(EIA)ECOLOGICAL SURVEY REPORT FOR THE PROPOSED FORMALISATION AND PROCLAMATION OF SASELEMANI CBD ON THE REMAINDER OF TSHIKUNDU'S LOCATION 262 MT, AND THE REMAINDER OF PORTION 1 OF TSHIKUNDU'S LOCATION 262 MT, COLLINS CHABANE LOCAL MUNICIPALITY, LIMPOPO PROVINCE.

Prepared by Africa Ecological and Development Services

P.O. Box 1163

Fauna Park

0787

Contact Person: Netshitungulu T.I

Cell: 082 814 9780

Email: africaresources18@gmail.com

Prepared for:
Mang Geoenviro Services
Block 9 unit 2 Board walk office park
6 Eros Road foerie glen, Pretoria, 0004
info@manggeoenviro.co.zza
Tel: 012 770 4022

REPORT IDENTIFICATION

Report number: AFTSH SE12 2020

Project Title: Proposed formalization and proclamation of Saselemani CBD on the remainder of Tshikundu's location 262 MT, and the remainder of portion 1 of Tshikundu's location 262 MT, Collins Chabane Local Municipality, and Limpopo Province.

Specialist report: Ecological Survey

Date produced: 20 March 2020

Prepared by: Mr Netshitungulu T.I (BA Envsc) Environmental sciences
Approved by: Mr Madzole P (Bachelor of Environmental Sciences)
SACNASP Pr No 122427(Candidate Natural Scientist)

This report is certified correct and represents the findings on the proposed site capability and suitability to support intended development

I declare that this report reflect a true reflection of what is existing on site

Report signed off:  **Madzole P**

20/03/2020

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Proposed site is located on an ecological support area 1(ESA1) as indicated on Limpopo critical biodiversity areas map. In consideration of the identified locality area still have natural environment on which a kind of land use will have impact on vegetation and this will still be saved by following all the protocols and recommendations outlined in this report.

The existence of sensitive areas such as flood plains; wetlands and streams were not identified except a single main perennial channel that flows from the southern side to north eastern side towards Jim mhinga high school which only flow when it rains.

All the major big trees have been well identified and amongst them there were some protected marula trees. Area location is feasible for a proposed township since it is currently located between existing villages and Saselemani shopping complexes (current town).

A well detailed environmental management plan will have to be developed prior to any development activity taking place with a supporting habitat management plan.

1. INTRODUCTION

1.1 Background

As stipulated in the master National environmental management Act and National Environmental management biodiversity Act and other environmental legislations; South African government is committed to sustainable development without a compromise on both human needs and protection of natural resources. Sustainable development principles are well observed and followed when considering authorizations for all development projects.

This report gives all the details on the current biological diversity, land use and natural resources status of the site where proposed development will take place.

Locality of proposed site did support a proposed activity and has high suitability and capability for sustenance of the development.

This specialist report provides a baseline and impact assessment of the ecosystems that could be affected by the proposed development. This report gives details of the vegetation survey and habitat survey which were done as means to determine the current ecological state of the area.

1.2 Aim and objectives

The aims of this study were as outlined below:

- Provide baseline data on habitat and species on and adjacent to the site

- Investigate potential impacts that may occur during construction and/or operational stages
- Provide advice on legislative framework relating to habitats and species on site.
- Suggest mitigation measures to be employed during the construction and operational stage; and
- Identify and assess the possible impacts that are likely to be caused by the development and their significant.

2. STUDY AREA

2.1 Geographic Area

The area is located under Collins Chabane local municipality which falls under Vhembe District municipality of Limpopo Province. Site is located on the western site of existing Saselemani shopping complex and stretches along R524 road to Kruger National Park and is located at about 45 km from Thohoyandou town on the east.

Site is located at the following geographical positioning system recorded point (GPS): 22°49'58.9"S 30°50'48.6"E

2.2 Drainage Areas

The proposed area of the development is located on Luvuvhu river catchment which is located under Levubu letaba water management area. Luvuvhu River is flowing from the western side to eastern side towards Kruger national park and is locate on the North- Western side of the proposed site. Refer to attached orthophoto clip below which outlines catchment drainage system of the area at large.

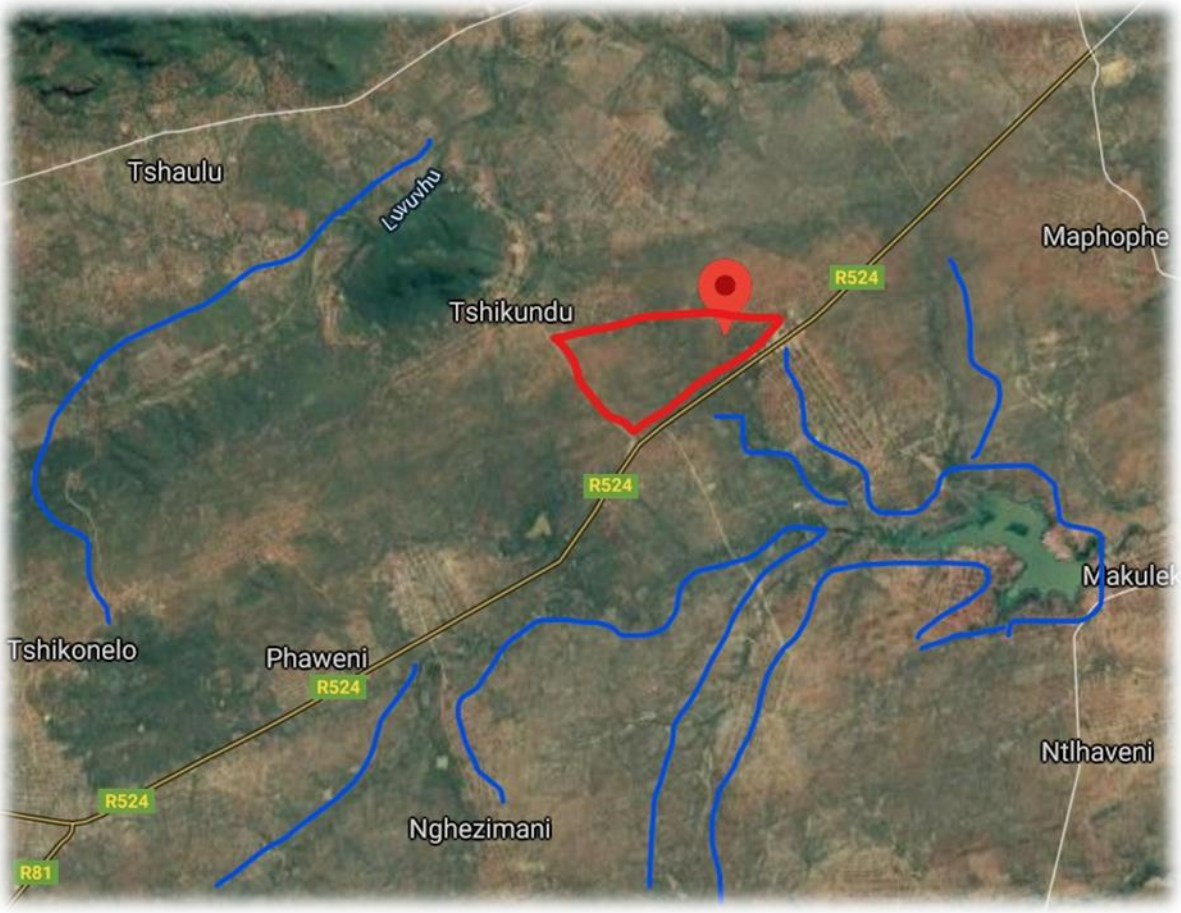


Figure 2.2.1: indication of drainage systems of the area marked in blue lines

2.3 Relief and Topography

The area is characterized by flat gentle undulating slopes with slope that range from 5-10%. Generally the area is flat. The main soil form that characterized by Mispah soil form with mostly dark reddish brown loamy sand to clay. Horizontally oriented hard rock also exists as the main rock strata. The appearance of the ground has few different facets with more homogenous facets.

