SITE SENSITIVITY VERIFICATION & AQUATIC COMPLIANCE STATEMENT

PROPOSED CONSTRUCTION OF 132 KV POWERLINES BETWEEN THE AUTHORISED LOERIESFONTEIN 3 PV SOLAR ENERGY FACILITY (12/12/20/2321/2/AM4) AND THE AUTHORISED DWARSRUG WIND ENERGY FACILITY (14/12/16/3/3/2/690/AM4), AND FROM THE DWARSRUG WIND ENERGY FACILITY TO THE AUTHORISED NAROSIES SUBSTATION (12/12/20/2049/3), LOCATED NEAR LOERIESFONTEIN IN THE HANTAM LOCAL MUNICIPALITY, NAMAKWA DISTRICT IN THE NORTHERN CAPE PROVINCE OF SOUTH AFRICA

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EXECUTIVE SUMMARY

Objective

The development is located near Loeriesfontein in the Hantam Local Municipality, Namakwa District in the Northern Cape Province of South Africa. The objective is to assess the impacts associated with the proposed construction of 132 kV overhead powerlines between the proposed (and authorised) 100MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) (12/12/20/2321/2/AM4) and proposed (and authorised) 140MW Dwarsrug Wind Energy Facility (WEF) (14/12/16/3/3/2/690/AM4); and between the Dwarsrug WEF and the proposed (and authorised) Narosies Substation (12/12/20/2049/3) located near Loeriesfontein in the Northern Cape Province of South Africa.

Key Findings

Through the impact assessment, the risks identified during construction have the highest impact although it would still be considered to be of low risk. The construction and operation phase associated impacts of the access roads, WEF, PV modules, substation, maintenance building and power lines have already been approved by the respective authorities. Therefore, the addition of the power line to the existing proposed development will have a minimal impact as it falls within the original developable area. The location of the proposed power line has been strategically placed to cross the least watercourses and follow existing servitudes.

Recommendation

The proposed 132 kV power lines location have taken cognisance of alternative locations and "no go" areas and option 1 is deemed to be the best possible location to link Dwarsrug WEF to Loeriesfontein 3 PV. In this area, given the low water use requirement on-site and adherence to specialist recommendations, the site is of low risk of negative aquatic impacts during construction and operation.

Option 3 is132 kV power line location is deemed to be the best possible location to link Dwarsrug WEF Narosies Substation.

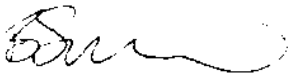
The previously approved specialist reports and the subsequent environmental authorisation (EA) are still relevant and these studies covered the proposed power line footprint. NatureStamp strongly confirms that the aquatic impacts associated with the power line would be minimal and acceptable and hence the EA should be granted to include the power line.

Specialist Details & Declaration

This report has been prepared in accordance with Section 13: General Requirements for Environmental Assessment Practitioners (EAPs) and Specialists as well as per Appendix 6 of GNR 982 – Environmental Impact Assessment Regulations and the National Environmental Management Act (NEMA, No. 107 of 1998 as amended 2017) and Government Notice 704 (GN 704). It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1 Details of Specialist

Specialist	Task	Qualification and accreditation	Client	Signature
Bruce Scott-Shaw NatureStamp SACNASP:118673	Design, GIS & report	BSc, BSc Hon, MSc, PhD Hydrology	SiVest	 Date: 05/12/2020

Details of Authors:

Bruce is a hydrologist, whose focus is broadly on hydrological perspectives of land use management and climate change. He completed his MSc under Prof. Roland Schulze in the School of Bioresources Engineering and Environmental Hydrology (BEEH) at the University of KwaZulu-Natal, South Africa. Throughout his university career he has mastered numerous models and tools relating to hydrology, soil science and GIS. Some of these include ACRU, SWAT, ArcMap, Idrisi, SEBAL, MatLab and Loggernet. He has some basic programming skills on the Java and CR Basic platforms. Bruce completed his PhD at the Center for Water Resources Research (UKZN), which focused on rehabilitation of alien invaded riparian zones and catchments using indigenous trees. Bruce is currently affiliated to the University of KwaZulu-Natal where he is a post-doctoral student where he runs and calibrates hydrological and soil erosion models. Bruce has presented his research around the world, including the European Science Foundation (Amsterdam, 2010), COP17 (Durban, 2011), World Water Forum (Marseille, 2012), MatLab advanced modelling (Luxembourg, 2013), World Water Week (Singapore, 2014), Forests & Water, British Colombia, (Canada, 2015), World Forestry Congress (Durban, 2015), Society for Ecological Restoration (Brazil, 2017). Conservation Symposium (Howick, South Africa, 2018) and SWAT modelling in Siem Reap (Cambodia, 2019). As a consultant, Bruce is the director and principal hydrologist of NatureStamp (PTY) Ltd. In this capacity he undertakes flood studies, calculates hydrological flows, performs general hydrological modelling, stormwater design, dam designs, wetland assessments, water quality assessments, groundwater studies and soil surveys.

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1. INTRODUCTION

1.1 Project Background and Description of the Activity

South Africa Mainstream Renewable Power Developments (Pty) Ltd (herein after referred to as "Mainstream") appointed SiVEST to undertake a Basic Assessment (BA) Process for the proposed construction of 132 kV overhead powerlines between the proposed (and authorised) 100MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) (12/12/20/2321/2/AM4) and proposed (and authorised) 140MW Dwarsrug Wind Energy Facility (WEF) (14/12/16/3/3/2/690/AM4); and between the Dwarsrug WEF and the proposed (and authorised) Narosies Substation (12/12/20/2049/3) located near Loeriesfontein in the Northern Cape Province of South Africa.

Mainstream are proposing the construction of a 132 kV overhead powerlines between the proposed (and authorised) 100 MW Loeriesfontein 3 PV SEF (12/12/20/2321/2/AM4) and proposed (and authorised) 140 MW Dwarsrug WEF (14/12/16/3/3/2/690/AM4); and between the Dwarsrug WEF and the proposed (and authorised) Narosies Substation (12/12/20/2049/3). The powerline from the Loeriesfontein 3 PV SEF to the Dwarsrug WEF is proposed to link the SEF to the WEF in order to create a hybrid renewable energy facility, which will ensure that electricity is constantly supplied to the national grid by at least one or both technologies (namely solar PV and wind), at any given time. The powerline from the Dwarsrug WEF is proposed to tie the, above mentioned, hybrid renewable energy facility into the approved Narosies substation to feed the National grid.

A site sensitivity verification has been undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool). The purpose of this report/statement is to verify the site sensitivity as identified by the screening tool and compile a statement confirming the identified impacts and any changes with the revised layout.

