WATER USE AUTHORIZATION APPLICATION
RISK MATRIX

PREPARED FOR:
Langeberg Municipality

PROPOSED BOEKENHOUTSKLOOF BONNIEVALE INFORMAL SETTLEMENT UPGRADE, UPGRADE OF ACCESS ROAD BY CONSTRUCTING A CULVERT BRIDGE OVER THE NON-PERENNIAL RIVER AND WATER AND SEWERAGE PIPELINE CONNECTIONS TO MUNICIPAL SERVICES.

OCTOBER 2018

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This Risk Matrix was requested by Breede Gouritz Catchment Management Agency (BGCMA) for the Water Use Authorization Application for the development of the infrastructure proposed within the regulated zone of the non-perennial river. This risk Matrix assists DWS to determine whether the proposed development triggers a Water Use License Authorization (WULA) or Water Use General Authorisation (WUGA). The risk assessment is based on the Department of Water and Sanitation 2015 publication: Section 21c and i water use Risk Assessment Protocol in Government Gazette no. 40229 dated 26 August 2016.

This Risk Matrix must be read in conjunction with the Freshwater and Terrestrial Ecosystem Impact Assessment dated October 2018 as conducted by Mr. Nicolaas Hanekom of Eco Impact.

Langeberg Municipality proposes the development of approximately 438 Residential Zone I erven, 4 Government and Municipal Zoned erven, 3 Open Space erven and Roads. Sewage will be removed by means of a waterborne gravity sewer network connected to the existing municipal network via a proposed sewer pump station, south east of the development. The gravity sewer network will consist of 160mm diameter uPVC sewer pipes and 1,0m diameter concrete sewer manholes. The estimated length of the network is 2 580m and approximately 45 manholes will be constructed. The development will be supplied with potable water from the existing Municipal water treatment works by means of a new 200mm ND UPVC pipeline (total estimated length 1 300m). The storm water will be directed in the roads reserves by means of the road geometry, kerbs and storm water pipes through-out the development where it will be discharged in a controlled manner into the existing water course. To achieve the above, concrete storm water pipes ranging from 375mm to 525mm in diameter (total estimated length = 580m) with associated catch pits and junction boxes will need to be installed. The southern ravine will need to be crossed to access the development. An anticipated culvert size of approximately 4 x 3,0m x 1,8m will need to be installed for the crossing of the ravine to accommodate the 1:100 year flood.

Based on the impact assessment it is evident that there are six possible impacts on the freshwater ecology of the area observed. In considering the impacts and mitigation, it is assumed that a high level of mitigation will take place without high prohibitive costs. From the table it is evident that prior to mitigation, the impacts on the loss of freshwater ecology habitat, disturbance to subsurface geological layers, degradation / loss of naturally occurring / indigenous flora and habitats are medium level impacts, which can be mitigated and will be reduced to low level impacts. The other tree impacts identified all has low impacts that is reduce to very low with the proposed mitigation measures.

Habitat Assessment

From the results of the application of the IHIA to the impacted site, it is evident that the rivers reach is modified and that the loss of natural habitat, biota and basic ecosystem functions is extensive. Instream impacts included a large impact from flow modifications, inundation as

well as bed and channel modifications. Overall, the site achieved a 67.6 % score for instream integrity.

Riparian impacts included a some impact from flow modifications, as well as bed and channel modifications. Overall, the site achieved a 75.2 % score for instream integrity.

The site obtained an overall IHIA rating of 71. 4%, which indicates the loss of natural habitat, biota and basic ecosystem functions is moderate. (Class C conditions).

Riparian Vegetation Response Assessment Index (VEGRAI)

The score attained for the VEGRAI indicated that the riparian system falls into the category C. This indicates that the loss of natural habitat, biota and basic ecosystem functions is moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.

Ecological Importance and Sensitivity (EIS)

EIS considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated according to a four-point scale. The median of the resultant score is calculated to derive the EIS category.

The non-perennial river is considered to be of high ecological importance.

This assessment concluded that the proposed development can be authorized provided that the mitigation measures are included in the Environmental Management Programme, monitored by an Environmental Control Officer and adhered to. The ESA will be maintained in a functional, near-natural state if the mitigation measures are adhered to. Some habitat loss will occur which is acceptable. The underlying biodiversity objectives and ecological functioning will not be compromised. The terrestrial ecology loss is limited and of low significant as a result of the proposed location inside the informal gravel tract and the sections of vegetation to be disturbed is limited and outside any CBA or ESA area.

The CBA will be maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas will be rehabilitated.