2.4 Climate

Climate of the area is characterized by dry winter and low rainfall in summer. Area has temperature ranging from 18-38 degrees in summer months and 15-24 degrees in winter months. Most of the rainy days are in summer. Climate is also characterized by hot summer and cold dry winter with mean annual rainfall from 200mm to 900mm due to the surrounding mountains. Temperatures range from $27C^0$ in June and $38C^0$ in December.

The areas are also affected by climate change especially on its weather patterns.

3. Land use

Area is a vacant land with no land with some small cultivation activities; grazing, fenced unbuilt plots; unfinished walls of house like structures located along R424 road. As confirmed during field visit there is an existing ESKOM powerline servitude which will also require a buffer zone. Grazing is a common land use activity of the area.

Surrounding land use activities are residential areas; accommodation facilities and shopping complex with variety of shops.

4. METHODOLOGY

The scope of the fieldwork was informed by research informed by desktop data analysis, knowledge of the study area, discussions with Darlington Borough Council, E3 Partnership Report 2005, and the timing and timescale of the study. A detailed field survey was undertaken with focus on all biological diversity aspects. Variety of surveys that were undertaken are indicated with their findings in this report.

This study considered collection of data considering all existing previous record in order to have informative information for decision making. The following surveys were done as outlined below. Data was collected for both fauna and flora by means of surveys.

4.1. Habitat survey

During habitat survey it was found that the proposed area is characterized by low veld sweet veld of a savannah biome of a bioregion of a Mopani veld woodland type and which falls under an African savannah biome. It has few standing trees which characterize a canopy cover of the area and dominated by shrubs. Dominants species included were mostly those of shrub life form than the trees. Area is under ecological support area No 1 as indicated on Limpopo conservation plan version 2. Habitat was found to be fragmented with less suitability to can be declared as a for conservation area.

4.2. Vegetation survey

During vegetation survey different plant species were identified on site and recorded. This included trees, shrubs and grass and herbs. The identified species are presented on a tables below as per their different categories. Protected tree species as per National Forest Act 84 of 1998 are also indicated on the table below. Due to area being at its secondary succession it has more of bush encroaching species and most of big trees are having coppice branches after being cut for fire wood and other uses by local people. It has been witnessed during survey that trees are being cut.

Scientific name	Common names	Occurrence level	%cover Dominancy	Protected	Indigenous /invasive	Life Form
Sclerocaryabirrea	Marula	Many	45%	Yes	Ind	Tree
Lannea discolor	Wild plum	Few	3%		Ind	Tree
Philenoptera violancea	Apple leaf	Many	16.8%	Yes	Ind	Tree
Rhus leptodictya	Mountain karee	Many	8%		Ind	Tree
Dombeya burgessiae	Pink wild pear		4,16%		Ind	Tree
Acacia nigrescens	Knob thorn	Many	38%		Ind	Tree
Spirostachys Africana	Tamboti		4%		Ind	Tree
Rhuslancea	Karee	Many	12%		Ind	Tree
Vachellia robusta	Muvumba ngwena Broadpod robust thorn	Few	11%		Ind	Tree
Ehretia rigida	Mutepe/ puzzle bush	Medium	14,8%		Ind	Shrub
Dichrostachyscinerea	Sickle bush	Many	56%		Ind	Shrub
Dalbergia melanoxylon	zebratree,muuluri,Xilutsi		6,10%		Ind	Shrubs
Ziziphusmucronata	Buffalo thorn	Few	7%		Ind	Tree
Acacia polyacantha	White thorn	Many	48%		Ind	Tree
Maytenusheterophylla	Tshipandwa	Abundant	3.5%		Ind	Shrubs &Trees
Piliostigima thonningii	Camel'sfoot mukolokote	Few	13%		Ind	Tree
Berchemia discolor	Brown ivory	Few	7.3%		Ind	Tree
Acacia tortilis	Umbrella thorn	Few	15%		Ind	Tree
Senna petersiana	Munembenembe/ Monkey pod	Few	18%		Ind	shrub
Bauhinia galpinii	Pride of De Kaap	Many	39%		Ind	Shrub

CombretumHererense	Russetbushwillow,mugari	Few	9.6%		Ind	Shrub
Diospyrosmespiliformis	Musuma	Few	10.2%		Ind	Tree
Toddalia asiatica	Orange climber	Many	14%		Ind	Climber
Xanthocarcis zambesiaca	Nyala tree	Few	11%		Ind	Tree
Ximenia cafra	Large sour plum	Few	5.5%		Ind	Shrub
Combretum imberbe	Lead wood	Few	9.6%	Yes	Ind	Shrub
Terminelia sericea	Silver cluster leaf	Many	19%			Tree
Piliostigma thonnigii	Camel's foot	Few	5.9%		Ind	Shrub
Agave sisalana	Sisal	Few	1,8%		Alien	Tree
Acacia robusta	Black thorn	Few	10%		Ind	Tree
Acacia Senegal	Slender three hook thorn	Few	22%		Ind	Tree
Lannea Schweinfurthii	False marula	Few	3%		Ind	Tree
Cassia abbreviata	Sjambok pod	Few	7%		Ind	Shrub
Grewia bicolar	White raisin Murabva ,nsihani	Many	33%		Ind	Shrub
Kirkia acuminata	White seringa	Few	4,5%		Ind	Tree
Schotia brachypetala	Weeping boerbean	Few	8%		Ind	Tree
Ficus sycomorus	Common fig	Few	1,5%		Ind	Tree
Ficus sur:=f capensis	Brown cluster fig	Few	2,0%		Ind	Tree

Table 4.2.1 shows vegetation species composition occurrence on proposed site

As indicated on the table 4.22.1 above and figure 4.2.1 below the area has a mix vegetation mixed in a way that cover is dominated by shrub plants; big and middle-sized trees .

