

CONFINEMENT OF MONTANASPRUIT

REVIEW **ECOLOGICAL MANAGEMENT PLAN**

Review of the Two Existing Ecological Management Plan Reports (Vol. 1 & 2) for the Proposed Confinement of the 1:100 Year Floodplain of the Montanaspruit on Portions 28 to 42, 137 & 138 of Doornpoort 295 JR, City of Tswane, Gauteng Province

Compiled by

Flori Scientific Services



AUGUST 2019

1 REPORT INFORMATION

PROJECT TITLE: Confinement of Montanaspruit

STUDY NAME: Review Ecological Management Plan (Vol. 1 & 2)

COMPILED BY: Flori Scientific Services cc

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2 EXECUTIVE SUMMARY

Background

The City of Tshwane Municipality has over the years received numerous complaints regarding the flooding of the Montanaspruit (Montana Stream) in the Pretoria area since the mid 1990s. The proposed project of remedial action involves the confinement the 1:100 year floodline, widening and flattening of the floodplain and canalisation of the mainstream channel, where necessary. The proposed project activities and actions cover an approximate area of 22.45 hectares on portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tswane, Gauteng Province.

Most of the specialist studies were conducted a few years ago and need to be reviewed and updated where necessary. Flori Scientific Services cc was appointed as the independent consultancy to conduct the review of the studies.

Field investigations were conducted in March 2019.

Location of the study area

The study site is a section of the Montanaspruit, which is situated on Portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tswane, Gauteng Province. The site is north of Sefako Makgatho Drive (Zambezi Drive, R513); west of the N1, and south of the N4 (Rustenburg highway).

Reports reviewed

Only the two existing ecological management plan reports (Vol. 1 & 2) were reviewed and are as follows:

- Montana Spruit Upgrade, Gauteng: Ecological Management Plan: Volume 1. May 2011. Strategic Environmental Focus (Pty) Ltd.
- Montana Spruit Upgrade, Gauteng: Ecological Management Plan: Volume 2. Strategic Environmental Focus (Pty) Ltd.


Summary of the review

The following is a summary of the review of the relevant ecological reports:

- The two-volume report focuses on the natural ecology of the site and contains the various necessary management plans related to the project, namely:
 - Riparian Management and Rehabilitation Plan;
 - Guideline: Ecologically Sound Storm Water Monitoring plan;

- Red and Orange List species: Rescue, Persistence and Monitoring Plan;
 - Natural Open Space: Fire Management Plan;
 - Alien Plant Monitoring and Eradication Plan;
 - Ecological Processes Management Plan; and
 - Recommendations: Formalisation of Open Space
- The two-volume report is not the Environmental Management Plan (EMP) but is additional information focusing on the ecology of the site that needs to be added to the EMP or kept in conjunction with the EMP. All the plans in the report/s are required and need to be implemented and monitored.
 - An independent aquatic monitoring process by a specialist is required as part of the project. This monitoring must commence just prior to commencement of the project itself. This necessary process is not highlighted in the report.
 - No additional significant information or hidden 'fatal flaws' were uncovered during the review process, which included site investigations.

3 REVIEW & APPROVAL

Name	Title & Company	Signature	Date
Johannes Maree	Ecologist & Author (Flori Scientific Services)		13/08/2019
Delia De Lange	Lead EAP (TGM Environmental Services)		

4 ACKNOWLEDGEMENTS

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CONTENTS

1	REPORT INFORMATION	1
2	EXECUTIVE SUMMARY	2
3	REVIEW & APPROVAL	4
4	ACKNOWLEDGEMENTS	4
5	ACRONYMS	7
6	BACKGROUND	8
6.1	Project overview	8
6.2	Reports reviewed	8
6.3	Study Site Location	8
6.4	GPS Coordinates of the Main Landmarks.....	10
6.5	Purpose of the study.....	10
6.6	Quality and age of base data	10
6.7	Update of environmental plans and frameworks.....	11
6.8	Assumptions and limitations.....	11
7	METHODOLOGY	12
7.1	Desktop assessment.....	12
7.2	Field surveys.....	12
8	REVIEW OF REPORTS	13
8.1	Assessment of the study site.....	13
8.2	Sensitivity of the study site	13
8.3	Review of Reports	15
9	APPENDICES	18
9.1	Summary of Marikana Thornveld	18
9.2	List of floral species	19
9.3	Photographs.....	20
10	REFERENCES	23
11	DECLARATION	25

LIST OF FIGURES

Figure 1: Study Site	9
Figure 2: Area investigated.....	9
Figure 3: Main watercourses in the study site and greater area.....	14
Figure 4: Sensitivity map	14

LIST OF TABLES

No tables.