Figure 1 The Loeriesfontein site prior to the Energy Facility

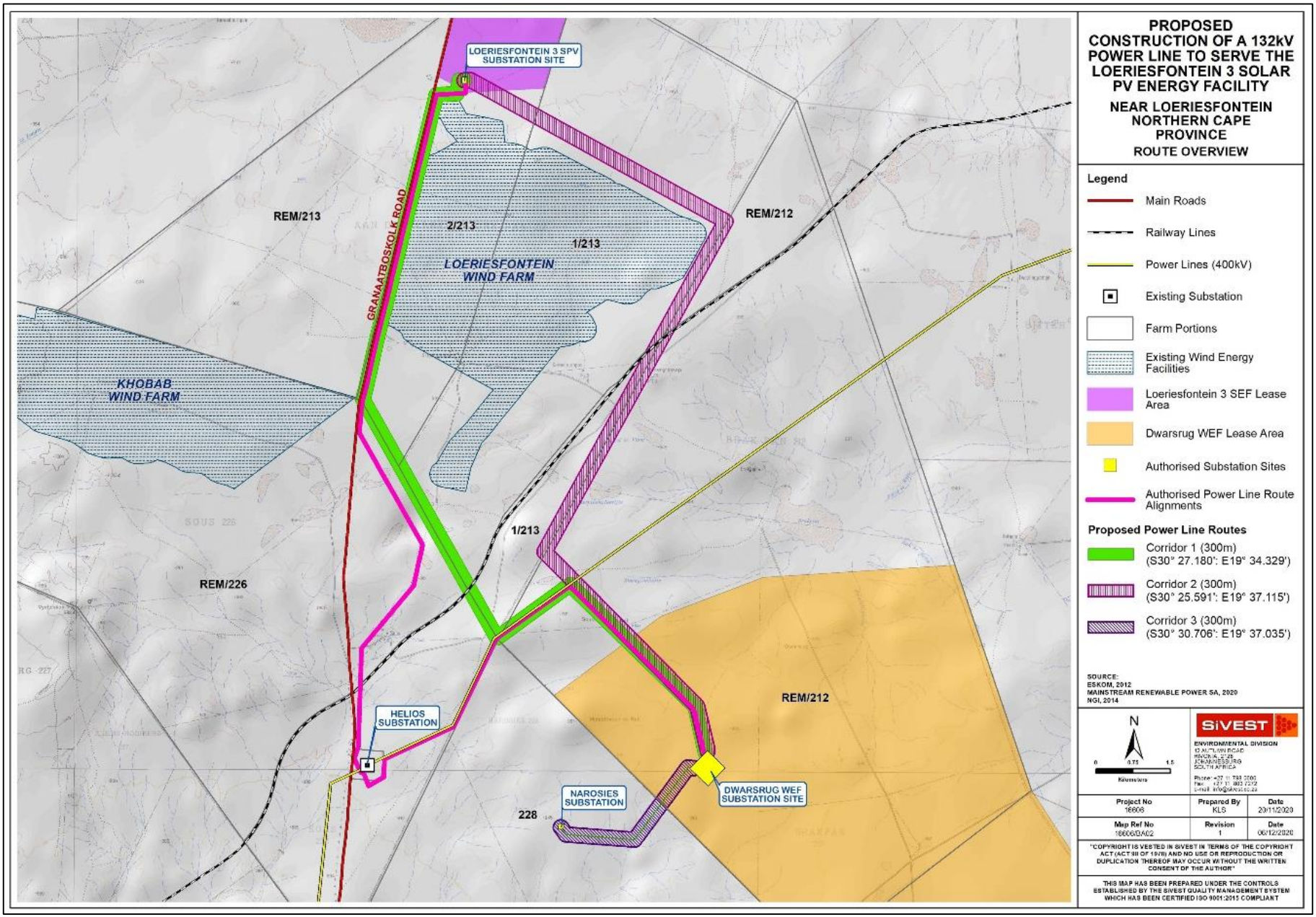

Figure 2 The layout of the proposed 132 kV power line

1.2 Scope and Objectives

Assess the aquatic impacts associated with the construction and operation of 132 kV overhead powerlines between the proposed (and authorised) 100MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) (12/12/20/2321/2/AM4) and proposed (and authorised) 140MW Dwarsrug Wind Energy Facility (WEF) (14/12/16/3/3/2/690/AM4); and between the Dwarsrug WEF and the proposed (and authorised) Narosies Substation (12/12/20/2049/3).

1.3 Terms of Reference

The terms of reference for the assessment consist of the Site Verification Report and a specialist study/compliance statement as per Government Notice 320 of 20 March 2020. The proposed development area is considered to have a very high sensitivity for the aquatic biodiversity theme. The Terms of Reference (ToR) applicable to this specialist study are:

- The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
- The site sensitivity verification must be undertaken through the use of:
    - A desk top analysis, using satellite imagery;
    - A preliminary on-site inspection; and
    - Any other available and relevant information.
- The outcome of the site sensitivity verification must be recorded in the form of a report that:
    - Confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.;
    - Contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and
    - Is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations (EIA Regulations).
- It is further important that the compliance statement must:
    - Be applicable to the preferred site and the proposed development footprint;
    - Confirm that the site is of "medium" sensitivity for plant species biodiversity; and
    - Indicate whether or not the proposed development will have an impact on the plant species diversity.
- The compliance statement must contain, as a minimum, the following information:
    - Contact details of the specialist, their SACNASP registration number, their field of expertise and a *curriculum vitae*;
    - A signed statement of independence by the specialist;
    - A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
    - A baseline profile description of biodiversity and ecosystems of the site;
    - The methodology used to verify the sensitivities of the plant biodiversity features on the site including the equipment and modelling used where relevant;
    - In the case of a linear activity, confirmation from the plant biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;
    - Where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;
    - A description of the assumptions made as well as any uncertainties or gaps in knowledge or data; and
    - Any conditions to which this statement is subjected.

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

1.4 Identified Theme Sensitivities

The site sensitivity as identified by the National Web-Based Environmental Screening Tool Shows that the aquatic biodiversity them is of **very high sensitivity**.

Table 2 Site sensitivity themes for Dwarsrug-Loeriesfontein amendment

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Agriculture Theme			X	
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archeological and Cultural Heritage Theme		X		
Civil Aviation Theme		X		
Defense Theme				X
Paleontology Theme	X			
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

2. METHODOLOGY

A detailed description of the methods has been provided. The regional context and desktop analysis were used as the point of departure. A detailed site visit was undertaken by SiVest in 2012 and 2015, prior to the approval of the solar and wind energy facility. Much of this information was used to confirm the sensitivity of this site.

The verification assessment of these systems considered the following databases where relevant:

Table 3 Data type and source for the site verification assessment

Data Type	Year	Source/Reference
Aerial Imagery	2013, 2016, present	Surveyor General
1:50 000 Topographical	2011	Surveyor General
5m Contour	2010	Surveyor General
River Shapefile	2011	NFEPA
Geology Shapefile	2011	Council of Geoscience, 2015/National Groundwater Archive
Borehole Data	Ongoing	National Groundwater Archive, WARMS
Land Cover	2006/present	SANBI
Water Registration	2013, 2016	WARMS - DWS
Previous Assessments	2015	SiVest

*Data will be provided on request

The following methods were used to undertake the site verification:

- General area desktop site inspection;
- Site photographs from previous studies;
- Satellite imagery (Google Earth/Landsat);
- Review of existing approvals/authorisations for the site.

The following methods were used to undertake the compliance statement:

- Assessment of alternative sites and "no go" areas;
- summarize previous assessment and identify any areas not covered by this assessment;
- revision of impacts as per the additional power line; and
- Final recommendations and compliance statement.

The alternatives that were investigated considered the classes or keys as indicated in Table 4.

Table 4 Alternative class table

PREFERRED	The alternative will result in a low impact / reduce the impact / result in a positive impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

The aim of the impact assessment is to identify the impacts that the proposed activity, including the construction and operational phase, will have on the receiving environment. If avoidance is not possible, mitigation is required in the form of practical actions (Ramsar Convention, 2008). Mitigation actions can be grouped into the following:

i. **Pre-construction:** This may take the form of changes in the scale of the development (e.g. reduce the size of the development), location of development (e.g. find an alternative area with less impact), and design (e.g. change the structural design to accommodate flows and continuity).
ii. **Construction:** This may take the form of a process change (e.g. changes in construction methods), siting (e.g. locality to sensitive areas), sequencing and phasing (e.g. construction during seasonal periods).
iii. **Operational:** This may take the form of changes in post management (e.g. change management to match unpredicted impacts), monitoring (e.g. frequent checks by an ECO), rehabilitation (e.g. if mitigation actions are not effective).

An impact rating table is derived through the population of the following parameters, pre- and post-mitigation measures:

- Extent - The area over which the impact will be expressed
- Probability - The chance of occurrence of an impact
- Reversibility - The degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity
- Irreplaceable loss of resources - The degree to which resources will be irreplaceably lost as a result of a proposed activity
- Duration - The lifetime of the impact as a result of the proposed activity
- Intensity/Magnitude - A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily
- Significance Rating - A brief description of the importance of an impact which in turn dictates the level of mitigation required (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity).

3. LIMITATIONS AND ASSUMPTIONS

In order to apply generalized and often rigid scientific methods or techniques to natural, dynamic environments, a number of assumptions are made. Furthermore, a number of limitations exist when assessing such complex ecological systems. The following constraints may have affected this assessment –

- As an extensive site visit has already been undertaken by SiVest, an additional site visit was not required.
- The impacts for the site are specific to the 132 kV power line.
- The databases used may not, at times, be recent as is the nature of these databases.
- This statement assumes that the work undertaken by SiVest (2012 & 2015) is unbiased and the methods adopted appropriately followed.

4. TECHNICAL DESCRIPTION

4.1 Project Location

The proposed power line is located on the authorised Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) (14/12/16/3/3/2/690) and the authorized Dwarsrug Wind Energy Facility (WEF) (14/12/16/3/3/2/690/AM4) near Loeriesfontein in the Hantam Local Municipality, Namakwa District in the Northern Cape Province of South Africa.