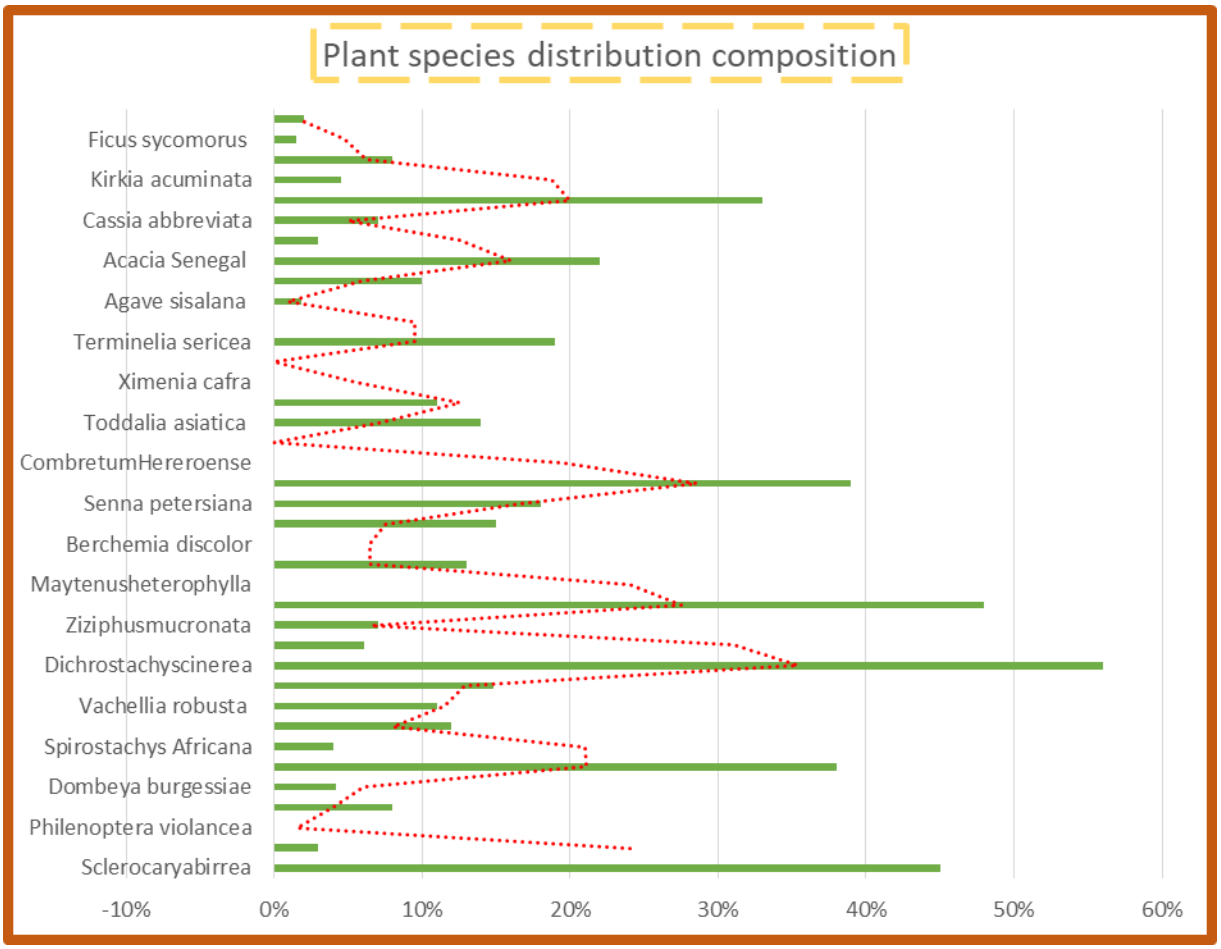


Figure 4.2.1: Graph showing species composition trend

Grass were also identified during field survey by means of walking through a line transect which was demarcated at an interval of 10m apart and 30m long. Grass are one of the important habitat species as they also comprise a habitat biome.

Grass plays an essential role in nature as they are a major source of food. They provide shelter and nesting material. They also form important part of food chain for those species that utilize grass. They play a major habitat for Rodents; Birds and Insects species. During field survey grasses were found to be in good condition which was an indicator that type of vegetation is good for grazing as it is at the moment.

Data on grass composition is presented on a table below.

Scientific name	Common name
Themeda triandra	Red grass
Enteropogon macrostachyus	Mopane grass
Cenchrus ciliaris	Foxtail buffalo grass
Panicum maximum	Guinea grass
Eragrostisrigidior	Curly leaf grass
Monocymbiumcresiiforme	Boat grass
Hyparrherniatamba	Berg gras
Setaria incrassate	Vlei bristle grass
Eragrostis racemosa	Narrow heart love grass
Merxmuelleradisticha	Mountain wire grass
Tragus berteronianus	Carrot seed grass
Hyparrherniahirta	Thatching grass
Hyperthelia Dissoluta	Yellow thatching grass
Andropogon Gayanus	Blue grass
Monocymbium ceresiiforme	Boat grass
Heteropogon Contortus	Spear grass
Elionurus Muticus	Wire grass
Setaria Sphacelata	Golden bristle grass

Table 4.1.2: Shows grass composition of the proposed area

4.2.1 Problem plants and herbaceous plants identified

Area has a complex species diversity of which it led to a need to also identify and present all herbaceous and problem species identified. These are presented on a table below: Most of the herbs were found under big trees and also on disturbed areas. As seen on the table majority of herbs are exotics in the village but not in a proposed area.

This means that for value of the overall area where development will not take place these exotic will have to be eliminated using relevant programs to avoid further spread into a proposed area.

Scientific Name	Common Names	Life form	Category
Boerhavia diffusa	spiderling	Herb	Exotic
Achyranthes aspera	Burweed ,Moxato	Herb	Probably exotic
Amaranthus deflexus	Perennial pig weed	Herb	Indigenous
Amaranthus hybridus	Pig weed	Herb	Exotic
Amaranthus spinosus	Thorny pig weed	Herb	Exotic
Amaranthus viridis	Slender amaranth	Herb	Exotic
Ageratina adenophora	Crofton weed	Herb	Exotic
Bidens pilosa	Common black jack	Herb	Exotic
Conyza sumatrensis	Tall fleabane	Herb	Exotic
Portulaca oleracea	porslein	Herb	Exotic
Senecio consanguineous	Starvation senecio	Herb	Exotic
Tagetes minuta	Tall khaki weed	Herb	Exotic
Xanthium strumarium	Large cocklebur	Herb	Exotic
Crotalaria sphaerocarpa	Wild lurcene	Herb	Indigenous
Corchorus trilocularis	Wild jute /delele	Herb	Indigenous
Mirabilis jalapa	Four-o'clocks	Herb	Exotic
Datura ferox	Large thorn apple	Herb	Exotic
Solanum elaeagnifolium	Silver leaf bitter apple	Herb	Exotic
Richardia brasiliensis	Mexican richardia	Herb	Exotic
Tribulus terrestris	Devil's thorn	Herb	Indigenous
Stylochiton natalensis	Bushveld arum	Herb	Indigenous

Table 4.2.1.1: Shows problem plant species composition

4.3. Reptile and amphibian survey

This was done by direct observation during a transect walk and indirect observation of callings from amphibians and reptile movement over the dry plants. No reptiles were identified during field visit although the following are likely to be found: Moles, Chameleons, and Lizards various snakes. Area is also a favorable snake such as green mambas and pythons. These are indicated on the attached appendix(s). Amphibians are unlikely to be found in the area and if occurring will be the tree frogs that are only found during rainy seasons since the area does not have any wetland or river. Although snakes were not physically sited they definitely exist in this suitable habitat.

4.4. Bird survey

Birds are known to be some of the mobile species that once and again fly over to different habitats searching for food and also for breeding sites. Birds were observed during site assessment. Also there were no protected bird species that were identified during field visit or either on existing documents but they are highly likely to be sighted considering that the area is located near a protected area which already support complex diversity of species. Since bird species are not stationed at one area; they are likely to be observed and or be occurring on the nearby habitats. In general, this area falls under the area of high ecological value which tends to support more bird species such as doves because of tree species that are loved by birds. More bird's callings were heard during field survey although couldn't easily be spotted.

The following birds species were seen during site assessments: mostly prominent crests (brownbul); hadeba ibis; African mourning dove; red eyed dove; dark –capped bulbul. Sparrows and eagles together with owls are also likely to be found in this area. Ravens were also identified.

4.5 Mammal survey

Mammals are one of the species that are sensitive to disturbed and human settlement areas. The area is not favorable to can support or become a habitat for mammals. Although they were not sighted during survey few might be found especially the ones for small stature.