LIST OF PHOTOGRAPHS

Photo 1: Montanaspruit (Stream)	20
Photo 2: Built up suburbs and gardens along Montanaspruit.....	20
Photo 3: Stream showing dense grasses and rushes along the banks and in the riparian zone.....	21
Photo 4: Low level bridge and road crossing over stream (Tsamma St).....	21
Photo 5: Dense rushes in steam and floodplain. Also notice alien invasive weeds (morning glory and zinnia).....	22

5 ACRONYMS

CBA	Critical Biodiversity Areas
CMA	Catchment Management Agencies
DEA	Department of Environment Affairs
DWA	Department of Water Affairs (Old name for DWS)
DWS	Department Water and Sanitation
EAP	Environmental Authorised Practitioner
EIS	Ecological Importance & Sensitivity
EMC	Environmental Management Class
HGM	Hydrogeomorphic
IBA	Important Bird Area(s)
IUCN	International Union for Conservation of Nature
MAP	Mean Annual Precipitation
NFEPA	National Freshwater Ecosystem Priority Areas
NPAES	National Protected Areas Expansion Strategy
PES	Present Ecological State
PDA	Primary Drainage Area
QDA	Quaternary Drainage Area
REC	Recommended Ecological Category (or Class)
REMC	Recommended Ecological Management Category (or Class)
RVI	Riparian Vegetation Index
SANBI	South African National Biodiversity Institute
SWSA	Strategic Water areas of South Africa
WMA	Water Management Areas
WUL	Water Use Licence
WULA	Water Use Licence Application

6 BACKGROUND

6.1 Project overview

The City of Tshwane Municipality has over the years received numerous complaints regarding the flooding of the Montanaspruit (Montana Stream) in the Pretoria area since the mid 1990s. The proposed project of remedial action involves the confinement the 1:100 year floodline, widening and flattening of the floodplain and canalisation of the mainstream channel, where necessary. The proposed project activities and actions cover an approximate area of 22.45 hectares on portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tswane, Gauteng Province.

Most of the specialist studies were conducted a few years ago and need to be reviewed and updated where necessary. Flori Scientific Services cc was appointed as the independent consultancy to conduct the review of the studies.

Field investigations were conducted in March 2019.

6.2 Reports reviewed

Only the two existing ecological management plan reports (Vol. 1 & 2) were reviewed and are as follows:

- Montana Spruit Upgrade, Gauteng: Ecological Management Plan: Volume 1. May 2011. Strategic Environmental Focus (Pty) Ltd.
- Montana Spruit Upgrade, Gauteng: Ecological Management Plan: Volume 2. Strategic Environmental Focus (Pty) Ltd.

6.3 Study Site Location

The study site is a section of the Montanaspruit, which is situated on Portions 28 to 42, 137 and 138 of Doornpoort 295-JR, City of Tswane, Gauteng Province. The site is north of Sefako Makgatho Drive (Zambezi Drive, R513); west of the N1 Highway, and south of the N4 (Rustenburg Highway) (Figure 1). However, the larger Montanaspruit system, as shown in Figure 2 below, was also investigated and needs to be taken into consideration as well.



Figure 1: Study Site



Figure 2: Area investigated

6.4 GPS Coordinates of the Main Landmarks

The GPS coordinates of the main landmarks within the project area are as follows:

- North end of site (Montanaspruit): 25°38'37.07"S; 28°15'35.13"E.
- South end of site area (Montanaspruit): 25°40'50.19"S; 28°15'42.34"E.
- Erasmia: 25°48'23.80"S; 28°05'31.69"E.
- 1:50 000 Topo Map reference (QDS): 2528CB (Silverton).
- Quaternary Drainage Area (QDA): A21B.

6.5 Purpose of the study

The study is a review and update of existing specialist studies and reports. The initial studies were conducted a few years ago in 2011 and it is deemed pertinent that they be reviewed and updated if and where necessary. The project involves the proposed confinement of the Montanaspruit in the area of Montana Park, Mondustria and Doornpoort. Project activities trigger numerous environmental requirements, including the need for certain specialist studies.