4.2 Site Description

The Loeriesfontein/Dwarsrug study site is situated within the Hantam Local Municipality in the greater Namakwa District Municipality, Northern Cape Province. The town of Loeriesfontein is within a basin surrounded by mountains, and it is accessed from the N7 highway (north out of Cape Town), turning off on the R27 at Van Rhynsdorp to Nieuwoudtville, then following the R357 to Loeriesfontein (a further 65 km north). The site can be accessed via a secondary road (Granaatboskolk Rd) from Loeriesfontein Town and a railway line from Cape Town. The study site is approximately 49 km north of the town of Loeriesfontein. The study area is located in the greater Nama Karroo Biome but is more specifically located within the Bushmanland Basin Shrubland bioregion.

The vegetation units are classified which contain a set of general but more local biophysical characteristics as opposed to the entire bioregion. The proposed development is found within the Bushmanland Basin Shrubland, the Bushmanland Vloere and the Hantam Karoo vegetation units, respectively.

The climate of the bioregion depicts a rainfall pattern occurring in late summer and early autumn with the Mean Annual Precipitation (MAP) ranging from about 100-200mm. The Mean maximum and minimum monthly temperatures in Brandvlei are 39.5° C and -4.6° C respectively.

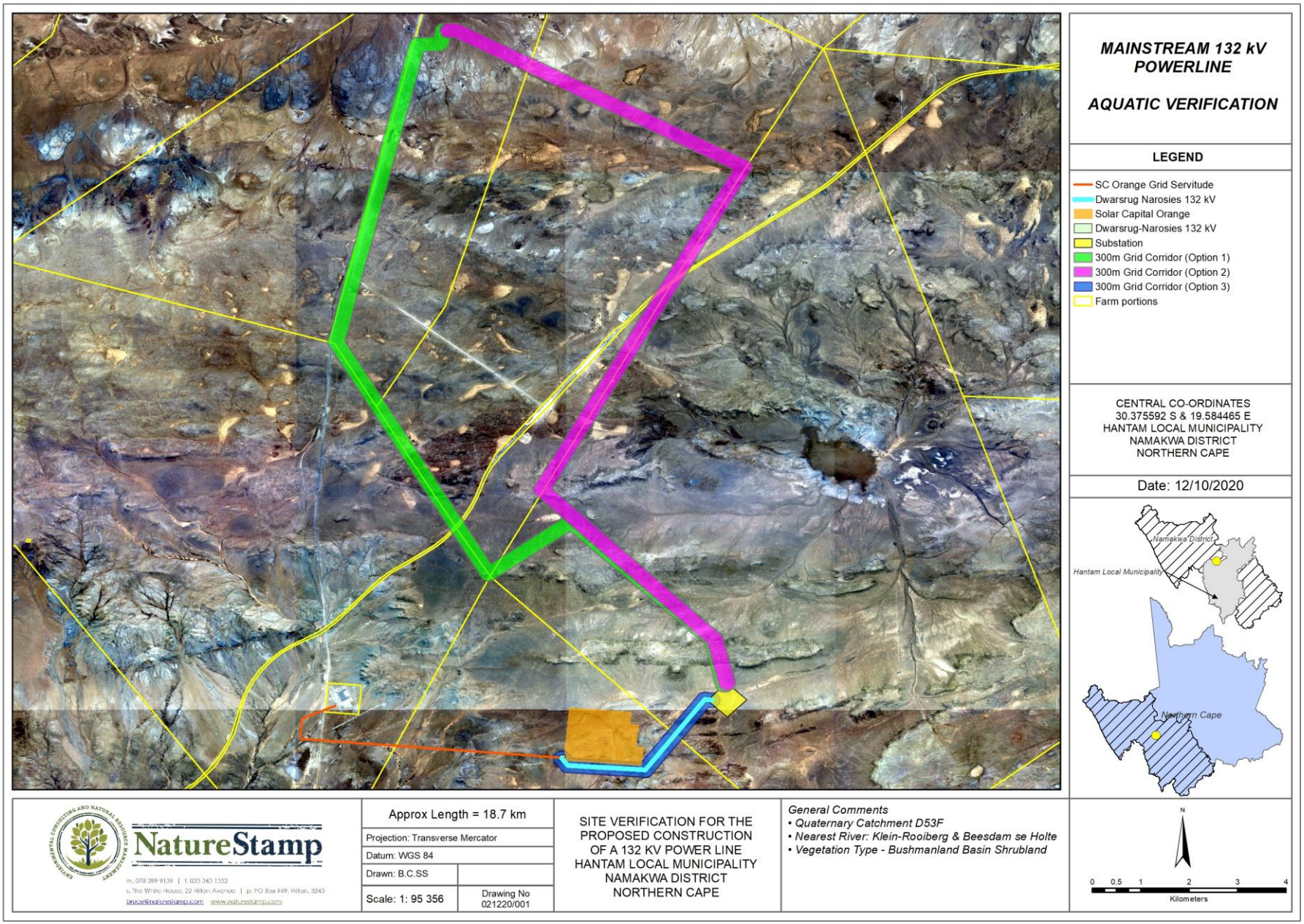

Figure 3 Locality map of the proposed 132 kV power lines

4.3 Location Alternatives

Two (2) power line alternatives were assessed that link the Loeriesfontein 3 PV SEF to the Dwarsrug WEF. A single power line is proposed to link these two (2) facilities to the National grid from the Dwarsrug WEF. All three (3) power line route alignments were assessed within a 300m wide assessment corridor (150m on either side of power line). The power line alternatives assessed are shown in Figure 4. The chosen alternative would be refined to avoid identified environmental sensitivities.

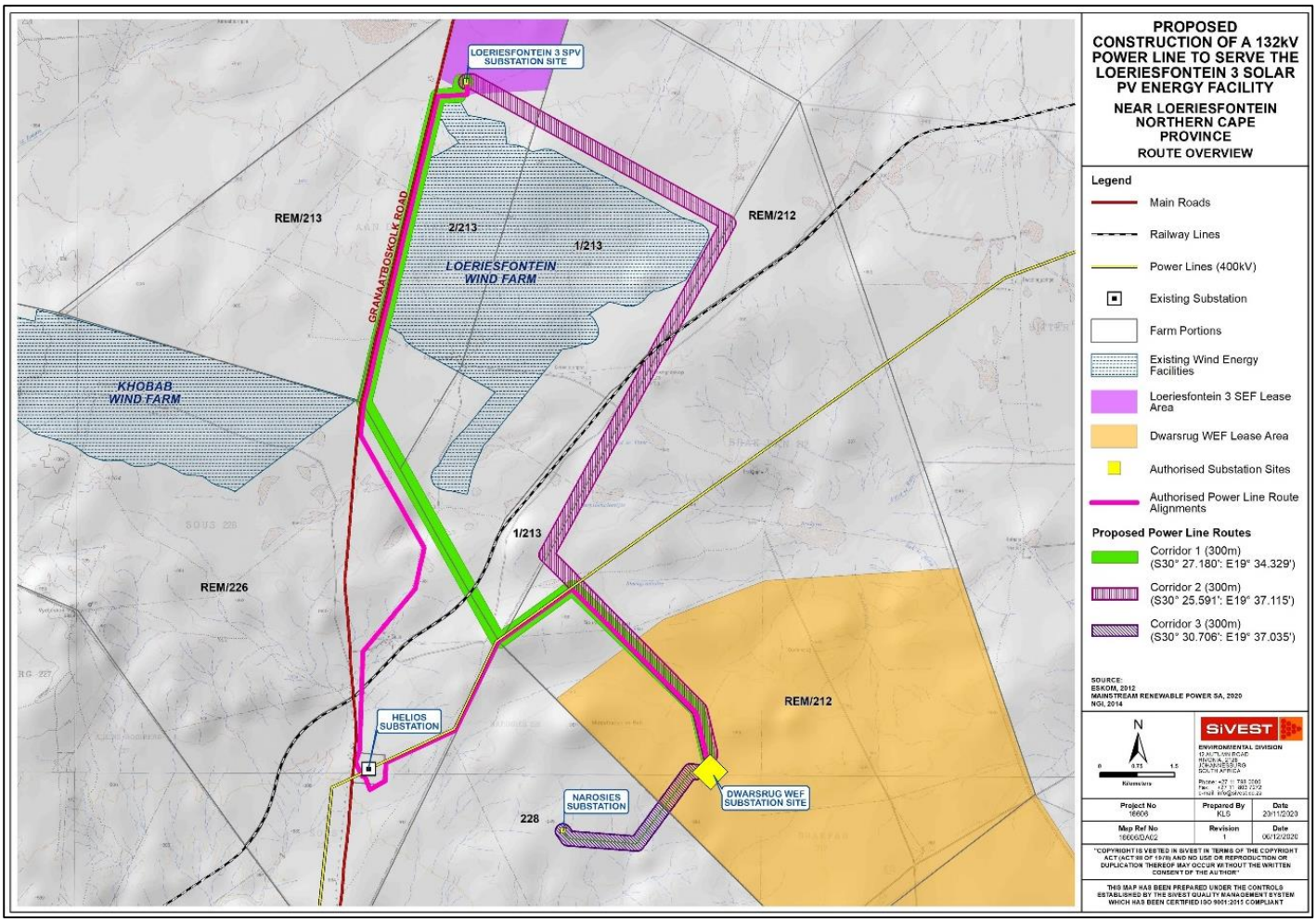

Figure 4 Proposed power line alternative options within 300 m corridors

4.4 'No-Go' Alternatives

The 'no-go' alternative is the option of not constructing the power line project, which would prevent the realization of the hybrid facility and thus prevent electricity generated from renewable sources being fed into the national grid. This alternative would result in no additional environmental impact other than that assessed during the BA for the Renewable Energy (RE) facilities. The 'no-go' option is a feasible option; however, this would prevent the hybrid facility from contributing to the environmental, social and economic benefits associated with the development of the renewables sector.