4.6 Butterfly; Beetles; Locusts, Ants and dragon fly survey

Butterflies and dragon fly are species that like to be found in wet areas and also during flowering season. Although this is the case none of these species were identified in the area; and are also likely to be found during wet seasons when temporary ponds can be established after rains. None of protected species or rare have been identified under this category. Dragon flies are also having a potential of existing in this area. Spiders were also spotted and was lucky to find a spider trapping a locust by its web.

During survey locusts were also spotted together with butter flies although they couldn't be photographed due to their movement. Some photos are shown in this report to confirm that. Existence of these symbolize the health of the habitat for its conservation support.

4.7 Stream; wetland survey and existence of sensitive area(s)

The area is located on luvhuvhu letaba river catchment with no wetlands that exist. The type of soil also clay loamy brown to reddish in color soil and loamy clay dark grey in color. There is no need to do any wetland delineation since there is not wetland. A 50 meter buffer zone must be demarcated along an existing non perennial channel that

only flow water during rain fall. Refer to an ortho- photo clip below indicating marked channel which is a sensitive area to be allocated a 50 meter buffer zone.

Figure 4.7.1 showing marked in yellow existing sensitive areas non perennial stream**.**

4.8 **CRITICAL BIODIVERSITY AREAS ASSESSMENT (Limpopo conservation plan version 2)**

A confirmation has been done using desktop analysis on GIS and field validation to confirm status of critical biodiversity area. Site is located on an ecological support area 1. This is an area where there is still some potential biodiversity that can still be conserved and for kind of intended development some pockets will have to be conserved in order to retain and contain the status. Refer to a CBA map below.

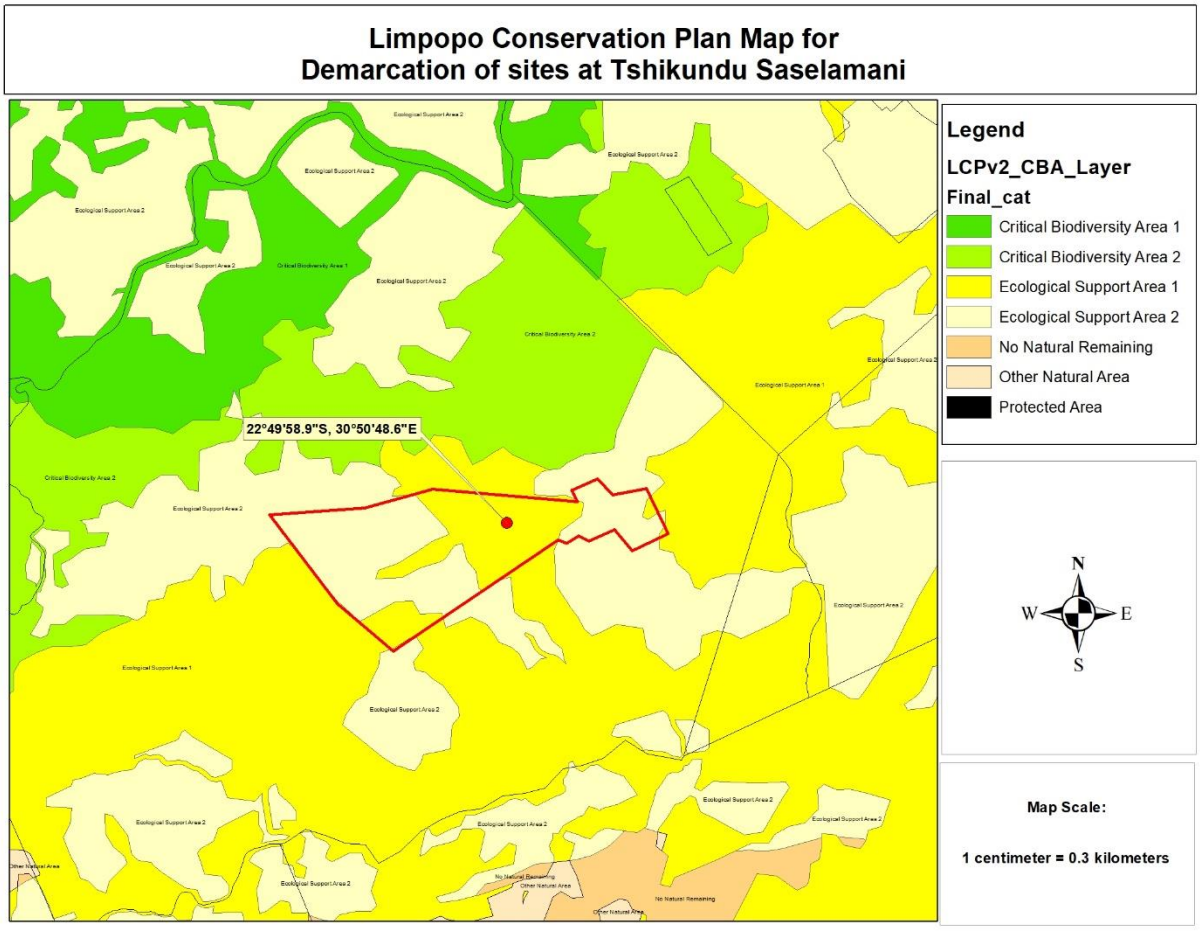


Figure 4.8.1: Shows category of CBA where proposed site is located.

This is an area where over densification of residential development must be minimized with incorporation of green open space. In consideration of provided layout plan there is a provision for open space management that will be achieved through park and other sport recreational activities.

5. MITIGATION MEASURES TO BE TAKEN INTO ACCOUNT

The following mitigation measures must be taken into account during development should there be such kind of resources to be taken care of during development.

The Impact Mitigation Hierarchy (DEA et al., 2013)

6. RED DATA PLANT EXISTENSE ON SITE

A review on red data plant list was done to check their existence on proposed site and those that were identified are indicated on a table list below

SA AFRICAN RED DATA PLANT LIST BASED ON IUCN CLASSIFICATION		
SCIENTIFIC NAME	**COMMON NAMES**	**CATEGORY**
Sclero carya birea	Marula/mufula(v)	Least concern(LC)
Lannea discolor	Wild plum	Least concern(LC)
Diospros mespilioformis	African ebony/Musuma(v)	Least concern(LC)
Dichrostachyscinerea	Sickle bush	Least concern(LC)
Dalbergia melanoxylon	Zebra wood,Xilutsi	Near threatened(NT)
Combretum collinum	Weeping bush willow/Muvuvha	Least concern(LC)
Lannea schweiafurthii	False marula	Least concern(LC)
Ehretia rigida	Puzzle bush	Least concern(LC)
Combretum imberbe	Lead wood	Least concern(LC)
Grewia bicolar	White raisin	Least concern(LC)
Cassia abbreviata	Sjambok pod	Least concern(LC)
Acacia robusta	Black thorn	Least concern(LC)
Spirostachys Africana	Tamboti	Least concern(LC)
Acacia Senegal	Slender three hook thorn	Least concern(LC)
Acacia tortilis	Umbrella thorn	Least concern(LC)
Ziziphus mucronata	Buffalo thorn	Least concern(LC)
Schotia brachypetala	Weeping boerbean	Least concern(LC)
Xanthocarcis zambesiaca	Nyala tree	Least concern(LC)
Philenoptera violancea	Apple leaf	Least concern(LC)
Copparis tomentosa	Woolly caper bush	Least concern(LC)

Table 6.1: shows red data plant species

7. EVALUATION OF ECOLOGICAL IMPACTS

The criteria for the description and assessment of environmental impacts were drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April1998) in terms of the Environment Conservation Act (ECA), 1989 (Act 107 of 1989). Although the ECA EIA Regulations have been repealed, the Guideline Document still provides good guidance for significance determination (Charles J.K.1994).

