NEDBANK OLWAZINI EXTENSION
ECOLOGICAL VERIFICATION

SEF Reference No. 505454

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STRATEGIC ENVIRONMENTAL FOCUS

MAY 2014

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SACNASP Reg. No. 300028/12	SACNASP: Reg. No. 400275/08
	_____
	Date: 07/03/2014

Declaration of Independence

I, **Karin van der Walt,** in my capacity as a specialist consultant, hereby declare that I -

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Have and will not have vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
- As a registered member of the South African Council for Natural Scientific Professions, will undertake my profession in accordance with the Code of Conduct of the Council, as well as any other societies to which I am a member
- Based on information provided to me by the project proponent, and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional judgement;
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field; and
- Undertake to have my work peer reviewed on a regular basis by a competent specialist in the field of study for which I am registered.

07/03/2014

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Karin van der Walt *Cert. Sci. Nat.* Date
Terrestrial Ecologist
SACNASP Reg. No. 300028/12

EXECUTIVE SUMMARY

Strategic Environmental Focus (Pty) Ltd, as independent environmental practitioners and ecological specialists, was appointed by Nedbank Group Limited to conduct and ecological scan and provide an ecological opinion of the area associated with the Nedbank Olwazini Training Centre Complex. Nedbank Limited intends to construct two additional 11 bedroom cottages to the accommodation portion of the Nedbank Olwazini Training Centre complex which is located on portion 29 of the farm Rietfontein 522 JQ in Muldersdrift, Gauteng. Each proposed cottage will consist of a single floor (single story) building. In addition an extension to the existing recreation area is proposed to accommodate male, female and disabled patrons and an extension to the first floor kitchen and courtyard.

The study area falls within the Carletonville Dolomite grassland vegetation type (Mucina & Rutherford, 2006) which is classified as Vulnerable. According to the Gauteng C-Plan, the areas associated with the construction of the additional cottage and extension to the kitchen are not located within a CBA or ESA. ESAs are located to the north and south of the proposed constructions site, but it is unlikely that these areas will be impacted on by the proposed development. The area was considered to be unsuitable for any faunal or floral species of conservation concern (formally termed Red Listed species), Red/Orange listed species and no primary vegetation was found within the study area.

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LIST OF ABBREVIATIONS

ADU	Animal Demographical Unit
CBA	Critical Biodiversity Area
CR	Critically Endangered
CWAC	Coordinated Waterbird Counts
DDD	Data Deficient Distribution
DDT	Data Deficient Taxanomic
EIA	Environmental Impact Assessment
EN	Endangered
ESA	Ecological Support Area
IBA	Important Bird Area
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
NEMBA	National Environmental Management: Biodiversity Act
NT	Near Threatened
PA	Protected Area
POSA	Plants of Southern Africa
SABAP	South African Bird Atlas Project
SACNASP	South African Council for Natural Scientific Professions
SEF	Strategic Environmental Focus
VM	Virtual Museum
VU	Vulnerable
WMM	With Mitigation Measures
WOMM	Without Mitigation Measures

1. INTRODUCTION

1.1 Project Description

Strategic Environmental Focus (Pty) Ltd, as independent environmental practitioners and ecological specialists, was appointed by Nedbank Group Limited to conduct and ecological scan and provide an ecological opinion of the area associated with the Nedbank Olwazini Training Centre Complex. Nedbank Limited intends to construct two additional 11 bedroom cottages to the accommodation portion of the Nedbank Olwazini Training Centre complex which is located on portion 29 of the farm Rietfontein 522 JQ in Muldersdrift, Gauteng. Each proposed cottage will consist of a single floor (single story) building. In addition an extension to the existing recreation area is proposed to accommodate male, female and disabled patrons and an extension to the first floor kitchen and courtyard.

1.2 Terms of Reference

The terms of reference for the ecological scan were as follows:

- Assess the study area in terms of suitability for Red Listed plant species, determine if the site has suitable habitat for any Red Listed faunal or floral species and determine if there is any primary vegetation present within the study area; and
- Provide a memorandum that states that it is not anticipated that any protected species are prevalent within the study area;

1.3 Methodology

An ecological scan of the site was undertaken on the 17th of April 2014 and the methodology entailed the following:

- Review of relevant literature including all previous surveys and assessments conducted, review of the vegetation unit(s) expected to occur on the site as well as the conservation status of the vegetation unit(s);
- Review of relevant literature which included the distribution data of fauna within the study area;
- Review known distributions for species of conservation concern (formally termed Red Listed) floral species likely to occur in the study area;
- Review of available information layers within the Geographical Information System (GIS); and
- A one day field survey to assess the faunal and floral habitat within the study area, as well as the degree of disturbances within the area.

1.4 Limitations

The ecological scan consisted of a single site visit on the 17th of April 2014. This ecological scan was conducted to assess the area in terms of likelihood of the presence of any floral or faunal species of conservation concern (formally termed Red Listed) or Red/Orange listed plant species based on suitable habitat for these species or primary vegetation within the study area. Special reference was made to *Gnaphalium nelsonii* and *Lutra maculicollis* (Spotted-neck Otter). The study area referred to in this report includes only the areas associated with the additional cottage and extension to the recreational area and does not include the entire farm portion.