5. LEGAL REQUIREMENTS AND GUIDELINES

In terms of the Environmental Impact Assessment (EIA) Regulations, which were published on 04 December 2014 and amended on 07 April 2017 [promulgated in Government Gazette 40772 and Government Notice (GN) R326, R327, R325 and R324 on 7 April 2017], various aspects of the proposed development are considered listed activities under GNR 327 and GNR 324 which may have an impact on the environment and therefore require authorisation from the National Competent Authority (CA), namely the Department of Environment, Forestry and Fisheries (DEFF), prior to the commencement of such activities.

6. SITE SENSITIVITY VERIFICATION

The site verification aims to confirm or dispute the **very high sensitivity** identified by the screening tool. This is done through a desktop investigation using more recent databases and aerial/remote imaging and data obtained from previous site visits.

6.1 Preferred Site Location

An extensive investigation has been undertaken at the site for the three alternative routes. The land cover is uniform throughout the site. As per the delineation undertaken by SiVEST, the alternatives do cross some drainage lines. However, any route that is chosen would unavoidably cross these systems. The key question is where the pylons positions would be situated. The preferred site should follow existing roads and avoid watercourse areas where possible.

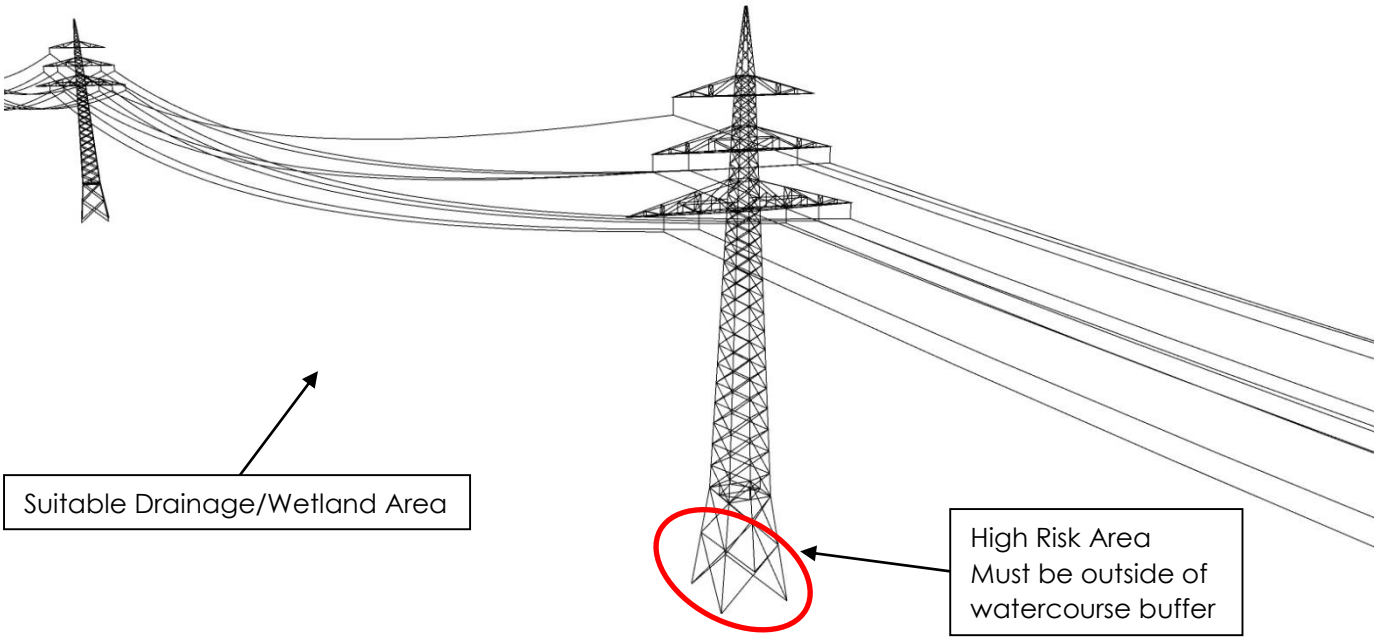

Figure 5 Generic power line and pylons

Through a detailed investigation, option/corridor 1 and option/corridor 3 was identified as the preferred options:

- These routes follow the greatest extent of road of the options allowing for ease of access, already modified state and drainage lines with existing crossings.
- Option 1 and option 3 have the least significant watercourse features.

- Much of this route is located on elevated (relative to this flat area) areas and any crossings are on ephemeral drainage lines near their origin. These systems do not have significant aquatic life as they are only active after peak rainfall events.

Table 5 Route ranking

PREFERRED	Option/Corridor 1
PREFERRED	Option/Corridor 3
LEAST PREFERRED	Option/Corridor 2

NatureStamp proposes that due to the previous assessments undertaken by SiVEST (2012 & 2015), option 1 is sited in the best possible alignment to link Dwarsrug WEF with Loeriesfontein 3 PV, as it follows the existing roads and crosses few watercourse systems. Additionally, Option 3 is deemed to be the best possible location to link Dwarsrug WEF Narosies Substation. If pylons, construction activity and access roads for the power line are kept outside of the identified watercourses and their buffers, the site could be considered to have a **low sensitivity**.