6.6 Quality and age of base data

The latest data sets were used for the report in terms of background information for veld types, ecosystems, threatened ecosystems, red data listed (RDL) fauna and flora species, priority areas (including protected areas, strategic expansion areas, wetlands, watercourses, etc. The data used was sourced from the same data sets that are nationally used and approved by all consultants and governmental organisations.

The source and age of data used included the following:

- Threatened ecosystems: Latest datasets were obtained from the SANBI website (www.bgis.sanbi.org).
- RDL species: Red List of South Africa Plants (latest update) – (www.redlist.sanbi.org).
- Veld types and ecosystems: Mucina & Rutherford, 2006, 2010. Updated in 2012 (National vegetation maps 2012 beta 2).
- SANBI data sets – latest updated website data (www.bgis.sanbi.org).
- Plants of Southern Africa: 2012 - (www.posa.sanbi.org).
- National environmental screening tool (Dept. Environmental Affairs) - (www.environment.gov.za).
- Gauteng Conservation Plan (C-Plan) version 3.3.

6.7 Update of environmental plans and frameworks

During the last few years important environmental conservation plans and frameworks have been updated as shown below.

- The latest conservation plan (v3.3) for the Gauteng Province came out in 2011. The CBAs and ESAs have been updated according to this C-Plan v3.3.
- The latest GPEMF was adopted in 2018 (Gazette 41473: Notice 164 of 2 March 2018). Publication of the GPEMF Standard for Implementation. Adoption of the GPEMF Standard and exclusion of associated activities from the requirement to obtain environmental authorisation in terms of section 24(2)(d) and 24(10)(a), read with section 24(10)(d), of the National Environmental Management Act, 1998.

6.8 Assumptions and limitations

The assumptions and limitations for the assessment are as follows:

- All information regarding the proposed project and related activities as provided by the Client are taken to be accurate;
- Field investigations were conducted on 28 March 2019.
- Precise buffer zones, regulated zones, etc. or exact GPS positions cannot be made using generalised corridors or kml files on Google Earth. However, the buffer zones drawn are accurate to within 2-3m;
- Standard and acceptable methodologies as required and used in South Africa were used.
- The latest data sets were used in terms of obtaining and establishing background information and desktop reviews for the project. The data sets were taken to be accurate, but were verified and refined during field investigations.

7 METHODOLOGY

7.1 Desktop assessment

A literature review was conducted regarding the existing specialist studies (reports) and compared to the latest existing base data such shown above in Section 6, as some of these have changed and been updated during the last few years. Various online environmental screening tools were also used to assess the latest data available, such as the DEA national environmental screening tool.

7.2 Field surveys

A site investigation was conducted for the purpose of ground-truthing and to determine to what extent the study area has changed during the last few years. During the field surveys, cognisance was taken of the following environmental features and attributes:

- Biophysical environment, including terrestrial and aquatic ecosystems;
- Regional and site specific vegetation;
- Habitats ideal for potential red data fauna and flora species;
- Sensitive faunal and floral habitats; and
- Red data and orange data fauna and flora species.

Digital photographs and GPS reference points of importance were recorded and used throughout the report when and where necessary.

8 REVIEW OF REPORTS

8.1 Assessment of the study site

The study site is situated within the original extent of Marikana Thornveld. The veld type is part of the Central Bushveld Bioregion, which is part of the Savanna Biome of South Africa. Marikana Thornveld is a threatened veld type with a threat status of vulnerable (VU) and not of endangered (EN) as stated in the reports.¹

In general, the ecology of the study area itself has remained quite constant and altered little over the last few years, especially in terms of the floral component. The faunal component was not assessed in the previous ecological studies, but it is fairly certain that due to the increase in urbanisation the wild fauna of the area would have been negatively impacted to some extent and a bit more than the floral component. The overall ecological and floral assessments of the previous reports are still deemed to be valid and sketch the upper end of the spectrum. In other words, the species listed as occurring in the area and discussed in the reports can be taken to still occur.

The figure below shows the three main watercourses (small streams) that are part of the larger ecosystem of the area, which are the Montanaspruit, Blinkblaarspruit, and Katdoringspruit (Figure 3). The Katdoring and Blinkblaar are very small highly ephemeral and seasonal small streams (drainage lines) that are tributaries of the larger Montanaspruit.

