Identify and evaluate potential management and mitigation measures that will reduce the possible negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the Environmental Management Programme (EMPr); and
- Provide the decision-making authorities with sufficient and accurate information in order to make a sound decision on the proposed development and set conditions that must be adhered to.

Since the construction and operation of the waste tyre storage and pre-processing depot triggers activities listed in GNR983, as amended by GNR327 of 7 April 2017 and GNR985 (as amended by GNR324 of a April 2017), a Basic EIA process will be required as per the requirements of GNR982 of the NEMA.

1.3 The Objectives of this Report

This Basic Assessment Report (BAR) was compiled with the aim to document the Basic EIA process that was conducted for the project. The Draft BAR will be made available to stakeholders for their comments. All comments received will be considered and incorporated into a Final BAR that will be submitted to the DENC for decision making.

1.4 Report Index in Relation to the NEMA Regulations

Regulation 2, Appendix 1 of GNR 982 published in terms of NEMA stipulates the minimal requirements and issues that need to be addressed in the BAR. This report strives to address all these requirements as per regulations. Table 1-1 indicates the regulations that have been addressed and the section of the BAR where these requirements can be found.

Table 1-1: Requirements of Appendix 1 of GNR 982

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
Appendix 1: 3 (1) (a)	Details of – the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae	Section 1.5.2
Appendix 1: 3 (1) (b)	The location of the activity, including – The 21 digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties.	Section 4

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
Appendix 1: 3 (1) (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken; or.	Section 4 Figure 4-1
Appendix 1: 3 (1) (d)	A description of the scope of the proposed activity, including – All listed and specified activities triggered and being applied for; A description of the activities to be undertaken, including associated structures and infrastructure.	 Section 6 Section 2
Appendix 1: 3 (1) (e)	A description of the policy and legislative context within which the development is proposed including- an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and have been considered in the preparation of the report; and how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Section 5
Appendix 1: 3 (1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 8
Appendix 1: 3 (1) (g)	A motivation for the preferred site, activity and technology alternative.	Section 3
Appendix 1: 3 (1) (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	
	Details of all alternatives considered;	Section 3
	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 7
	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 7.5
	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9
	The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated.	Section 10.3
	The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 10.2

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 11
	The possible mitigation measures that could be applied and level of residual risk;	Table 11-1 and Table 11-2
	The outcome of the site selection matrix;	N/A
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Section 0
	A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 3.1
Appendix 1: 3 (1) (i)	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including— a description of all environmental issues and risks that were identified during the environmental impact assessment process; and an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 10 Section 11
Appendix 1: 3 (1) (j)	An assessment of each identified potentially significant impact and risk, including— cumulative impacts; the nature, significance and consequences of the impact and risk; the extent and duration of the impact and risk; the probability of the impact and risk occurring; the degree to which the impact and risk can be reversed; the degree to which the impact and risk may cause irreplaceable loss of resources; and the degree to which the impact and risk can be avoided, managed or mitigated;	Section 11
Appendix 1: 3 (1) (k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 16.1
Appendix 1: 3 (1) (l)	an environmental impact statement which contains— a summary of the key findings of the environmental impact assessment; a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 16

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
Appendix 1: 3 (1) (m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed [impact management objectives and the impact management outcomes for the development for inclusion in the EMPr;	Table 11-1 and Table 11-2
Appendix 1: 3 (1) (n)	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 15
Appendix 1: 3 (1) (o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 12
Appendix 1: 3 (1) (p)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 15
Appendix 1: 3 (1) (q)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Section 14
Appendix 1: 3 (1) (r)	An undertaking under oath or affirmation by the EAP in relation to- The correctness of the information provided in the report; The inclusion of the comments and inputs from stakeholders and interested and affected parties; The inclusion of inputs and recommendations from the specialist reports where relevant; and Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Section 17
Appendix 1: 3 (1) (s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not Applicable
Appendix 1: 3 (1) (t)	Any specific information required by the competent authority.	Not Applicable
Appendix 1: 3 (1) (u)	Any other matter in terms of Section 24(4)(a) and (b) of the NEMA	Not Applicable

1.5 Contact Details

1.5.1 Applicant

Table 1-2 presents the details of the applicant and depot owner.

Table 1-2: Applicant Contact Details

Contact details of the Applicant:
Magogudi Construction Projects CC **Solomon Lamola** solly@manyeleticonsulting.co.za 011 475 5863 11 Kreupelhout Ave, Weltevreden Park

1.5.2 Environmental Assessment Practitioner

Ndi Geological has been appointed by Magogudi Construction Projects CC as the EAP. The project team members as stipulated in Table 1-3 can be contacted for the purposes of this project.

Table 1-3: Details of the Project Team

Contact details of the EAP:
Ndivhudzannyi Mofokeng Ndi Geological Consulting Services (Pty) Ltd 38 Ophelia Street Kimberley, 8301 Cell: 082 760 8420 Tel: 053 842 0687 Fax: 086 538 1069 atshidzaho@gmail.com ndi@ndigeoservices.co.za

Ndivhudzannyi holds BSc (Hons) Earth Sciences in Mining and Environmental Geology. She has close to 10 years' experience in the exploration and open cast work in the mining industry. She has proven leadership skills from supervising exploration rigs (Reverse Circulation and percussion drilling). She has proven working experience in field exploration and mapping, borehole logging, borehole sampling, sample preparation for laboratory analysis, handling of GPS, supervisory duties within the field, geological report and progress report writing, including Prospecting Work Programmes and Environmental Management Plans, handling the Department of Mineral Resources (DMR) documents in general. Ndivhudzannyi has as a solid technical background in GIS Arcview software (GSSA Prof Reg), Rockworks, Turbo-Cad and Turbo-Sketch, and Global Mapper 9 Application.

Appendix A contains the curriculum vitae of the impact assessment project team and qualifications.

1.5.3 Details of the Specialists

The EAP team was supported by qualified specialists. Qualifications and experience of the specialists are included in the specialist studies reports.

1.5.4 Competent Authority Details

An EA for the proposed project is required from the DENC. Details of the competent authorities are provided in Table 1-4.

Table 1-4: Competent Authority Details

Department	**Contact Person**	**Contact Details**	
DENC		Tel	
		Email	

1.5.5 Municipality and Ward Details

The project area is located within the jurisdiction of the John Taolo Gaetsewe District Municipality and Dawid Kruiper Local Municipality. Upington is the closest residential area, approximately 12 km south-east of the project area. Details of the relevant municipality are provided in Table 1-6.

Table 1-5: Local and District Municipality Details

Department	Contact Person	Contact Details	
ZF Mgcawu District Municipality	Mr Gilbert Lategan (Acting Municipal Manager and Director: Planning and Development)	Tel	054 337 2800
		Email	gil@siyanda.gov.za
Dawid Kruiper Local Municipality	Mr Elias Ntoba	Tel	054 338 7002
		Email	manager@dkm.gov.za managersec@kharahais.gov.za

Figure 1-1 provides an illustration of the relevant district and local municipalities surrounding the proposed project.

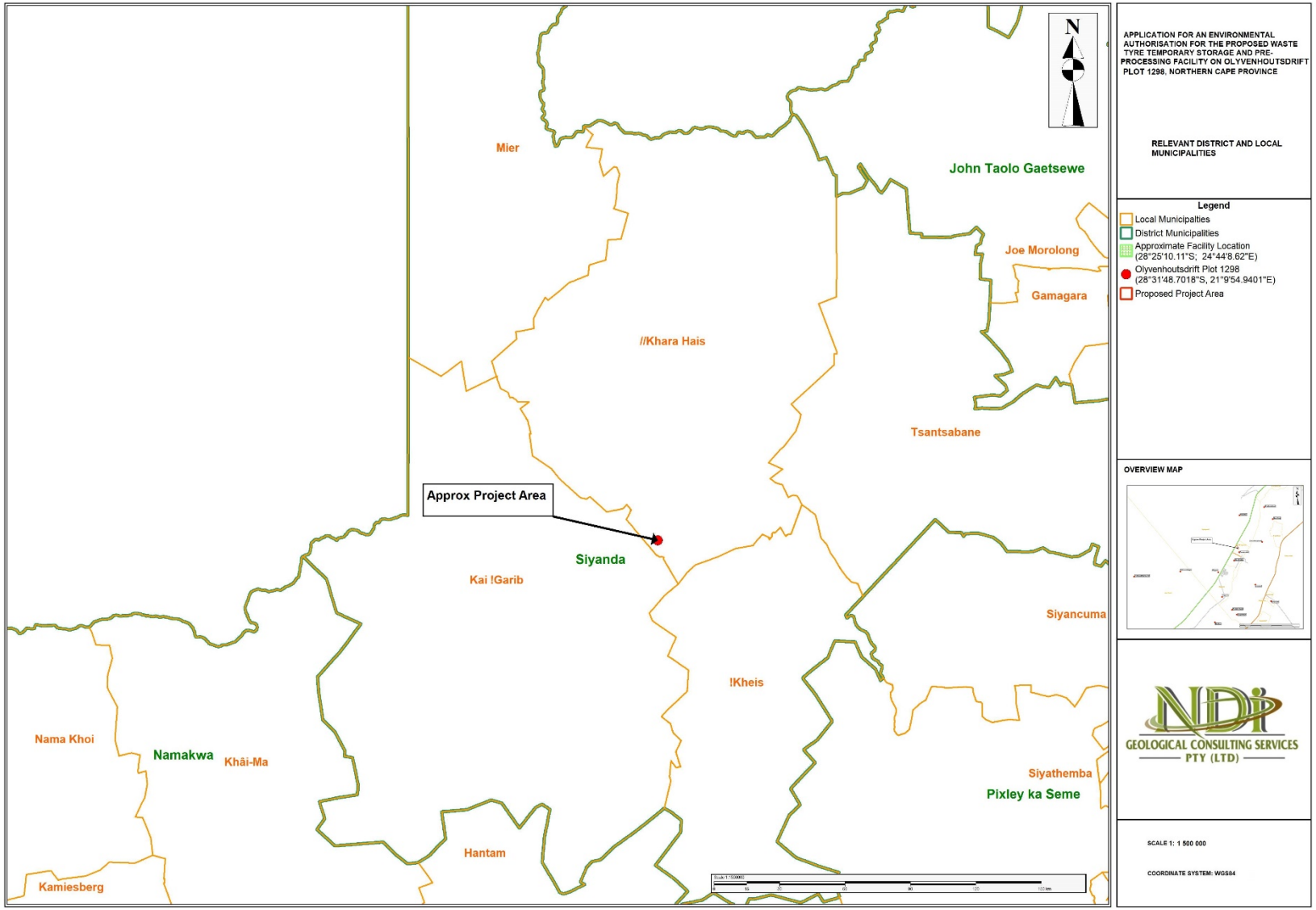


Figure 1-1: Relevant District and Local Municipalities Relevant to the Proposed Project

1.6 Environmental Authorisation Application Process

All activities that trigger activities listed in GNR 983 (as amended by GNR327 of 7 April 2017) and/or GNR 985 (as amended by GNR324 of 7 April 2019) require that a Basic Assessment (BA) process be followed. The BA process will entail:

- Compilation of an Initial Draft BAR and draft EMPr for the public to comment on before the submission of the application to DENC.
- Submission of the EA Application to the DENC.
- Finalisation of the Draft BAR and EMPr for the official public participation comment period of 30 days.
- Incorporation of stakeholder comments into the final BAR and EMPr.
- Public Participation Process (PPP).

The BA process will follow the procedure as prescribed in Regulations 19 to 20 and is summarised in Figure 1-2.

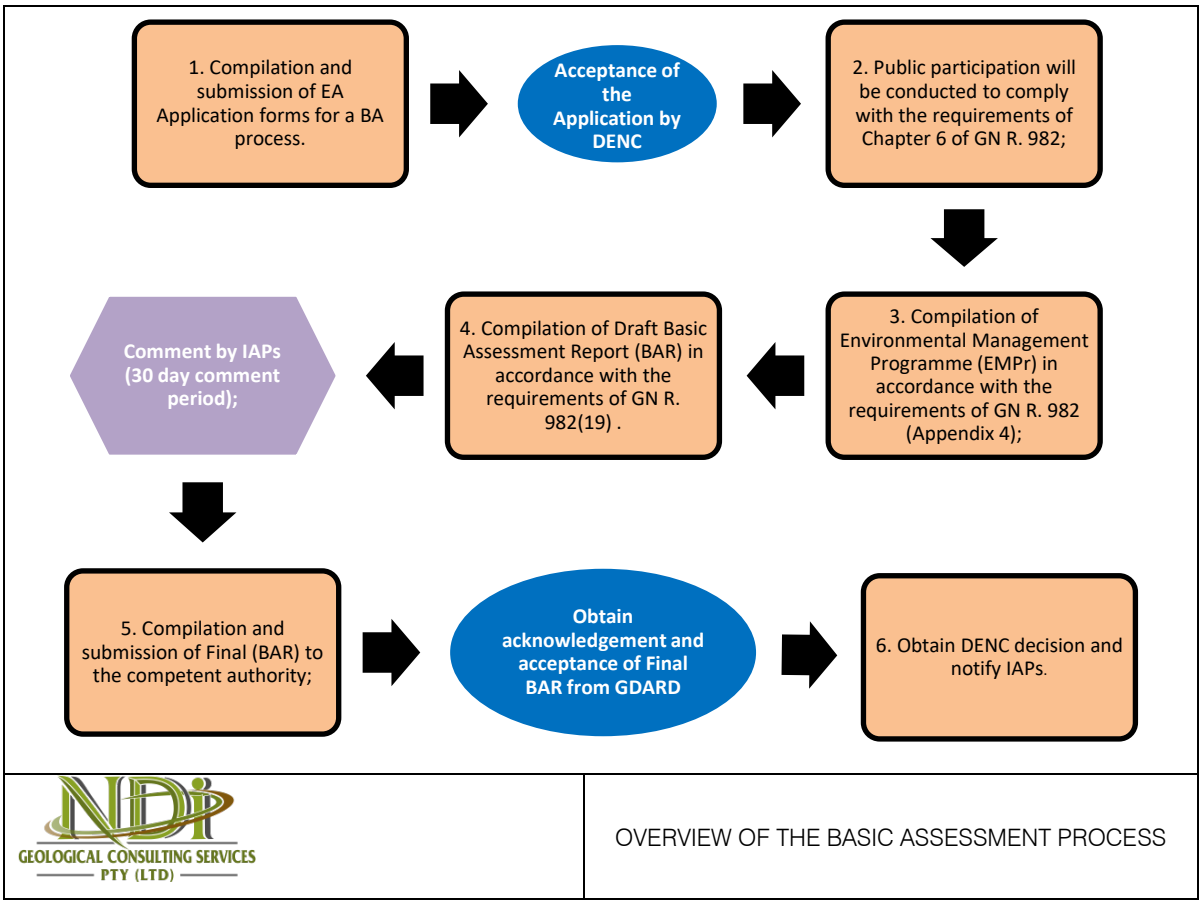


Figure 1-2: Overview the Basic Assessment Process

The DENC will have a maximum of 107 days to review and make a decision on the application.

2 Project Description

The operation will be mechanized and involve the following process:

- Trucks / bakkies deliver 100% of old tyres (scrap) to the depot for temporary storage. It is estimated that 10 Deliveries per day will be received;
- Temporary Storage of waste tyres;
- Baling; and
- Removal of Bales and Waste Tyres: small packages of baled tyres are loaded onto trucks (5-7 tons) and take the scrap tyres to storage facility.

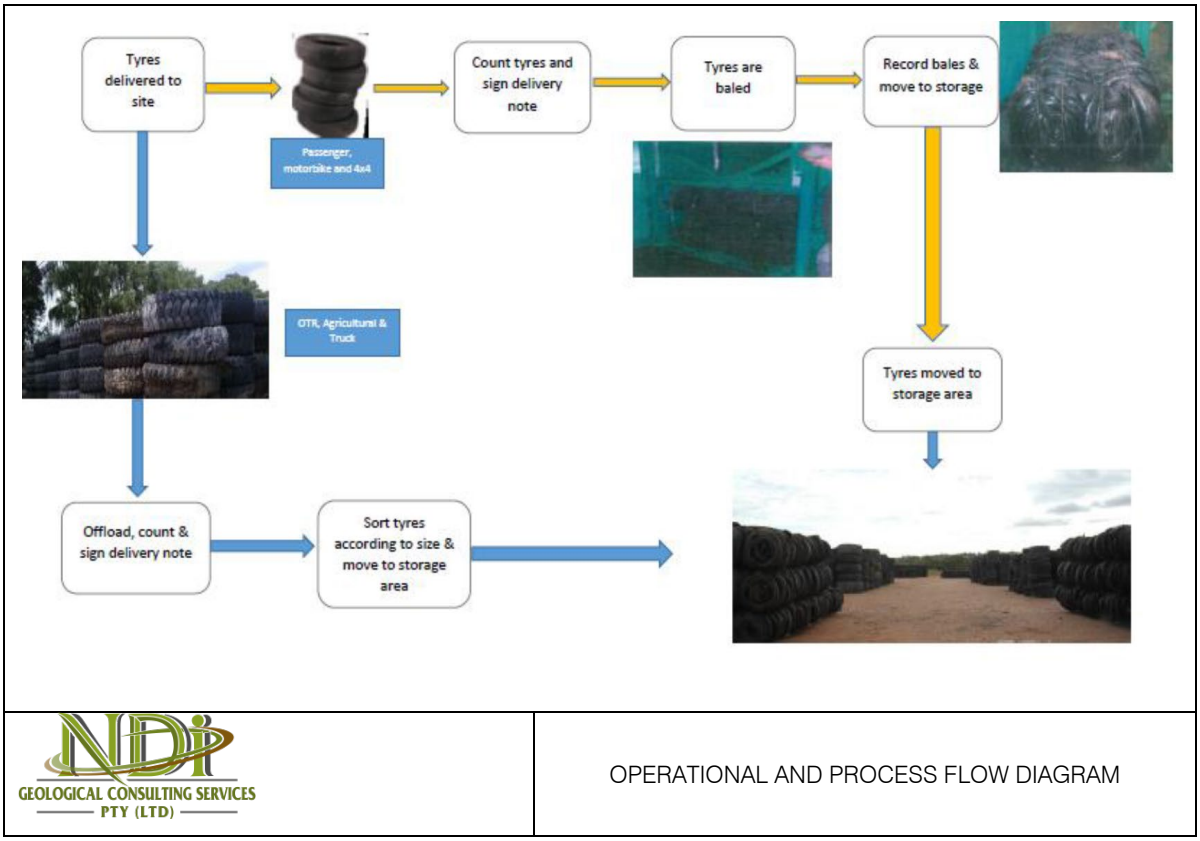


Figure 2-1: Operational and Process Flow Diagram

2.1 Temporary Waste Tyre Storage

Trucks / bakkies will deliver old tyres (scrap) to the depot for temporary storage. Receiving, offloading and sorting of waste tyres at the temporary storage area will be conducted according to tyre sizes. It is expected that approximately ten deliveries per day will be received at the proposed depot. Waste tyres will be offloaded manually or by use of support vehicles, e.g. forklift, depending on size of tyres, stacked and stored according to the requirements of the Waste Tyre Regulations, R. No. 149 of 13 February 2009.

Once tyres have been stockpiled and stored on site, they will be subject to the following pre-processing activities.

2.2 Waster Tyre Bailing

Scrap tyres are cut / shred / baled in small packages of bales. The baling (compaction) will be done through a mechanised process. The baling machine will be placed on a flat base in the depot, and the tyres will be deposited in the loading chamber and compressed by twin vertical rams. When enough

compressed tyres exist in the chamber to form a bale, a wire is then secured around the material and a bale material is produced. The bales will then be moved from the baling area using a forklift vehicle and baled tyres are temporally stored in the storage area.

2.3 Waste Tyre and Bale Removal

The baled tyres and other tyres will be removed from site on a regular basis by approved transporters and delivered to approved processors for recycling purposes. Small packages of baled tyres are loaded onto trucks (5-7 tons) and transported to a scrap tyres storage facility

2.4 Infrastructure

The required infrastructure will include:

- A mobile office block; and
- Mobile chemical toilets or the staff on site.

The required services such as water, electricity and roads will be provided by the Dawid Kruiper Local Municipality.

2.5 Employment

Magogudi Construction Projects CC will make use of contactors during the construction phase, who will recruit local people where possible to assist in the construction of the waste tyre storage and pre-processing depot.

3 Alternatives Considered

3.1 Site Alternatives

No alternatives outside of the no-go alternative were considered during the impact assessment. The selection of sites was conducted by the Department of Environmental Affairs (DEA)'s Waste Bureau during the bidding process. The identified site satisfied the requirements of the Waste Bureau in that it meets the capacity needs in the Northern Cape. Other requirements include:

- Be at least 7500m^2 in size, including pre-processing areas, office space etc, the site is approximately 40 000 m^2;
- Have electricity and water points or proof of application for the facilities should be included;
- Have easy access to big trucks and links. The road should be wide enough to accommodate big trucks. There should also be turning areas for these big trucks (Road width and turning ability);
- Have sufficient parking space for the trucks;
- Be within the correct zoning as per the relevant municipal land use and planning by-laws for the storage of waste tyres and pre-processing (baling, shredding, de-beading etc.); and
- Should be located in or within a radius of about 50kms to Kimberly, Upington and/or Kuruman.