The level of detail as depicted in the EIA regulations were fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. The impact assessment criteria used to determine the impact of the proposed development are as follows:

- Nature of the impact;
- The Source of the Impact;
- Affected Stakeholders;
- Extent - The physical and spatial scale of the impact;
- Duration - The lifetime of the impact, that is measured in relation to the lifetime of the proposed development;

Details of the impact assessment methodology are indicated on the attached appendix. For this assessment impact assessment and evaluation is indicated below Mitigations are clearly indicated also on the recommendations.

Figure 7.1: Assessment of impact which is likely to happen during development

Nature of Impact	Development stage associated with	IMPACT RANKING,WEGHING AND SCALING							
		extent	Duration	Intensity	Probability	Weighting factor	Significance rating	Mitigation efficiency	Significance
Removal of vegetation	**A**	3	2	4	4	3	0-19	2.0	0-19
Destabilization of soil	**A** **B**	2	2	3	5	3	20-39	1.0	20-39
Compaction of soil	**A** **B**	2	2	3	3	3	20-39	1.0	20-39
Spread of invasive alien plant seeds	**A**	3	3	1	3	2	20-39	0.6	20-39
Habitat fragmentation	**A**	1	1	1	1	2	0-19	1.0	0-19

8. CONCLUSION AND RECOMMENDATIONS

The proposed development will be located on the on a thick savannah biome of Mopani sweet veld woodland which is having abundant species composition with more shrubs and trees. It was confirmed that reptile and mammal species are also likely to be found in the area and no red data species were observed nor are expected to exist in the area. More herbs were also identified under the tree canopies.

Taking into consideration the findings of the filed surveys there were no rivers, wetlands and streams found in the area. Considering the vegetation type there is a need to have a detailed environmental management plan which will give a clear guidance to developers and planners in order to minimize destruction of indigenous trees including the protected trees. The following recommendations have been done for consideration during the development phases:

- A specialist (Environmental officer) must be appointed to deal with all environmental issues as indicated on the impact assessment. This will assist in implementing an environmental friendly development.
- A license to disturb or cut indigenous trees and also protected trees must be applied for from the Department of Agriculture, forestry and fisheries as per National Forest Act, 1998 (Act No. 84 of 1998)
- Conservation of Agricultural Resources Act, 1983. (Act No. 43 of 1983) must also be considered when dealing with invasive alien plants so that all measure can be based on this legislation and its regulations.
- Environmental management plan must be developed to cater for detailed mitigations during all development phases.

- Minimize cutting down of big indigenous trees where possible but also ensure that protected trees are not removed since they are few unless the lay out plan doesn't allow or can't be altered.
- Transportation of material must be done with care in order to minimize the transportation of alien plants seeds from one point to another.
- A 50 meter buffer zone on non-perennial stream must be adhered to.
- A conservation space must be reserved with corridors to protect big trees and promote greening and through park creation.

References

Alan S. (2003), Introducing physical geography, John Willey and Sons, USA.

Bromilow C **(**2010), Problem plants and alien weeds of South Africa, Briza, Pretoria South Africa

Camp K.G. (1999), the Bio resource Groups of KwaZulu Natal, Department of Agriculture, Pietermaritzburg.

Chris and Stuart T (1995) Mammals of Southern Africa, Struik, Cape Town South Africa.

Farina M.P.W. (1981), the hunter system of soil analysis, *Fertilizer Society of South Africa Journal*, 1, 39-41.

Henderson L. (2001), Alien weeds and invasive plants, Paarl Printers, Cape Town.

Hilton-Taylor, C. (1996) Red data list of Southern African plants. National Botanical Institute, Pretoria.

IUCN (1993), Draft IUCN Red List Categories, IUCN Gland, Switzerland.

Smit N (2008), Field guide to Acacias of South Africa, Briza, Pretoria South Africa.

Van wyk B and Van wyk P (2007), Field guide to trees of Southern Africa, Struik, Cape Town South Africa.

Van wyk E (2002), a guide to grasses of Southern Africa, Briza, Pretoria South Africa.

APPENDIX A: IMPACT ASSESSMENT METHODOLOY

The criteria for the description and assessment of environmental impacts were drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April1998) in terms of the Environment Conservation Act (ECA), 1989 (Act No. 73 of 1989). Although the ECA EIA Regulations have been repealed, the Guideline Document still provides good guidance for significance determination (Charles J.K.1994).

The level of detail as depicted in the EIA regulations were fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. The impact assessment criteria used to determine the impact of the proposed development are as follows:

- Nature of the impact;
- The Source of the Impact;
- Affected Stakeholders;
- Extent - The physical and spatial scale of the impact;
- Duration - The lifetime of the impact, that is measured in relation to the lifetime of the proposed development;
- Intensity - The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself;

- Probability - This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time;
- Mitigation. The impacts that are generated by the development can be minimized if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimize impacts and achieve sustainable development.
- Determination of Significance – Without Mitigation. Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required.
- Determination of Significance – With Mitigation. Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the identified mitigation measures.
- All identified impacts will be assessed in accordance with the abovementioned criteria and the extended criteria.

Previous experience has shown that it is often not feasible or practical to only identify and address possible impacts. The rating and ranking of impacts is often a controversial aspect because of the subjectivity involved in attaching values to impacts. Therefore, the assessment will concentrate on addressing key issues.

The methodology employed involved a circular route, which will allow for the evaluation of the efficiency of the process itself. The project will be divided into three phases in order to assess impacts related to the Pre-construction, Construction and Operational phases. The assessment of actions in each phase was conducted in the following order:

a) Identification of key issues;
b) Analysis of the activities relating to the proposed development;
c) Assessment of the potential impacts arising from the activities, without mitigation; and
d) Investigation of the relevant mitigation measures, as well as an assessment of their effectiveness in alleviating impacts.

Assessment of biophysical and cumulative impacts

The criteria for the description and assessment of environmental impacts were drawn from the
EIA Regulations and in terms of the NEMA Act, 1998 (Act No 107 of 1998). This guideline provides good guidance for significance determination. Activities within the framework of the proposed development and their respective construction and operational phases, give raise to certain impacts. For the purpose of assessing these impacts, the project has been divided into two phases from which impacting activities can be identified, namely:

a) Construction phase:

All the construction related activities on site, until the contractor leaves the site.
b) Operational phase:

All activities, including the operation and maintenance of the proposed development. The activities arising from each of these phases have been included in the tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

Assessment criteria

The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

Extent

The physical and spatial scale of the impact is classified as:

a) Footprint

The impacted area extends only as far as the activity, such as footprint occurring within the total site area.

b) Site

The impact could affect the whole, or a significant portion of the site.

C) Regional

The impact could affect the area including the neighboring properties, the transport routes and the adjoining towns.

d) National

The impact could have an effect that expands throughout the country (South Africa).

e) International

Where the impact has international ramifications that extent beyond the boundaries of South Africa.

Duration

The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.

a) Short term

The impact would either disappear with mitigation or will be mitigated through natural processes in a period shorter than that of the construction phase.

b) Short to Medium term

The impact will be relevant through to the end of the construction phase.

c) Medium term

The impact will last up to the end of the development phases, where after it will be entirely neglected.

d) Long term

The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.

e) Permanent

This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

Intensity

The intensity of the impact is considered by examining whether the impact is destructive or not, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself.

The intensity is rated as:

(a) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

(b) Medium

The affected environment is altered, but functions and processes continue, albeit in a modified way.