8.2 Sensitivity of the study site

One of the major desired outcomes from an ecological assessment is to determine and delineate the sensitivities of the area, including any potential 'no-go' areas. The sensitivity mapping of the site, as per the specialist reports has remained the same in terms of actual ecological sensitivity and can be taken as accurate and relevant. However, the focus of the report is mainly vegetation. Taking the larger aquatic ecosystem into account, buffer areas and the threat status of veld type, it is recommended that the entire study area be viewed and approached as sensitive (high sensitivity), with the exception of the urban plots and houses on the east side that fall within the original floodplain. The 'high sensitive' delineated area must include all of the area up to the existing 1:100 flood line, as well as the 32m buffer zone. The sensitive area must also include the entire delineated areas of the CBA

¹ Reports refers to the reports under review as listed in Section 6.2

and ESA. All watercourses are, by default, viewed as sensitive and should be approached as such.

Figure 4, below, shows the current ecological sensitivity of the study area.



Figure 3: Main watercourses in the study site and greater area

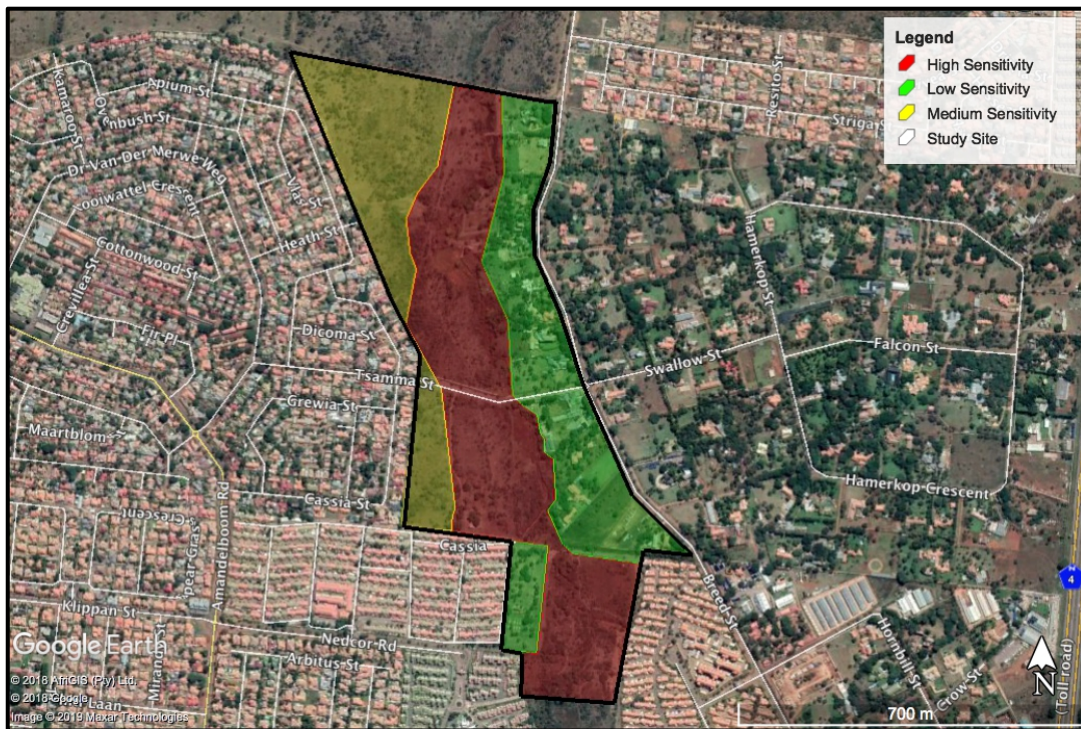


Figure 4: Sensitivity map

8.3 Review of Reports

The following is a review of the ecological management plan reports (volume 1 & 2): According to the reports they are not the Environmental Management Plan (EMP), but an 'add on' requirement that should be read in conjunction with the EMP.

Overall the ecology of the study area itself has altered little over the last few years since the reports were first drafted in 2011 and can be taken as still being relevant.

Marikana Thornveld, which includes the study area and open thornveld to the north, is a threatened ecosystem with a status of vulnerable (VU) and not endangered (EN) as stated in some of the reviewed reports.