3.2 No-Go Alternative

This option will result in no additional impacts occurring as it maintains the current status quo. This alternative would represent a lost opportunity for the applicant Dawid Kruiper Local Municipality and the broader region as follows:

- Waste tyres being discarded into landfill sites that are already struggling for capacity of which placing tyres into the landfill sites increases the capacity constraints at the landfill sites.
- Burning of tyres has a harmful impact on the environment.
- Waste tyres being incinerated in kilns, which has a harmful impact on the environment.
- A lost opportunity in the loss of the benefits to the local community and economy associated with the creation of employment opportunities and the establishment of new related businesses such as transporting, waste collection, security services and also recycling companies.
- A lost opportunity of Northern Cape Province to have a waste tyre management depot in the province that will ensure on going waste management from recovery and diverting tyres from landfill through recycling and the promotion of treatment and processing technologies in Northern Cape Province.
- National goals: According to the National Development Plan (NDP) - 2030, South Africa aims to achieve among others environmental sustainability and resilience and also the need to progress towards achieving an absolute reduction in the total volume of waste disposed to landfill. The implementation of the no go alternative will result in a lost opportunity for the municipality to contribute towards this national objective.
- The National Waste Management Strategy (NWMS) presents the Government's strategy for, integrated waste management for South Africa. In order to ensure that the NWMS is implemented, municipalities across the country have developed Integrated Waste Management Plans (IWMPs). Implementation of the proposed project will assist Dawid Kruiper Local Municipality and other municipalities to achieve their set objectives and targets.

.

4 Location of the Proposed Activity

The proposed project falls within the ZF Mgcawu District Municipality, under the jurisdiction of the Dawid Kruiper Local Municipality in the Northern Cape Province. The proposed project is located on the farm portion as illustrated in Figure 4-1. Table 4-1 provides a description of the proposed activities located on the property.

Table 4-1: List of Affected Farms and Farm Portions Illustrating the Relevant Activities

Farm and 21 Digit Survey General Code	Owner	Proposed Activities
Olyvenhoutsdrift Plot 1298	Magogudi Construction Projects	Temporary storage and pre-processing of waste tyres
C02800130000129800000		

The property affected by the proposed project is owned by the applicant, Magogudi Construction Projects.

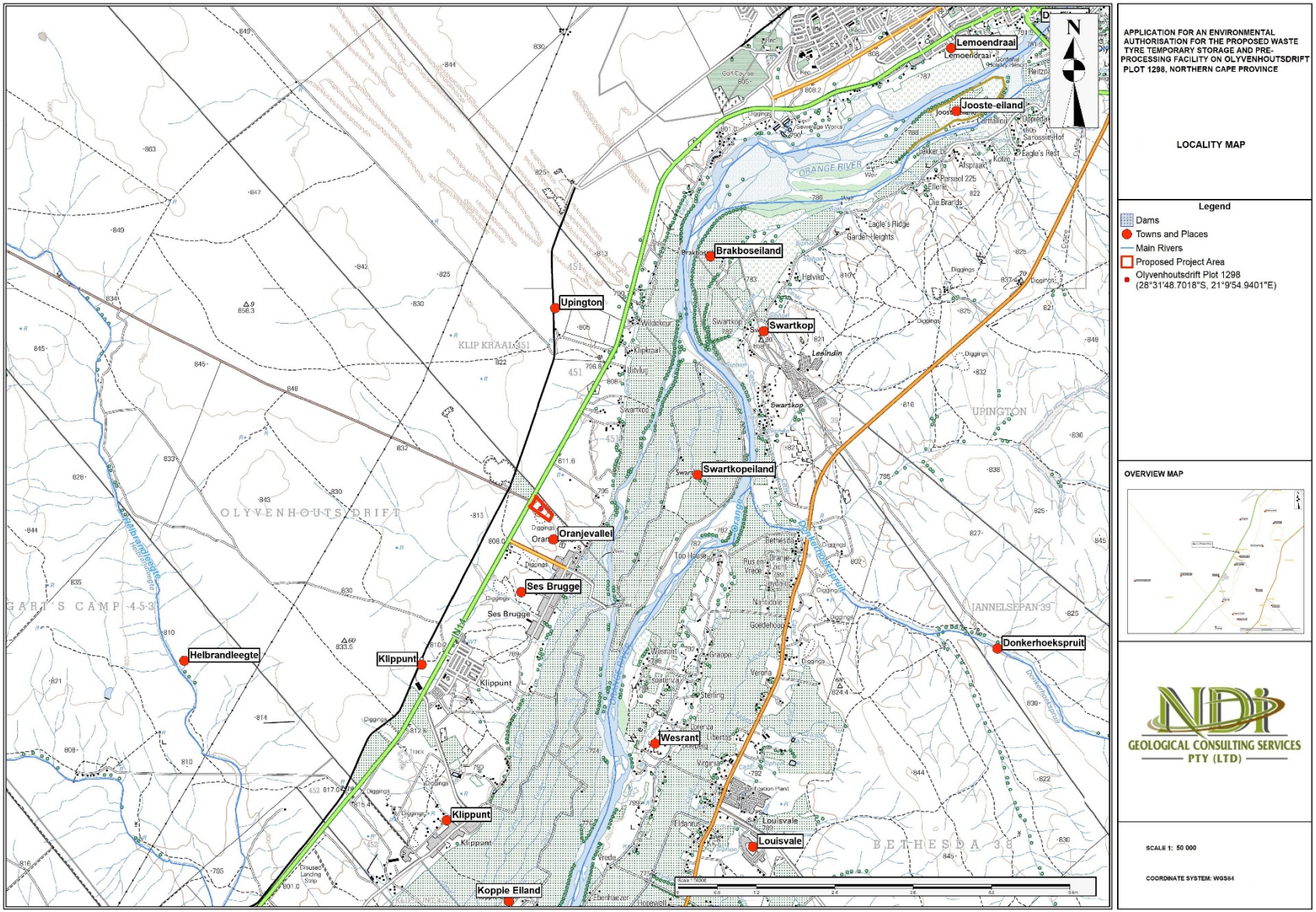


Figure 4-1: Layout Plan and Affected Farm Portion

5 Legal and Policy Framework

The following Acts and regulations are applicable during the construction and operation of the proposed project and associated infrastructure. Environmental legislation applicable to the proposed project operation includes, but is not limited to, the following:

- The Constitution of the Republic of South Africa (Act No. 108 of 1996);
- NEMA (Act No. 107 of 1998, as amended);
- National Environmental Management: Protected Areas Act (Act No. 57 of 2003);
- National Environmental Management: Air Quality Act (Act No. 39 of 2004) (NEM: AQA);
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM: BA);
- National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA);
- Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA);
- Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA);
- The NWA (Act No. 36 of 1998); and
- The National Heritage Resources Act (Act No. 25 of 1999) (NHRA).

Table 5-1 lists the applicable legislation, policies and guidelines identified as relevant to the proposed project. In addition, a description of how the proposed activity complies with and responds to the legislation and policy context, is provided. This list is not exhaustive but rather represents an indication of the most applicable pieces of legislation relevant to the project.

Table 5-1: Policy and Legislative Context of Proposed Project

Legislation	Description and Relevance	Authority
Constitution of the Republic of South Africa, (No. 108 of 1996)	Chapter 2 – bill of rights Section 24 – Environmental Rights The proposed activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental rights of South Africans	N/A
Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA	The Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA) recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right. The purpose of the Act is to promote transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their right. The BA process to be undertaken in terms of the NEMA, where the associated stakeholder consultation process will be aligned with the PAIA in the sense that all I&APs will be given an opportunity to register as an I&AP prior to the initiation of the project and all registered stakeholders will in turn be provided a fair opportunity to review and comment on any reports submitted to the competent authorities for decision making.	N/A
National Environmental Management Act (NEMA) (No. 107 of 1998)	Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment) Section 28 – Duty of care and remediation of environmental damage Environmental management principles will be incorporated into the EIA and EMPr, which the applicant will be required to comply with to ensure that negative impacts on the environment are avoided or kept to a minimum and that positive impacts are enhanced.	Department of Environmental Affairs
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the EIA Regulations 2014 (Government Notice (GN) 984), as amended	The EIA Regulations (GNR 982) were promulgated in terms of Sections 24 of the NEMA, to manage the process, methodologies and requirements for the undertaking of an EIA. The GNR 982 stipulates that the applicant for activities listed under GNR 983, 984 or 985 must appoint an independent EAP to manage the EIA process. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental impact on the environment, and which may not commence without an EA from the Competent Authority (CA). EA required for Listed Activities is subject to the completion of either a Basic Assessment (BA) process or full Scoping and Environmental Impact Assessment (S&EIA) with	Department of Environment and Nature Conservation (DENC)

Legislation	Description and Relevance	Authority
	applicable timeframes associated with each process. The EA must be obtained prior to the commencement of those listed activities. The project triggers activities listed in GNR 983 and GNR985 and will require an EA from the DENC. According to GNR 982 of the NEMA, activities listed in GNR 983 require that a BA be undertaken. The applicable listed activities that will be triggered by the project is provided in Table 6-1.	
Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series, Guideline 5: Assessment of the EIA Regulations, 2012 (Government Gazette 805)	Environmental impacts will be generated primarily in the construction and associated operational phases of the project. These will be assessed as part of the proposed project.	
Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004	An Environmental Assessment is required for the proposed project as activities are triggered under GN R983.	
Review in Environmental Impact Assessment, Integrated Environmental Management, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.		
DEA Integrated Environmental Management Guideline Series, Guideline 7: Public Participation in the Environmental Impact Assessment Process, 2012 (Government Gazette 807)	Public participation is a requirement of the EIA Process and will be conducted for the proposed project as stipulated in Chapter 6 of the NEMA.	
National Water Act, 1998 (Act 36 of 1998)	The NFEPA data indicates that there are no wetlands located within 500m or water courses located within 100m of the proposed project site, a Water Use Authorisation (WUA) will therefore not be required.	N/A
National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA)	In terms of the NEM: WA, storage of waste tyres forms part of Category C of GNR 921 (Norms and Standards). This will require registration of the areas with the DEA/Bureau and must include a management and audit plan for the areas.	Department of Environmental Affairs

Legislation	Description and Relevance	Authority
Government Notice Regulation (GNR) 149 of 2009.	*GNR 149 (DEAT, 2009) states the following for "Storage of Waste Tyres" in Part 6 (Section 16) of the regulation:* *1) The waste lyre storage area for a lyre dealer shall not exceed 500m^2.* *2) Any waste tyre storage area must not exceed 30000m^2.* *3) A waste tyre storage area plan must be developed by the tyre dealer, waste lyre processor and waste tyre storage site owner.* *4) (The waste tyre storage plan must be approved by the municipal fire department and must be available on site at all times.* *5) The municipal fire department may exempt the waste lyre storage owner from the provisions in sub-regulation (6).* *6) The site on which waste lyres are stored must meet as a minimum the following requirements:* *a) Clearly visible signs with operating hours. contact details and site regulations must be posted near the entrance to the depot;* *b) a security attendant trained in fire prevention must be on site at all times;* *c) the site manager must be on site at all times when the depot is open;* *d) no single pile of waste lyres may exceed a height of 3 metres, a length of 20 metres and a width of 10 metres;* *e) all interior firebreaks between piles of waste lyres must be at least five metres wide;* *f) the site must be flat and hard packed;* *g) the site must make provision for storm water management;* *h) the edges of the piles must be at least 8 metres from the perimeter fence, and any buildings, and the area between the piles and the fence and buildings must be clear of debris and vegetation;* *i) all firebreaks must be at least B metres wide; and* *j) waste tyre piles may not be located within 8 metres of a powerline.* *7) Waste tyres must not be stored on wetlands, flood plains, ravines, canyons, on steeply grade surfaces or anywhere else where they may pose a significant environmental or fire risk.* Mitigation measures in the project EMPr will ensure that the proposed project will comply with the requirements of GNR149."	Department of Environmental Affairs
National Environmental Management Air Quality Act (Act No. 39 of 2004)	Air quality management in terms of: Section 32 – Dust control. Section 34 – Noise control. Section 35 – Control of offensive odours. Although no Air Emissions Licence (AEL) will be required for the project, the principles of the NEM: AQA, focusing on minimisation of pollutant emissions will be taken cognisance of in the development of the EMPr.	N/A

Legislation	Description and Relevance	Authority
The National Forestry Act, 1998 (Act No. 84 of 1998) (NFA)	The NFA protects against the cutting, disturbance, damage, destruction or removal of protected trees. A biodiversity assessment was conducted as part of the EIA, which identified protected trees which may be affected by the proposed project. Magogudi Construction Projects CC will apply for the required permits for the removal and/or relocation of the trees prior to commencement of construction activities.	Department of Agriculture, Forestry and Fisheries (DAFF)
The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA)	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. The Act provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered, endangered, vulnerable or protected. The management and control of alien invasive species on the impacted areas during all the phases of the project will be governed by the NEM: BA. The NEM: BA ensures that provision is made by the site developer to remove any alien species, which have been introduced to the site or are present on the site. Biodiversity hotspots and bio-regions were investigated to determine the potential impacts that the project may have on the receiving environment.	Department of Environmental Affairs
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Control measures for erosion Control measures for alien and invasive plant species The EMPr will include measures to control and manage alien invasive plant species.	Department of Agriculture Forestry and Fisheries
National Heritage Resources Act 25 of 1999	Heritage Permit for structures 60 years or older. A Phase 1 Heritage assessment was conducted for the proposed project to identify heritage and/or cultural sites affected by the proposed project, if any. The Heritage Impact Assessment (HIA) shows that there are no heritage resources located on the affected property. However, should there be any heritage and/or cultural resources encountered during the construction phase of the project, a Phase 2 Heritage Study for grave relocation permits shall be conducted.	Northern Cape Heritage Resource Authority

5.1 Provincial and Municipal By-laws

The ZF Mgcawu District Municipality, Dawid Kruiper Local Municipality and the Northern Cape Province have developed local by-laws and various policies relating to waste disposal, water, economic development, air quality, etc. The proposed project must ensure that such policies and bylaws are adhered to as far as possible during the construction and operation of the waste tyre depot.

5.2 Guidelines

The following documents will be taken into account during the impact assessment process and compilation of the EMPr of the proposed project:

- Northern Cape Biodiversity Conservation Plan (NCBCP);
- Dawid Kruiper Local Municipality Integrated Development Plan (IDP) (2017-2022);
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline A6: Water Management for Underground Mines.
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G1 Storm Water Management;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G3. Water Monitoring Systems;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline G4: Impact Prediction;
- DEAT. 2002. Integrated Environmental Management, Information series 2: Scoping. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 3: Stakeholder Engagement. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 4: Specialist Studies. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 12: Environmental Management Programmes. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEA. 2010. Companion to the EIA Regulations 2010 for Comment, Integrated Environmental Management Guideline Series 5, Department of Environmental Affairs;
- DEA. 2010. Companion to the EIA Regulations 2010 for Comment, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs;
- DEA. 2012. Companion to the EIA Regulations 2010, Integrated Environmental Management Guideline Series 5, Department of Environmental Affairs;
- DEA. 2012. Companion to the EIA Regulations 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs; and
- Western Cape Department of Environmental Affairs and Tourism. 2010. EIA Guideline and Information Document Series: Guideline on Need and Desirability.

6 Applicable Listed Activities

The project triggers activities listed in GNR 983 (as amended by GN R327 of 7 April 2017) and GNR 985 (as amended by GNR324 of 7 April 2017). All relevant activities which require authorisation in terms of NEMA have been included in Table 6-1

Table 6-1: Applicable Activities

Listed Activity	Comment
GNR983, as amended (Activity 27): The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— *(i) the undertaking of a linear activity; or* (ii) *maintenance purposes undertaken in accordance with a maintenance management plan.*	The footprint of the project is approximately 4 ha.
GNR985, as amended (Activity 12): The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. *g. Northern Cape* *ii. Within critical biodiversity areas identified in bioregional plans;*	The development footprint area is located in a Critical Biodiversity Area 2 (CBA-2.

7 Stakeholder Engagement Process

The stakeholder engagement process forms an important part of the impact assessment process. The stakeholder engagement process is primarily aimed at affording I&AP's the opportunity to gain an understanding of the proposed project. In addition, the purpose of consultation with the landowners, key stakeholders, and I&AP's is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether the project will affect them, and provide the EIA team with local knowledge of the area and raise concerns relating to the biophysical, socio-economic and cultural impacts that may arise.

The stakeholder engagement process is conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA. Chapter 1 of the NEMA outlines the principles of environmental management, several pertaining to public consultation (e.g. Chapter 1, subsections (2), (3), (4) (f), (g), (h), (k), (q) and (r). Chapter 6, Regulations 39 – 44 of the amended EIA Regulations GNR) 982, promulgated on 8 December 2014, specify the minimum requirements for stakeholder engagement in an EIA process conducted under the NEMA. In 2017, the Minister of Environmental Affairs published, in terms of Section 24J of the NEMA, Public Participation Guidelines which guide the Public Participation Process (PPP) in order to give effect to Section (2)(4)(f), (o) and 24 (1A)(C) of the NEMA.

Figure 7-1 provides a summary of the stakeholder engagement process followed for the proposed project.

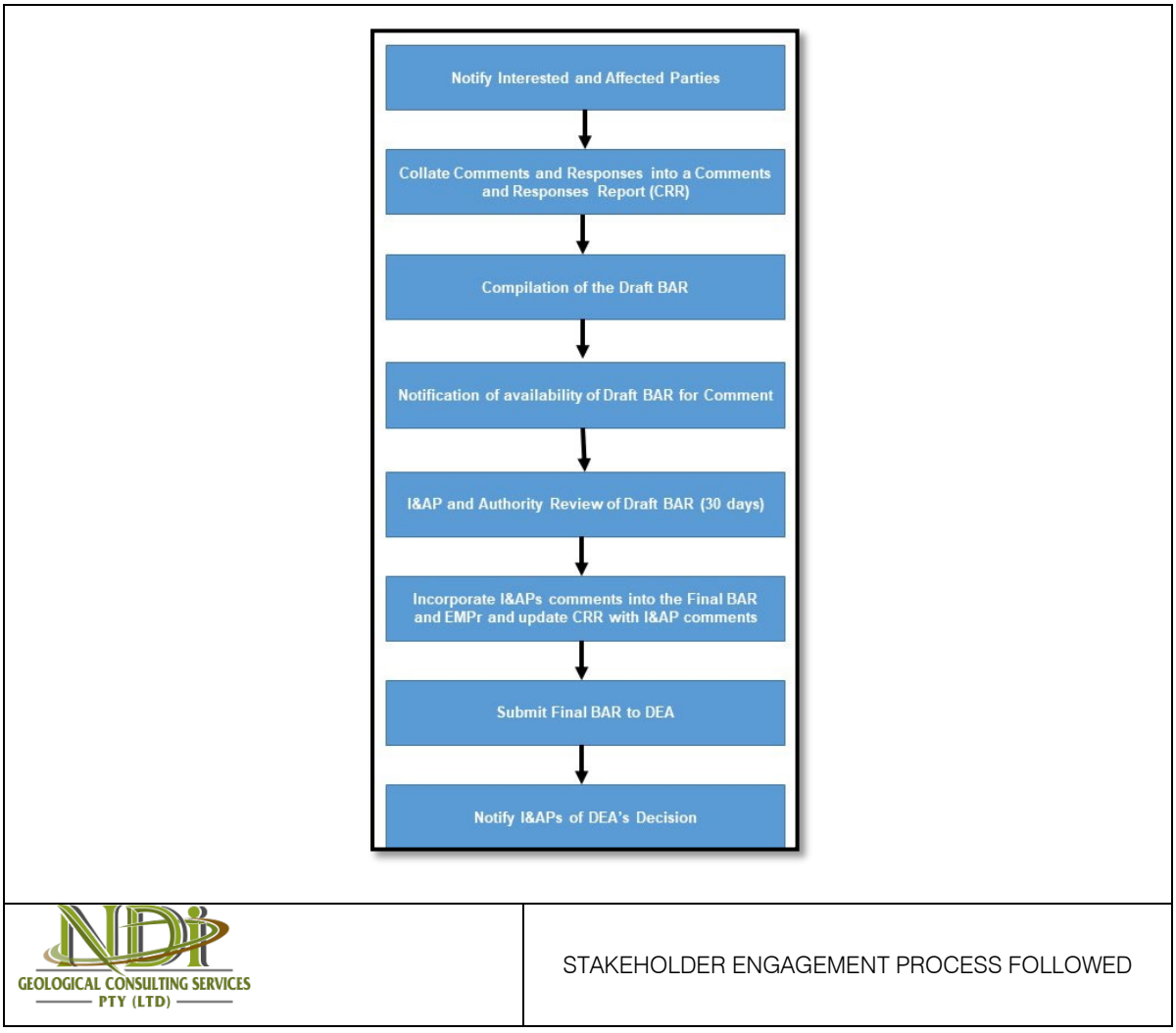


Figure 7-1: Summary of the Stakeholder Engagement Process followed

All the above guidelines have been incorporated into this stakeholder engagement process. This application will be submitted to the DENC for authorisation as the competent authority. Identified commenting authorities on this application include:

- DWS – Regional Office;
- SAHRA – Provincial;
- Dawid Kruiper Local Municipality ;
- John Taolo Gaetsewe District Municipality; and
- Department of Agriculture, Forests and Fisheries (DAFF): Northern Cape Province

7.1 Stakeholder Identification Interested and Affected Parties

Interested and Affected Parties (I&APs) were identified using GIS and cadastral information to identify affected and adjacent properties. The affected and adjacent property owners were identified using the surveyor general website, www.deedsweb.gov.za. An I&AP register was developed using the information from the deedsweb search as well as from I&APs that responded to invitations to register as I&APs that were sent out via notification letters, on-site notices and newspaper advertisements.