It should further be noted that in order to obtain a comprehensive understanding of the dynamics of the biota on the site, including species of conservation concern, on a specific site, studies should include investigations through different seasons, over a number of years and should include extensive sampling. Due to project time constraints, such long term research was not feasible.

2. BACKGROUND

2.1 Location

The study area was located at the Nedbank Olwazini Training Centre complex which is located on portion 29 of the farm Rietfontein 522 JQ in Muldersdrift, Gauteng. The area falls within Quarter Degree Grid Cell (QDGC) 2527DD between 25°58'43.50" – 25°58'44.66" south and 27°48'08.58" – 27°48'08.41" east. The study area as defined in this report refers to the area associated with the proposed additional cottage and extension of the recreational area and does not include the entire farm portion (Figure 1).

2.2 Climate

The average maximum temperatures range from 17°C in June to 26°C in January and the average minimum temperatures range from 1.1°C in June and 14°C in January. Severe frost is experienced during winter. The area normally receives about 590mm of rain per year, with most rainfall occurring during summer. (Mucina and Rutherford, 2006).

2.3 Regional Vegetation

The study area is situated within the Grassland Biome (Rutherford & Westfall, 1994). The Grassland Biome comprises mainly of 'sweet' and 'sour' grasses and plants with perennial underground storage organs, for example bulbs and tubers, while trees are restricted to specialised habitats such as rocky outcrops or kloofs. The majority of Rare and Threatened plant species in the summer rainfall regions of South Africa are

restricted to high-rainfall grasslands, making this the biome in most urgent need of conservation. It is not generally acknowledged that the majority of plant species in grasslands are non-grassy herbs (forbs), most of which are perennial plants with large underground storage structures. Rare and Endangered species in grasslands are mostly small, very localised and visible for only a few weeks in the year when they flower (Ferrar & Lötter, 2007).

The Grassland Biome is divided into smaller units known as vegetation types. According to Mucina & Rutherford (2006), the study area is located in the Carletonville Dolomite Grassland. Carletonville Dolomite Grassland occurs in the North-West province and Gauteng from where it marginally extents into the Free State Province. It consists of slightly undulating plains dissected by prominent rocky chert ridges. Important graminoid species include *Aristida congesta, Brachiaria serrate, Cynodon dactylon, Digitaria tricholaenoides, Diheteropogon amplectens, Eragrostis chloromelas, E.racemosa, Heteropogon contortus, Loudetia simplex, Setaria sphacelata, Andropogon schirensis, Aristida canescens, A.diffusa, Bewsia biflora, Cymbopogon caesius* and *Monocymbium ceresiiforme.* The herbaceous layer include species such as *Acalypha angustata, Barleria macrostegia, Chamaecrista mimosoides, Crabbea angustifolia, Dianthus mooiensis, Dicoma anomala, Helichrysum caespititium, H.nudifolium, Kyphocarpa angustifolia, Pollichia campestris, Senecio coronatus, Vernonia oligocephala, Boophone disticha* and *Habenaria mossii.* Low shrubs include species such as *Anthospermum rigidum, Indigofera comosa, Searsia magalismontana, Ziziphus zeyheriana* and *Tylosema esculentum.*

Carletonville Dolomite Grassland is currently listed as Vulnerable (Mucina & Rutherford, 2006) with more than a quarter of the original vegetation type transformed by cultivation, urban sprawl and mining.