Risk Assessment Matrix - Total Severity Score with Mitigation

					Severity				
No	**Phases**	**Activity**	**Aspect**	**Impact**	**Flow Regime**	**Physico &Chemical (Water Quality)**	**Habitat (Geomorph + Vegetation**	**Biota**	**Total Severity Score**
1	Construction phase	Construction of the proposed infrastructure through and within 100m of the non-perennial river	Site clearance and construction of proposed infrastructure will impact on the non-perennial river.	***Riparian zone*** Earthworks in the vicinity of drainage systems leading to increased runoff and erosion and altered runoff patterns. Construction of the infrastructure altering stream flow patterns and water velocities. Alien invasive vegetation encroachment. Erosion and incision of riparian zone.	1- No water was flowing during time of site visit. From the relatively dense growth of shrubs within the floodplain, it is evident that the floodplain does not get inundated frequently.	1- The water quantity is affected by the on site, upstream and downstream impacts on the non-perennial river.	1- None. Informal road surface. *Vachellia karoo* is common and the dominant species in the river channel and valleys. The floodplain area is dominated by *Galenia africana*. .	1- None. Informal road surface. *Vachellia karoo* is common and the dominant species in the river channel and valleys. The floodplain area is dominated by *Galenia africana*. .	1

				Instream zone Loss of aquatic refugia. Altered substrate conditions due to the deposition of silt Altered depth and flow regimes in the major drainage systems Alien vegetation proliferation						
2	Operational Phase	Operation of the proposed infrastructure through and within 100m of the non-perennial river	Maintenance of proposed infrastructure will impact on the non-perennial river.	***Riparian zone*** Earthworks in the vicinity of drainage systems leading to increased runoff and erosion and altered runoff patterns. Construction of the infrastructure altering stream flow patterns and	1- No water was flowing during time of site visit. From the relatively dense growth of shrubs within the floodplain, it is evident that the floodplain does not get inundated frequently.		1- The water quantity is affected by the on site, upstream and downstream impacts on the non-perennial river.		1- None. Informal road surface. *Vachellia karoo* is common and the dominant species in the river channel and valleys. The floodplain area is dominated by *Galenia africana*.		1- None. Informal road surface. *Vachellia karoo* is common and the dominant species in the river channel and valleys. The floodplain area is dominated by *Galenia africana*.		1

				water velocities. Alien invasive vegetation encroachment. Erosion and incision of riparian zone. ***Instream zone*** Loss of aquatic refugia. Altered substrate conditions due to the deposition of silt Altered depth and flow regimes in the major drainage systems Alien vegetation proliferation				.		.		

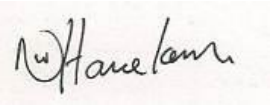
Risk Assessment Matrix – Final Risk Rating

No.	Severity	Spatial scale	Duration		Consequence		Frequency of activity	Frequency of impact	Legal issues	Detection		Likelihood	Significance	Risk Rating
1	1	1	1		3		1	3	5	2		11	33	Low
2	1	1	4		6		5	3	5	2		15	90	Moderate

Risk Assessment Matrix – Confidence Level and Proposed Post Control/Mitigation Measures

No.	Risk Rating	Confidence level	Control measures	Borderline LOW – MODERATE Rating Classes	PES and EIS of Watercourses
1-2	21-66 Low – Moderate	90%	Refer to Freshwater and Terrestrial Ecosystem Impact Assessment Report (Eco Impact, October 2018) which lists all the proposed mitigation measures to be implemented during the construction and operational phases of the proposed activity.	After considering both the construction and operational phases of the activity, the potential impacts/risks of the activity to the resource quality post mitigation measures, the sensitivity (EIS) and status (PES) of the watercourse receptor and the mitigation measure to be implemented we recommend that the risk rating stay unchanged at moderate.	Refer to Freshwater and Terrestrial Ecosystem Impact Assessment Report (Eco Impact, October 2018). The PES and EIS will however not be altered or affected as a result of the infrastructure construction and operations.

Recommendations in Terms of Water Use Application Requirements
The overall risk rating of potential Impacts on the applicable non-perennial drainage line after mitigation is rated as low and moderate negative. A sewer pipeline is proposed to cross and is located within 100m of the non-perennial river and therefore the WUA must be a license.