The I&AP register will be maintained for the duration of the study where the details of stakeholders are captured and automatically updated upon communication to the EAP. The identification, registration, and comments from I&AP's will be an on-going activity. Please refer to Appendix C 1 for a copy of the I&AP register.

The affected properties are provided in Table 7-1.

Table 7-1: List of Affected Farm and Farm Portions

Erven	21 Digit Survey General Code
1298	C02800130000129800000

Table 7-2 provides a list of the adjacent properties.

Table 7-2: List of Adjacent Farms and Farm Portions

Erven	21 Digit Survey General Code
1996	C02800130000199600000
1997	C02800130000199700000
1998	C02800130000199800000
829	C02800130000082900000
Remainder of Erf 665	C02800130000066500000
Remainder of Erf 788	C02800130000078800000

A map of the affected and adjacent properties are illustrated in Figure 7-2.

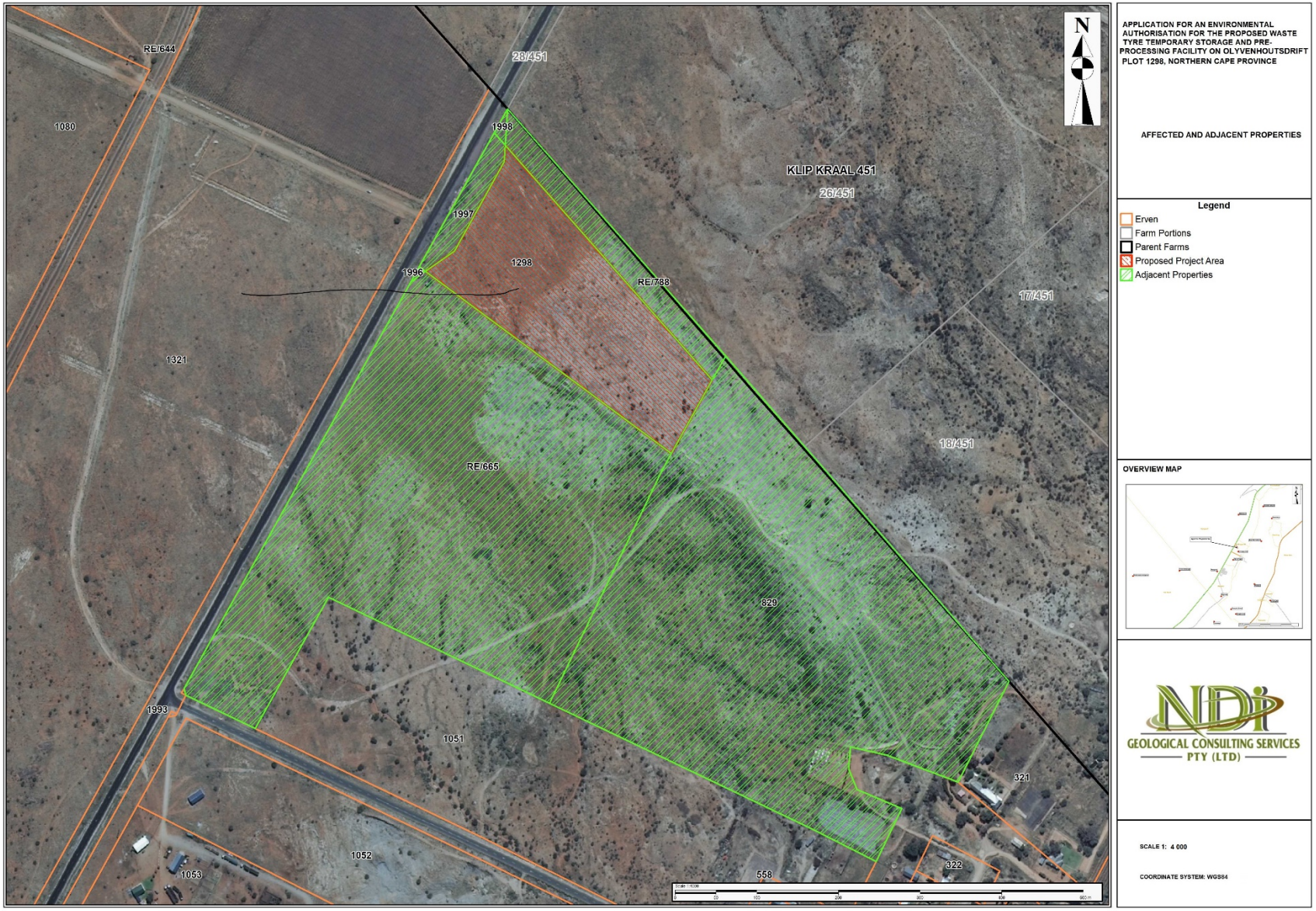


Figure 7-2: Affected and Adjacent Properties

7.2 Project Announcement

Ndi Geological made use of various methods to inform stakeholder of Magogudi Construction Projects CC's intention to undertake the required and environmental processes and EA application. Stakeholders were provided with the opportunity to participate and register as I&AP's during the announcement Phase of the project.

7.2.1 Distribution of Notification Letters

Notification letters were sent to identified I&AP's, informing them of the proposed project. A copy of the notification letter is attached as Appendix C 2.

7.2.2 Site Notice Placements

Sites notice boards (Size A2: 600 mm X 420 mm) notifying stakeholders and I&AP's of the proposed waste tyre storage and pre-processing depot were placed at conspicuous places in the project area. A copy of the site notices and proof of their placement is provided in Appendix C 3.

7.2.3 Newspaper Advertisements

Newspaper advertisements notifying stakeholders about the proposed project and the opportunity to participate in the EA application process were placed in the Kathu Gazette on 20 April 2019 and can be found in Appendix C 4.

7.3 Public Review of the Draft Basic Assessment Report

The Draft BAR was compiled in terms of the requirements of GNR 982. All comments received during the announcement phase of the stakeholder engagement process were incorporated into Draft BAR and collated into a Comments and Responses Report (CRR). The initial comment period for the Draft BAR was scheduled for 16 August 2019 to 16 September 2019, however due to requests from stakeholders for more time to review and comment, the review and comment period was extended to 30 September 2019.

The availability of the Draft BAR was announced by means of SMS's, letters and emails to registered I&AP's.

Copies of the draft BAR will be made available at the venues.

The draft BAR will also made available to the competent and commenting authorities during the 30-day review and comment period.

7.4 Key Comments Received.

Table 7-3 provides a summary of the comments received to date following the newspaper adverts, site notices, written notification of the project and the Draft BAR review period.

Table 7-3: Key Comments Received

Comment Date	Comment raised by	Comment	Ndi Geological' s Response
7 Mar 2019	DENC	The DENC responded to a request for clarification in terms of the NEMA requirements for the project. The DENC confirmed that the project would require an EA and concurred with the specialist studies recommended by the EAP.	N/A

Comment Date	Comment raised by	Comment	Ndi Geological' s Response

7.5 Comments and Response Report

All issues and concerns raised by I&AP's will be recorded and responded to in the CRR. A copy of the CRR is included as Appendix C 5. Comments received during the 30-day public review and commenting period of the draft BAR will be incorporated into the final BAR and updated CRR that will be submitted to the DENC for decision making.

8 Need and Desirability of the Proposed Project

The municipal IDP (2017/2022) shows that waste management forms part of the development priorities (Priority 7) of the Dawid Kruiper Local Municipality ((Dawid Kruiper Local Municipality, 2017). According to the IDP, sanitation, waste management and waste removal are viewed as Key Performance Areas (KPA 1) for service delivery and infrastructure development. Under this KPA, the LM intends to regulate and manage waste disposal to prevent pollution of the natural environment and natural resources. The proposed establishment of a public waste drop off depot within the area will prevent and minimize illegal dumping activities, thereby preventing pollution of the natural environment and natural resources.

The proposed activity also forms part of an Integrated Waste Management approach aimed at reducing the amount of waste transported to the landfill site and prevent illegal dumping. In addition, the proposed activity supports the implementation of the National Waste Management Strategy (NWMS) which promotes waste recovery and waste beneficiation. Any anticipated and potential negative impacts are adequately mitigated in accordance with the Environmental Management Programme (EMPr) developed for the depot and is attached as Appendix E.

The overall benefits of the proposed activity include the following:

- Social:
  - Waste management services improved; and
  - Public health improved from reduced pollution and illegal dumping sites that attract vectors such as rodents and flies.

- Economic
  - Temporal and permanent jobs result in increased quality of life; and
  - Economic development in the area.

- Environmental
  - Improved environmental well-being;
  - Eradication of illegal dumping sites;
  - Improved waste management system;
  - Reduced pollution from illegal dumped waste and
  - Improved land use management.

8.1 Developer/Applicant

The proposed project will generate a source of income for the applicant, Magogudi Construction Projects CC, and is therefore desirable from an economic point of view. In terms of the Recycling and Economic Development Initiative of South Africa (REDISA) Plan, it is proposed that waste tyre producers (manufacturers and importers) will be charged a waste management fee of R2.30 + VAT for every kilogram of new tyre rubber produced. These funds will then be used for the development and support of recyclers, such as Magogudi Construction Projects CC.

8.2 Local Community, District and Provincial Benefit

It is estimated that there are approximately 60 million legacy waste tyres in South Africa and approximately 11 million tyres are added to this total every year. These tyres are found in landfill sites, where they take up valuable space, as well as in stockpiles in residential, rural and industrial areas across South Africa. Many of the tyres are burned, releasing liquids and noxious gases such as carbon monoxide and dioxins. In some rural areas, waste tyres are also burnt to generate heat, especially in

winter months, resulting in health risks to those inhaling the resultant fumes (http://www.redisa.org.za, 2019)

Local landfill sites will benefit from more landfill airspace being available for other waste types and people in the local, district and provincial areas will benefit from cleaner air and decreased health risks, as tyre burning will be prevented.

8.3 Local Community

The unemployment rate for the Dawid Kruiper Local Municipality was 22.1 % according to the 2011 census (Statistics South Africa, 2011). The proposed project will generate new, direct and indirect employment opportunities during the construction phase. Permanent employment opportunities well also be generated during the operational phase. These employment opportunities will act as a source of income for a number of households within the local municipal area. The proposed project will also stimulate other businesses, such as waste tyre collectors, especially as part of the REDISA Plan.

8.4 District and Provincial Benefit

The proposed project will form part of the country wide REDISA system and will assist in the establishment of REDISA. In doing so, the network of REDISA Transporters, Depots, Recyclers, Collection Points, Secondary Industries and Manufacturers/Importers will grow and be strengthened, leading to ever increasing employment opportunities. It is estimated that the REDISA Plan, through the establishment of the new waste tyre recycling industry, will create approximately 10 000 new employment opportunities (http://www.redisa.org.za, 2019).

9 Description of the Baseline Environment

The following section presents an overview of the biophysical and socio-economic environment in which the proposed project is located, so as to:

- Understand the general sensitivity of and pressures on the affected environment;
- Inform the identification of potential issues and impacts associated with the proposed project, which have been assessed in the impact assessment section of the BAR;
- Identify gaps in available information to inform specialist study requirements; and
- Conceptualising practical mitigation measures.

This section has been compiled, based on the following:

- Existing information on the environmental parameters of the area;
- Agricultural Geographic Information Systems (GIS);
- SANBI databases; and
- South African Weather Service.

Where site specific information is not available, information is reported on a regional scale.

9.1 Climate

9.1.1 Regional Climate

The climate in Upington is called a desert climate, with virtually no rainfall throughout the year. In a year, the average rainfall is 180 mm. The climate is classified as BWh by the Köppen-Geiger system. The average annual temperature in Upington is 19.3 °C.

9.1.2 Local Climate

Rainfall data (1900 – 2012) was obtained from rainfall station no 0284008W, situated approximately 37 km southeast of the property. A Mean Annual Precipitation (MAP) of 192 mm/a was calculated. The P5 (1:20 dry year) and P95 (1:20 wet year) was calculated at 58 mm/a and 340 mm/a respectively over the 112-year period. The area is a summer rainfall area with 81 % of the rainfall precipitating between November and April.

The average evaporation across the D73F quaternary catchment is Approximately 2 650 mm/a.

The area has cold winters and warm summers with temperatures ranging from an average monthly maximum of 26.2 °C in January to an average monthly minimum of 11.5 °C in July (Figure 9-1).

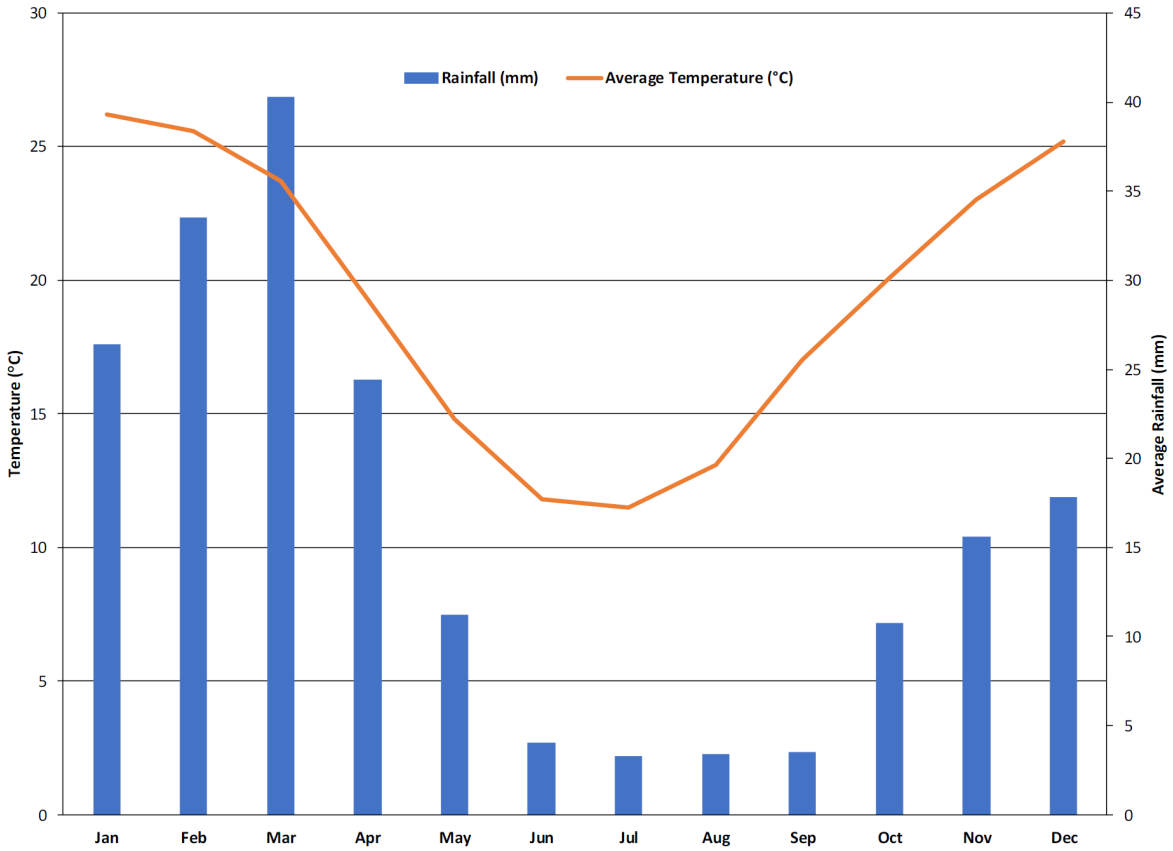


Figure 9-1: Average monthly rainfall and temperature

9.2 Topography

According to the Environmental Potential Atlas of South Africa (ENPAT, 2000) the project area is classified as being "Plain at a medium level - dune shaped depression". The project area is characterised by slightly undulating plains. The topography across the site varies from slightly undulating to flat plains with the elevation being 800 mamsl. The slopes of the study area are classified as being between 1 and 9 degrees.

9.3 Land Type Units

The land type unit represented within the study area include the Ae10 land type (Land Type Survey Staff, 1987) (ENPAT, 2001). The land type, geology and associated soil type is presented in Table 9-1 as classified by the Environmental Potential Atlas, South Africa (ENPAT, 2000) (Exigo Sustainability (Pty) Ltd, 2019).

Table 9-1: Land types, geology and dominant soil types of the proposed development site

Land type	Soils	Geology
Ae10	Red-yellow apedal, freely drained soils; red, high base status, > 300 mm deep (no dunes)	Migmatite, gneiss and ultrametamorphic rocks of the Namaqualand Metamorphic Complex.

9.4 Soils, Land-Use, Agriculture Potential and Land Capability

The current land-use on the project site is vacant land, although it was previously used for limestone mining and cattle farming. Neighbouring farms are being used for crop cultivation, livestock grazing and game farming (Exigo Sustainability (Pty) Ltd, 2019).

The soils were classified into broad classes (Figure 9-2) according to the dominant soil form and family as follows:

- Medium depth red apedal soils of the Hutton soil form (Hutton / Clovelly soil forms):
    - The red-yellow Hutton soil form occurs throughout most of the project area. The soil in this area is fine sandyclayloam soil and forms a mosaic of Hutton and Clovelly soils. Hutton soils were identified on the basis of the presence of an apedal (structureless) “red” B-horizon. The Hutton and Clovelly soils found on this section of the site are widespread and moderately deep, although it has a low clay content. (2-4%).
    - Agricultural Potential: Low potential soils, due to the sandy nature of the soils and the climatic conditions. The areas are not suitable for crop cultivation under arable conditions.
    - Land capability: The soil form is suitable for livestock grazing purposes, although it is limited due to the low nutrient content of the sandy soils and the palatability of the grass layer. The prevailing land capability class in the area is Class VI, which is suitable for moderate grazing at best, with no arable potential. This is due to the combination of unfavourable climate and sandy soils.

- Shallow, calcareous soils of the Mispah soil form / exposed bedrock derived from limestone (Mispah / bedrock soil form):
    - Both these soil forms can be categorised in the international classification group of lithic soil forms. In lithic soil forms the solum is dominated by rock or saprolite (weathered rock). These soils have sandy to sandyloam texture, while topsoil structure is apedal and the profiles are very shallow. Exposed bedrock nodules are spread on the soil surface throughout the area. The soil in this area is often weakly structured, sandy and forms a mosaic of shallow Glenrosa soils and very shallow rocky soils (Mispah soil form), with exposed bedrock in some areas. The Mispah and Glenrosa soils found on this section of the site are localised in the central and northern section of the site and shallow in depth, although it has a medium clay content.
    - Agricultural Potential: Low potential soils, due to the shallow nature of the soils and low soil pH, making these areas are not suitable for crop cultivation under arable conditions. The orthic A-horizon of the lithic soil group is unsuitable for annual cropping or forage plants (poor rooting medium since the low total available moisture causes the soil to be drought prone).
    - Land capability: The grazing potential of these areas is moderate-low. The most suitable and optimal utilization of the area would be grazing by livestock or game species.

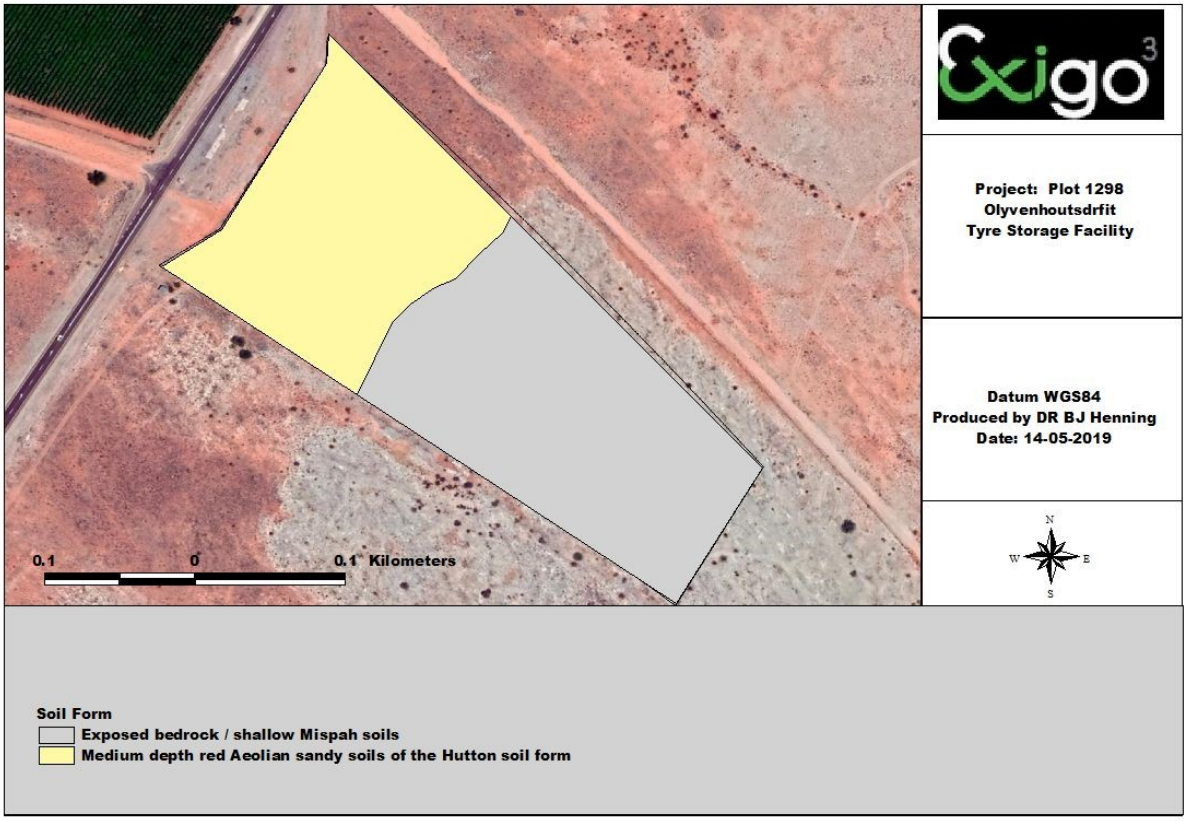


Figure 9-2: Soil Forms in the project area

Land Capability Map - site is classified as Non-arable – low potential grazing land (Figure 9-3).