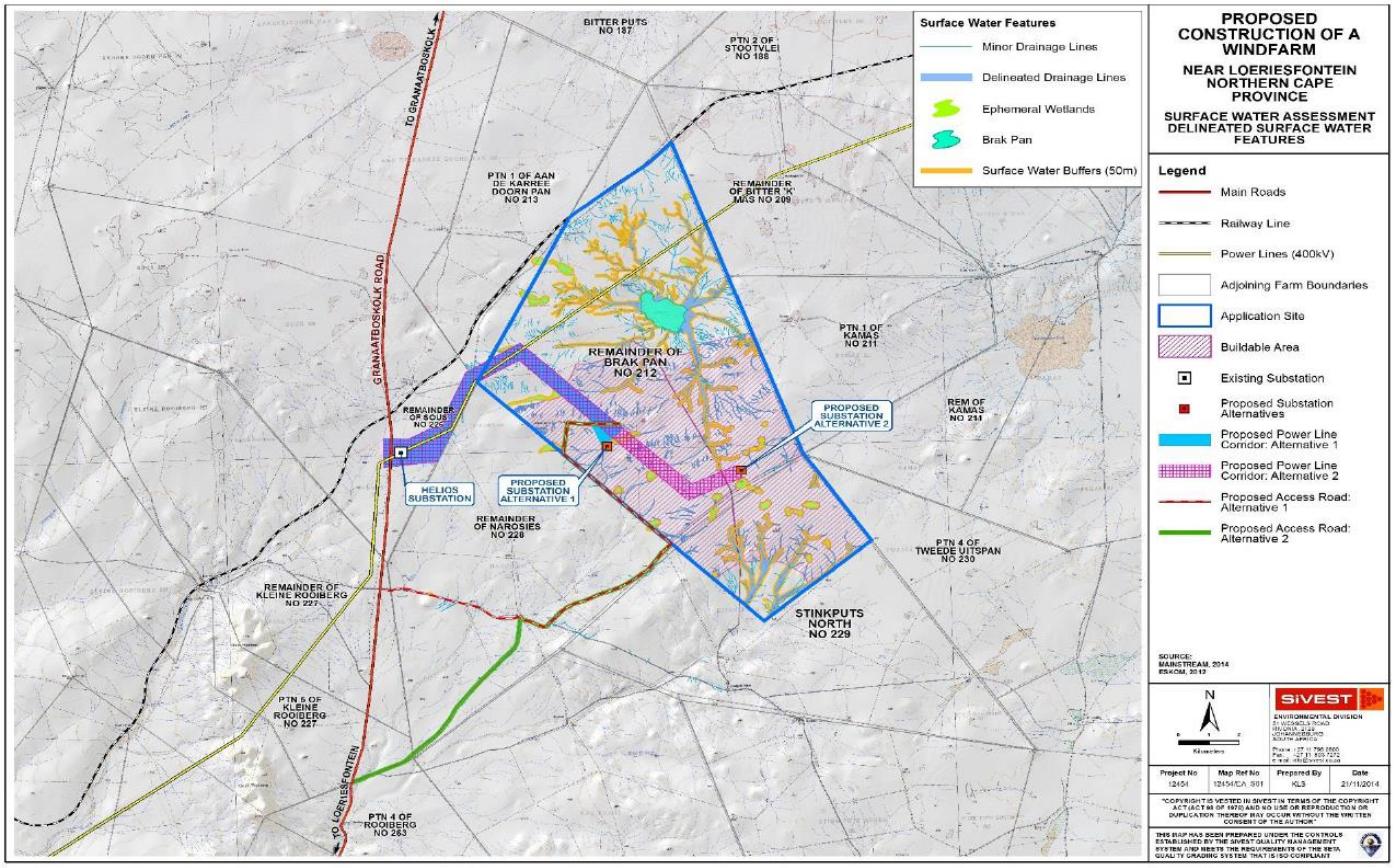

Figure 6 Previous watercourse study for Dwarsug (SiVest, 2015)

The areas identified as "no go" areas by Taylor (2012), are still relevant for the additional proposed power line. However, the pylons and access roads must not encroach upon "no go" areas. The revised aquatic layout can be seen in Figure 8.

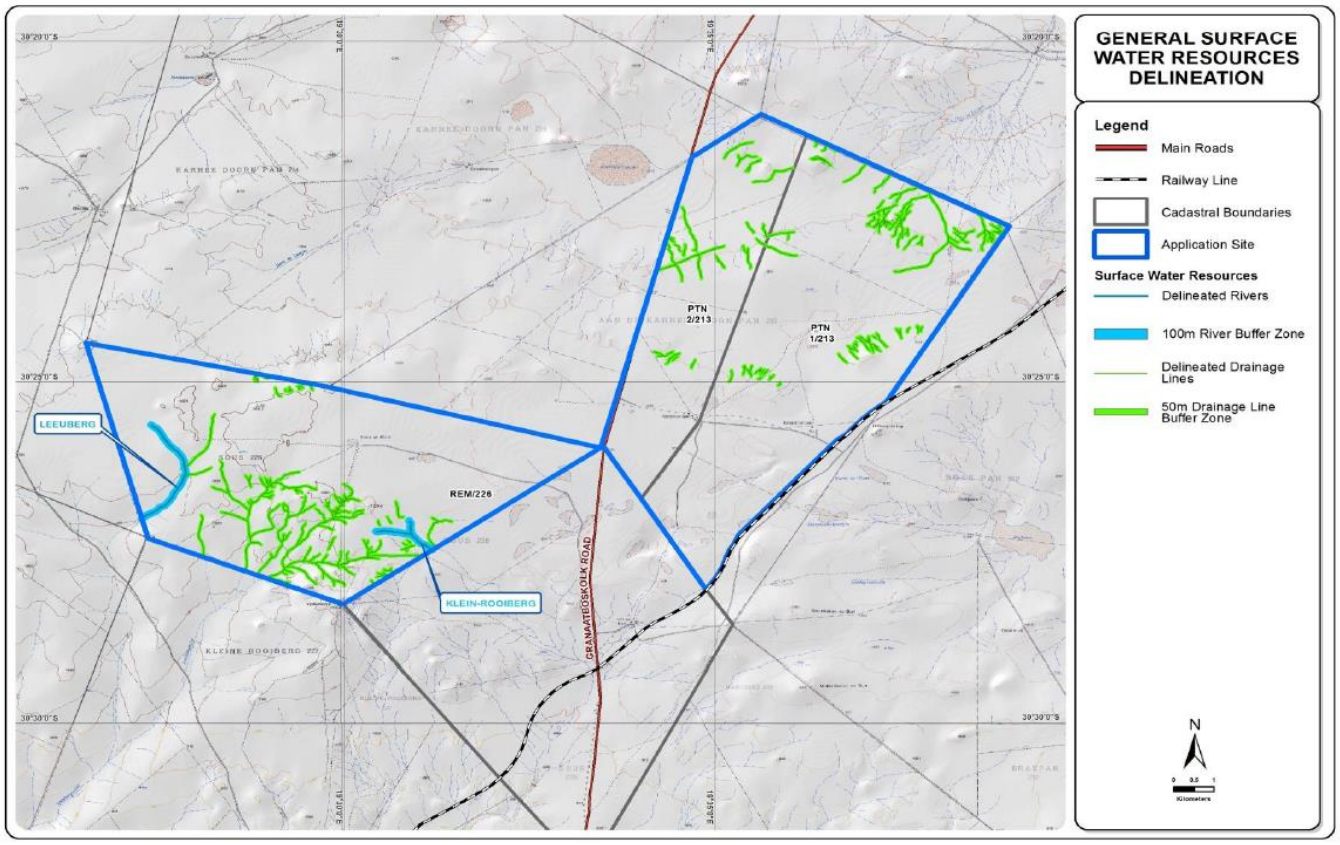

Figure 7 Previous watercourse study for Loeriesfontein (SiVest, 2012)

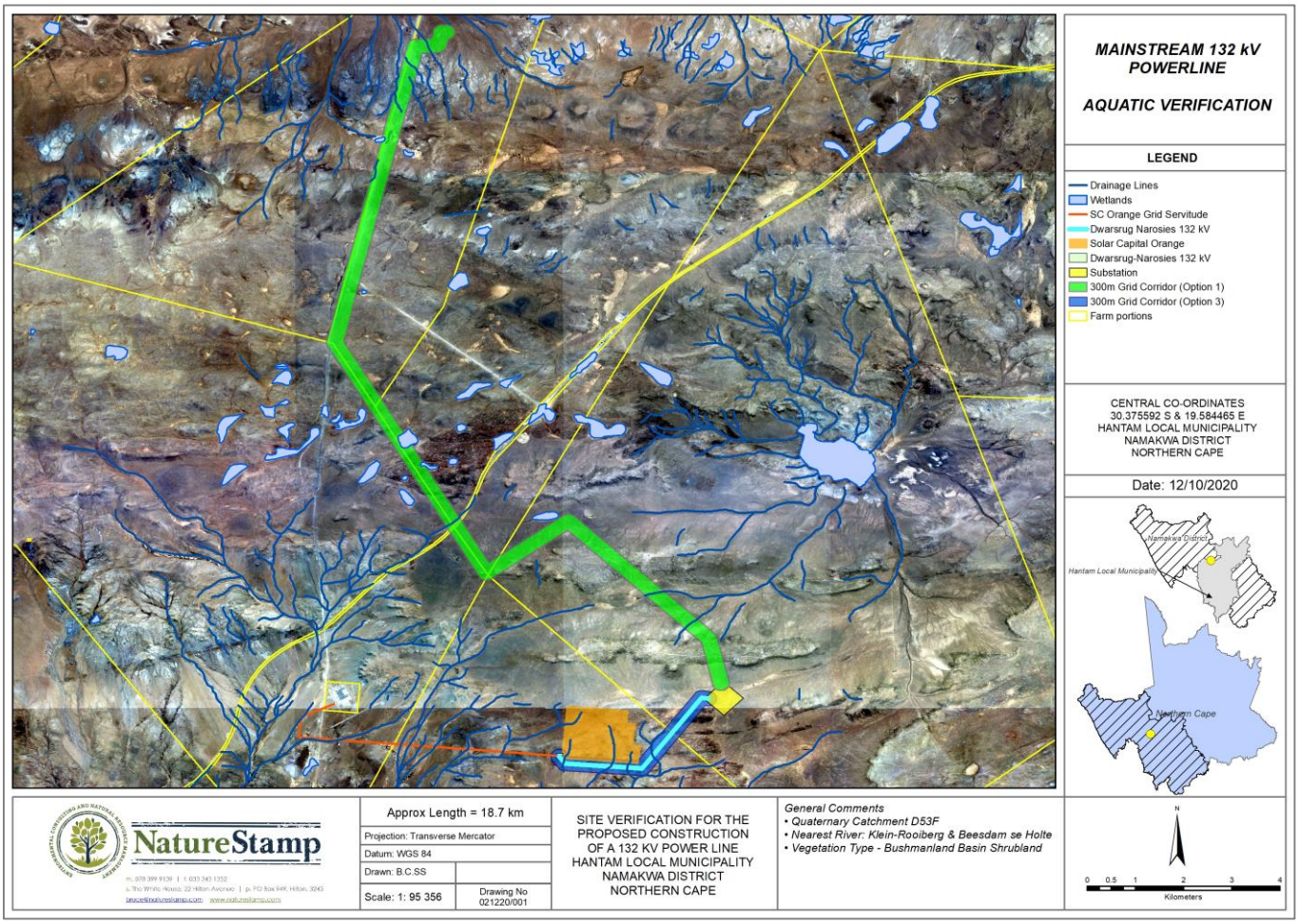

Figure 8 Aquatic verification showing the preferred Loeriesfontein3 PV-Dwarsrug and Dwarsrug substation to Narosies substation