(c) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length during the life cycle of the activity, and not at any given time. The classes are rated as follows:

(a) Impossible

The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).

(b) Possible

The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.

(c) Likely

There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.

(d) Highly likely

It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.

(e) Definite

The impacts will take place regardless of any provisional plans, and or mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100%.

Mitigation

The impacts that are generated by the development can be minimized if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimize impacts and achieve sustainable development.

Determination of significance – Without Mitigation

Significance is determined through a synthesis of impacts as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:

(a) No significance

The impact is not substantial and does not require any mitigation action.

(b) Low

The impact is of little importance, but may require limited mitigation.

(c) Medium

The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

(d) High

The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential (Charles J.K., 1994).

Determination of significance – With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

(a) No significance

(b)

The impact will be mitigated to the point where it is regarded as insubstantial.

(b) Low

The impact will be mitigated to the point where it is of limited importance.

(c) Low to Medium

The impact is of importance however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.

(c) Medium

Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance.

However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.

(d) Medium to High

The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.

(f) High

The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

APPENDIX B: Red data Species Checklist Considered

(National Environmental Management Biodiversity Act (Act 10 of 2004)

REPTILIA						
SCIENTIFIC NAME	**COMMON NAME**	**CRITICALLY ANDANGERED**	**ENDANGERED**	**VULNERABLE**	**PROTECTED**	**LIKELY TOEXIST ON PROPOSED AREA**
Caretta caretta	Loggerhead Sea Turtle	✓				
Dermochelys coriacea	Leatherback Sea Turtle	✓				
Eretmochelys imbricate	Hawksbill Sea Turtle	✓				
Chelonia mydas	Green Turtle		✓			
Cordylus giganteus	Giant Girdled Lizard		✓			
Lepidochelys olivacea	Olive Ridley Turtle		✓			
Psarnrnobates geornetricus	Geometric Tortoise		✓			
Bitis gabonica	Gabon Adder				✓	
Bitis schneideri	Namaqua Dwarf Adder				✓	
Bradypodion taeniabronchum	Smith's Dwarf Chameleon				✓	
Cordylus cataphractus	Armadillo Girdled Lizard				✓	
Crocodylus niloticus	Nile crocodile				✓	
Python natalensis	African Rock Python				✓	
AVES						
SCIENTIFIC NAME	**COMMON NAME**	**CRITICALLY ANDANGERED**	**ENDANGERED**	**VULNERABLE**	**PROTECTED**	**LIKELY TOEXIST ON PROPOSED AREA**
Grus carunculatus	Wattled Crane	✓				
Hirundo atrocaerulea	Blue Swallow	✓				
Neophron percnopterus	Egyptian Vulture	✓				
Poicephalus robustus	Cape Parrot			✓		
Trigonoceps occipitalis	White-headed Vulture			✓		
Aquila rapax	Tawny Eagle			✓		

A rdeotis kori	Kori Bustard			✓		
Ciconia nigra	Black Stork			✓	✓	
Circaetus fasciolatus	Southern Banded Snake Eagle			✓	✓	
Eupodotis caerulescens	Blue Korhaan			✓	✓	
Falco fasciinucha	Taita Falcon			✓		
Falco naumanni	Lesser Kestrel			✓		
Falco peregrinus	Peregrine Falcon			✓		
Geronticus calvus	Bald Ibis			✓		
Neotis ludwigii	Ludwig's Bustard			✓		
Polemaetus bellicosus	Martial Eagle			✓		
Terathopius ecaudatus	Bateleur			✓		
Tyto capensis	Grass Owl			✓		
Bucowus leadeateri	Southern Ground-Hornbill				✓	
Circus ranivorus	African Marsh Harrier				✓	
Neotis denhami	Denham's Bustard				✓	
Spheniscus demersus	Jackass Penguin				✓	

MAMMALIA

SCIENTIFIC NAME	COMMON NAME	CRITICALLY ANDANGERED	ENDANGERED	VULNERABLE	PROTECTED	LIKELY TOEXIST ON PROPOSED AREA
Bunolagus monticularis	Riverine Rabbit	✓				
Chrysospalax villosus	Rough-haired Golden Mole	✓				
Arnblysomus robustus	Robust Golden Mole					
Damaliscus lunatus	Tsessebe			✓		
Diceros bicornis	Black Rhinoceros		✓			
Lycaon pictus	African Wild Dog		✓			
Neamblysomus gunningi	Gunning's Golden Mole		✓		✓	
Ourebia ourebi	Oribi		✓		✓	
Paraxerus palliates	Red Squirrel		✓		✓	
Acinonyx jubatus	Cheetah		✓			

Cricetomys gambianus	Giant rat		✓			
Manis temminckii	Pangolin		✓			
Neamblysomus julianae	Juliana's Golden Mole		✓			
Otomops martiensseni	Large-eared Free-tailed Bat		✓			
*Panthera **leo***	Lion		✓			
Panthera pardus	Leopard		✓			
Philantomba monticola	Blue Duiker		✓			
Atelerix frontalis	South African Hedgehog		✓			
Connochaetes gnou	Black Wildebeest		✓			
Crocuta	Spotted Hyena		✓			
Felis nigripes	Black-footed Cat		✓			
Parahyaena brunnea	Brown Hyena		✓			
Loxodonta africana	African elephant		✓			
Lutra maculicollis	Spotted-necked Otter		✓			
Mellivora capensis	Honey Badger		✓			
Redunca arundinum	Reedbuck		✓			
INVERTEBRATA						
SCIENTIFIC NAME	**COMMON NAME**	**CRITICALLY ANDANGERED**	**ENDANGERED**	**VULNERABLE**	**PROTECTED**	**LIKELY TOEXIST ON PROPOSED AREA**
Colophon spp - All species	Stag Beetles		✓			
Aloeides clarki	Coega Copper Butterfly					
Ceratogyrus spp - All species	Horned Baboon Spiders					
Echinodiscus bisperforatus	Pansy Shell			✓		
Dromica spp - All species	Tiger Beetles		✓			
Graphipterus assimilis	Velvet Ground Beetle					
Xadogenes spp -	Flat Rock Scorpions					

All species						
Haliotis midae	South African Abalone				✓	
Xarpactira spp - All species	Common Baboon Spiders				✓	✓
Ichnestoma spp - *All* species	Fruit Chafer Beetles				✓	✓
Manticora spp - *All* species	Monster Tiger Beetles				✓	
Megacephala asperata	Tiger Beetle				✓	✓
Megacephala regalis	Tiger Beetle				✓	
Nigidius auriculatus	StagBeetle				✓	✓
Oonotus adspersus	Stag Beetle				✓	
Oonotus interioris	Stag Beetle				✓	✓
Oonotus rex	Stag Beetle				✓	
Oonotus sericeus	Stag Beetle				✓	
Opisthacanthus spp - All species	Creeping Scorpions				✓	
Opistophthalmus spp - All species	Burrowing Scorpions				✓	
AMPHIBIA						
SCIENTIFIC NAME	**COMMON NAME**	**CRITICALLY ANDANGERED**	**ENDANGERED**	**VULNERABLE**	**PROTECTED**	**LIKELY TOEXIST ON PROPOSED AREA**
Pyxicephalus adspersus	Giant Bullfrog				✓	
Pyxicephalus edulis	Afiican Bullfrog				✓	

APENDIX C: Photos: Listed photos below shows view of the site in terms of vegetation cover and condition of the land.

Photo 1: shows a sedge growing in a sensitive non perennial area, an indicator.

Photo 2: shows a vegetation community which must not destroyed or disturbed.