The two-volume report focuses on the natural ecology of the site and contains the various necessary management plans related to the proposed project, namely:

- Riparian Management and Rehabilitation Plan;
- Guideline: Ecologically Sound Storm Water Monitoring plan;
- Red and Orange List species: Rescue, Persistence and Monitoring Plan;
- Natural Open Space: Fire Management Plan;
- Alien Plant Monitoring and Eradication Plan;
- Ecological Processes Management Plan; and
- Recommendations: Formalisation of Open Space

Rehabilitation Plan

The rehabilitation plan is adequate for the proposed project. An important point to highlight that is mentioned in the plan is that rehabilitation of the floodplain and terrestrial areas must use *indigenous plants that occur naturally in the riparian area*. In other words, the plants used in the rehabilitation process must be locally indigenous species. The rehabilitation of the riparian and floodplain zones are a priority.

Crew camps (and any temporary lay down areas) must be located outside of the floodplain. However, there are also sensitive areas in the thornveld. It is therefore important that the ECO / Ecologist on the project approve any site location prior to set up.

According to the plan, rehabilitation of sections must take place as soon as possible, and not just after completion of the entire project. This is important, as the rehabilitation process must be seen as part of the construction phase and not simply as an add-on afterwards.

Storm water management plan

A danger of storm water run-off during and after construction is siltation of the main channel of the Montanaspruit as well as the floodplains. This risk has been adequately addressed in the management plan.

The storm water management plan is adequate and sufficiently relevant for the proposed project.

Rescue, Persistence and Monitoring Plan

Only two identified on site priority floral species (orange data listed) are mentioned, namely *Crinum bulbispermum* and *Hypoxis hemerocallidea*. The plan does mention that all other bulbous plants should also be given priority, which is supported.

It is important that the ECO or appointed ecologist be involved in the initial search and rescue of the priority plants at the start of and during construction phase. This important activity cannot be simply left up to the contractors that will most likely not have the expertise.

A critical priority species mentioned in the plan is the African grass owl (*Tyto capensis*). It is important that a specialist scout the site immediately prior to the commencement of the construction phase to search for nest or presence of grass owls.

Fire Management Plan

Issues to highlight that need to be part of the plan are:

- Contractors may not make unauthorised, open fires. Only specific and well secured designated areas may be used;
- No burning to clear areas may be conducted, even if controlled;
- Supervisors / ECO must orientate workers on the danger of fires, as well as the danger of possible veld fires, especially if working during the dry, winter months.

With the inclusion of the above the plan is adequate.

Alien Plant Monitoring and Eradication Plan

The plan is adequate and still relevant for the proposed project and site. The use of chemical control must be extremely well monitored and limited. No chemical spraying may take place within areas of the stream itself and areas of open water.

Certain chemical gels may be used on cut down trees or shrubs, but these need to be very carefully and properly monitored. The supervisor and ECO need to give some prior training and orientation regarding any use of chemicals (herbicides).

No herbicides (and other dangerous chemicals) may be stored within 100m of any watercourses, including wetlands. Proper response plans to chemical spills need to be in place and proper orientation and training of workers is required on these response / emergency procedures.

The difficult part of the plan to implement is the post-construction monitoring and maintenance of the plan, but this falls outside of the scope of the plan itself.

Ecological Processes Management Plan

The processes and plan are adequate and need to be implemented as an integral part of the EMP. Proper monitoring and auditing from the ECO and other independent specialists or government departments is necessary.

An independent aquatic monitoring programme is required for this project.

Recommendations on formalization of Open space

The recommendations are supported and still viable and adequate for the project.

Comments on Volume 2

The Ecological Management Plan consists of two volumes. Volume 2 is basically supporting information for the plans discussed in Volume 1. Volume 2 is still viable and a necessary supplement.

The supplementary information in Volume 2 recommends the use of *Eragrostis teff* as a grass for rehabilitation purposes (Vol.2, Table 3). Tef should not be used for rehabilitation because it is not an indigenous grass species, even though it has become naturalized in large areas of the country. The grass originates from Ethiopia. The good locally indigenous grass recommended to use in place of tef, with very similar conditions, is *Eragrostis curvula*.

An independent aquatic monitoring process by a specialist is required as part of the project. This monitoring must commence just prior to commencement of the project itself. This necessary process is not highlighted in the report.

9 APPENDICES

9.1 Summary of Marikana Thornveld

The study area is situated within the original extent of Marikana Thornveld. Below is a summary of Marikana Thornveld (Mucina & Rutherford, 2006, 2010).

Marikana Thornveld is also known as:

- VT 19 Sourish Mixed Bushveld (VT 19) (Acocks, 1953).
- Other Turf Thornveld (VT 13) (Acocks, 1953).
- Clay Thorn Bushveld (LR 14) (Low & Rebelo 1996).