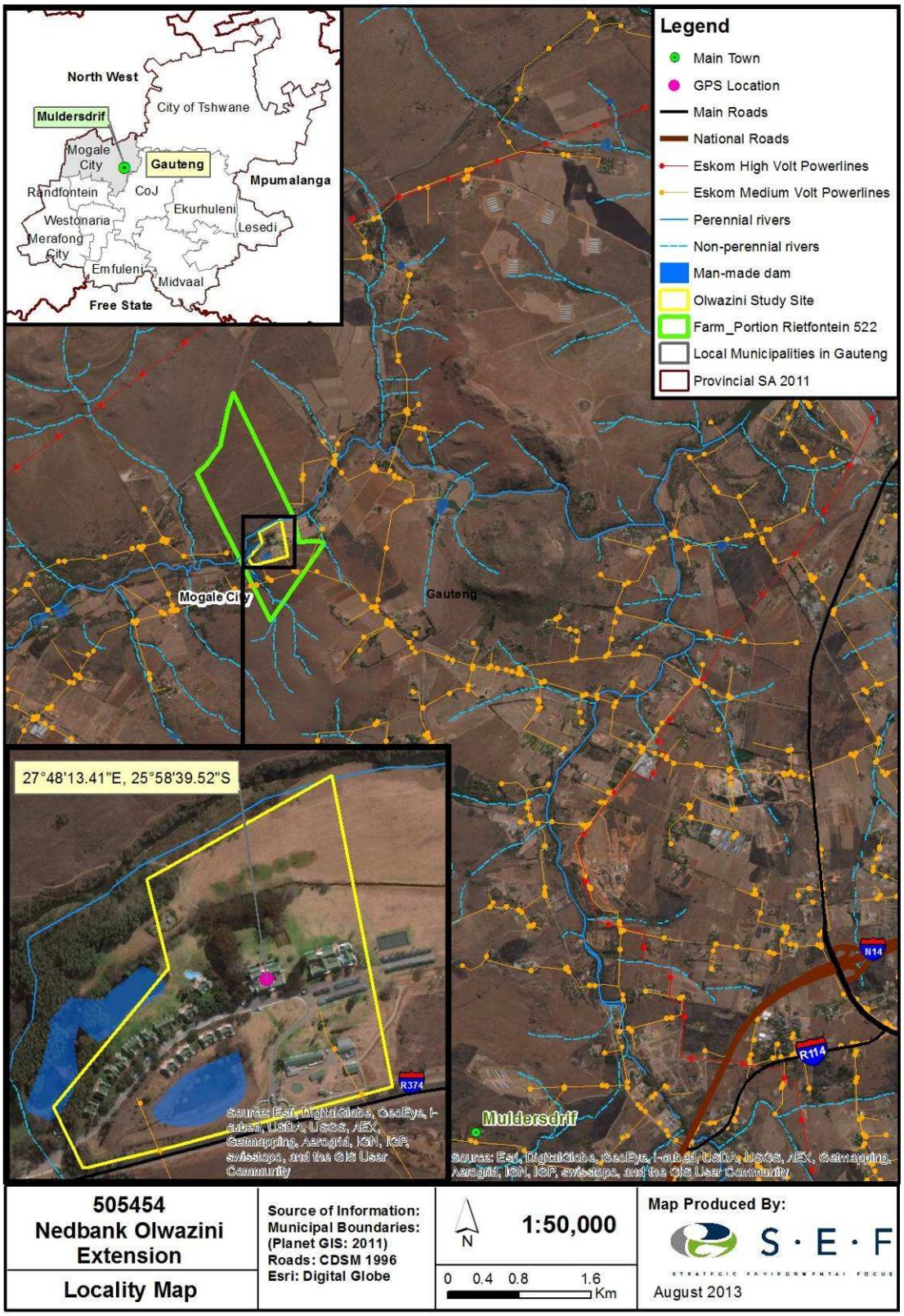

Figure 1: Location of the study site

2.4 Gauteng Biodiversity Conservation Plan

The Gauteng Biodiversity Conservation Plan (C-Plan) was started in 2000 and the aim was to revise this plan at least every five years. The small size of Gauteng province made it feasible to conduct extensive biodiversity surveys which aimed to provide the information on spatial occurrence of biodiversity which was necessary for conservation planning. C-Plan 3 is based on the principles of complementarity, efficiency, defensibility and flexibility, irreplaceability, retention, persistence and accountability (GDARD, 2013).

Knowledge of the distribution of biodiversity, the conservation status of species, approaches for dealing with aspects such as climate change, methods of data analysis, and the nature of threats to biodiversity within the planning region, are constantly changing, especially in Gauteng province where development is taking place at a rapid rate. The main purposes of the C-Plan 3 are:

- To serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process;
- To inform protected area expansion and biodiversity stewardship programmes within the province; and
- To serve as a basis for development of Bioregional Plans in municipalities within the province.

The C-Plan 3 considers the following biodiversity features:

- Plants (Including priority ranking of species of conservation concern in Gauteng);
- Bird habitat models;
- Invertebrates;
- Fish;
- Herpetofauna;
- Pan clusters;
- Near pristine quaternary catchments;
- Bioclimatic zones;
- Carbon sequestration; and
- Primary vegetation.

According to the Gauteng C-Plan, the areas associated with the construction of the additional cottage and extension to the kitchen are not located within a CBA or ESA (Figure 2). ESAs are located to the north and south of the proposed constructions site, but it is unlikely that these areas will be impacted on by the proposed development (GDARD, 2011).