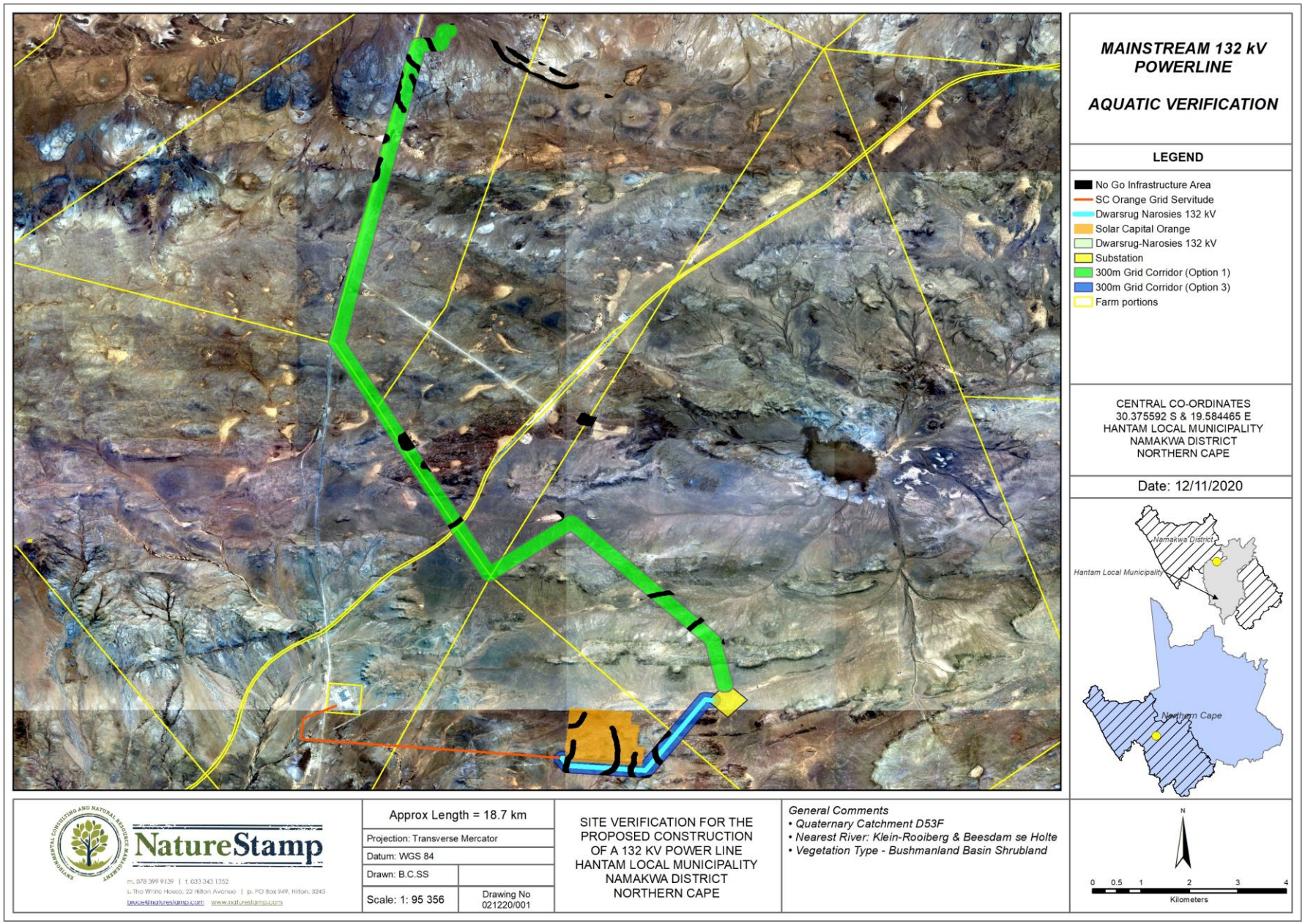

Figure 9 "No Go" areas identified for infrastructure and access roads at the preferred Loeriesfontein3 PV-Dwarsrug and Dwarsrug substation to Narosies substation

7. SPECIALIST FINDINGS/ASSESSMENT OF IMPACTS

7.1 Significance of impacts

The key impacts identified for the proposed 132 kV power line are:

- Disturbance of the ground surface from pylons and access roads;
- A slight increase in impervious surface reducing the infiltration/groundwater recharge;
- A slight Increase in stormwater leading to an increase of peak flows entering watercourse systems; and
- Potential oil spills/leaks during construction.

Mitigating measures need to be strictly adhered to during construction and during any subsequent maintenance. The design of the power line is important to ensure that impacts are prevented such as the location of the pylons, location of the access roads and maintenance of vegetation within the corridor. Table 6 provides a detailed overview of each impact and the recommended mitigation.

Table 6 Impact rating table and risk significance

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	STATUS (+ OR -)	TOTAL	S		E	P	R	L	D	I / M	STATUS (+ OR -)	TOTAL	S
Construction Phase																				
Surface and groundwater Water Quantity	Change in impervious surface preventing infiltration	3	1	2	2	1	2	-	18	Low	○ *The development must ensure areas around the pylons and construction access are revegetated.* ○ *The existing vegetation should not be removed in the corridor unless completely necessary.*	3	1	1	1	1	2	-	14	Low
Flood Hydrology/ Storm Water	Increase in Storm Water	1	2	1	1	3	3	-	24	Low	o *The mitigation measures required relates to the development and implementation of an adequate storm water management plan to be designed by an appropriate engineer.* o *The engineer should account for both natural run-off (that which can be released into the natural landscape with no detrimental effect) and excess artificial run-off generated by the access roads and pylon base.* o *Storm water drains can reduce the amount and rate of excess run-off generated by the proposed development entering wetlands and thereby prevent the onset of erosion.* o *The pylon footprint and access roads must stay outside of the 1:100 year flood extent.*	1	2	1	1	3	1	-	8	Low
Surface and Groundwater Water Quality	General spills/Leaks	1	2	3	3	3	3	-	36	Low	o *All vehicles will need to be checked for leakage before and after entering the construction area.* o *Areas where fuels are either kept or transferred will need to be bunded so as to contain spillage.* o *Cement mixing sites will also need to be strategically positioned and bunded to prevent spillage.* o *Ablution facilities must be provided to prevent workers urinating near or in the wetlands.* o *Ablution facilities must be positioned at least 100metres away from the wetland areas and buffer zones.*	1	1	1	1	3	1	-	7	Low
Aquatic Biodiversity	Clearing of vegetation for Access roads and pylons	1	4	3	3	4	3	-	45	Low	o *The loss of vegetation is inevitable and necessary for the proposed development to take place. Hence, the impact of vegetation clearance will be definite.* o *Mitigation measures primarily will relate to the cumulative impacts associated with exposed open stretches of land. Run-off is to be mitigated by the use of structures that will reduce the rate and volume of run-off so as to prevent erosion and siltation impacts affecting nearby wetlands.*	1	4	3	3	4	2	-	30	Low