Distribution: North-West and Gauteng Provinces. Occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the east. Approximate altitude at about 1 050 to 1 450 m.

Vegetation & Landscape Features: Open *Acacia karroo* woodland, occurring in valleys; slightly undulating plains; and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops and in other habitats protected from fire.

Conservation: Less than 1% statutorily conserved. Found in the Magaliesberg Nature Area and De Onderstepoort Nature Reserve. Considerably impacted on already, with about 48% transformed, mainly cultivated and urban or built-up areas. Most agricultural development of this vegetation unit is in the western regions towards Rustenburg; while in the east (near Pretoria) industrial development and urban sprawl are greater threats of land transformation. Erosion is very low to moderate. Alien invasive plants occur localised in high densities, especially along the drainage lines.

Geology & Soils: Most of the area is underlain by the mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite, pyroxenite and anorthosite. The shales and quartzites of the Pretoria Group (Transvaal Supergroup) also contribute. Mainly vertic melanic clays with some dystrophic or mesotrophic plinthic catenas and some freely drained, deep soils. Land types mainly Ea, Ba and Ae.

9.2 List of floral species

Below is a list of dominant floral species found in Marikana Thornveld, according to Mucina & Rutherford (2006).

Tall Trees: Acacia burkei.

Small Trees: Acacia caffra (d), A. gerrardii (d), A. karroo (d), Combretum molle (d), Searsia lancea (d), Ziziphus mucronata (d), Acacia nilotica, A. tortilis subsp. heteracantha, Celtis africana, Dombeya rotundifolia, Pappia capensis, Peltophorum africanum, Terminalia sericea.

Tall Shrubs: Euclea crispa subsp. crispa (d), Olea europaea subsp. africana (d), Rhus pyroides var. pyroides (d), Diospyros lycioides subsp. guerkei, Ehretia rigida subsp. rigida, Euclea undulata, Grewia flava, Pavetta gardeniifolia.

Low Shrubs: Asparagus cooperi (d), Rhynchosia nitens (d), Indigofera zeyheri, Justicia flava.

Woody Climbers: Clematis brachiata (d), Helinus integrifolius.

Herbaceous Climbers: Pentarrhinum insipidum (d), Cyphostemma cirrhosum.

Graminoids: Elionurus muticus (d), Eragrostis lehmanniana (d), Setaria sphacelata (d), Themeda triandra (d), Aristida scabrivalvis subsp. scabrivalvis, Fingerhuthia africana, Heteropogon contortus, Hyperthelia dissoluta, Melinis nerviglumis, Pogonarthria squarrosa.

Herbs: Hermannia depressa (d), Ipomoea obscura (d), Barleria macrostegia, Dianthus mooiensis subsp. mooiensis, Ipomoea oblongata, Vernonia oligocephala.

Geophytic Herbs: Ledebouria revoluta, Ornithogalum tenuifolium, Sansevieria aethiopica.

(d) = Dominant.

Acacia is also known as *Vachellia*.

9.3 Photographs



Photo 1: Montanaspruit (Stream)



Photo 2: Built up suburbs and gardens along Montanaspruit



Photo 3: Stream showing dense grasses and rushes along the banks and in the riparian zone



Photo 4: Low level bridge and road crossing over stream (Tsamma St)



Photo 5: Dense rushes in steam and floodplain. Also notice alien invasive weeds (morning glory and zinnia)

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11 DECLARATION

DECLARATION OF INDEPENDENCE

I, **Johannes Oren Maree** , do hereby declare that I :

- Act as an independent ecologist, wetland specialist and environmental specialist in compiling this report;
- Do not have any financial interests, or stand to gain in any way whatsoever in the undertaking of this activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- Do not have, nor will have, any vested interest in the proposed activity proceeding;
- Have no, neither will engage in, conflicting interests in the undertaking of this 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 Environmental Impact Assessment Regulations, 2014; and
- Will provide the competent authority with access to all information at my disposal regarding the investigations, studies and application, whether such information is favourable to the applicant or not.

The South African Council for Natural Scientific Profession (SACNASP) certifies that in terms of Section 20(3)(a) of the Natural Scientific Professions Act, 2003 (Act 27 of 2003), that Mr. J.O. Maree is registered as a Professional Natural Scientist.

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DATE: __15 July 2019 __