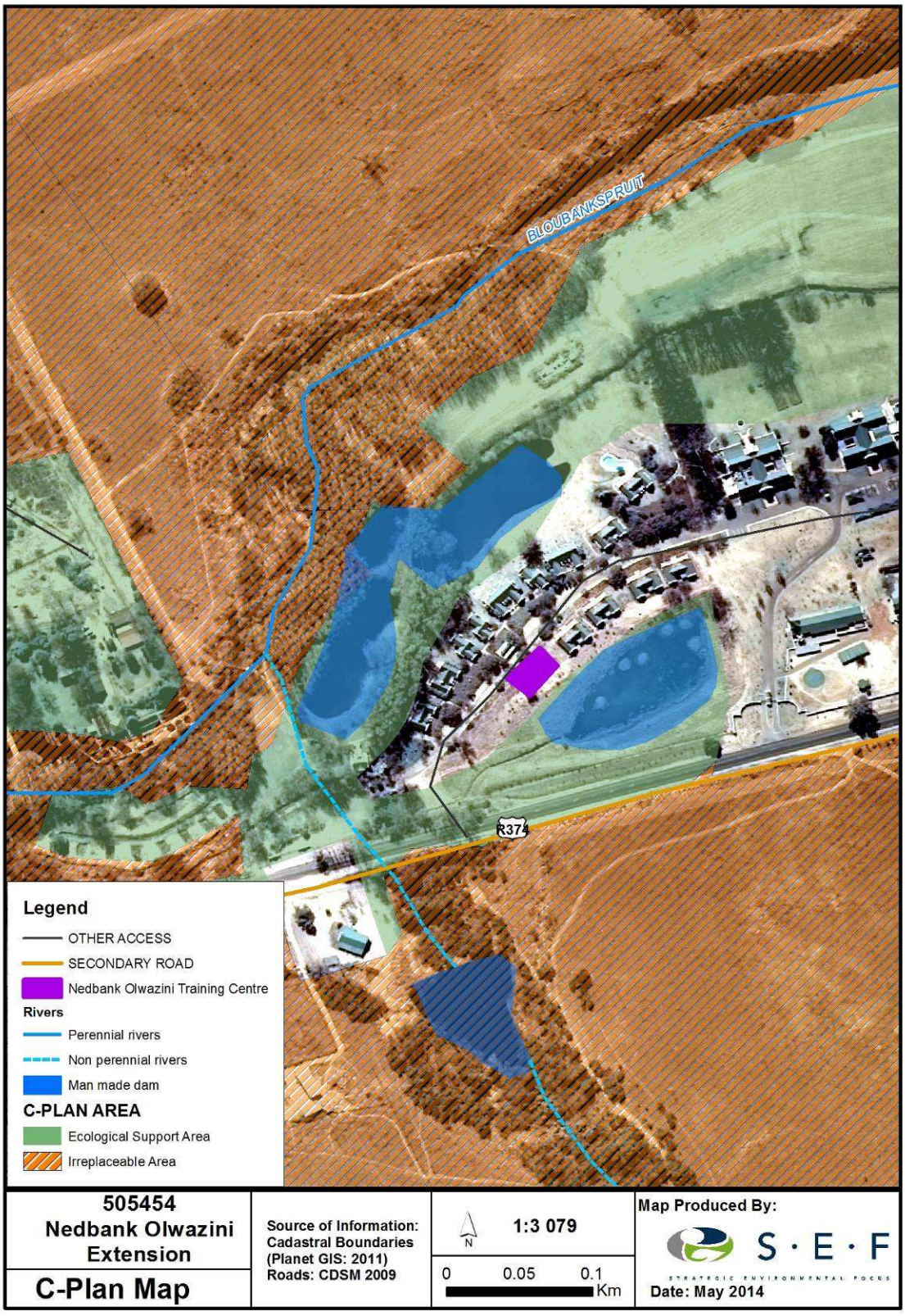

Figure 2: Gauteng Conservation Plan in relation to the study area

3. RESULTS

3.1 Overview

The area associated with the extension to the existing recreation area which includes the male, female and disabled patrons as well as an extension to the first floor kitchen and courtyard was found to be completely transformed and consisted of paved surface infrastructures with exotic tree species such as *Quercus* sp. (Oak Trees) used for landscaping (Photograph 1).

Photograph 1: The area associated with the extension to existing recreation area was transformed with no indigenous species

The area which was associated with the proposed additional cottage was historically disturbed probably during the construction of the adjacent cottage and has subsequently been rehabilitated (Photograph 2). Plant species recorded within this area included planted indigenous woody species such as *Searsia lancea* and *Combretum erythrophyllum* while the graminoid layer included species such as *Melinis repens, Digitaria ternata, Heteropogon contortus* and *Cymbopogon excavatus.* Alien invasive species associated with this area included *Opuntia ficus-indica, Zinnia peruviana, Bidens* sp., *Eucalyptus* sp., *Celtis* sp., *Acacia dealbata, Pyracanthua angustifolia* and *Pennisetum clandestinum.* No primary vegetation or suitable habitat for any faunal or floral species of conservation concern (formally termed Red Listed) or Red/Orange Listed species was recorded in this area.

Photograph 2: The area associated with the proposed cottage has been historically disturbed and has been rehabilitated

3.2 Red or Orange Listed Floral Species or Suitable Habitat

Gauteng's Red Data policy was developed using a ranking scheme that prioritized Red and Orange Listed plant species from the most important to the least important in terms of conservation. The Red and Orange List consists of 44 species (Appendix A) but based on the lack of suitable habitat, none of these are considered likely to occur within the area associated with the proposed additional cottage or extension of the recreational area.

3.3 Red Listed Avifaunal Species or Suitable Habitat

Nineteen priority Red Listed avifaunal species were included in the latest Gauteng C-Plan (Appendix B). The area associated with the proposed additional cottage and extension to the recreational area do not support suitable habitat for any of these species. It is however possible that suitable habitat exists within the large farm portion.

3.4 Red Listed Mammal Species or Suitable Habitat

Eight priority Red Listed mammal species were included in the latest Gauteng C-Plan (Appendix C). Based on the habitat requirements for these species, none are considered likely to occur within the study area. A small artificial dam was located approximately 60m south east of the area associated with the proposed cottage, however it was not considered to provide suitable habitat for *Lutra maculicollis* (Spotted-necked Otter) (Photograph 3).

Photograph 3: Small dam located south east of the area associated with the proposed cottage

4. CONCLUSION

Nedbank Limited intends to construct two additional 11 bedroom cottages to the accommodation portion of the Nedbank Olwazini Training Centre complex which is located on portion 29 of the farm Rietfontein 522 JQ in Muldersdrift, Gauteng. Each proposed cottage will consist of a single floor (single story) building. In addition an extension to the existing recreation area is proposed to accommodate male, female and disabled patrons and an extension to the first floor kitchen and courtyard.