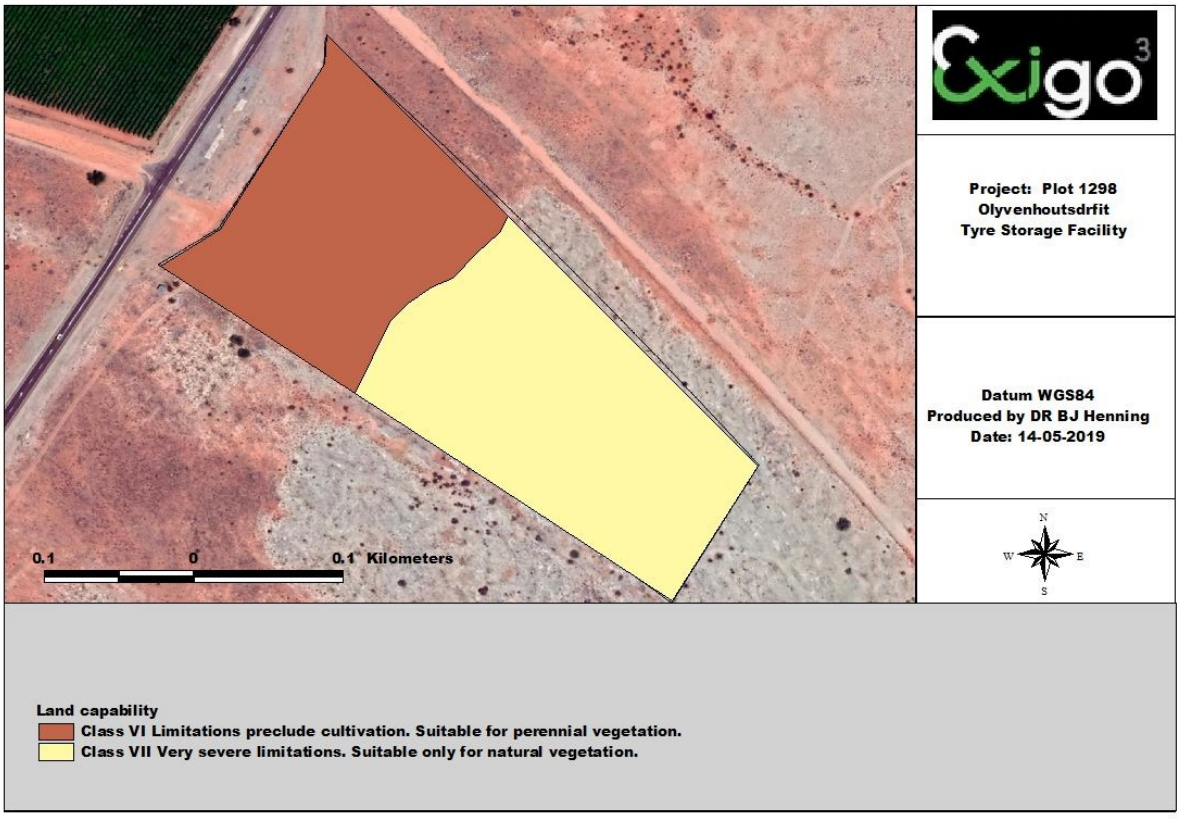


Figure 9-3: Land Capability

Agricultural Potential Map - indicating that the project site is classified as Low Agricultural Potential (Figure 9-4).

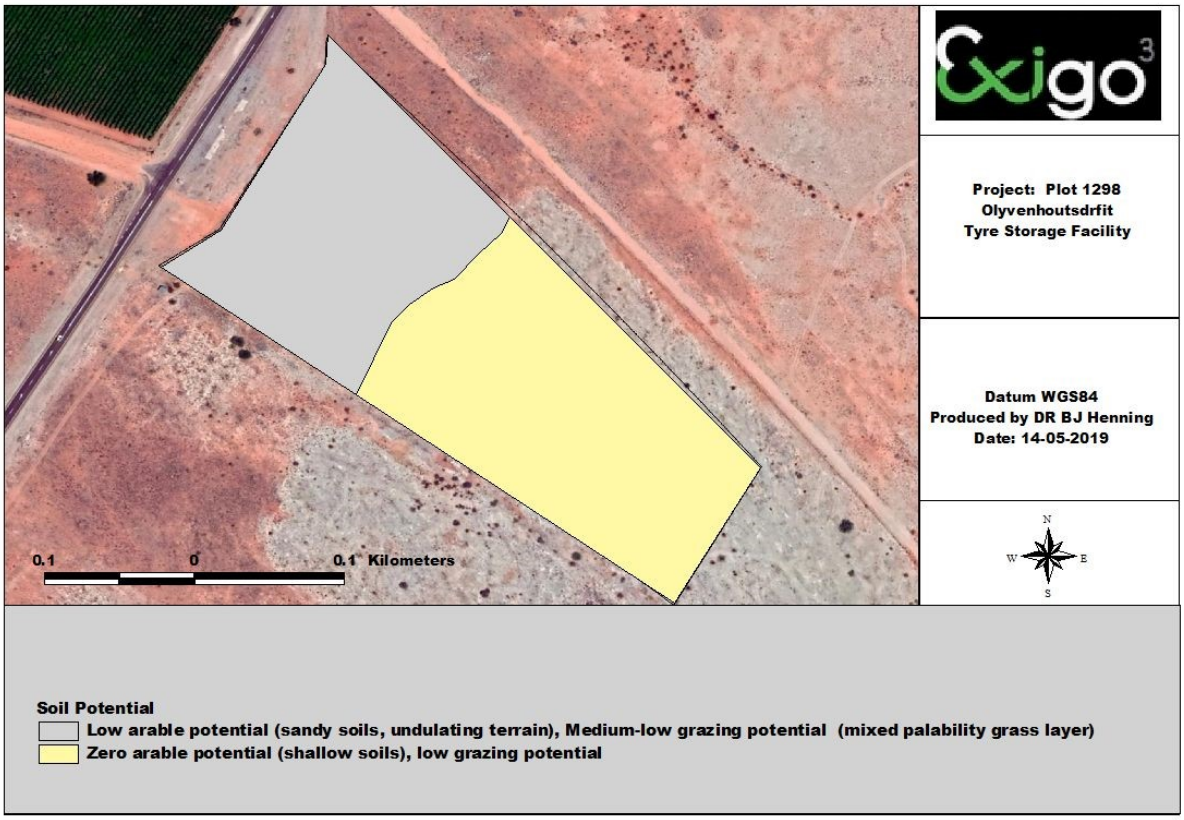


Figure 9-4: Agricultural Potential

9.5 Hydrology

The project area is situated within the quaternary catchment D73F that covers an area of 4 630 km^2 in the Lower Orange Water Management Area (WMA) ((Exigo Sustainability (Pty) Ltd, 2019). The study area is drained mainly by surface run-off (i.e. sheet wash) with surface water flowing into perennial rivers and wetlands of the study area. This water eventually drains into the Orange River that is situated to the east of the site. The state of the Orange River is summarized in Table 9-2.

Table 9-2: State of major streams / rivers in the project area (DWA)

Quaternary drainage region	Name	Class	Ecoregion II	State of river / streams	Category
D73F	Lower Orange	Perennial	Lower Vaal and Orange valleys	Class C: Moderately Modified	Endangered

The surface run-off ranges between 5.12 to 9.60 M/m^3/a (WR2012, 2015). The catchment has an annual evaporation of approximately 2 650 mm which is high considering the MAP of the area (Exigo Sustainability (Pty) Ltd, 2019).

The topography on site is flat and has an elevation ranging from approximately 815 mamsl on the north-western perimeter to 806 mamsl on the south-eastern perimeter. The property is characterised by a flat slope towards the Orange River to the southeast..

A dendritic drainage pattern dominates the surrounding areas. The property drains from northwest to southeast as shown in Figure 9-5 (Exigo Sustainability (Pty) Ltd, 2019).

The soils are freely draining and structureless with a high erodibility index. These soils have a restricted soil profile depth. The on-site soils also have excessive to imperfect drainage capabilities and a low soil moisture retention capacity. The high erodibility index and drainage capabilities of the on-site soils lead to problems relating to mass migration to the groundwater environment with physical degradation and washing away of top soils. The soils to the southeast (downstream) of the property are characterised by soils that have higher soil moisture retention capacities as these soils have a higher organic matter content due to the river's flow channel (Exigo Sustainability (Pty) Ltd, 2019).

Agricultural activities flourish on the banks of the Orange River, which include properties directly downstream from the Olyvenhoutsdrift property (Exigo Sustainability (Pty) Ltd, 2019).

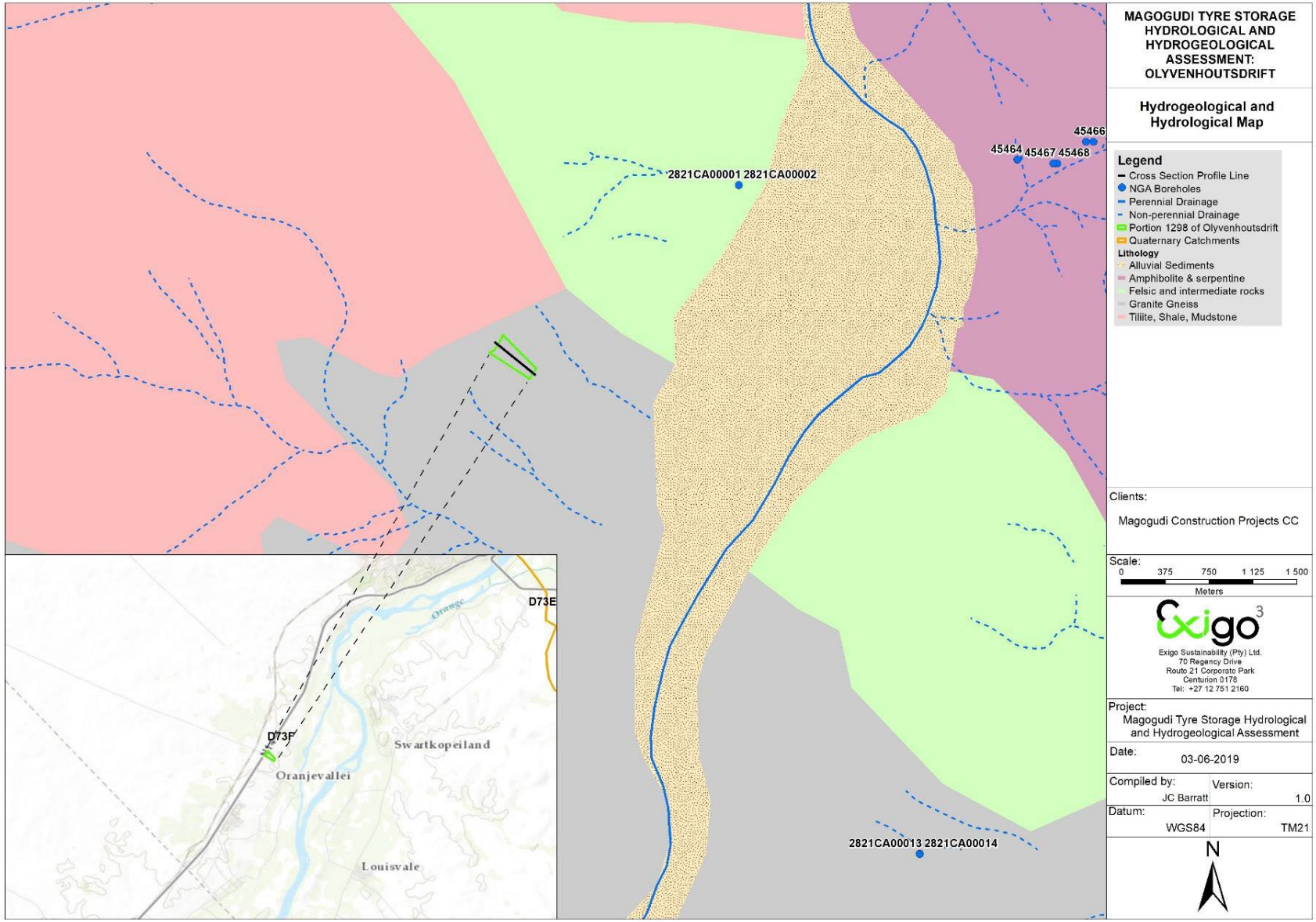


Figure 9-5: Hydrological and hydrogeological map

9.6 Geohydrology

9.6.1 Geological setting

The 1: 1 000 000 geological data shows that the site is underlain by predominantly granitic gneiss within the Louisvale Granite of the Keimoes Suite. These granitic rocks are deeply underlain by metamorphosed amphibolites and serpentines within the Jannelsepan Formation of the Areachap Group. Silcrete and calcrete deposits are superimposed over these formations and vary is thickness. Dolerite dyke and sheet intrusions are also sporadic in the area (Figure 9-6) (Exigo Sustainability (Pty) Ltd, 2019).

These geological formations have a low groundwater yield potential within this area of the Northern Cape with exception to the alluvial material along the banks of the Orange River which yield high volumes of groundwater. These alluvial basins circulate water directly from the river. The dolerite dykes and sheets within the Keimoes Suite create semi-permeable to impermeable barriers where groundwater can accumulate or flow along.

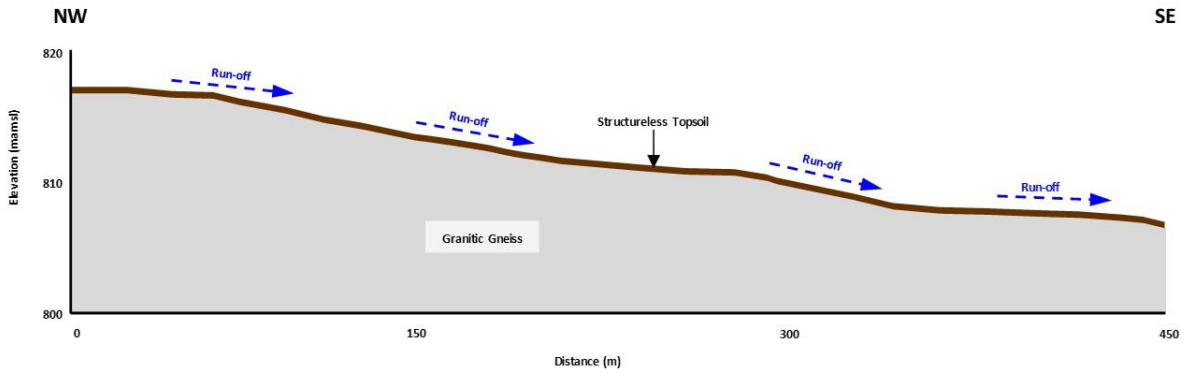


Figure 9-6: Hydrogeological conceptual model

9.6.2 Groundwater quality and quantity

The National Groundwater Archive (NGA) database show that there are 37 boreholes within a 15 km radius from the site were found. Historical NGA data from 1998 indicates that the water levels range from approximately 13.8 to 17.4 mbgl east of the site opposite the Orange River. Older data (1984 - 1986) suggests that the water levels south of the site ranged from approximately 4 - 8 mbgl with water levels southwest of the site approximately 4 mbgl. Vegter (1995) calculated that the water level depths for the area surrounding the site range between 11.9 and 50.1 m. The calculation by Vegter (1995) may not be highly applicable as the calculation included data more than 100 km from the property.

From all of the NGA borehole data, the average depth of the water strikes is 41.4 mbgl with and average blow yield of 1.3 ℓ/s, while Vegter's (1995) calculations show an average aquifer depth of 24 m. The elevated blow yield calculated for the NGA data is due to one of the boreholes approximately 11 km northeast of the property yielding 7.0 ℓ/s which elevated the average calculation. By using the P5 and P95 of the MAP along with a recharge range of between 1 and 4 %, the average available groundwater abstraction rate was calculated between 2.89E-05 and 0.0007 ℓ/s/a for Portion 1298 of Olyvenhoutsdrift. This calculation does not take any storage into consideration and can be seen as conservative (Exigo Sustainability (Pty) Ltd, 2019).

According to Vegter (1995), the average TDS ranges between 585 and 3340 mg/ℓ. The TDS will fluctuate seasonally with the increases and decrease of water levels due to rainfall recharge (if sufficient recharge is received). The high evaporation will cause higher saline conditions leading to

high chloride concentrations expected that will be the largest contributing constituent to the TDS (Exigo Sustainability (Pty) Ltd, 2019).

9.7 Wetlands

The National Freshwater Ecosystems Priority Areas (NFEPA) database indicates there are no wetlands located within 500 m of the proposed project location (Figure 9-7). The perennial Orange River occurs 1 kilometre east of the site.

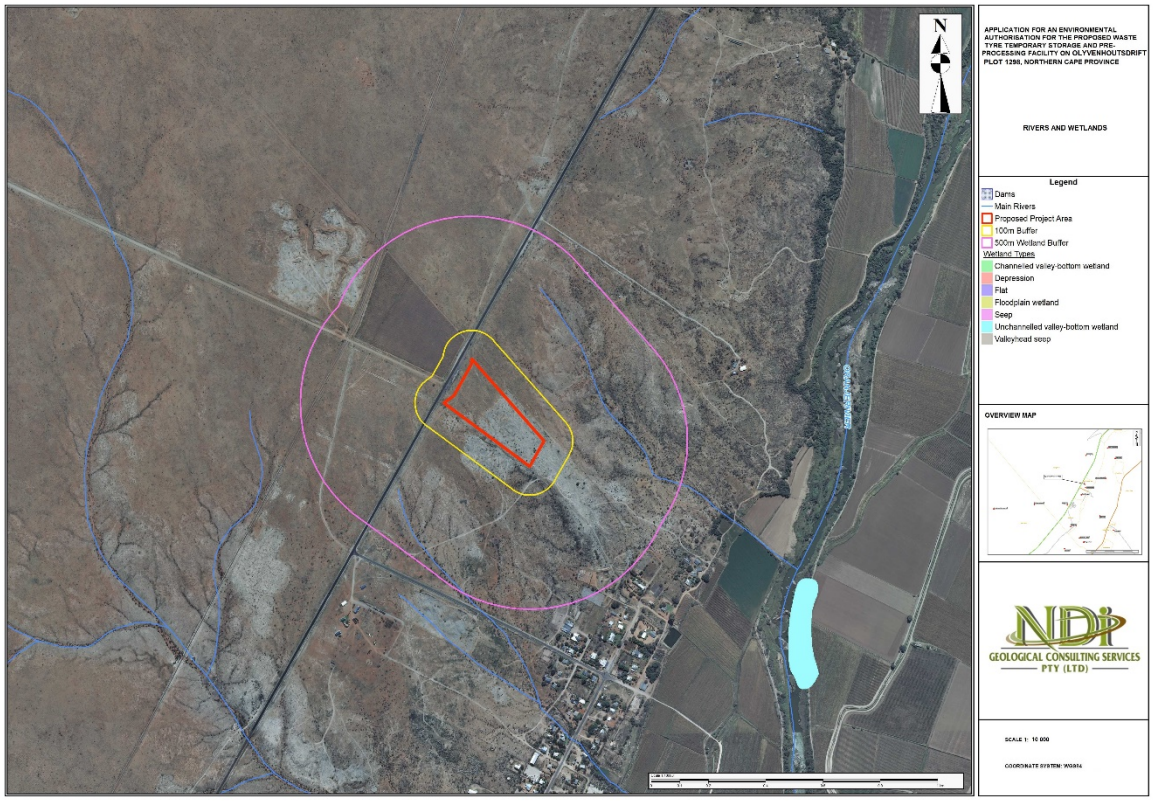


Figure 9-7: Rivers and Wetlands

9.8 Biodiversity

9.8.1 Critical Biodiversity Areas and Ecological Support Areas

The development footprint area is located in a Critical Biodiversity Area 2 (CBA-2) as shown in Figure 9-8.