Photo3: shows ground cover condition with herbaceous plants on bare areas.

Photo 4: shows in side of the existing non perennial stream.

Photo 5: bottom view of non- perennial stream

Photo 6: shows sour plum shrub wild fruit to be conserved for recreational purpose

Photo 7: shows general view of vegetation cover and ground.

Photo 8: shows a butterfly found sucking nectar from ***bauhinia galpinii*** flowers

Photo 9: shows ***Bauhinia galpinii shrub*** (Pride of De-kaap) to be conserved for beauty.

Photo 10: shows ***Ficus Sychomorus*** (fig tree); to be protected in situ.

Photo 11: shows existing protected marula tree

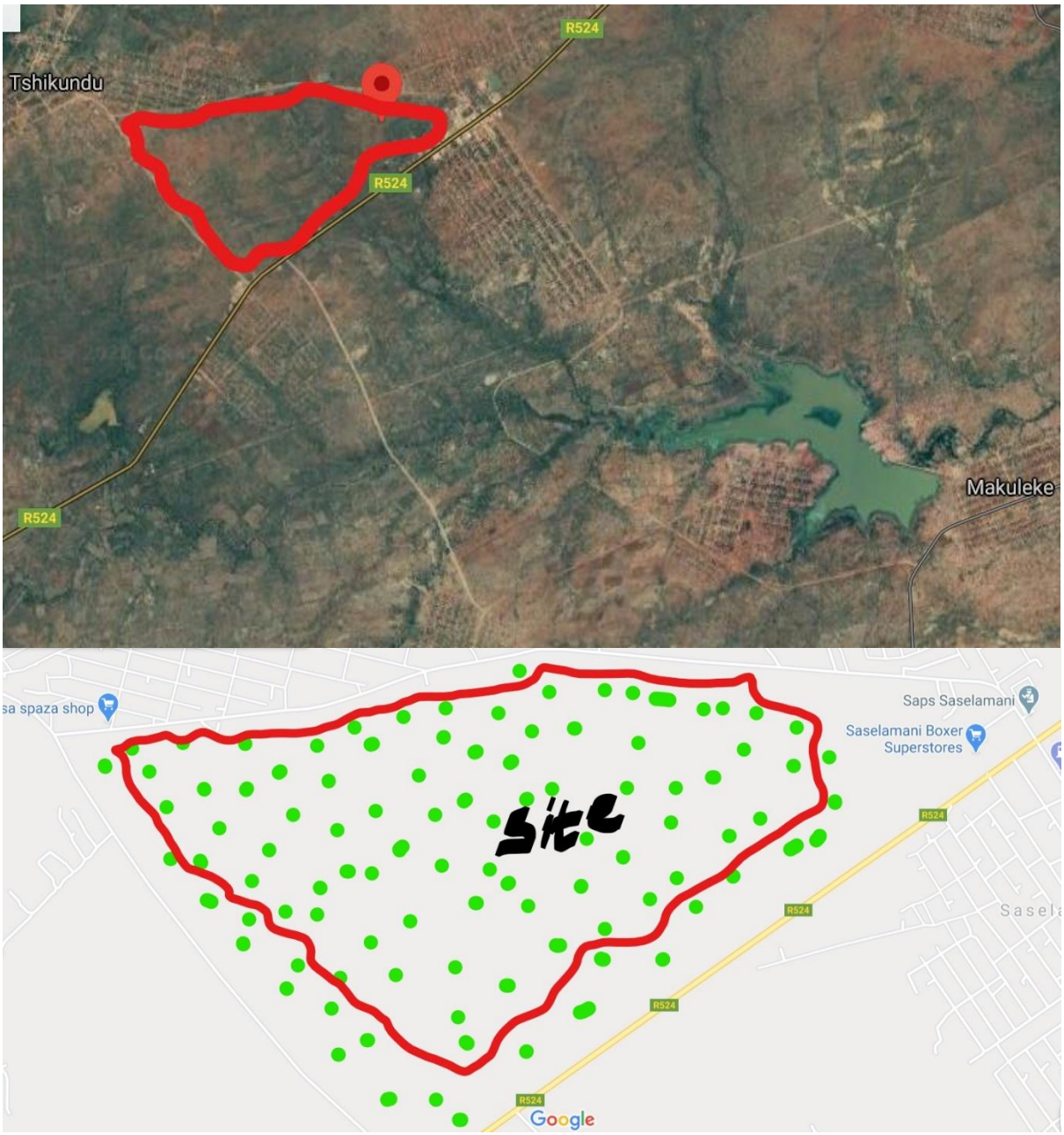
Photo 12: shows herbaceous plants ground cover and soil condition

Photo 13: shows a group of young marula trees not to be destroyed

Photo 14: shows invasive sisal plant on site

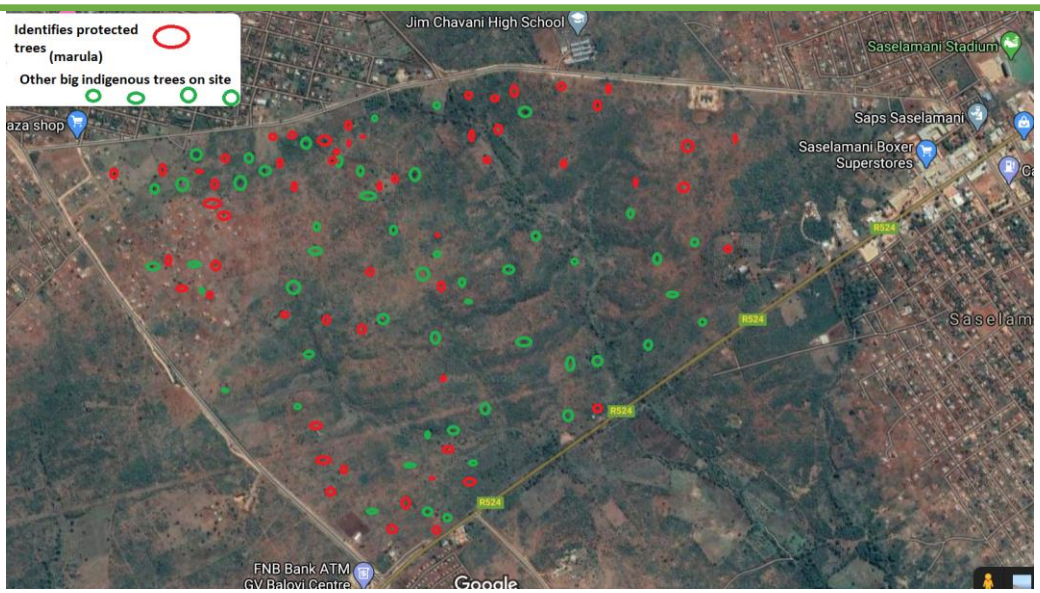
Photo 14: shows grass cover of the area

Photo 15: shows vegetation cover on the southern side around the ESKOM powerline which is a thicket bush recovering after being destructed.