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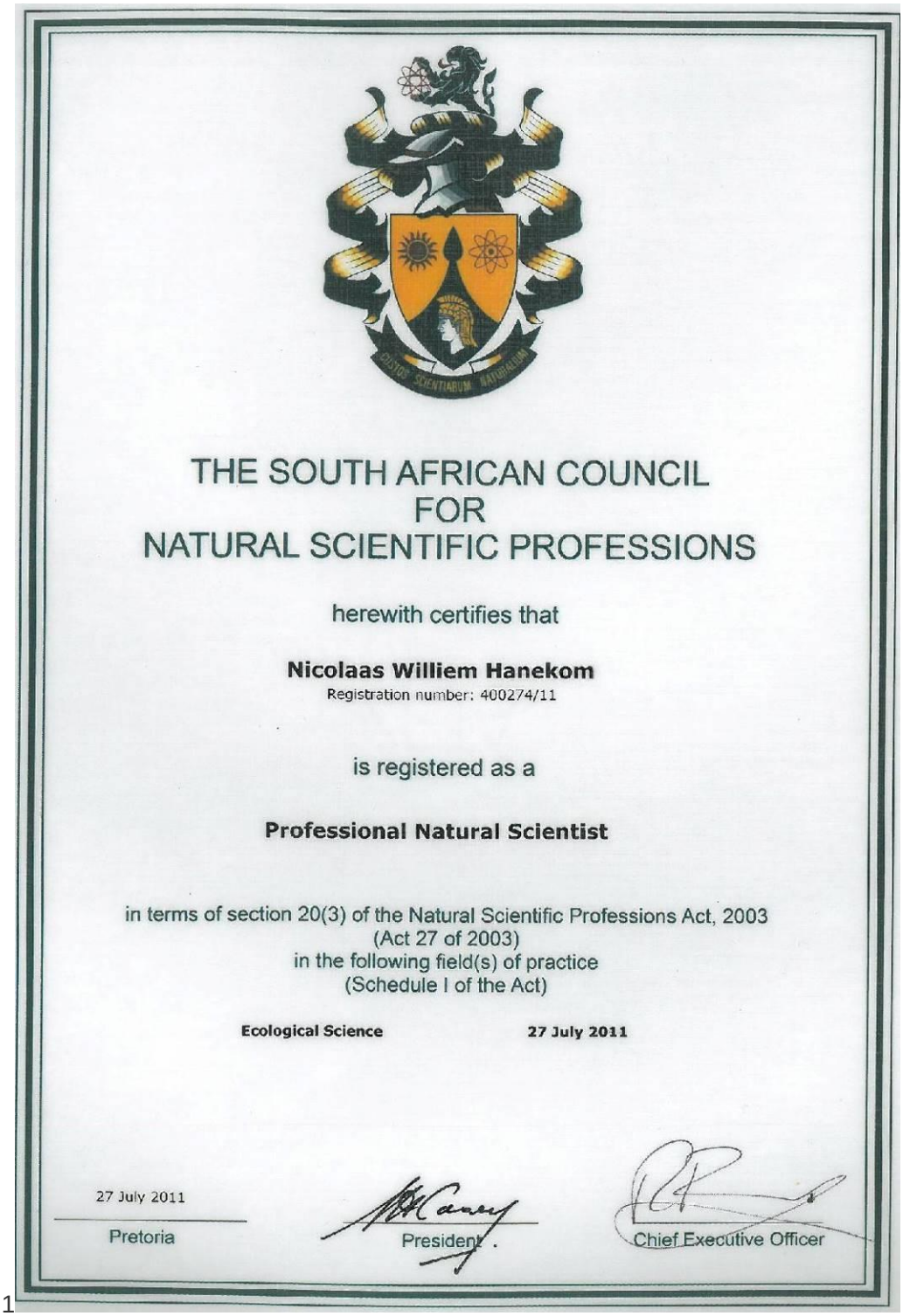

THE SOUTH AFRICAN COUNCIL
FOR
NATURAL SCIENTIFIC PROFESSIONS

herewith certifies that

Nicolaas Williem Hanekom
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is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice
(Schedule I of the Act)

Ecological Science **27 July 2011**

27 July 2011
Pretoria

President

Chief Executive Officer

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RISK ASSESSMENT KEY **(Referenced from DWD 2015 publication: Section 21 c and i water use Risk Assessment Protocol)**

Negative Rating

TABLE 1- SEVERITY How severe does the aspects impact on the environment and resource quality characteristics (flow regime, water quality, geomorphology, biota, habitat)?	
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Total severity score calculation – (Flow Regime) + (Physico&Chemical) + (Habitat) + (Biota) =? x 25 = ?/100 = Total Severity Score	
Where "or wetland(s) are involved" it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significant rating	

TABLE 2 – SPATIAL SCALE How big is the area that the aspect is impacting on?	
Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond seconday catchment or provinces)	4
Global (impacting beyond SA boundary)	5

TABLE 3 – DURATION How long does the aspect impact on the environment and resource quality?	
One day to one month, PES, EIS and/or REC not impacted	1
One month to one year, PES, EIS and/or REC impacted but no change in status	2
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and/or REC permanently lowered	4
More than life of the organisation/facility, PES and EIS scores, a E or F	5

TABLE 4 – FREQUENCY OF THE ACTIVITY How often do you do the specific activity?	
Annually or less	1
6 monthly	2
Monthly	3

Weekly	4
Daily	5

TABLE 5 – FREQUENCY OF THE INCIDENT/IMPACT How often does the activity impact on the environment?	
Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 6 – LEGAL ISSUES How is the activity governed by legislation?	
No legislation	1
Fully covered by legislation (wetlands are legally governed)	5
Located within the regulated areas	

TABLE 7 – DETECTION How quickly can the impacts/risks of the activity be observed on the environment (water resource quality characteristics), people and property?	
Immediately	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

TABLE 8: RATING CLASSES		
RATING	**CLASS**	**MANAGEMENT DESCRIPTION**
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.

170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

A low risk class must be obtained for all activities to be considered for a GA

TABLE 9: CALCULATIONS
Consequence = Severity + Spatial Scale + Duration
Likelihood=Frequency of Activity + Frequency of Incident +Legal Issues + Detection
Significance \ Risk= Consequence X Likelihood