Operational Phase																				
Flood Hydrology/ Storm Water	Increase in Storm Water	1	2	1	1	3	3	-	24	Low	o *The corridor area must be revegetated where clearing was done.* o *Any areas where watercourses were crossed by access roads must be rehabilitated.* o *Maintenance should be undertaken with aerial means where possible.*	1	2	1	1	3	1	-	8	Low
Aquatic Biodiversity	Spills/Leaks during maintenance	1	2	3	3	4	3	-	39	Low	o *Implement the storm-water management plan and ensure appropriate water diversion systems are put in place.* o *Compile an emergency response plan and implement should an emergency occur such as an electrical fire.* o *Ensure that spill kits (if appropriate) are available on site for clean-up of spills and leaks.* o *Immediately clean up spills and dispose of contaminated soil at a licensed waste disposal facility.*	1	2	1	1	3	1	-	8	Low
Decommissioning Phase																				
Aquatic Biodiversity/Water Quality/ Hydrology	Sediments and spills entering water resources	1	1	4	1	3	1	-	10	Low	o *All vehicles will need to be checked for leakage before and after entering the decommission area.* o *Areas where fuels are either kept or transferred will need to be bunded so as to contain spillage.* o *Ablution facilities must be provided to prevent workers urinating near or in the wetlands.* o *Ablution facilities must be positioned at least 100metres away from the wetland areas and buffer zones.* o *Revegetation must occur immediately following the decommission.*	1	1	4	1	3	1	-	10	Low
Cumulative																				
Water Quality/ Hydrology	Compounded impacts from surrounding development	2	2	2	1	3	1	-	10	Low	o *The mitigation measures required relates to the development and implementation of an adequate storm water management plan/structures to be designed by an appropriate engineer.* o *Such structures can reduce the amount and rate of excess run-off generated by the proposed development entering wetlands and thereby prevent the onset of erosion downstream.*	2	1	2	1	2	1	-	8	Low
No-go options																				
Aquatic Biodiversity/Water Quality/ Hydrology	N/A	/	/	/	/	/	/	/	/	Low	o *The No-Go alternative entails no change to the status quo.*	/	/	/	/	/	/	/	/	Low

7.2 Environmental Management Programme (EMPr) Input

The objectives of the amendment to the EMPr is to ensure that any impacts remain at a low risk/sensitivity. Furthermore, this also allows for the additional power line area to be incorporated into the existing EMPr.

Table 7 Rehabilitation actions for inclusion into the EMPr

Objective	Action	Timing
Locate pylons outside of watercourse areas	1. Located line near to road servitude	With immediate effect (Planning & Construction)
	2. Ensure pylons and access roads are outside of watercourse areas	With immediate effect (Planning & Construction)
Mitigate any flood risk	3. Ensure structures are outside of 1:100 year flood event	Planning and Construction
Ensure groundwater quality is not impacted upon	4. In the event of a spill, implement a spill contingency plan and monitor groundwater for 6 months if spill is not contained.	Construction and Operation
Manage storm water from the access roads and pylon footprint	5. Ensure appropriate storm water infrastructure is installed to dissipate flow and direct away from concentrated paths.	During winter months
	6. Ensure drip trays are used under vehicles/machinery and that impervious floor surfaces are constructed to ensure chemicals and waste do not enter the sub-surface.	With immediate effect throughout construction.
Manage spills during construction	7. Ensure drip trays are used under vehicles/machinery and erosion control measures are implemented. 8. Ensure a spill contingency plan is put into place.	With immediate effect ECO to check every 2 months
Ensure the site is revegetated	9. Keep vegetation on site where possible. 10. Revegetate any disturbed areas.	Construction and Operation
Manage spills during operation	11. Spills must be completely removed from the site. 12. Implement the storm-water management plan and ensure appropriate water diversion systems are put in place. 13. Compile an emergency response plan and implement should an emergency occur. 14. Ensure that spill kits (if appropriate) are available on site for clean-up of spills and leaks.	With immediate effect/Ongoing

8. CONCLUSION AND SUMMARY

8.1 Summary of Findings

The assessment undertaken for the additional 132 kV power lines (preferred option 1 to link Dwarsrug WEF to Loeriesfontein 3 PV and option 3 to link Dwarsrug WEF Narosies substation) resulted in low significance impacts for the site. The impacts would be very low if pylons and access roads are kept outside of identified watercourse areas for option 1 and option 3. There were no suitable alternatives for option 3 and this was considered to be the best location for this site. No additional No-Go areas were identified as a result of this amendment. Through the impact assessment, the risks identified during construction have the highest impact although it would still be considered to be low. The construction and operation phase associated impacts of the access roads, turbines, crane pads/lay down areas, PV arrays, substation, maintenance building and power lines have already been approved by the respective authorities. Therefore, the addition of the 132 kV power line (option 1 and 3) to the approved development will have a minimal impact. The location of the proposed power lines has been strategically placed to be situated away from watercourses. Option 1 and 3 was considered to be the best route from an aquatic perspective.

Table 8 Summary of preferred power line route

Alternative	Preference	Reasons (incl. potential issues)
POWER LINE CORRIDOR ROUTE ALTERNATIVES: LOERIESFONTEIN 3 PV SEF TO DWARSRUG WEF		
Power Line Corridor Alternative 1 (Loeriesfontein 3 PV SEF to Dwarsrug WEF)	Preferred	• Crosses the least area of watercourses • Crosses the least significant watercourse • Pylons and access roads can be easily placed outside of these watercourses • Follows existing disturbed areas (roads)
Power Line Corridor Alternative 2 (Loeriesfontein 3 PV SEF to Dwarsrug WEF)	Least preferred	• Crosses some significant watercourses • Follows less road than option 1
Power Line Corridor Alternative/Option 3 (Dwarsrug WEF Narosies substation)	Preferred	• Is the best possible route • Crosses some less significant watercourse • Pylons and access roads can be easily placed outside of these watercourses • Follows existing disturbed areas (roads)

8.2 Aquatic Impact Statement

With reference to this report and previous assessments done on the site, including that of SiVest (2012 & 2015), the approved EA for the greater development footprint and the impact assessment undertaken in this report, NatureStamp is of the opinion that the impacts of the power line option 1 and option 3 would be minimal and acceptable and hence the EA should be granted for this BA process. Option 2 would have a slightly greater impact and is thus least preferred.

Additionally, the following are confirmed by the specialist:

1. The site was identified as very high sensitivity by the screening tool as there are watercourses within the Loeriesfontein and Dwarsrug properties, which are very large properties.
2. The preferred power line route is however of **low sensitivity** in an aquatic context.
3. Given the negligible water use requirement on-site, short lived construction period and adherence to specialist recommendations, the site is of low risk of aquatic disturbance. However, appropriate preventative measured need to be taken to ensure that this low risk is still minimised.
4. The site is mostly flat and located on sparse vegetation. This is confirmed by SiVest (2012 & 2015) who's study covered the greater area.
5. Impacts have been identified with proposed mitigation measures. Should these measures be adhered to, the additional power line area would remain a low sensitivity.
6. A list of conditions has been provided that should be included in the EMPr.
7. No further assessments are required given the location of the power line.
8. NatureStamp hereby acknowledges that there are no fatal flaws associated with the proposed power line and should be authorized.

Appendix A *Curriculum Vitae*

Dr Bruce Scott-Shaw
Hydrologist

Carter High School
Pietermaritzburg, South Africa

The University
of KwaZulu-Natal
Pietermaritzburg, South Africa
BSc, BSc Honours, MSc,
PhD Hydrology

REFERENCES

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Professor
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E-mail: eversonc@ukzn.ac.za
Nick Davis
Hydrologist/Director (Isikhungusethu Environmental Services)
Phone: +27 79 490 6963
Email: nick@isik.co.za

CONTACT INFORMATION

Phone: +2778 3999 139
E-mail: bruce@naturestamp.com
Linkedin: www.linkedin.com/in/bruce-scott-shaw-58b20231
Address: 22 Hilton Ave, Hilton, 3245, South Africa

ABOUT ME

I am an experienced, motivated and dynamic hydrologist, with a passion for sustainable land-use management and global change issues. Throughout my academic and consulting career I have mastered numerous models and tools relating to hydrology, soil science and GIS. Some of these include ACRU, SWAT, HEC-RAS, ArcGIS, WRSM, Idrisi, SEBAL, MatLab and Loggernet. I have basic programming skills on the Java and CR Basic platforms. I have vast experience in hydro-meteorological monitoring, including automatic weather stations, eddy covariance, heat pulse velocity, flow and ecological monitoring.

I completed my MSc under Prof Roland Schulze where I developed an agro-hydrological grassland biomass model for applications in management and climate change studies. Subsequently, I completed my PhD at the School of Bioresources Engineering and Environmental Hydrology (BEEH) which focused on quantifying the water-use of alien invaded riparian forests and catchments for rehabilitation programmes. I have presented my research around the world, where I have gained a wide network of academic contacts and experience.