The study area falls within the Carletonville Dolomite grassland vegetation type (Mucina & Rutherford, 2006) which is classified as Vulnerable. According to the Gauteng C-Plan, the areas associated with the construction of the additional cottage and extension to the kitchen are not located within a CBA or ESA. ESAs are located to the north and south of the proposed constructions site, but it is unlikely that these areas will be impacted on by the proposed development. The area was considered to be unsuitable for any faunal or floral species of conservation concern (formally termed Red Listed species), Red/Orange listed species and no primary vegetation was found within the study area.

REFERENCES

Barnes, K.N. (2000): *The Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland*, Johannesburg: BirdLife South Africa.

Chittenden, H. (2007): *Roberts Bird Guide. A comprehensive field guide to over 950 bird species in southern Africa*, Cape Town: John Voelcker Bird Book Fund.

Friedmann, Y. and Daly, B. (eds) (2004): *Red Data Book of the Mammals of South Africa: A Conservation Assessment*, Conservation Breeding Specialist Group (CBSG) Southern Africa (SSC/IUCN), Endangered Wildlife Trust, South Africa.

Gauteng Department of Agriculture and Rural Development (2011). Gauteng C-Plan, Version 3.3.

Gauteng Department of Agriculture and Rural Development (2013): Gauteng Conservation Plan Version 3.3 (C-Plan 3.3) Technical Report. October 2011, revised December 2013.

Harrison, J.A., Allan D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. and Brown, C.J. (1997): *The Atlas of Southern African Birds*, Johannesburg: BirdLife South Africa.

Henderson, L., (2001): *Alien Weeds and Invasive Plants. A complete guide to declared weeds and invaders in South Africa*, Plant Protection Research Institute Handbook No. 12, Agricultural Research Council, South Africa.

Henning, G.A., Terblanche, R.F. and Ball, J.B. (2009): *South African Butterfly Conservation Assessment*, Sanbi Biodiversity Series 13, Pretoria.

Hockey, P.A.R., Dean, W.R.J. and Ryan P.G. (2005): *Roberts Birds of Southern Africa*, 7th Edition, Cape Town: John Voelcker Bird Book Fund.

Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. and Manyama P.A., (eds) (2009): *Red List of South African plants* 2009, Strelitzia *25*, Nelspruit: South African National Biodiversity Institute.

Skinner, J.D. and Chimimba, C.T. (2005): *The Mammals of the Southern African Subregion*, London: Cambridge.

Van Wyk, B. and Malan, S. (1997): *Field Guide to the Wild Flowers of the Highveld*, Cape Town: Struik Publishers.

Van Wyk, B. and Smith, G. (2005): *Guide to the Aloes of South Africa*, Pretoria: Briza Publications.

Van Wyk, B. and Van Wyk, P. (1997): *Field Guide to Trees of Southern Africa*, Cape Town: Struik.

DIGITAL REFERENCES

Southern African Birding cc. (2011): Roberts VII Multimedia, Birds of Southern Africa, Computer Software.

GLOSSARY

Alien species	Plant taxa in a given area, whose presence there, is due to the intentional or accidental introduction as a result of human activity.
Biodiversity	Biodiversity is the variability among living organisms from all sources including *inter alia* terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
Biome	A major biotic unit consisting of plant and animal communities having similarities in form and environmental conditions, but not including the abiotic portion of the environment.
Buffer zone	A collar of land that filters edge effects.
Climax community	The presumed end point of successional sequence; a community that has reached a steady state, the most mature and fully developed vegetation that an ecosystem can achieve under the prevailing conditions. It is reached after a sequence of changes in the ecosystem, known as succession. Once climax vegetation develops, the changes are at a minimum and the vegetation is in dynamic equilibrium with its environment. Very few places show a true climax because physical environments are constantly changing so that ecosystems are always seeking to adjust to the new conditions through the process of succession.
Conservation	The management of the biosphere so that it may yield the greatest sustainable benefit to present generation while maintaining its potential to meet the needs and aspirations of future generations. The wise use of natural resources to prevent loss of ecosystems function and integrity.
Conservation concern	Plants of conservation concern are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened (see **Threatened**), Extinct in the wild, Data deficient, **Near threatened**, Critically rare, Rare and **Declining**. These plants are nationally protected by the National Environmental Management: Biodiversity Act. Within the context of these reports, plants that are Declining are also discussed under this heading.
Conservation status	An indicator of the likelihood of that species remaining extant either in the present day or the near future. Many factors are taken into account when assessing the conservation status of a species: not simply the number remaining, but the overall increase or decrease in the population over time, breeding success rates, known threats, and so on.
Community	Assemblage of populations living in a prescribed area or physical habitat, inhabiting some common environment.
Correspondence Analysis	Correspondence Analysis simultaneously ordinates species and samples.