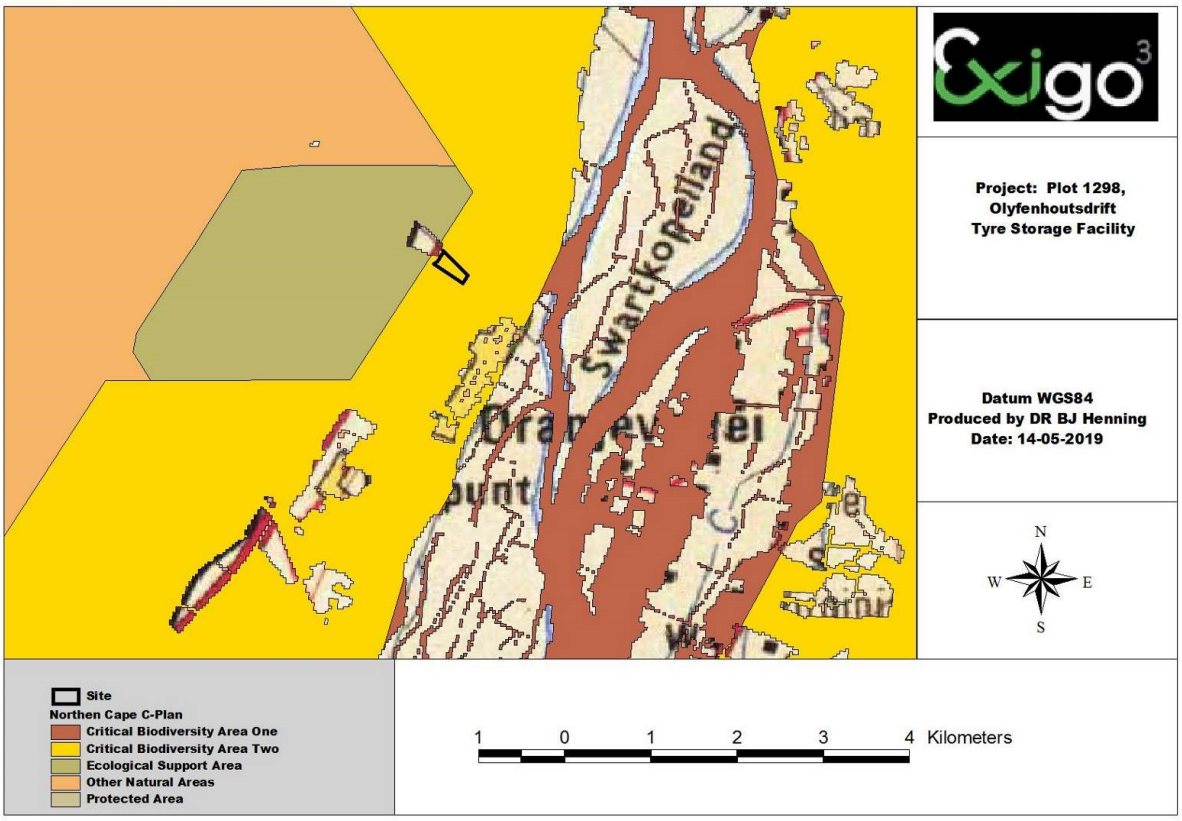


Figure 9-8: Terrestrial CBA areas of the study area (2014)

9.8.2 Protected Areas Network and National Protected Areas Expansion Strategy (NPAES)

No National Protected Areas Expansion Strategy (NPAES) occur in close proximity to the project area. The Kamiesberg Bushmanland Augrabies NPAES area occurs further west of the project area.

9.8.3 Important Bird Areas

No Important Bird Areas (IBA) are affected by the proposed project. The Augrabies Falls National Park IBA is located further than 60 kilometres west of the project area.

9.8.4 National Threatened Ecosystems

The proposed development site is not located within any listed ecosystem. The listed Lower Gariep Alluvial Vegetation is located almost directly east of the project area.

9.8.5 Flora

The specialist assessment identified 2 major vegetation / ecological unit (Figure 9-9) as follows:

- *Rhigozum trichotomum - Stipagrostis obtusa* dwarf shrubveld; and
- *Senegalia mellifera - Aristida* limestone quarry.

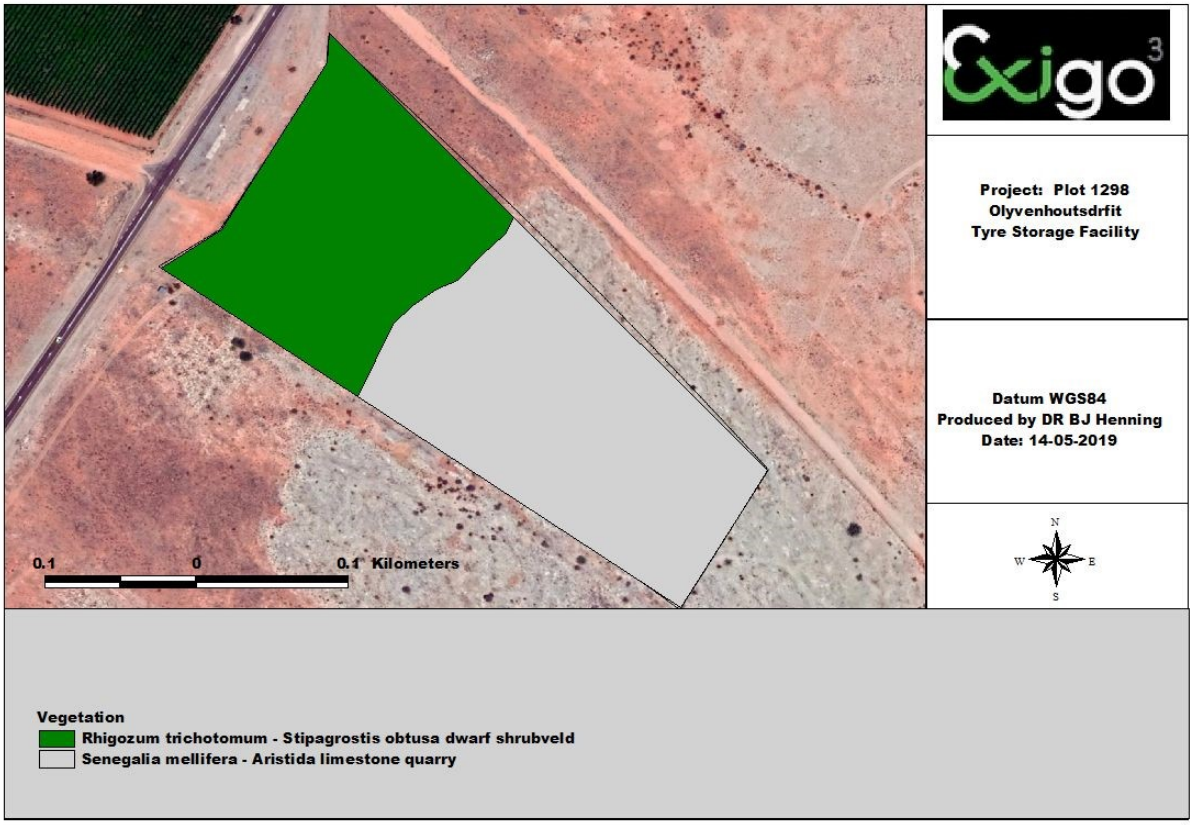


Figure 9-9: Vegetation Map of the proposed development

The characteristics of the vegetation units are described in Table 9-3.

Table 9-3: Characteristics of the major vegetation units in the study area

Characteristics	***Rhigozum trichotomum - Stipagrostis obtusa dwarf shrubveld***	***Senegalia mellifera - Aristida* limestone quarry**
State of vegetation	Slightly degraded	Totally degraded / modified
Vegetation structure:	Dwarf shrubveld / grassland	Little / no structure – scattered woody shrubs and dwarf shrubs
Woody structure	Trees: <1 (3-8m) Shrubs 2-5% (1-2m)	Trees: <1 (3-8m) Shrubs 1-2% (1-2m)
Herbaceous layer	Grass: 60-70% (0.8-1.2m) Forbs: 1-2% (0.5m)	Grass: 5-10% (0.8-1.2m) Forbs: 1-2% (0.5m)
Conservation priority	Medium	Low
Sensitivity	Medium	Low

Characteristics	***Rhigozum trichotomum - Stipagrostis obtusa* dwarf shrubveld**	***Senegalia mellifera - Aristida* limestone quarry**
Dominant plant species	*Rhigozum trichotomum, Aptosimum spinescens, Pentzia calcarea, Stipagrostis obtusa, Aloe claviflora*	*Senegalia mellifera, Prosopis glandulosa, Aristida congesta, Pentzia calcarea*
Red data flora species	None observed during surveys	None observed during surveys
Protected tree species	*Vachellia erioloba* (few individuals)	None observed during surveys
General (Geology, soil)	Red apedal Aeolian soils over calcrete (limestone)	Exposed limestone bedrock caused by mining of limestone that formed quarries
General:	Low shrubveld associated with the ecotone between the Nama Karoo biome and the Kalahari	Exposed limestone quarries with scattered vegetation
Habitat	No specific red data fauna or other fauna of significance occur in the degraded areas. Mostly utilized by common birds and small mammals (rodents, porcupine, and scrub hare) for foraging and shelter. Currently vacant land.	

Species of conservation concern

A list of SCC plant species previously recorded in the study area in which the proposed development is planned was obtained from the Plants of Southern Africa (POSA) database of South African National Biodiversity Institute (SANBI).

Table 9-4 indicates the potential red data species occurring in the QDS of the study area with reference to the vegetation types.

Table 9-4: Red data species potentially occurring in the quarter degree grid of the study area with specific reference to the vegetation types (SIBIS database)

Species Name	Conservation Status
Felicia deserti	*Data Deficient*
Acanthopsis hoffmannseggiana	*Data Deficient*
Dinteranthus wilmotianus	*Near Threatened*
Aloidendron dichotomum	*Vulnerable*

None of these species were documented during the surveys.

Protected Trees

A few individuals of the protected species *Vachellia erioloba* was documented on site. A licence should be obtained before any of the individuals can be eradicated, or alternatively the trees could be preserved on site.

Protected plants (Northern Cape Nature Conservation Act, No. 9 of 2009)

None of the species provided in the Northern Cape Nature Conservation Act, No. 9 of 2009 list was documented during the surveys.

Invasive alien species (Alien and Invasive Species Regulations GNR 599 of 2014)

The Alien Invasive Plant Species identified during the survey are provided in Table 9-5.

Table 9-5: List of AIS documented in the project area

Species	Category
Argemone ochroleuca	1b
Prosopis glandulosa	1b
Salsola kali	1b

9.8.6 Fauna

Mammal Habitat Assessment

Large mammals that occurred historically at the site, are absent from the area, owing to anthropogenic impacts in recent centuries. This loss of large species means that the mammal diversity at the site is far from its original natural state not only in terms of species richness but also with regards to functional roles in the ecosystem.

Antelope species such as duiker and steenbok might potentially migrate through the area and are not restricted by game fences. Smaller mammal species such as honey badgers and serval can become habituated to anthropogenic influences, while other species such as brown hyena will rather move away from the construction activities and will seldom use the area. The dominant species composition therefore comprises of widespread taxa with some species having specialised life history traits.

Mammals are sensitive to disturbances and habitat destruction and degradation and as such the anticipated species diversity of the study area would be low. The mammals are mostly represented by generalised species such as rodents, ground squirrel, scrub hare, porcupine and smaller antelope (steenbok, common duiker) that will move through the area while foraging.

The connectivity[2] of the project site is low. Of significance is the role of the Orange River as zoogeographical dispersal corridors, although it occurs more than 1 kilometre to the east of the site.

Birds (avifauna)

Two major bird habitats were identified within the borders of the study site namely

[2] C**onnectivity (habitat connectivity)** - Allowing for the conservation or maintenance of continuous or connected habitats, so as to preserve movements and exchanges associated with the habitat.

- Microphyllous woodland; and
- Dwarf shrubveld / grassland

Herpetofauna (Reptiles and Amphibians)

Typical reptilian species associated with arid and semi-arid habitat types occur in the study area. Venomous species such as the puff adder and cape cobra is expected to occur in the study area, although the presence of these snakes is dependent on the presence of their prey species (rodents, frogs etc.). The general habitat type for reptiles consists of open shrubveld and grassland with limited available habitat for diurnally active and sit-and-wait predators, such as terrestrial skinks and other reptiles. The lack of trees in the area explains the lack of arboreal species in the area.

The amphibians appear to be poorly represented on site and the Orange River represents the most suitable habitat for the few amphibian species that could occur in the larger area. No threatened species occur in the area.

Red data species

According to the existing databases and field survey the following number of fauna species included in the IUCN red data lists can potentially be found in the study area (Table 9-6):

Table 9-6: **Red data list of potential fauna for the study area**

English Name	Conservation Status	Probability of occurrence on site
BIRDS		
Bustard, Kori	Near Threatened	Medium
Bustard, Ludwig's	Endangered	Low
Duck, Maccoa	Near Threatened	Zero – no habitat on site
Falcon, Lanner	Vulnerable	Medium
Flamingo, Greater	Near Threatened	Zero – no habitat on site
Harrier, Black	Endangered	Low
Secretary bird	Vulnerable	Medium
Stork, Abdim's	Near Threatened	Medium
MAMMALS		
South-western Black Rhinoceros	Endangered	Zero – restricted to game reserves / parks
Roan Antelope	Endangered	Zero – restricted to game reserves / parks
Southern White Rhinoceros	Near Threatened	Zero – restricted to game reserves / parks
Brown Hyena	Near Threatened	Low
African Striped Weasel	Near Threatened	Medium
Dent's Horseshoe Bat	Near Threatened	Medium
Hartmann's Mountain Zebra	Vulnerable	Zero – restricted to game reserves / parks
Black-footed Cat	Vulnerable	Low
Leopard	Vulnerable	Low

9.9 Archaeological Status of the Site

The town of Upington was surveyed on portions of the original Olyvenhoutsdrift property in 1871 but no particular reference to archaeological sites or features of heritage potential were recorded during an examination of literature thematically or geographically related to the project area subject to this assessment (Exigo Sustainability (Pty) Ltd, 2019). A careful analysis of historical aerial imagery and

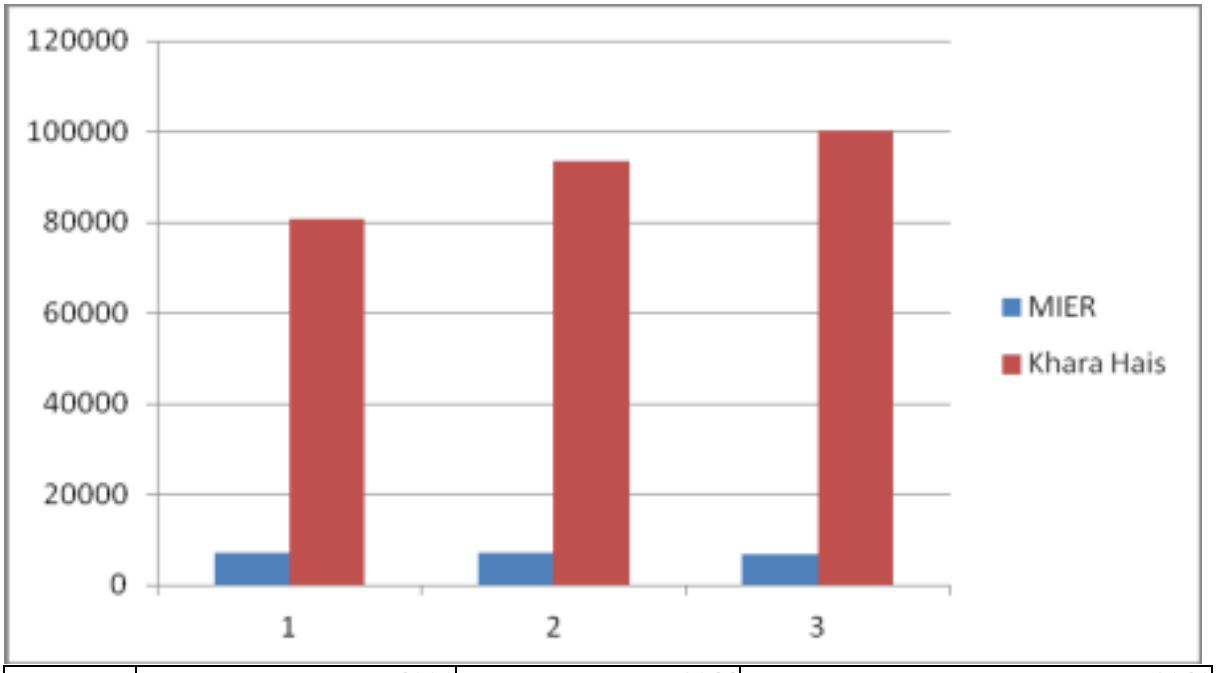
archive maps indicates that the larger Olyvenhoutsdrift property had been utilized for agriculture characteristic of the Orange River Basin during the last century. However, it is evident that the proposed project footprint has been altered and transformed extensively by quarrying and this inference was confirmed during an archaeological site assessment where it was noted that much of the project area had been transformed by a large quarry to the south.

However, a scatter of Stone Age archaeological material was noted along the more pristine northern portion of the project footprint (Exigo Sustainability (Pty) Ltd, 2019).

9.10 Socio – Economical Environment

The project area falls within the Dawid Kruiper Local Municipality, which was established after the August 2016 local elections by merging Mier and //Khara Hais local municipalities.

Figure 9-10 shows that the Khara Hais area, population was 100 497 in 2011. This reflects an overall population growth of 1.82% between 2001 and 2011. Dawid Kruiper Local Municipality is the most populous municipality in ZF Mgcawu District Municipality. Figure 9-10 indicates that there is currently 6 879 people within the Mier area which in terms of the demographic spread are scattered compared to the 100 282 within the Khara Hais/Upington area, which bring the total population at 107 162 within the Dawid Kruiper jurisdiction.



	1996	2011	2016
Mier	7026	7 003	6 879
Khara	80 823	93 494	100 282

Figure 9-10: Population (Source – Stats SA)

The unemployment rate decreased significantly from 34% in 2001 to 22.1% in 2011. There was a huge decline in the youth unemployment rate too from 42.3% in 2001 to 29% in 2011, but the youth unemployment rate is considered high in comparison with the overall unemployment rate of the municipality. Although about 44.7% of the Dawid Kruiper population are between14 and 35 years old, youths remains relatively marginalised.

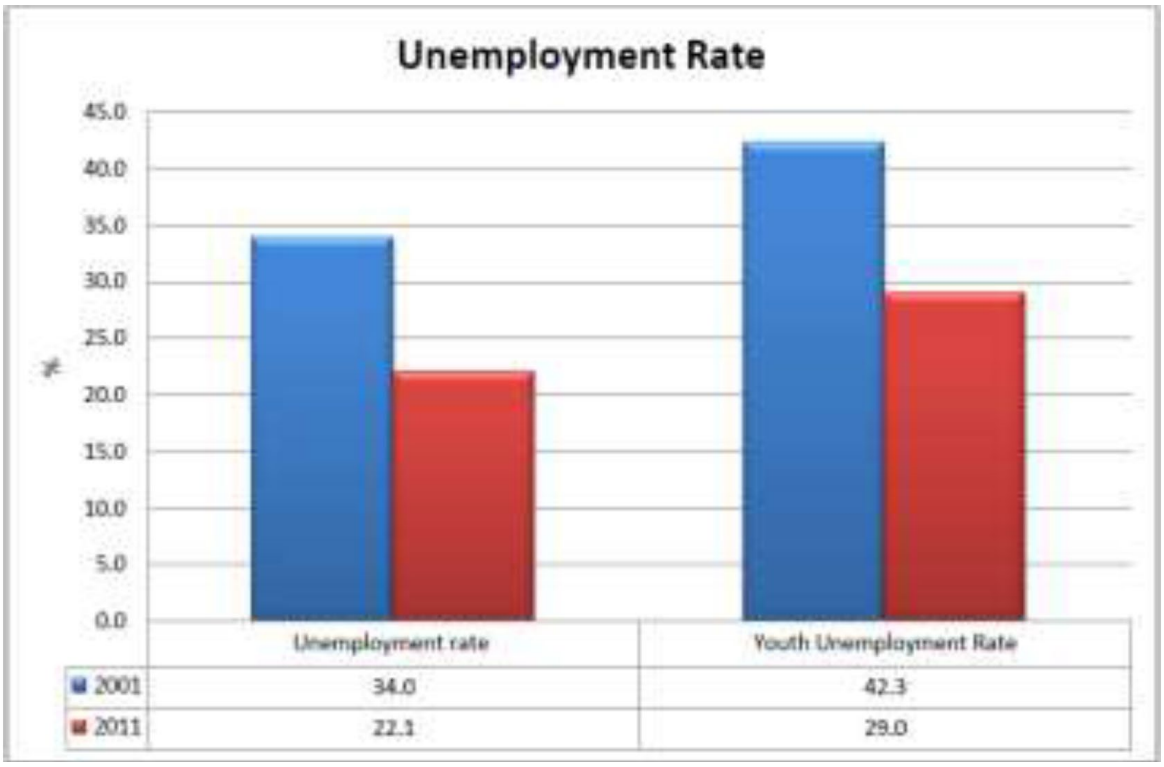


Figure 9-11: Unemployment Rate (Source – Stats SA)

An increase of 5.1% (20.9% in 2001 to 26% in 2011) of people living in Dawid Kruiper over the age of twenty years have completed the 12th grade while there was a significant decline of 6.5% (13.6 in 2001 to 7.1% in 2011) in people that had no schooling at all. Higher education increased from 20.9% in 2001 to 26% in 2011.