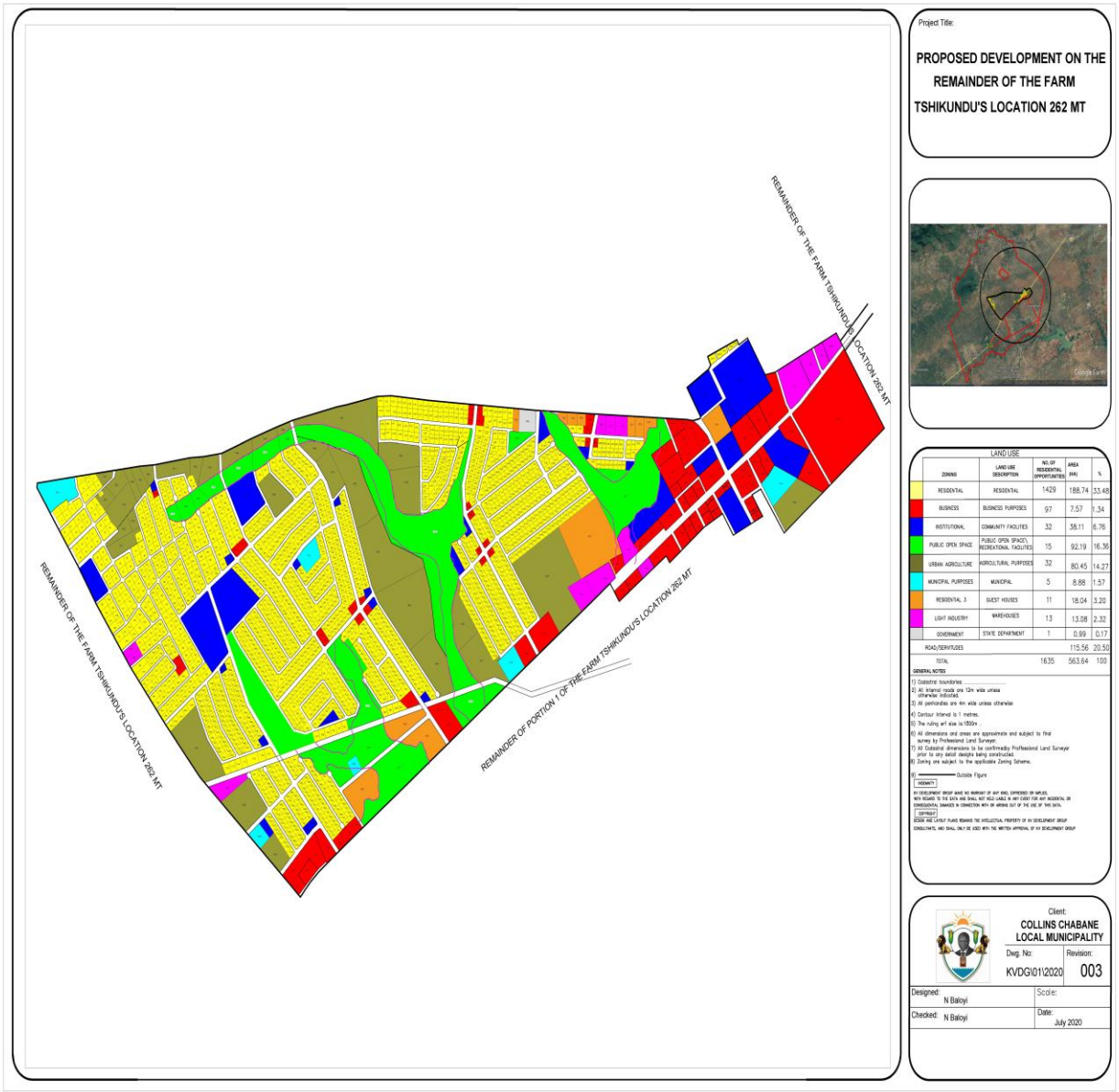


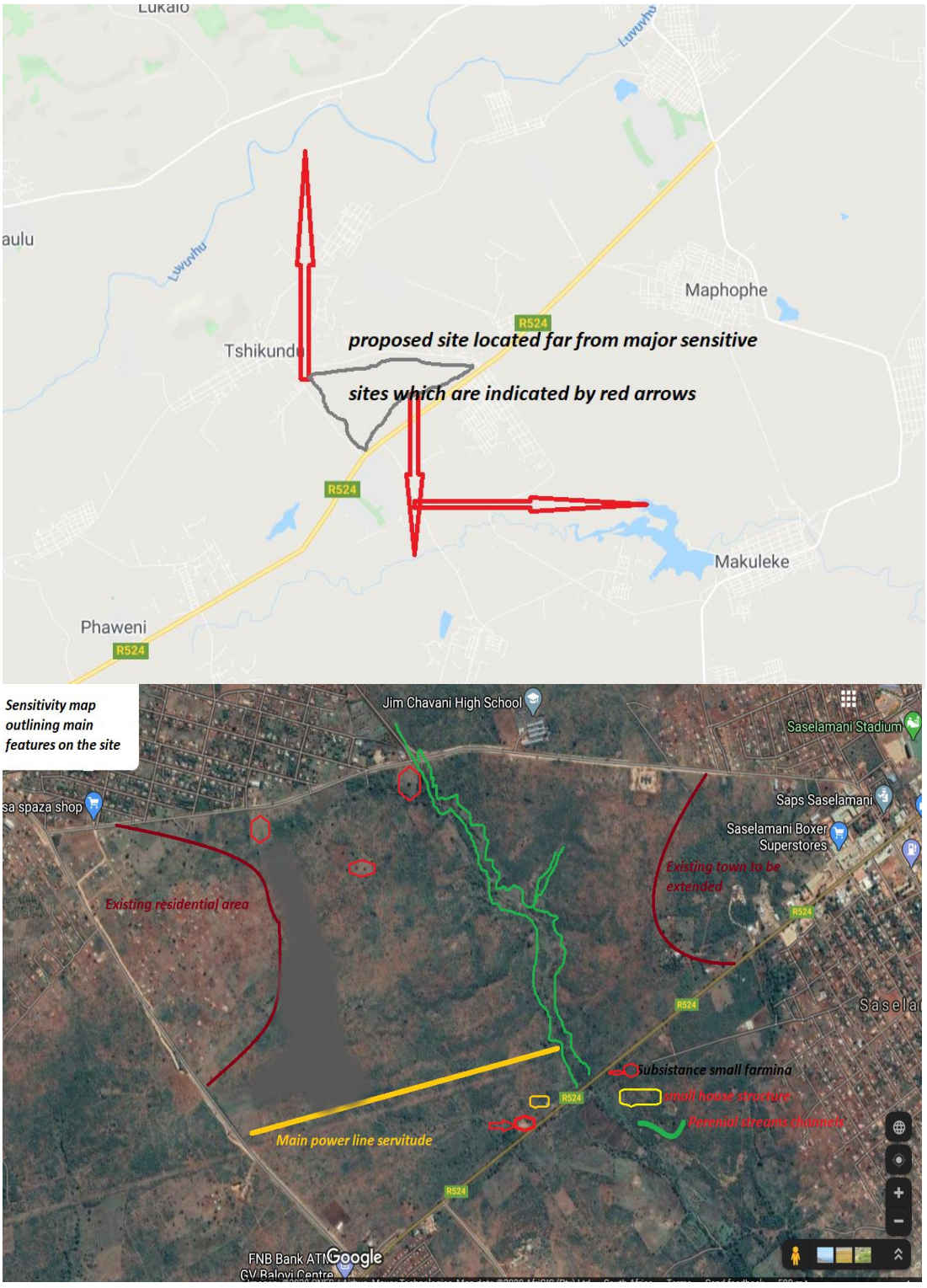
Locality map of the study area

Map showing identified large trees that must be avoided or minimize their destruction and protected trees which are mainly marula trees. Other cover is comprised of thickets and shrubs. Alignment to layout plan is indicated by a two-way arrow. These will be considered for avoidance during preparations for construction with guidance of an ecologist



Detailed layout plan for proposed development





Sensitive areas map showing main features identified on site