Critically Endangered	A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
Data Deficient	There is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. However, "data deficient" is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.
Declining	A taxon is declining when it does not meet any of the five IUCN criteria and does not qualify for the categories Threatened or Near Threatened, but there are threatening processes causing a continuous decline in the population (Raimondo *et al.*, 2009).
Ecological Corridors	Corridors are roadways of natural habitat providing connectivity of various patches of native habitats along or through which faunal species may travel without any obstructions where other solutions are not feasible.
Edge effect	Inappropriate influences from surrounding activities, which physically degrade habitat, endanger resident biota and reduce the functional size of remnant fragments including, for example, the effects of invasive plant and animal species, physical damage and soil compaction caused through trampling and harvesting, abiotic habitat alterations and pollution.
Endangered	A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
Fauna	The animal life of a region.
Flora	The plant life of a region.
Forb	A herbaceous plant other than grasses.
Habitat	Type of environment in which plants and animals live.
Indigenous	Any species of plant, shrub or tree that occurs naturally in South Africa.
Invasive species	Naturalised alien plants that have the ability to reproduce, often in large numbers. Aggressive invaders can spread and invade large areas.
Least Concern	A taxon is Least Concern when it has been evaluated against five IUCN criteria and does not qualify for the Threatened or Near threatened Categories (Raimondo *et al.*, 2009).
Mitigation	The implementation of practical measures to reduce adverse impacts.

Near Threatened	A Taxon is Near Threatened when available evidence indicates that that it nearly meets any of the five IUCN criteria for Vulnerable, and is therefore likely to qualify for a threatened category in the near future (Raimondo *et al.*, 2009).
Plant community	A collection of plant species within a designated geographical unit, which forms a relatively uniform patch, distinguishable from neighbouring patches of different vegetation types. The components of each plant community are influenced by soil type, topography, climate and human disturbance.
Protected Plant	According to Provincial Nature Conservation Ordinances, no one is allowed to sell, buy, transport, or remove this plant without a permit from the responsible authority. These plants are protected by provincial legislation.
Threatened	Species that have naturally small populations and species which have been reduced to small (often unsustainable) population by man's activities.
Red Data	A list of species, fauna and flora that require environmental protection - based on the IUCN definitions. Now termed Plants of Conservation Concern.
Species diversity	A measure of the number and relative abundance of species.
Species richness	The number of species in an area or habitat.
Succession	Progressive change in the composition of a community of plants, e.g. from the initial colonisation of a bare area, or of an already established community towards a largely stable climax. The complete process of succession may take hundreds or thousands of years and entails a number of intermediate communities - each called a seral community. The replacement of one seral community by another in most cases leads to the eventual formation of a climax community, a relatively stable community of plants and animals.
Vegetation Unit	A complex of plant communities ecologically and historically (both in spatial and temporal terms) occupying habitat complexes at the landscape scale. Mucina and Rutherford (2006) state: "Our vegetation units are the obvious vegetation complexes that share some general ecological properties such as position on major ecological gradients and nutrient levels, and appear similar in vegetation structure and especially floristic composition".
Threatened	Threatened Species are those that are facing a high risk of extinction, indicated by placing in the categories Critically Endangered (CR), Endangered (E) and Vulnerable (VU) (Raimondo *et al.*, 2009).
Vulnerable	A taxon is Vulnerable when it is not Critically Endangered or Endangered but meets any of the five IUCN criteria for Vulnerable and is therefore facing a high risk of extinction in the wild in the future (Raimondo *et al.*, 2009).

APPENDICES

APPENDIX A	**Red and Orange Listed Plant species, their habitat requirements and likelihood of occurring in the study area**
APPENDIX B	**Red Listed Avifaunal species, their habitat requirements and likelihood of occurring in the study area**
APPENDIX C	**Red Listed Faunal species, their habitat requirements and likelihood of occurring in the study area**

APPENDIX A: RED AND ORANGE LISTES PLANT SPECIES, HABITAT REQUIREMENTS AND LIKELHOOD OF OCCURRING IN THE STUDY AREA

Scientific Name	Flowering Season	Habitat requirements	Likelihood of occurring in the study area
Agrostis eriantha var. *planifolia*	December	Plants grow in typical bankenveld grassveld on flat or undulating plains. The grass grows in amongst other grass species often in full sunlight.	Low
Brachiaria subulifolia	September-November	Frequently in damp or seepage areas on sandy soils.	Low
Brachystelma discoideum	November	Savanna in gravelly sandy soil.	Low
Calamagrostis epigeios var. *capensis*	January-May	Vleis.	Low
Cucumis humifructus	January & April	Woodland and grassland, on deep sand.	Low
Eulophia coddii	Early December	Steep hillsides on soil derived from sandstone, grassland or mixed bush.	Low
Eulophia leachii	December-January	Bushveld under trees on stony, black and heavy soils.	Low
Gladiolus robertsoniae	October-December	Grassland, shale slopes.	Low
Gnaphalium nelsonii	October-December	Seasonally wet grasslands	Low
Habenaria bicolor	January-March	Terrestrial in drained grassland, recorded from about 1800m.	Low
Habenaria mossii	March-April	Open grassland on dolomite or in black sandy soil.	Low
Trachyandra erythrorrhiza	September-October	Marshy areas, grassland, usually in black turf marshes.	Low
Schizoglossum umbelluliferum	September-February	Deep black turf in open woodland mainly in the vicinity of drainage lines.	Low
Ceropegia turricula	December-February	Unknown.	Unknown
Lepidium mossii	Unknown	Unknown.	Unknown