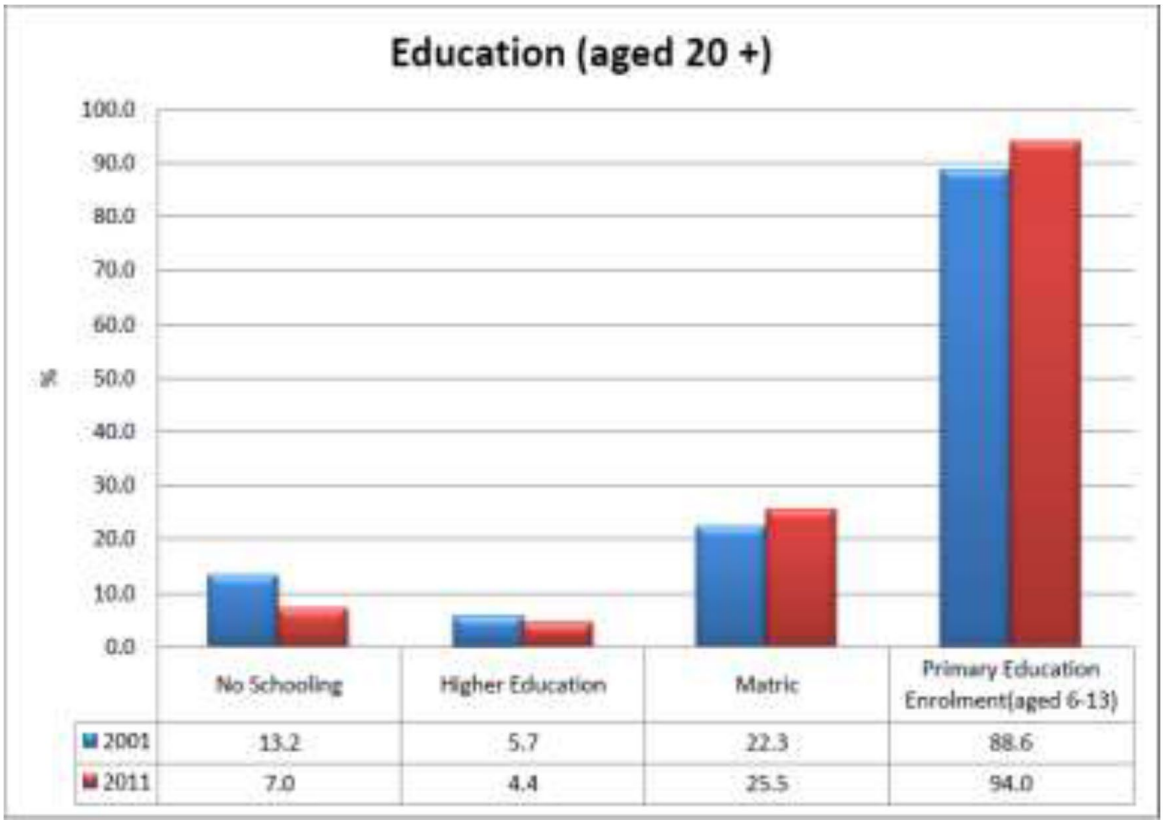


Figure 9-12: Graph 6: Education (Source – Stats SA)

10 Environmental Impact Assessment Process

A basic environmental impact assessment was conducted for the project as required by GNR 982 of the NEMA. The impact assessment process entailed the following:

- Baseline characterisation (provided in Section 9);
- Identification of potential impacts, including potential impacts identified in specialist studies; and
- Quantification of the significance of the identified potential impacts before and after implementation of mitigation measures.

10.1 Specialist Studies

The following specialist studies were conducted as part of the EIA process:

- Biodiversity study;
- Soils and land capability;
- Hydrology and Geohydrology; and
- Heritage Resources.

The assessment also includes the impacts on the socio-economic environment, visual, noise, waste management, stormwater management, soils and land use.

10.2 Impact Assessment Methodology

The main objective of the impact assessment is to identify the negative environmental impacts that can be avoided and/or mitigated and the benefits of the positive impacts that can be enhanced during the construction and operation of the proposed waste tyre storage and pre-processing depot.

A quantitative impact assessment methodology was used for the impact assessment. This method makes use of the basic risk assessment approach of deriving an expression for risk from the product of likelihood (probability) and consequences.

10.2.1 Baseline Characterisation of the Environment

The baseline characterisation of the environment (biodiversity, geohydrology, heritage resources, wetlands, air quality and hydrology) included in Section 9 of this BAR is based on findings from the specialist studies and other existing information and GIS databases. The characterisation provides a description of the current status of the environment, based on which an impact assessment will be conducted.

The specialist studies reports have been attached as Appendix D.

10.2.2 Identification of Key Issues

Key potential environmental risks have been identified as part of the impact assessment through the stakeholder engagement process as well as the specialist studies conducted for the project. The assessment also took into account any anticipated cumulative impacts that may occur as a result of the construction and operation of the proposed waste tyre storage and pre-processing depot.

10.2.3 Quantitative Impact Rating (Significance)

The anticipated impacts associated with the proposed project will be assessed according to a standardised impact assessment methodology, which is presented below. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact,

spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

The first stage of any impact assessment is the identification of potential environmental activities[3], aspects[4] and impacts, which may occur during the commencement, and implementation of a project. This is supported by the identification of receptors[5] and resources[6], which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts[7] (social and biophysical) are then identified based on the potential interaction between the aspects and the receptors/resources.

The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in Table 10-1.

The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity[8], spatial scope[9] and duration[10] of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity[11] and the frequency of the impact[12] together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix table as shown in Table 10-2.

This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Natural and existing mitigation measures, including built-in engineering designs, are included in the pre-mitigation assessment of significance. Measures such as demolishing of infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

[3]An ***activity*** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.
[4]An ***environmental aspect*** is an 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an impact.
[5]***Receptors*** comprise, but are not limited to people or man-made structures.
[6]***Resources*** include components of the biophysical environment.
[7]***Environmental impacts*** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. In the case where the impact is on human health or well-being, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.
[8]***Severity*** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.
[9]***Spatial scope*** refers to the geographical scale of the impact.
[10]***Duration*** refers to the length of time over which the stressor will cause a change in the resource or receptor.
[11]***Frequency of activity*** refers to how often the proposed activity will take place.
[12]***Frequency of impact*** refers to the frequency with which a stressor (aspect) will impact on the receptor.

Table 10-1: Criteria for Assessing Significance of Impacts

SEVERITY OF IMPACT	RATING
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

SPATIAL SCOPE OF IMPACT	RATING
Activity specific	1
Site specific (within the property boundary)	2
Local area (within 5 km of the plant boundary)	3
Regional (Greater Dawid Kruiper LM area)	4
National	5

DURATION OF IMPACT	RATING
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure / permanent	5

CONSEQUENCE

FREQUENCY OF ACTIVITY / DURATION OF ASPECT	RATING
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly / likely	4
Daily / permanent / high	5

FREQUENCY OF IMPACT	RATING
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

LIKELIHOOD

Table 10-2: Interpretation of Impact Rating

Likelihood \ Consequence	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	10	20	30	40	50	60	70	80	90	100	110	120	1	140	150

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

10.3 Summary of Identified Possible Impacts

The identified potential positive and negative biophysical, socio-economic and cultural impacts are summarised in Table 10-3.

Table 10-3: Summary of Potential Environmental Impacts Associated with the Proposed Development

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible temporary job opportunities during the construction and operational phases of the proposed waste tyre storage and pre-processing depot. Temporary creation and support of small informal businesses during the construction and operational phases of the project.
Hydrogeology	Possible, but limited groundwater contamination.
Surface water	Possible, but limited surface water contamination.
Air Quality	Possible, but limited impact on air quality in the area.
Noise	Possible generation of noise during the construction and operational phases of the proposed waste tyre storage and pre-processing depot
Visual	Possible visual impacts during the construction and operational phases of the proposed waste tyre storage and pre-processing depot.
Soils/Land Use/Land Capability	Possible impacts on soils during the construction phase of the proposed waste tyre storage and pre-processing depot.
Biodiversity	Possible loss and impacts on biodiversity due to construction activities.
Heritage	Possible impacts on graves and heritage resources during the construction phase of the proposed waste tyre storage and pre-processing depot
Wetland	Possible impacts on wetlands during the construction and operational phases of the proposed waste tyre storage and pre-processing depot

11 Quantitative Environmental Impact Assessment Results

Environmental impacts on the biophysical and socio-economic environment, which could potentially occur throughout the construction phase, are described in the following sections.

11.1 Construction Phase

11.1.1 Socio Economic

The main positive impacts of the proposed project will be the temporary creation of jobs during the construction phase of the project. The project may also result in a temporary boost in small local businesses in the area.

It is expected that the project will result in the creation of limited employment opportunities during the construction phase of the project.

The potential negative socio-economic impacts associated with the proposed project are as follows:

- Generation of dust due to movement of construction vehicles potentially resulting in a health and nuisance impact;
- Impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly;
- Health and safety risk as a result of the movement of vehicles increasing the risk of accidents;
- Clearing of land which may potentially impact on the sense of place; and
- Squatting of job seekers.

The mitigation measures have been included in Table 11-1 and have also been incorporated into the EMPr.

11.1.2 Groundwater

The use of earth moving machinery and construction vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater. The removal of vegetation could furthermore lower the evapotranspiration rates, thereby allowing a greater volume of potentially contaminated water to percolate to the underlying aquifer in the event of an accidental spill from the machinery. It must however be noted that the removal of vegetation will be limited to the required footprints, therefore the impact on evapotranspiration is therefore expected to be negligible.

Site clearing and grubbing is unlikely to materially affect the groundwater within the project area. However, care should be taken during the utilisation and storage of hydrocarbons and chemicals, which may have an impact on groundwater quality as a result of spillages and uncontrolled release.

11.1.3 Surface Water

The possible potential impacts on surface water during the construction phase of the waste tyre storage and pre-processing depot are as follows:

- Accidental spillages of hazardous substances from construction vehicles used during construction, as well as from hazardous storage areas;
- Contamination of runoff by poor materials/waste handling practices;
- Debris from poor handling of materials and/or poor waste management practises;
- Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality; and

- Increase of surface runoff and potentially contaminated water that needs to be controlled in the areas where site clearing occurred.

Sedimentation could potentially occur in the watercourses as runoff is naturally anticipated to pick up environmental debris as it crosses natural areas. Dust produced from movement of vehicles and machinery during the construction operational phase of the project has potential to settle in the watercourse, increasing turbidity. Increased turbidity is reversible and surface water should return to pre-impact turbidity levels once sediment levels entering the watercourse are reduced. Settled sediments should naturally move downstream during periods of high flow flowing storm events.

11.1.4 Wetlands

The NFEPA wetlands database shows that there is a wetland located on the border of the affected property could potentially be affected by the construction of the waste tyre storage and pre-processing depot. The removal of vegetation from the construction area is also expected to have an impact on the provision of ecological and sociocultural services by the wetland by reducing flood attenuation and assimilation abilities of the wetland. In addition, construction waste dumping and oil leakages from construction vehicles will alter biodiversity maintenance of the wetland features, which endangers the survival of wetland species inhabiting the area. Impacts on the wetland will include:

- Loss of habitat and wetland ecological structure as a result of site clearance activities and uncontrolled wetland degradation;
- Impact on the wetland systems as a result of changes to the sociocultural service provisions though site clearance, waste management and wetland disturbance;
- Potential poor planning, resulting in the placement of the access roads across wetland habitats, leading to altered habitat;
- Impact on the hydrological functioning of the wetland systems;
- Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat; and
- Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources.

11.1.5 Air Quality and Climate Change

The movement of vehicles and earth moving machinery will likely result in an increase in nuisance dust, PM_{10} and $PM_{2.5}$. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

The movement of vehicles and earth moving machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

11.1.6 Noise

The use of vehicles and machinery during construction activities may result in an increase in ambient noise in the immediate vicinity of the project.

11.1.7 Visual

The following potential impacts on the visual character of the area as a result of the proposed project are envisaged during the construction and operational phases of the project:

- Visual intrusion as a result of the movement of machinery; and
- Indirect visual impact due to dust generation, as a result of the movement of vehicles and materials, to and from the site area.

11.1.8 Soils, Land Use and Land Capability

During the construction phase, all infrastructure and activities required for the operational phase will be established. The main envisaged activities include the following:

- Movement of construction vehicles, machinery and workers in unprotected areas (bare) may result in compacting of the soil of the existing roads;
- Fuel and oil spills from vehicles may result in soil chemical pollution;
- Clearing of vegetation will result in the soils being particularly more vulnerable to soil erosion;
- Soil contamination as a result of. incorrect hazardous substance storage, incidental hydrocarbon leakages from construction vehicles); and
- Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint.

11.1.9 Biodiversity

Flora

The project may result in the following impacts on the floral environment during the construction phase:

- Indiscriminate movement of vehicles may result in loss of species of conservational concern;
- Impact on floral diversity as a result of anthropogenic activities and possible uncontrolled fires;
- The construction will lead to the loss of individual plants that will be cleared on the footprint areas;
- The clearing of vegetation during construction and operation will result in an increase in edge habitat immediately adjacent to disturbed areas. Edge habitat is characterized by a predominance of generalist and alien species;
- Potential spreading of alien invasive species as a result of floral disturbance as a result of ineffective alien plant species management and control; and
- Generation and incorrect disposal of waste from leading to disturbance of natural vegetation.

Fauna

The project may result in the following impacts on the faunal environment during the construction phase of the project:

- Loss of faunal habitat and ecological structure as a result of indiscriminate movement of vehicles, poor management and control of alien invasive species, erosion, and construction activities;
- Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal species trapping;
- Impact on faunal species of conservational concern due to habitat loss and collision with vehicles; and
- Potential spreading of alien invasive species as a result of floral disturbance may lead to further impacts on faunal habitat.

The proposed development will result in modification of a small section of degraded habitat in the footprint area compared to the larger area.

11.1.10 Heritage

Although the heritage assessment found that there are no heritage resources that will affected by the proposed waste tyre storage and pre-processing depot, it must be noted that there remains a possibility that some resources may have been missed during the assessment. The following impacts

are therefore envisaged on archaeological artefacts and graves as a result of the construction phase of the proposed project:

- The proposed project has the potential to impact on local graves within the area; and
- The proposed project has the potential to impact on sites of archaeological importance.

11.1.11 Traffic

The movement of construction vehicles in the project area will result in an increase in traffic on the roads.

The results of the quantitative impact assessment for the construction phase are provided in Table 11-1.

Table 11-1: Quantitative Impact Assessment Results for the Construction Phase

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Social-economic	Possible boost in short term employment and local small business opportunities.	1	1	2	3	5	32	Medium-Low (+)	• Encourage the local employment for the following: ○ Employment opportunities for local SMME contractors during site clearance, preparation and construction. ○ Secondary service provision of food, toilet hires, and equipment, etc. • Reduce speed limits to 40 km/h or less. • No fires are allowed on the site, unless in areas demarked and managed for this purpose. • All workers will be made aware of fire risks. • Limit the aerial extent of the disturbance to the footprint of the proposed development, including the laydown areas surrounding the primary footprint.	1	1	2	3	5	32	Medium-Low (+)
	Generation of dust potentially resulting in a health and nuisance impact.	3	2	2	2	3	35	Medium-Low (-)		2	1	2	2	2	20	Low (-)
	Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	3	2	2	2	3	35	Medium-Low (-)		2	1	2	2	2	20	Low (-)
	Visual impact assessment as a result of movement of vehicles in the project area.	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
	Potential squatting of job seekers.	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	3	2	3	3	3	48	Medium-High (-)	• No washing of vehicles shall be allowed outside demarcated areas. The bays will be clearly demarcated and will not be allowed to contaminate any surface runoff; • Sufficient areas shall be provided for the maintenance and washing of vehicles; • Refuelling of vehicles will only be allowed in designated areas; • All construction equipment shall be parked in a demarcated area • Drip trays shall be used when equipment is not used for some time; • On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material; • Bund areas shall contain 110% of the stored volume; • Bund areas must be impermeable; • Bund areas must have a facility such as a valve/sump to drain or remove clean stormwater; • Contaminated water shall be pumped into a container for removal by an approved service provider; • Regular inspections shall be carried out to ensure the integrity of the bundwalls; • All preventative servicing of earth moving equipment and construction vehicles shall be undertaken off site; • Runoff from this area shall be contained; • Spill kits shall be made available and all personnel shall be trained on how to use the kits and training records shall be made available on request.	2	1	2	2	2	20	Low (-)
	Improper storage and handling of hazardous materials leading to groundwater contamination.	3	2	3	3	3	48	Medium-High (-)		2	1	2	2	2	20	Low (-)

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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery.	2	3	3	2	2	32	Medium-Low (-)	• Ensure the clean and dirty water segregation. • Spill kits to be made available at areas of possible spillages of hazardous substances. • Remediation of spillages must be conducted on a continual basis. • Contaminated runoff will be contained and re-used where necessary. • No direct discharge of polluted water to the environment is permitted. • Ensure that topsoil is properly stored, away from the streams and drainage areas. • No other construction activities are allowed within 100 metres from the nearby steams without consent from the DWS. • Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited. • Ensure that topsoil is properly stored, away from the streams and drainage areas; • Vehicle and personnel movement within watercourses and drainage areas shall be strictly prohibited; • Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses and wetlands from dirty water.	2	2	2	2	2	24	Low (-)
	Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	2	2	2	2	2	24	Low (-)		2	2	2	1	2	18	Low (-)
	Increase in silt load in runoff due to movement of vehicles on site.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Deterioration of water quality as a result of improper handling/ of chemicals.	2	3	2	3	2	35	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Poor stormwater management leading to runoff from stockpiled material removed causing sedimentation of the water resources.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	1	2	18	Low (-)
	Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site clearing occurred.	2	3	2	2	2	28	Medium-Low (-)		2	2	2	1	2	18	Low (-)
Wetlands and Aquatic Ecosystems	Localised changes to the riparian areas as a result of vegetation clearing.	2	2	2	2	3	30	Low (-)	• Adequate stormwater management must be incorporated into the design of the project in order to prevent erosion and the associated sedimentation of the aquatic system; • No construction activities shall be allowed within 500 m of wetlands and/or riparian zones without consent from the DWS; • No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels; • All disturbed areas shall be re-vegetated with indigenous species; • All construction materials shall be kept out of the wetlands and riparian areas; and • All vehicles shall be regularly inspected for leaks. Re-fuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystems	1	1	1	1	1	6	Low (-)
	Loss of habitat and wetland ecological structure as a result of site clearance activities and uncontrolled wetland degradation.	3	2	2	2	2	28	Low (-)		1	1	1	1	1	6	Low (-)
	Impact on the wetlands systems as a result of changes to the sociocultural service provisions.	3	2	2	2	2	28	Low (-)		1	1	1	1	1	6	Low (-)
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources.	3	2	2	2	2	28	Low (-)		1	1	1	1	1	6	Low (-)

Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat.	3	2	2	2	2	28	Low (-)		1	1	1	1	1	6	Low (-)
	Impact on the hydrological functioning of the wetland systems.	2	2	2	2	2	24	Low (-)		1	2	1	1	2	12	Low (-)
Air Quality	The movement of vehicles and machinery during the construction phase may result in possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	2	2	2	2	2	24	Low (-)	• Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities; • Appropriate dust suppression measures may include spraying with water; • Where practical rehabilitation of areas cleared of vegetation should be undertaken in tandem with the construction activities; • A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road; • All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution; • Dust control suppression shall be implemented on dry weather days and periods of high wind velocities; • Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water; • Where practical rehabilitation should be undertaken progressively; • Materials transported on public roads must be covered; • Odours: • Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; and • Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Depot Manager.	1	2	1	1	2	12	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	2	2	24	Low (-)		1	2	1	1	2	12	Low (-)
Climate change	Emissions of Green House Gases as a result of the use of construction vehicles and machinery.	2	2	2	2	2	24	Low (-)	• All the construction vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	2	2	2	2	1	18	Low (-)
Heritage and Palaeontology Resources	The proposed project has the potential to impact on local graves within the area.	2	1	2	2	2	20	Low (-)	• Prior to the site establishment, a heritage impact assessment must be undertaken and mitigation and /or management measure for the protection of such resources must be implemented; • No construction activities may be undertaken within 50 m of the heritage and/or cultural sites; • If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. • Should fossils be exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of	1	1	1	1	1	6	Low (-)
	The proposed project has the potential to impact on sites of archaeological importance.	2	1	2	2	2	20	Low (-)		1	1	1	1	1	6	Low (-)
	Construction activities have potential to impact on palaeontological resources	2	1	2	2	1	20	Low (-)		1	1	1	1	1	6	Low (-)

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		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
									the finds can be made.							
Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of the depot.	3	2	2	2	3	35	Medium-Low (-)	• The Contractor shall be on the lookout for SCC and any floral SCC encountered within the development footprint are to be relocated to areas with suitable habitat, outside the disturbance footprint; • Floral species of conservation concern, if encountered within the development footprint, are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist; • The proposed development footprint shall be kept to the minimum; • All disturbed areas must be concurrently rehabilitated during construction; • Prohibit the collection of any plant material for firewood or medicinal purposes; • The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas; • Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area; • All sensitive open space areas will be demarcated and access into these areas shall be prohibited; • Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the construction activities; • Monitoring of relocation success will be conducted during the operational phase; • Construction related activities shall be kept strictly within the development footprint; • Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the project. • Alien Invasive Plant Species Management plan to be implemented; • Edge effects of activities including erosion and alien/ weed control will be strictly managed in the riparian area; • All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants; • Exotic or invasive plants shall be controlled as they emerge; • An alien vegetation control program must be developed and implemented within all disturbed areas. After removal of alien vegetation, the affected areas must be re-assessed to determine the success of the program and any follow up measures that may be required; • The eradicated plantmaterial must be disposed of at an approved solid waste disposal site; • During post-construction, an alien vegetation removal and monitoring plan must be compiled for those areas which were not effectively rehabilitated;	2	2	2	2	1	18	Low (-)
	Loss of localised floral species diversity including RDL and medicinal protected species due to site clearance and establishment of the depot.	3	2	2	2	3	35	Medium-Low (-)		2	2	2	2	1	18	Low (-)
	Potential spreading of alien invasive species as indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	2	24	Low (-)