As a consultant, I am the director and principal hydrologist of NatureStamp (PTY) Ltd. In this capacity I undertake flood studies, calculate hydrological flows, perform general hydrological modelling, stormwater design, dam designs, wetland assessments, water quality assessments, groundwater studies and soil surveys.

I am affiliated to the University of KwaZulu-Natal where I am a part-time lecturer for undergraduate hydrology and dam design. I am also a post-doctoral student where I run and calibrate hydrological and soil erosion models.

SKILLS

Hydrological Modelling ●●●●●	GIS ●●●●●	General Computing Skills ●●●●○
MS Office ●●●●●	Field Assessments ●●●●●	Soil Surveys ●●●●○
Communication Skills ●●●●○	Networking ●●●●○	Scientific Writing ●●●●●

WORK EXPERIENCE

Director March 2015 – Present
NatureStamp (PTY) Ltd.
Environmental consulting company, offering a range of services to promote sound natural resource management. We are a team of qualified, experienced and dedicated people, who take pride in producing a high quality of work and providing a personalized, professional service.

Hydrology Lecturer January 2016 – Present
University of KwaZulu-Natal
Part-time lecturer for Hydrology modules. This includes dam design, hydrology basics and modelling. I also run a Soil Water Assessment Toll (SWAT) workshop through ArcGIS to provide students with the skills to run the model for their research purposes.

Post-doctoral Researcher June 2018 – Present
University of KwaZulu-Natal
Assess the impact of erosion and sediment yield from different land uses in farming and forestry systems and their effect on water resources in selected catchments of South Africa. This is done by measuring and modelling soil erosion losses under different land uses and management practices.

PUBLICATIONS

1. Paper for the 14th SANCHIAS symposium, 2009. Development and Verification of a Dynamic Grassland Biomass Model for Agrohydrological Applications under Different Scenarios of Climate and Management. B.C. Scott-Shaw and R.E. Schulze.
2. Water-Use Dynamics of a Peat Swamp Forest and a Dune Forest in Maputaland, South Africa. A.D. Clulow, C.S. Everson, J.S. Price, G.P.W. Jewitt, and B.C. Scott-Shaw. Hydrol. Earth Syst. Sci -2013-31.
3. Use of an Agrohydrological Model for Applications in Management Studies Related to Tall and Short Grassveld in South Africa. B.C. Scott-Shaw and R.E. Schulze (In Press).
4. Water-Use Dynamics of An Alien Invaded Riparian Forest Within the Mediterranean Climate Zone of the Western Cape, South Africa, Hydrol. Earth Syst. Sci., 21, 4551–4562, 2017. Scott-Shaw, B.C., Everson, C. S., and Clulow, A. D.
5. Handbook on Adaptation to Climate Change for Farmers, Officials and Others in the Agriculture Sector of South Africa (Released 2018): Short and Tall Natural Grasslands in South Africa and Climate Change. B.C. Scott-Shaw and R. E. Schulze.
6. Water-use dynamics of an alien invaded riparian forest within the summer rainfall zone of South Africa. Hydrol. Earth Syst. Sci., Discussion, 2018. Scott-Shaw, B.C., Everson, C. S.
7. Rehabilitation of alien invaded riparian zones and catchments using indigenous trees: an assessment of indigenous tree water-use. Scott-Shaw B.C, Everson C.S, Geldenhuys C.J, Starke, A, Atsame-Edda A, Schutte S, R, Mupemba Mwamba. Water Research Commission Report K5/2081. 2016.
8. Water-efficient production methods and systems in agroforestry, woodlands and forestry plantations. Everson C.S, Scott-Shaw B.C, Kelbe, B.E, Starke, A, Pearton T, Geldenhuys, C, Vather, T, Maguire, M. Water Research Commission Report K5/2554. 2018.
9. Assessing the impact of erosion and sediment yield from different land uses in farming and forestry systems and their effect on water resources in selected catchments of South Africa. This is done by measuring and modelling soil erosion losses under different land uses and management practices. Hill, T.R, Scott-Shaw B.C, Gilham, J.S, Dickey, M, Duncan, G.E, Everson, C.S, Everson, T.M, Zuma, K, Birkett, C.K. Water Research Commission Report K5/2402. 2019.
10. Assessment of soil erosion under rainfed sugarcane in KwaZulu-Natal, South Africa" by Abdalla, Khatab; Dickey, Matthew; Hill, Trevor; Scott-Shaw, Bruce. Natural Resources Forum. Under Review.

Research and Training

- Hydro-pedological characterization of degraded soils with the Institute de recherche pour le development (IRD)
- Advanced international training programme on Climate Change: Mitigation and Adaptation in Norrkoping, Sweden at the Swedish Meteorological and Hydrological Institute (SMHI)
- Advanced international training programme on Climate Change: Mitigation and Adaptation in Kasane, Botswana. Regional follow up course. Swedish Meteorological and Hydrological Institute (SMHI)
- Advanced MatLab ® course: Model building, inference and hypothesis testing in hydrology. Gabriel Lippmann, Luxembourg. April 2013.
- Advanced training course on Eddy Covariance. Mike Savage, Pietermaritzburg, 2018.
- Advanced training course on Surface Renewal. Mike Savage, Pietermaritzburg, 2018.
- Environmental Law training: 2014 E+EIA Regulations in Context. Shepstone & Wylie, Umhlanga. 2016.
- KZN Wetlands Forum Buffers workshop. Umngeni Valley, September, 2014.
- Advanced SWAT modelling course, Siem Reap, Cambodia, 2019.

Presentations/Showcase/Awards

- European Science Foundation (Amsterdam, 2010),
- COP17 (Durban, 2011),
- World Water Forum (Marseille, 2012),
- MatLab advanced modelling (Luxembourg, 2013),
- World Water Week (Singapore, 2014),
- Forests & Water, British Colombia, (Canada, 2015),
- World Forestry Congress (Durban, 2015),
- Society for Ecological Restoration (Brazil, 2017).
- Conservation Symposium (Howick, South Africa, 2018)
- Roland Schulze award for the top third year hydrology student.
- Golden Key award for obtaining marks in the top 15 % of the University of KwaZulu-Natal.
- NRF scholarship for being a top achiever.

Personal Information

Date of Birth	7th January 1986
Place of Birth	Pietermaritzburg, South Africa
Citizenship	South African, UK Ancestry, Italian citizen pending (through marriage)
Language	English
Sex	Male
Marital Status	Married
Children	Two
Hobbies	All sports & outdoors, tree species, geology

Appendix B Declaration of Independence

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

PROPOSED CONSTRUCTION OF 132 KV POWERLINES BETWEEN THE AUTHORISED LOERIESFONTEIN 3 PV SOLAR ENERGY FACILITY (12/12/20/2321/2/AM4) AND THE AUTHORISED DWARSRUG WIND ENERGY FACILITY (14/12/16/3/3/2/690/AM4), AND FROM THE DWARSRUG WIND ENERGY FACILITY TO THE AUTHORISED NAROSIES SUBSTATION (12/12/20/2049/3), LOCATED NEAR LOERIESFONTEIN IN THE HANTAM LOCAL MUNICIPALITY, NAMAKWA DISTRICT IN THE NORTHERN CAPE PROVINCE OF SOUTH AFRICA

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs

Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

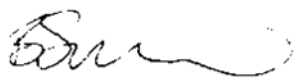
1. SPECIALIST INFORMATION

Specialist Company Name:	NatureStamp (PTY) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	0
Specialist name:	Dr Bruce Scott-Shaw			
Specialist Qualifications:	BSc, BSc Hons, MSc, PhD Hydrology			
Professional affiliation/registration:	KZN Wetland Forum, Natural Scientist (118673)			
Physical address:	22 Hilton Avenue, Hilton, PMB			
Postal address:	22 Hilton Avenue, Hilton, PMB			
Postal code:	3245	Cell:	0783999139	
Telephone:	033 343 1352	Fax:		
E-mail:	bruce@naturestamp.com			

2. DECLARATION BY THE SPECIALIST

I, **Bruce Scott-Shaw**, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

NatureStamp (PTY) Ltd

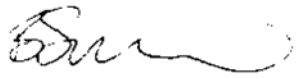
Name of Company:

09/11/2020

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Bruce Scott-Shaw**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

NatureStamp (PTY) Ltd

Name of Company

10/11/20

Date

Signature of the Commissioner of Oaths

11/11/20

Date

Km