Scientific Name	Flowering Season	Habitat requirements	Likelihood of occurring in the study area
Aloe peglerae	July-August	Rocky places, often on gravelly quartzite, confined mainly to the Magaliesberg range, usually on the northern slopes and summit; scanty grassland, very little soil.	Zero
Barleria rehmannii	December-March	Sandy and gravelly soil, open bushveld, rocky slopes.	Zero
Bowiea volubilis	September-April	Shady places, steep rocky slopes and in open woodland, under large boulders in bush or low forest.	Zero
Ceropegia decidua subsp. *pretoriensis*	December-April	Direct sunshine or shaded situations, rocky outcrops of the quartzitic Magaliesberg mountain series, in pockets of soil among rocks, in shade of shrubs and low trees, can be seen twining around grass spikes.	Zero
Cineraria longipes	March-May	Koppies to the south of Johannesburg, amongst rocks and along seep lines in association with *Pteridium*.	Zero
Cleome conrathii	April-May	On stony slopes, usually on sandy soil, open to closed deciduous woodland, quartzites, red sandy soil, all aspects, 1515m.	Zero
Delosperma davyi	August-March	On dolomite rocks at the edge of dense, shady scrub above river.	Zero
Delosperma framesii	August-March	Ridges, hills.	Zero
Delosperma gautengense	August-March	Among rocks of Magaliesberg quartzite in grassland in transition to sour grassveld.	Zero
Delosperma leendertziae	August-March	Rocky ridges.	Zero
Delosperma macellum	August-March	In loose gravel in open places near trees.	Zero

Scientific Name	Flowering Season	Habitat requirements	Likelihood of occurring in the study area
Delosperma purpureum	August-March	Quartzite slopes: S aspect, usually on steep dipping rock strata forming slabs/sheets; skeletal soil associated with "sheet rock mat formation" typified by the sedge *Coleochloa setifera*.	Zero
Delosperma vogtsii	August-March	On rather steep south facing slopes of quartzite in mountain grassveld.	Zero
Encephalartos lanatus	March-September	Open to closed woodland on the slopes of sheltered wooded kloofs or ridges and sheltered rocky ledges.	Zero
Encephalartos middelburgensis	Unknown	Open and grassy with rather sparse bush and tree cover in sheltered valleys, steep rocky slopes.	Zero
Frithia humilis	December-February	Sandy flat areas associated with rough rocky outcrops.	Zero
Frithia pulchra	December-January	Shallow soil pockets between small, gravelly quartzite stones on large flat slabs of rock. On summits and top of Magaliesberg.	Zero
Heteranthera callifolia	February	Swampy areas, vleis, pans or rock pools.	Zero
Holothrix micrantha	October	Terrestrial on grassy cliffs, recorded from 1500 to 1800 m.	Zero
Holothrix randii	September-January	Grassy slopes & rocky ledges.	Zero
Khadia beswickii	October-March	Open areas on shallow surfaces above rocks in grassland.	Zero
Kniphofia typhoides	February-March	Heavy, black clay soil, climax *Themeda triandra* grassland, low lying marshy ground - pans or vleis.	Zero
Lithops lesliei subsp. *lesliei* var. *rubrobrunnea*	April	Grassland with dark pinkish-red ferruginous shaly siltstone.	Zero

Scientific Name	Flowering Season	Habitat requirements	Likelihood of occurring in the study area
Lotononis adpressa subsp. *leptantha*	February-May	Open grassland.	Zero
Macledium pretoriense	April	Hillsides.	Zero
Melolobium subspicatum	October-May	Grassland.	Zero
Nerine gracilis	February-March	Undulating grasslands in damp, moist areas; the plants grow in full sun in damp depressions, near pans or on the edges of streams; grassland, riverbanks, vleis.	Zero
Nuxia glomerulata	October-June	On open hillsides, rocky western slopes or in deep rocky ravines.	Zero