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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
									• The extent of invasion must be established through investigation to identify priority areas; • Priority species shall be identified to control and develop protocols for the removal of all alien species e.g. mechanical removal, herbicidal treatment etc. Mechanical, methods must be favoured for the removal of alien invasive species. Chemical removal shall only be undertaken by a suitably qualified and approved person; and • As much vegetation growth as possible must be promoted in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro seeding, rehabilitation planting (where applicable) are to be implemented.							
Fauna	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	3	2	2	2	28	Medium-Low (-)	• The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas; • No trapping or hunting of fauna shall be permitted; • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed; • Should any SCC be encountered within the study area, these species will be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist; • No informal fires in the vicinity of construction areas shall be permitted; • An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss.	2	2	2	2	2	24	Low (-)
	Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	3	2	2	2	2	28	Medium-Low (-)		3	2	2	2	1	21	Low (-)
	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	2	2	2	2	24	Low (-)		2	2	2	2	1	18	Low (-)
	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	2	2	2	2	24	Low (-)		2	2	2	2	1	18	Low (-)
Visual	Scaring of the landscape as a result of the clearance of vegetation.	2	1	2	2	2	20	Low (-)	• The number of construction vehicles and machinery to be used shall be kept to a minimum; • Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents; • Materials transported on public roads must be covered; and • Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum.	1	1	1	1	2	9	Low (-)
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)

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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Noise	The use of vehicles and machinery may generate nuisance noise in the immediate vicinity	2	2	2	2	2	24	Low (-)	• Correct personal Protective Equipment (PPE) must be worn at all times by the personnel at the site. • All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. • Staff working on site should wear ear protection equipment where necessary. • All equipment must be kept in good working order • Equipment must be operated within specifications and capacity (e.g. no overloading of machines). • Regular maintenance of equipment must be undertaken.	2	1	2	2	2	20	Low (-)
Soils, land use and land capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	3	2	2	2	2	28	Medium-Low (-)	• No waste or spillage of effluent should be allowed to occur within or near sensitive habitat boundaries. • A pollution control system/spill handling procedure must be implemented to limit impact of such occurrences and prevent discharge to the receiving environment. • Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEM: WA, or can be removed by a service provider that is qualified to clean the soil; • Drip trays shall be used when dispensing fuel or oils from the earthmoving equipment outside designated areas. • Drip trays shall only be emptied into a dedicated container. • Dedicated containers must be emptied into containers for removal by an approved contractor. • Waste manifests and safe disposal certificates must be filed as proof of safe disposal from site. • Erosion control measures shall be implemented where deemed necessary. • Prevent erosion from stockpiles to prevent increase in turbidity of watercourses. • All erosion damage must be repaired as soon as possible.	2	2	2	2	1	18	Low (-)
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	3	2	2	2	2	28	Medium-Low (-)		2	2	2	2	1	18	Low (-)
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	3	2	2	2	2	28	Medium-Low (-)		2	2	2	2	1	18	Low (-)
	Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	3	2	2	2	2	28	Medium-Low (-)		3	2	2	2	2	28	Low (-)
Traffic	Increase in traffic volumes as a result of transportation of materials to site which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	3	3	2	2	2	32	Medium-Low (-)	• Speed limits will be reduced to 40 km/h or less to reduce dust and noise generation and minimise the occurrences of accidents on public roads. • All the vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency. • The number of construction vehicles and trips shall be kept to a minimum. • Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	2	2	2	2	2	24	Low (-)
	The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	2	24	Low (-)
Waste Management	Poor waste management could result in the contamination of surface runoff resulting in the	3	3	2	2	2	32	Medium-Low (-)	**Separation of waste:**	2	2	2	2	2	24	Low (-)

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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
	deterioration of water quality of the watercourse.								• All waste shall be separated into general waste and hazardous waste; • Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed; • General waste can further be separated into waste that can be recycled and or reused; • No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste; • Where necessary dedicate a storage area on site for collection of construction waste. • Storage of waste: • No stockpiling of debris shall be permitted within 100 m of any water courses and drainage lines, or within 500 m of wetland and riparian areas; • General waste will be collected in an adequate number of litter bins located throughout the construction site; • Bins must have lids in order to keep rain water out; • Bins shall be emptied regularly to prevent them from overflowing; • All work areas shall be kept clean and tidy at all times; • All waste management facilities will be maintained in good working order; • Waste shall be stored in demarcated areas according to type of waste; • Runoff from any area demarcated for waste will be contained, treated and reused; • Flammable substances must be kept away from sources of ignition and from oxidizing agents; • No construction rubble shall be disposed of to the riparian area; • If construction rubble is not removed immediately it shall be stockpiled outside the 1:100 year floodline and outside the sensitive wetland and riparian areas; • Demolition waste and surplus concrete shall be disposed of responsibly; • Waste shall not be buried or burned on site; and • The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. **Disposal of hazardous waste:** • No dumping shall be allowed in or near the construction site; • Hazardous containers shall be disposed of at an appropriate licensed site; • Hazardous waste will be removed and managed by an approved service provider;							
	Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	2	24	Low (-)
	Stockpiling material may result in secondary pollution and contamination of the watercourses.	3	3	2	2	2	32	Medium-Low (-)		2	2	2	2	1	18	Low (-)

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		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating		Consequence			Probability		Significance (Degree to which impact may cause irreplaceable loss of resources/damage)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact				Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
									• A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and • The safe disposal certificate shall be stored and provided on request. **Disposal of general waste:** • No dumping shall take place in or near the construction site; • All general waste shall be disposed of to the nearest licensed landfill site; • Demolition waste and builders rubble shall be disposed of to an appropriate licensed landfill site; and • The necessary permissions must be obtained to dispose of builders' rubble to the landfill site.							

11.2 Operational Phase

11.2.1 Socio Economic

It is expected that during the operation phase the project will result in the creation of employment. The community will also continue to benefit as a result of the continued boost in small local businesses. The socio-impacts expected during the operation phase include:

- Impact on the day to day operation by landowners in the area, which may have an impact on their livelihoods;
- Negative impacts on health and safety of the local communities as a result of additional vehicles on the roads and potential accidental fires;
- Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation; and
- Potential damage to adjacent landowners'/occupiers' infrastructure as a result of accidental fires.

11.2.2 Groundwater

The use of vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater. Additional possible sources of groundwater contamination also include:

- Pollution of groundwater resources due to:
    - Seepage of mass into the groundwater environment;
    - Leakage from run-off capturing storage tanks; and
    - Possible on-site septic tank leakage.
- Abstraction of water from a groundwater resource for domestic and fire-fighting purposes.

11.2.3 Surface Water

The possible potential impacts on surface water during the operational phases of the waste tyre storage and pre-processing depot are as follows:

- Accidental spillages of hazardous substances from vehicles dropping off and collecting waste tyres from the depot;
- Wash water may be generated when the waste tyres are cleaned prior to them being taken to the shredder. Rain water will also wash dirt and road oil from the tyres and this may result in contaminated stormwater runoff.
- Potential of soil contamination from leachate originating from the tyres stored on site;
- Potential contamination of soil, groundwater, and surface water run-off during a fire event if contact fire-fighting water is not contained;
- Potential contamination of off-site surface water due to uncontained on-site surface water run-off;
- Potential of groundwater contamination due to leachate originating from tyres stored on site and potentially uncontained on-site contact water; and
- Increase of surface runoff and potentially contaminated water that needs to be controlled in the areas where site clearing occurred.

11.2.4 Wetlands

The operational phase of the project is expected to have the following impacts on the wetland located on the edge of the property:

- Loss of habitat and wetland ecological structure as a result of continual wetland disturbance and uncontrolled wetland degradation;
- Impact on the wetlands systems as a result of changes to the sociocultural service provisions through continued uncontrolled waste management and wetland disturbance; and
- Impact on the hydrological functioning of the wetland systems as a result of reduced wetland footprints and uncontrolled disturbance.

11.2.5 Air Quality and Climate Change

The movement of vehicles will likely result in an increase in nuisance dust, PM_{10} and $PM_{2.5}$. There is also potential for increase in nuisance dust due to the movement of vehicles and machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust. There is also potential for increase in carbon emissions due to accidental burning of waste tyres

The movement of vehicles and earth moving machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

11.2.6 Noise

The movement of vehicles during operational activities to and from the project site may result in an increase in ambient noise in the immediate vicinity of the project.

11.2.7 Visual

The following potential impacts on the visual character of the area as a result of the proposed project are envisaged during the operational phase of the project:

- Visual intrusion as a result of the movement of machinery;
- Visual intrusion due to the storage of waste tyres which may be visible to residents in the area; and
- Indirect visual impact due to dust generation, as a result of the movement of vehicles and materials, to and from the site area.

11.2.8 Soils, Land Use and Land Capability

During the operational phase, indiscriminate movement of vehicles transporting waste tyres to and from the site will result in the continued impacts on soils as follows:

- Movement of vehicles and workers in unprotected areas (bare) may result in compacting of the soil of the existing roads;
- Fuel and oil spills from vehicles may result in soil chemical pollution; and
- Soil contamination as a result of incorrect hazardous substance storage, incidental hydrocarbon leakages from vehicles.

11.2.9 Biodiversity

Flora

The project may result in the following impacts on the floral environment during the operation phase:

- Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation;
- Impact on floral diversity as a result of possible uncontrolled and/or accidental fires;
- Potential spreading of alien invasive species as a result of floral disturbance; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.

Fauna:

The project may result in the following impacts on the faunal environment during the operation phase:

- Migration of fauna from the project area due to noise as a resulting of movement of vehicles transporting waste tyres to and from activities;
- Loss of faunal species due to collisions with vehicles;
- Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping; and
- Failure to initiate a rehabilitation plan and alien control plan during the operation phase may lead to further impacts during the operation phase.

11.2.10 Traffic

The movement of construction vehicles in the project area will result in an increase in traffic on the roads.

The results of the quantitative impact assessment for the construction phase are provided in Table 11-2.

Table 11-2: Quantitative Impact Assessment Results for the Operational Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Socio-Economic	Uncontrolled access of private property during operation may result in conflict with affected landowners and occupiers.	2	1	3	1	2	18	Low (-)	• Liaise with the SAPD and existing forums in order to implement effective crime prevention strategies; and • The applicant will ensure that as far as possible locals will be used during the operation of the prospecting project. • Recruitment will not be undertaken on site. • Recruitment will be conducted in a way that favours locals. • Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; • Where possible the transportation of materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents; • The number of vehicles on the roads shall be kept to a minimum; • Security and safety should be emphasized; • No workers shall be allowed to access private properties without the owner's knowledge and consent; • Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving vehicles to ensure the safety of the public;	1	1	3	1	2	15	Low (-)
	Negative impact as a result of additional trucks on the roads, impacting on local communities' health and safety.	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
	Negative impact on, local community health and safety due to potential influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation.	2	1	3	1	2	18	Low (-)		1	1	3	1	2	15	Low (-)
	Possible boost in short term employment and local small business opportunities.	1	1	2	3	5	32	Medium-Low (+)		1	1	2	3	5	32	Medium-Low (+)
Groundwater	Seepage of mass into the groundwater environment leading to pollution of groundwater resources	2	1	3	1	2	18	Low (-)	• All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. • All waste generated from the project site will be collected in proper receptacles and removed to a registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities. • All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. • Monitor the groundwater environment for hydrochemistry and hydrocarbons • Line the septic tank. • Monitor the groundwater environment for hydrochemistry and microbial matter • Ensure that the adjacent land owners' borehole yields are monitored during the drilling operation. • No groundwater may be abstracted for use on site without approval from the DWS.							Low (-)
	Water supply from groundwater for domestic and fire-fighting purposes	2	2	2	3	3	36	Medium-Low (-)								Low (-)
	The use of vehicles during the operational phase may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the soils and groundwater resources.	2	2	2	3	3	36	Medium-Low (-)								Low (-)
	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	2	2	2	3	3	36	Medium-Low (-)								Low (-)
	On-site septic tank leakage resulting in pollution of groundwater resources	2	2	2	3	3	36	Medium-Low (-)								Low (-)
Surface Water	Temporary storage of tyres in close proximity to a water course has potential for soil and river water contamination from leachate originating from the tyres stored on site.	3	2	2	2	2	28	Medium Low (-)	• No operations will be undertaken within 100 metres from the nearby steams and 500 meters from the wetland and/or riparian areas without consent from the DWS;	2	1	2	1	2	15	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
	Heavy rainfall events and associated sheet run-off towards the Vaal River has potential for contamination of off-site surface water due to uncontained on-site surface water run-off .	3	2	2	2	2	28	Medium Low (-)	• The sumps will be excavated for the collection mud and excess water from the drilling sites; • The sumps will be sized such that they will be able to contain the water and mud that will be generated during the prospecting operation; • Storm water generated around the project site will be diverted away to the clean water environment; • No concrete mixing and vehicle maintenance will be allowed on site. • All hydrocarbons will be stored on protected storage areas away from the streams. • Fire-fighting water- (sufficient storage, correct additives, impermeable storage containers), and contact water (run-off contained, remove or treat contained contact water) management • Design and construct (bunding, impervious storage base), and manage stormwater run-off (shaping of drains, channelling run-off, contact water containment) • Ensure contaminated surface run-off is either treated or contained in leak-resistant structures • Ensure contaminated surface run-off is either treated or contained in leak-resistant structures							Low (-)
	Accidental fires and extinguishing of on-site fires results in potential contamination of soil, groundwater, and surface water run-off during a fire event if contact fire-fighting water is not contained	2	2	3	1	2	21	Low								Low (-)
Biodiversity	Continued destruction of potential floral habitats for species of conservational concern as a result continual disturbance of soils leading to altered floral habitats, erosion and sedimentation.	2	1	3	2	2	24	Low	• All disturbed areas must be rehabilitated in tandem with construction activities. • The collection of any plant material for firewood or medicinal purposes shall be strictly prohibited. • The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the demarcated drill sites.	2	1	1	1	1	8	Low (-)
	Impact on floral species of conservational concern as a result of an increased in alien species proliferation and ineffective rehabilitation of exposed areas	2	1	3	2	2	24	Low		2	1	1	1	1	8	Low (-)
	The use of vehicles during for dropping off and collection of waste tyres may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils.	3	2	3	2	2	32	Medium Low (-)	• Ensure that the operational activities are done in such a manner that the environment is protected from probable spillages and contamination. • The contaminated soils will be removed and disposed of at a licensed waste disposal plant. • All waste generated from the site will be collected in proper receptacles and removed to registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities.	N/A	N/A	N/A	N/A	N/A	N/A	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
	Loss of faunal habitat and ecological structure as a result of increased fires during operation and introduction of alien species, leading to transformation of the natural habitat	2	1	3	2	2	24	Low (-)	• The rehabilitation of the disturbed areas must be conducted such that the rehabilitated areas will encourage the migration of animals back into the rehabilitated areas. • The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas. • No trapping or hunting of fauna shall be permitted. • Edge effects of all operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat shall be strictly managed. • No informal fires in the vicinity of project site shall be permitted. • An alien vegetation control plan must be implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss. • Poaching of wild animals and livestock will be prohibited.	1	1	1	1	1	6	Low (-)
Soils Land use and Land Capability	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from vehicles).	3	1	2	2	2	24	Low (-)	• Ensure that topsoil is properly stored, away from the streams and drainage areas. • The soils must be used for the backfilling and rehabilitation of the sumps. • The rehabilitated sump must be seeded with recommended seed mix consisting of indigenous species. • Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. • Soil disturbance within the drill sites shall be kept to a minimum.	2	1	1	1	1	8	Low (-)
Aquatic Ecology and Wetlands	Loss of habitat and wetland ecological structure as a result of continual wetland disturbance and uncontrolled wetland degradation.	3	1	2	2	2	24	Low (-)	• No waste tyres shall be stored within 100 metres from the nearby steams and 500 meters from the wetland and/or riparian areas as per the requirements of Government Notice Regulation (GNR) 149 of 2009. • Storm water generated around the site will be diverted away to the clean water environment; • No concrete mixing and vehicle maintenance will be allowed on site. • All hydrocarbons will be stored on protected storage areas away from the wetlands.	2	1	1	1	1	8	Low (-)
	Impact on the wetlands systems as a result of changes to the sociocultural service provisions through continued uncontrolled waste management and wetland disturbance.	3	1	2	2	2	24	Low (-)		2	1	1	1	1	8	Low (-)
	Impact on the hydrological functioning of the wetland systems as a result of reduced wetland footprints and uncontrolled disturbance.	3	1	2	2	2	24	Low (-)		2	1	1	1	1	8	Low (-)
Air Quality	The operational phase of the project will require vehicular movement which may result in Possible increase in dust generation, PM10 and PM2.5 as a result of use of heavy machinery, and material movement.	2	3	2	2	2	28	Medium Low (-)	• Dust suppression must be conducted during the operational phase of the project. • Correct speed will be maintained at the proposed project site. • Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes. • Where practical possibly rehabilitation should be undertaken progressively. • A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads.	1	1	1	1	1	6	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	2	3	2	2	2	28	Medium Low (-)		1	1	1	1	1	6	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Management and Mitigation Measures • All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution. • Dust control suppression shall be implemented on dry weather days and periods of high wind velocities; • Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water; • Materials transported on public roads must be covered; and • Where practical rehabilitation should be undertaken progressively. • Odours • Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; and • Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer.							
Visual	The temporary storage of waste tyres on site may result in visual impacts as the waste tyres may be visible from the nearby residents and properties.	2	2	3	2	3	35	Medium Low (-)	• Ensure that the time period during which the tyres ill be stored on see is kept to a minimum and that tyres will be neatly arranged o minimise the visual impacts	1	1	1	1	1	6	Low (-)
Noise	Increase in traffic volumes as a result of movement of vehicle to and from the waste tyre storage and pre-processing depot.	2	2	2	2	2	24	Low (-)	• Ensure that proper management measures as well as technical changes are undertaken to reduce the impacts on surrounding residents and employees. This include ensuring that less noisy equipment is used, that equipment is kept in good working order and that the equipment must be fitted with correct and appropriate noise abatement measures and where possible use white-noise generators instead of tonal reverse alarms on heavy vehicles operating on roads. • Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.gw. noise) in advance. • All equipment should be provided with standard mufflers. • Muffling units on vehicles and equipment must be kept in good working order. • Staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment. • Where possible, operation of several equipment and machinery must be avoided; • All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fan-belts, worn bearings and other sources of noise; • Equipment must be operated within specifications and capacity (e.g. no overloading of machines); • Regular maintenance of equipment must be undertaken, particularly with regard to lubrication; • Equipment shall be switched off when not in operation; • Appropriate directional and intensity settings must be maintained on all hooters and sirens;	1	1	1	1	1	6	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Management and Mitigation Measures • The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; • Adjacent landowners shall be notified in writing if work needs to be carried out after hours or if any blasting will be required; and • Noise producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 17H30 and Saturday 07H00 -14H00).							
Traffic	The operational phase of the project will require vehicular movement which may result in Possible increase in dust generation, PM10 and PM2.5 as a result of use of heavy machinery, and material movement.	2	3	1	2	2	24	Low (-)	• Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; and • Where possible the transportation of the waste tyres and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	1	2	1	1	1	8	Low (-)
Climate	Emissions of Green House Gases as a result of the use of vehicles and, heavy moving machinery, generators etc.	2	2	2	2	2	24	Low (-)	• The number of construction vehicles and trips shall be kept to a minimum • All the vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	1	1	1	1	1	6	Low (-)
Waste Management	Inadequate waste management may result in contamination of water resources and the environment in general.	2	1	1	2	2	16	Low (-)	**Storage of waste** • General waste will be collected in an adequate number of litter bins located throughout the construction site; • Bins must have lids in order to keep rain water out; • Bins shall be emptied regularly to prevent the bins from overflowing; • All work areas shall be kept clean and tidy at all times; • All waste management facilities will be maintained in good working order; • Waste shall be stored in demarcated areas according to type of waste; • Runoff from drill sites will be contained, treated and reused; • Flammable substances must be kept away from sources of ignition and from oxidizing agents; • No storage of waste shall be permitted within 100 m of the water courses or within 500 m of wetlands and riparian areas; • Demolition waste and surplus concrete shall be disposed of responsibly; • Waste shall not be buried or burned on site; and • The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. **Disposal of hazardous waste** • No dumping shall be allowed in or near the construction site; • Hazardous containers shall be disposed of at an appropriate licensed site; • Hazardous waste will be removed and managed by an approved service provider;	1	1	1	1	1	6	Low (-)

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Management and Mitigation Measures • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and • The safe disposal certificate shall be stored and provided on request. **Disposal of general waste** • No dumping shall take place in or near the drill sites; and • All general waste shall be disposed of to the nearest licensed landfill site. **Storage of Waste Tyre** • Training must be provided continuously to employees working with waste. The training programme must include the provisions stipulated in GNR. 926 of 29 November 2013. • An Emergency Preparedness Plan must be compiled in accordance with GNR. 926 of 29 November 2013. • Monitoring, auditing, reporting and record keeping must be conducted in accordance with GNR. 926 of 29 November 2013.							