APPENDIX B: RED LISTED AVIFAUNAL SPECIES, THEIR HABITAT REQUIREMENTS AND LIKELIHOOD OF OCCURRING IN THE STUDY AREA

Scientific Name	Common Name	Habitat Requirements	Likelihood of occurring in the study area (area associated with the additional cottage and extension of recreational area)
Falco biarmicus	Lanner Falcon	Most frequent in open grassland, open or cleared woodland, and agricultural areas. Breeding pairs favour habitats where cliffs available as nest and roost sites, but will use alternative sites (eg trees, electricity pylons, buildings) if cliffs absent	Low
Falco naumanni	Lesser Kestrel	Warm, dry, open or lightly wooded environments; concentrated in grassy Karoo, w fringes of grassland biome and se Kalahari; generally avoids foraging in transformed habitats but occurs in some agricultural areas, incl croplands in fynbos and renosterveld of W Cape	Low
Alcedo semitorquata	Half-collared Kingfisher	Clear, fast-flowing perennial streams, rivers and estuaries, usually narrow and secluded, with dense marginal vegetation; often near rapids	Zero
Gorsachius leuconotus	White-backed Night-Heron	Clear and slow-flowing perennial rivers and streams with overhanging vegetation, in woodland and forest. Sometimes along vegetated watercourses in open country. Also lakes, dams and marshes with overhanging vegetation, mangrove swamps and, occasionally, reedbeds	Zero
Podica senegalensis	African Finfoot	Mostly quiet, wooded streams and rivers flanked by thick riparian vegetation and overhanging trees. Also dam verges, especially with sufficient overhanging vegetation and reed cover	Zero
Phoeniconaias minor	Lesser Flamingo	Primarily open, eutrophic, shallow wetlands; breeds on saline lakes and saltpans	Zero
Ciconia nigra	Black Stork	Dams, pans, floodplains, flooded grassland, associated with mountainous areas	Zero
Phoenicopterus roseus	Greater Flamingo	Large, shallow, eutrophic wetlands, slat pans, saline lakes, coastal mudflats	Zero
Mycteria ibis	Yellow-billed Stork	Wetlands, incl alkaline and freshwater lakes, rivers, dams, pans, flood plains, marshes, flooded grassland and small pools or streams	Zero
Gyps coprotheres	Cape Vulture	Mostly mountainous country, open country with inselbergs and escarpments; less common in savanna or deserts. Forages over open grassland, woodland and agricultural areas. Roosts on cliffs, but will also make use of trees and pylons.	Zero
Anthropoides paradiseus	Blue Crane	Midland and highland grassveld, edge of karoo, cultivated land and edges of vleis. Nests in both moist and dry areas. For	Zero
Tyto capensis	African Grass-Owl	Treeless areas associated with damp substrata, mainly marshes and vleis. Favours patches of tall, rank grass, sedges or weeds. Also areas with dense	Zero

		ground cover in scattered thorn scrub, low fynbos and renosterveld, usually close to water and among thick stands of grass (*Stenotaphrum* sp) and sedge (*Juncus* sp)	
Circus ranivorus	African Marsh-Harrier	Almost exclusively inland and coastal wetlands	Zero
Eupodotis senegalensis	White-bellied Korhaan	The White-bellied Korhaan occurs sparsely in both the Grassland and Savanna Biomes. It is often most common in transitional areas between different habitats (ecotones), and undisturbed, rolling grassland dotted with some tree cover and where termite mounds are plentiful (especially on rocky ground) seems to be considered prime habitat by this species.	Zero
Polemaetus bellicosus	Martial Eagle	Open woodland, arid and mesic savanna, forest edges	Zero
Eupodotis caerulescens	Blue Korhaan	Flat and undulating terrain in grassland and Nama Karoo, where rainfall 300-1 000 mm; often on damp ground; sometimes attracted to burnt areas; favours short vegetation	Zero
Mirafra cheniana	Melodious Lark	Grassland dominated by *Themeda triandra*; avoids wet lowlands, favouring fairly short grassland (< 0.5 m), with open spaces between tussocks, at 550-1 750 m altitude, with annual rainfall 400-800 mm	Zero
Sagittarius serpentarius	Secretarybird	Open grassland (< 0.5 m) with scattered trees, shrubland, open Acacia and bushwillow (Combretum spp) savanna; absent from dense woodland and rocky hills	Zero
Buphagus erythrorhynchus	Red-billed Oxpecker	Open savanna, up to 3 000 m; dependent on presence of host ungulates	Zero

APPENDIX C: RED LISTED FAUNAL SPECIES, THEIR HABITAT REQUIREMENTS AND LIKELIHOOD OF OCCURRING IN THE STUDY AREA

Scientific Name	Common Name	Habitat Requirements	Likelihood of occurring in the study area (area associated with the additional cottage and extension of recreational area)
Pipistrellus rusticus	Rusty pipistrelle/bat	There is very little known of this species' habitat preferences and densities but they have been found in crevices of trees, under the bark of dead Acacia trees, and once in an old building, caves and other substantial shelter such as mine adits	Medium
Neamblysomus julianae	Juliana's golden mole (Bronberg sub-population	Known from three geographically isolated sub-populations (Bronberg ridge, Nylsvley Nature Reserve & Kruger National Park). Habitat loss due to urbanization and sand mining are major threats for this species.	Low
Atelerix frontalis	Southern African hedgehog	In Gauteng, they are confined in the grassland biome	Low
Lutra maculicollis	Spotted-necked otter	Spotted- necked otter is an aquatic species and spends very little time in dry land compared to its counterpart the African clawless otter	Low
Mystromys albicaudutus	White tailed mouse	Predominantly a grassland species, but not confined to this biome, the white-tailed mouse is a low density species and is under threat from habitat fragmentation. The population is recorded as declining as a result of grazing and agricultural pressures	Low
Lutra maculicollis	Spotted-necked Otter	Aquatic areas, natural and man-made, fish, crab, frogs, in low densities	Low
Miniopterus schreibersii	Scheiber's long-fingered bat	The species is a cave dweller and the availability of caves or other substantial shelter such as mine adits is an essential habitat requirement. The species occurs in immense colonies with numbers reaching up to 300 000.	Low
Myotis tricolor	Temminck's hairy bat	Savanna woodland species and roost in caves. Roost sites are extremely important and sensitive as they are focal areas of activity	Low