11.3 Decommissioning Phase

Magogudi Construction Projects CC was appointed by the DEA for a period of five years and it is expected that should the contract not be renewed, closure and decommissioning of the waste tyre storage and pre-processing depot will be required. Should the closure and decommissioning of the depot be required, a detailed closure and rehabilitation plan will be submitted to the DENC prior to decommissioning.

11.4 Cumulative Impacts

Incomparable activities can result in a number of complex effects on the natural biophysical and social environment. These impacts are mainly identified as direct and immediate effects on the environment by a single entity affecting a variable of the environment. These direct impacts have the potential to combine and interact with other activities, depending on the surrounding environmental state and land use. These impacts may aggregate or interact with other impacts to cause additional effects, not easily quantified when assessing an individual entity.

The NEMA, 2014, specifically requires that cumulative impacts be assessed. This section provides a description and analysis of the potential cumulative effects of the proposed waste tyre storage and pre-processing depot, and past and present projects hereby considering the effects of any changes on the:

- Biophysical; and
- Socio – Economic conditions.

For the analysis of cumulative effects to be utilised as a useful tool for decision makers and stakeholders, it must be limited to the effects that can be meaningfully evaluated, rather that expanding on resources or receptors that are no longer affected by the development or are not of interest to the stakeholders. Two important aspects require consideration prior to the evaluation of cumulative effects:

- The determination of an appropriate spatial and temporal boundaries for evaluation of cumulative effects of the project; and
- The evaluation of relevant projects for consideration in the cumulative effects analysis.

Spatial and temporal boundaries for analysis of cumulative effects are dependent on a number of factors, including:

- The size and nature of the project and its potential effects;
- The size, nature and location of past and (known) future projects and activities in the area,
- The aspect of the environment impacted by the cumulative effect; and
- The period of occurrence of effects.

The spatial extent of the cumulative impact analysis is generally aligned with the zone of influence of the project and other projects in the vicinity. Most impact will be localised; however, others may be experienced on a regional scale. This is taken into consideration during the assessment of cumulative impacts.

11.4.1 Hydrological and Surface Water Impacts

The potential groundwater and surface water quality impact associated with the project relates to the potential contamination as a result of leakages from vehicles and machinery as well as the area where the tyres will be stored. Mitigation measures have been proposed for the impacts on ground water and surface water contamination. It is expected that with the implementation of the mitigation measures

this impact will be reduced to an acceptable level. The hydrological and surface water cumulative impacts resulting from the project will be negligible.

11.4.2 Air Quality Impacts

The potential air quality impacts associated with the waste tyre storage and pre-processing depot relate to the potential generation of $PM_{2.5}$, PM_{10} and fugitive dust emissions as a result of vehicular movements.

Mitigation measures have been proposed to mitigate these adverse impacts. It is expected that the implementation of these mitigation measures will reduce this impact to an acceptable standard. It is expected that the cumulative air quality impacts from the project will be negligible.

11.4.3 Noise Impacts

The potential noise nuisance relates to the movement of vehicles and operation of machinery on site. Mitigation measures have been proposed to avoid and/or reduce the nuisance noise impacts. It is expected that with the implementation of the mitigation measures this impact will be reduced to an acceptable level. It is therefore anticipated that the cumulative noise impacts from the project will be negligible.

12 Assumptions, uncertainties and gaps in knowledge

12.1 Independent Environmental Assessment Practitioner (EAP)

Ndi Geological assumes that all the technical data and information provided by the specialists is accurate. It is also assumed that the applicant will comply with all legislation pertaining to the activities of this proposed project and that all permits and license that may be required will be identified and applied for prior to commencement of construction and operational activities.

The stakeholder engagement process has been sufficiently effective in identifying the critical issues needing to be addressed in the impact assessment and compilation of the EMPr by the EAP. The stakeholder engagement process has sought to involve key stakeholders, including the CA (DENC). Wherever possible the information requested and comments raised by I&AP's have been sufficiently addressed and incorporated into the Draft BAR / EMPr report for perusal and comment. The comments received from stakeholders and responses provided by the EAP have also been collated into a CRR contained in Appendix C 5.

Ndi Geological assumes that the applicant will implement the measures contained in the EMPr and will adhere to any monitoring procedures. A monitoring and evaluation system, including auditing, will be established and operationalised to track the implementation of the EMPr ensuring that management measures are effective to avoid, minimise and mitigate impacts and that corrective action is being undertaken to address shortcomings and/or non-conformances.

12.2 Specialist Studies

Assumptions and limitations relevant to each specialist study conducted for the project is provided in the following sections. Other additional impacts on the environment will have a minimal effect and were assessed using the professional judgement of the Ndi Geological EIA team.

12.2.1 Biodiversity Assessment

The following assumptions and limitations apply to the biodiversity assessment:

- In order to obtain a comprehensive understanding of the dynamics of the flora and fauna of the study area, surveys should ideally be replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this biodiversity study was conducted over one season;
- The large study area did not allow for the finer level of assessment that can be obtained in smaller study areas. Therefore, data collection in this study relied heavily on data from representative, homogenous sections of vegetation units, as well as general observations, aerial photograph analysis, generic data and a desktop analysis. Thus, even though it might be assumed that survey findings are representative of the ecosystem of the project area, it should be stated that the possibility exists that individual plants or animal species might have been missed due to the nature of the terrain. Therefore, maintaining due cognisance of the integrity and accuracy of the ecological survey, it should be stated that the ecological resources identified during the study do not necessarily represent all the ecological resources present on the property.

12.2.2 Soils, Land use, Land Capability and Agriculture Potential

The following assumptions and limitations apply to the soils, land use, land capability and agriculture potential assessment:

- The study focuses only on the development footprint on Olyvenhoutsdrift Plot 1298;
- In order to obtain a comprehensive understanding of the dynamics of the soils of the study area, surveys should ideally be replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible;
- The large study area did not allow for the finer level of assessment that can be obtained in smaller study areas. Therefore, data collection in this study relied heavily on data from representative, homogenous sections of soils, as well as general observations, aerial photograph analysis, generic data and a desktop analysis;

12.2.3 Hydrology and Geohydrology

The study was based on a desktop analysis of satellite imagery and existing information and databases.

12.2.4 Heritage Resources

The site survey for the Magogudi Tyre Storage Facilities Olyvenhoutsdrift Project AIA primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the aerial survey) as well as areas of high human settlement catchment. In summary, no major constraints were encountered during the site survey. It should be noted that, even though it might be assumed that survey findings are representative of the heritage landscape of the project area for the Project, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

13 Environmental Management Programme

The EMPr for the construction and operation of the waste tyre storage and pre-processing depot has been included in Appendix E. The mitigation measures listed in the EMPr are deemed adequate to avoid further degradation of the features. In the long term, effective implementation of mitigation measures (as recommended in the EMPr) may also result in positive impacts in terms of control of alien vegetation as well as erosion control.

Mitigation measures from specialist studies have been incorporated into the Environmental Management Programme compiled for the project.

14 Period for which the Environmental Authorisation should be issued

Although it is expected that the waste tyre storage and pre-processing depot is be required for approximately 5 years, it is requested that the EA be issued for a minimum period of 8 years to allow for any unforeseen issues which may delay the process.

15 Opinion and Conditions of Environmental Authorisation

Based on the outcomes of the Environmental Impact Assessment, conducted as part of this BA process, Ndi Geological recommends that the DENC authorises the waste tyre pre-processing depot. It is costly to transport uncompressed tyres as they take up considerable amount of space in haulage vehicles. The baling of tyres prior to transportation reduces transportation cost and carbon footprint. The following mitigation measures are recommended.

- A final site development plan must be submitted to the fire chief for approval.
- The mitigation measures proposed in this report and the draft EMPr must be implemented during the construction and operational phases of the project.
- The certificate for consent land use must be obtained from the relevant Municipality and kept on site.
- A permit must be obtained from the DAFF for the removal of *Vachellia erioloba* tree species from site should it be required.
- All operational activities shall be managed and operated in accordance with Waste Tyre Regulations (WTRs), 2009 and National Norm and Standards for Waste Storage, 2013.
- A suitably qualified employee must be mandated with the task of monitoring compliance, and correct implementation of all mitigation measures and provisions as stipulated in the EA once issued and the EMPr.
- Magogudi Construction Projects CC must ensure that the emergency preparedness plan is implemented.
- The proposed site must be flat and hard-packed to comply with the WTRs, 2009.
- In the event of a major incident (e.g. fire causing damage to property and environment, major spill or leak of contaminants), the relevant authorities should be notified as per the notification of emergencies/ incidents, as per the requirements section 30 of NEMA. .

16 Environmental Impact Statement

This section of the report presents the outline of the key findings of the Impact Assessment. A Basic Environmental Impact Assessment has been conducted in accordance with the NEMA regulations which included the required PPP aimed at the key Organs of State and the identified I&APs. Where potential biophysical or social impacts have been identified mitigation and management measures have been proposed to control and monitor the magnitude of impacts associated with the various aspects of the proposed project.

The identified impacts are manageable through the implementation of mitigation measures contained in the EMPr.

16.1 Summary of Key Findings of the EIA

The potential impacts evident from the detailed impact assessment (Section 11) of the proposed project are both positive and negative in nature and can be managed to acceptable levels. Table 16-1 provides a summary of findings from the impact assessment.

Table 16-1: Summary of Potential Environmental Impacts Associated with the waste tyre storage and pre-processing depot

Phase	Aspect	Impact	Environmental Impact Significance Before Mitigation	Environmental Impact Significance After Mitigation
CONSTRUCTION PHASE	Social-economic	Possible boost in short term employment and local small business opportunities.	Medium-Low (+)	Medium-Low (+)
		Generation of dust potentially resulting in a health and nuisance impact.	Medium-Low (-)	Low (-)
		Potential impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly.	Medium-Low (-)	Low (-)
		Visual impact assessment as a result of movement of vehicles in the project area.	Low (-)	Low (-)
		Potential squatting of job seekers.	Low (-)	Low (-)
	Groundwater	Local spillages of oils from vehicles and machinery leading to groundwater contamination.	Medium-High (-)	Low (-)
		Improper storage and handling of hazardous materials leading to groundwater contamination.	Medium-High (-)	Low (-)
	Surface Water Quality	Potential deterioration in water quality as a result of accidental spillages of hazardous substances such as hydrocarbons from vehicles and machinery.	Medium-Low (-)	Low (-)
		Possible contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	Medium-Low (-)	Low (-)
		Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	Low (-)	Low (-)
		Increase in silt load in runoff due to movement of vehicles on site.	Medium-Low (-)	Low (-)
		Deterioration of water quality as a result of improper handling/ of chemicals.	Medium-Low (-)	Low (-)
		Poor stormwater management leading to runoff from stockpiled material removed causing sedimentation of the water resources.	Medium-Low (-)	Low (-)

		Debris from poor handling of materials and/or waste blocking watercourses may result in flow impediment and pollution.	Medium-Low (-)	Low (-)
		Increase of surface runoff and potentially contaminated water that needs to be contained in the areas where site clearing occurred.	Medium-Low (-)	Low (-)
	Wetlands and Aquatic Ecosystems	Localised changes to the riparian areas as a result of vegetation clearing.	Low (-)	Low (-)
		Loss of habitat and wetland ecological structure as a result of site clearance activities and uncontrolled wetland degradation.	Low (-)	Low (-)
		Impact on the wetlands systems as a result of changes to the sociocultural service provisions.	Low (-)	Low (-)
		Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources.	Low (-)	Low (-)
		Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat.	Low (-)	Low (-)
		Impact on the hydrological functioning of the wetland systems.	Low (-)	Low (-)
	Air Quality	The movement of vehicles and machinery during the construction phase may result in possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	Medium-Low (-)	Low (-)
		Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	Low (-)	Low (-)
	Climate change	Emissions of Green House Gases as a result of the use of construction vehicles and machinery.	Low (-)	Low (-)
		The proposed project has the potential to impact on local graves within the area.	Low (-)	Low (-)

	Heritage and Palaeontology Resources	The proposed project has the potential to impact on sites of archaeological importance.	Low (-)	Low (-)
		Construction activities have potential to impact on palaeontological resources	Low (-)	Low (-)
	Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of the depot.	Medium-Low (-)	Low (-)
		Loss of localised floral species diversity including RDL and medicinal protected species due to site clearance and establishment of the depot.	Medium-Low (-)	Low (-)
		Potential spreading of alien invasive species as indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.	Medium-Low (-)	Low (-)
	Fauna	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	Medium-Low (-)	Low (-)
		Habitat fragmentation as a result of construction activities of the access roads leading to loss of floral diversity.	Medium-Low (-)	Low (-)
		Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	Medium-Low (-)	Low (-)
		Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	Low (-)	Low (-)
		Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	Low (-)	Low (-)
	Visual	Scaring of the landscape as a result of the clearance of vegetation.	Low (-)	Low (-)
		Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	Low (-)	Low (-)
		Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	Low (-)	Low (-)
	Noise	The use of vehicles and machinery may generate nuisance noise in the immediate vicinity	Low (-)	Low (-)

	Soils, land use and land capability	Localised chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	Medium-Low (-)	Low (-)
		Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Medium-Low (-)	Low (-)
		Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	Medium-Low (-)	Low (-)
		Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	Medium-Low (-)	Low (-)
	Traffic	Increase in traffic volumes as a result of transportation of materials to site which may lead to an increase in traffic congestion on roads around the project area increasing the chances of road accidents.	Medium-Low (-)	Low (-)
		The increase in vehicles results in an increased potential for road degradation of the road network in the vicinity of the project.	Medium-Low (-)	Low (-)
	Waste Management	Poor waste management could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Medium-Low (-)	Low (-)
		Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Medium-Low (-)	Low (-)
		Stockpiling material may result in secondary pollution and contamination of the watercourses.	Medium-Low (-)	Low (-)
OPERATIONAL PHASE	Socio-Economic	Uncontrolled access of private property during operation may result in conflict with affected landowners and occupiers.	Low (-)	Low (-)
		Negative impact as a result of additional trucks on the roads, impacting on local communities' health and safety.	Low (-)	Low (-)
		Negative impact on, local community health and safety due to potential influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation.	Low (-)	Low (-)

		Possible boost in short term employment and local small business opportunities.	Medium-Low (+)	Medium-Low (+)
	Groundwater	Seepage of mass into the groundwater environment leading to pollution of groundwater resources	Low (-)	Low (-)
		Water supply from groundwater for domestic and fire-fighting purposes	Medium-Low (-)	Low (-)
		The use of vehicles during the operational phase may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the soils and groundwater resources.	Medium-Low (-)	Low (-)
		Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	Medium-Low (-)	Low (-)
		On-site septic tank leakage resulting in pollution of groundwater resources	Medium-Low (-)	Low (-)
	Surface Water	Temporary storage of tyres in close proximity to a water course has potential for soil and river water contamination from leachate originating from the tyres stored on site.	Medium-Low (-)	Low (-)
		Heavy rainfall events and associated sheet run-off towards the Vaal River has potential for contamination of off-site surface water due to uncontained on-site surface water run-off .	Medium-Low (-)	Low (-)
		Accidental fires and extinguishing of on-site fires results in potential contamination of soil, groundwater, and surface water run-off during a fire event if contact fire-fighting water is not contained	Low (-)	Low (-)
	Biodiversity	Continued destruction of potential floral habitats for species of conservational concern as a result continual disturbance of soils leading to altered floral habitats, erosion and sedimentation.	Low (-)	Low (-)
		Impact on floral species of conservational concern as a result of an increased in alien species proliferation and ineffective rehabilitation of exposed areas	Low (-)	Low (-)
		The use of vehicles during for dropping off and collection of waste tyres may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils.	Medium Low (-)	Low (-)

		Loss of faunal habitat and ecological structure as a result of increased fires during operation and introduction of alien species, leading to transformation of the natural habitat	Low (-)	Low (-)
	Wetlands and Aquatic Ecosystems	Loss of habitat and wetland ecological structure as a result of continual wetland disturbance and uncontrolled wetland degradation.	Low (-)	Low (-)
		Impact on the wetlands systems as a result of changes to the sociocultural service provisions through continued uncontrolled waste management and wetland disturbance.	Low (-)	Low (-)
		Impact on the hydrological functioning of the wetland systems as a result of reduced wetland footprints and uncontrolled disturbance.	Low (-)	Low (-)
	Soils Land use and Land Capability	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from vehicles).	Low (-)	Low (-)
	Air Quality	The operational phase of the project will require vehicular movement which may result in Possible increase in dust generation, PM10 and PM2.5 as a result of use of heavy machinery, and material movement.	Medium-Low (-)	Low (-)
		Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.	Medium-Low (-)	Low (-)
	Visual	The temporary storage of waste tyres on site may result in visual impacts as the waste tyres may be visible from the nearby residents and properties.	Medium-Low (-)	Low (-)
	Noise	The use of vehicles and machinery during the operational phase may generate noise in the immediate vicinity	Low (-)	Low (-)
	Traffic	Increase in traffic volumes as a result of movement of vehicle to and from the waste tyre storage and pre-processing depot.	Low (-)	Low (-)
	Climate	Emissions of Green House Gases as a result of the use of vehicles and, heavy moving machinery, generators etc.	Low (-)	Low (-)
	Waste Management	Inadequate waste management may result in contamination of water resources and the environment in general.	Low (-)	Low (-)

16.2 Alternatives assessment

No alternative assessment was conducted.

16.3 No-go alternative

This option will result in no additional impacts occurring as it maintains the current status quo. This alternative would represent a lost opportunity for the applicant Dawid Kruiper Local Municipality and the broader region as follows:

- Waste tyres being discarded into landfill sites that are already struggling for capacity of which placing tyres into the landfill sites increases the capacity constraints at the landfill sites.
- Burning of tyres has a harmful impact on the environment.
- Waste tyres being incinerated in kilns, which has a harmful impact on the environment.
- A lost opportunity in the loss of the benefits to the local community and economy associated with the creation of employment opportunities and the establishment of new related businesses such as transporting, waste collection, security services and also recycling companies.
- A lost opportunity of Northern Cape Province to have a waste tyre management depot in the province that will ensure on going waste management from recovery and diverting tyres from landfill through recycling and the promotion of treatment and processing technologies in Northern Cape Province.
- National goals: According to the National Development Plan (NDP) - 2030, South Africa aims to achieve among others environmental sustainability and resilience and also the need to progress towards achieving an absolute reduction in the total volume of waste disposed to landfill. The implementation of the no go alternative will result in a lost opportunity for the municipality to contribute towards this national objective.
- The National Waste Management Strategy (NWMS) presents the Government‘s strategy for, integrated waste management for South Africa. In order to ensure that the NWMS is implemented, municipalities across the country have developed Integrated Waste Management Plans (IWMPs). Implementation of the proposed project will assist Dawid Kruiper Local Municipality and other municipalities to achieve their set objectives and targets.

The No-Go alternative is, therefore, not preferred.

17 Undertaking of Oath by the EAP

Section 16 (1) (b) (iv), and Appendix 3 Section 2 (j) of the EIA Regulations, 2014 (promulgated in terms of the NEMA), require an undertaking under oath or affirmation by the EAP in relation to:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and I&APs; and
- Any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs.

Ndi Geological and the EAPs managing this project hereby affirm that:

- To the best of our knowledge the information provided in the report is correct, and no attempt has been made to manipulate information to achieve a particular outcome. Some information, especially pertaining to the project description, was provided by the applicant and/or their sub-contractors. In this respect, Ndi Geological's standard disclaimer pertaining to information provided by third parties applies.
- To the best of our knowledge all comments and inputs from stakeholders and I&APs have been captured in the report and no attempt has been made to manipulate such comment or input to achieve a particular outcome. Written submissions are appended to the report while other comments are recorded within the report. For the sake of brevity, not all comments are recorded verbatim, and in instances where many stakeholders have made similar comments, they are grouped together, with a clear listing of who submitted which comment(s).
- Information and responses provided by the EAP to I&APs are clearly presented in the report. Where responses are provided by the applicant (not the EAP), these are clearly indicated.

18 Conclusion and Recommendations

Ndi Geological has undertaken the impact assessment and EMPr for the proposed waste tyre storage and pre-processing depot in accordance with the requirements of the NEMA. This has included a comprehensive stakeholder engagement process which has sought to provide stakeholders with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the impact assessment of this study. Specialist input has been included for all key environmental aspects.

To date, there are no fatal flaws or red flags that have been identified for the proposed project. Findings from specialist studies have been incorporated into the BAR and EMPr.

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to successfully mitigate the majority of the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr will assist the project in striving towards the principles of the NEMA.

The majority of the impacts identified were classified as low (-) to medium (-) without mitigation. All the identified impacts can be mitigated to low (-) significance impact rating.

The project team believes that the impact assessment undertaken for the proposed project fulfils the process requirements of the NEMA. The EAP recommends that an Environmental Authorisation be issued by the DENC and that the project should be conducted under duty of care and must be in accordance with the recommendations that were included in this BAR and the accompanying EMPr.

It is therefore recommended that the construction and operation of the waste tyre storage and pre-processing depot is allowed to proceed.

Prepared by

N. Mofokeng

EAP

19 References

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Appendices

Appendix A: Curriculum Vitae of the Project Team

Appendix B: Project Experience

Appendix C: Stakeholder Engagement

Appendix C 1: Stakeholder Database

Appendix C 2: Announcement Phase Notifications

Appendix C 3: Site Notices

Appendix C 4: Newspaper Advertisements

Appendix C 5: Comments and Responses Report

Appendix C 6: Stakeholder Communications

Appendix C 7: Authority Correspondence

Appendix D: Specialist Studies Reports

Appendix E: Environmental Management Programme