REPORT

Scoping Assessment for the Proposed Dalmanutha Wind Energy Facility

WSP

Submitted to:

Ashlea Strong

WSP
Knightsbridge
33 Sloane Street
Bryanston
2191

Submitted by:

Golder Associates Africa (Pty) Ltd.

Building 1, Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand, 1685, South Africa

P.O. Box 6001, Halfway House, 1685

+27 11 254 4800

21500715-353056-7

July 2022

Distribution List

1 x Electronic Copy to WSP Africa

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Record of Issue

Company	Client Contact	Version	Date Issued	Method of Delivery
WSP	Ashlea Strong	Final	27 June 2022	Email
WSP	Ashlea Strong	Final	20 July 2022	Email

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1.0 INTRODUCTION

Golder Associates Pty Ltd (member of WSP) was appointed by Enertrag South Africa to provide a scoping assessment for the proposed Dalmanutha Wind Energy Facility (WEF). WSP will carry out an Environmental Impact Assessment (EIA) for the WEF development. The purpose of this scoping assessment is to provide a description of the proposed project, including a sufficient level of detail to enable stakeholders to identify relevant issues and concerns.

2.0 PROJECT DESCRIPTION

The Dalmanutha WEF project will comprise the following:

- **Wind turbines**: 77 wind turbines with a maximum generating capacity of 300 MW in total, each with a foundation area of 25 m^2 and depth of 3 m. The hub height of each turbine will be up to 200 m and the rotor diameter up to 200 m.
- **Operations and Maintenance (O&M) Building**: Located near the substation, the O&M building itself will be 20 m x 20 m. Associated structures include septic tanks with portable toilets, a workshop (15 m x 10 m) and stores (15 m x 10 m).
- **Construction camp laydown area**: The proposed laydown area is 100 m x 50 m in size.
- **Sewage infrastructure:** Will include conservancy tanks and portable toilets.
- **Temporary laydown or staging area**: The proposed size is 220 m x 100 m, covering an area of 22 000 m^2. This may need to increase to 30 000 m^2 should concrete towers be required.
- **Temporary cement batching plant**: Gravel and sand will be stored in separate stockpiles whilst the cement will be contained in a silo. The plant will cover an area of approximately 5 000 m^2 and the maximum height of the concrete silo will be 20 m.
- **Internal Roads:** The internal roads will be between 8 m and 10 m wide which will increase to 12 m on bends. Approximately 60 km of internal roads are proposed.
- **Independent Power Producer (IPP) site substation and Battery Energy Storage System (BESS)**: The total footprint of the IPP and BESS will be up to 40 000 m^2 (4 ha) in extent. The IPP will include a high voltage substation yard to allow for multiple (up to) 132 kV feeder bays and transformers, control building/s, telecommunication infrastructure and access roads. The BESS storage capacity will be up to 100 MW/400 MWh with up to 4 hours of storage. It is proposed that Lithium Battery Technologies, or Vanadium Redox flow technologies will be considered as the preferred battery technology. The main components of the BESS include the batteries, power conversion system, and transformer which will all be stored in various rows of containers.
- **Cables**: The medium voltage collector system will comprise of up to 33 kV cables that will run underground, except where a technical assessment suggests that overhead lines are required. The cables connect the turbines to the onsite IPP substation.
- **Stormwater channels**: If required, stormwater channels will be constructed on the site to ensure that stormwater runoff from the site is appropriately managed. Water from these channels will not contain any chemicals or hazardous substances and will be released into the surrounding environment based on the natural drainage contours.

3.0 BACKGROUND

Enertrag South Africa (ESA) is a subsidiary of the German-based Enertrag SE, a hydrogen and renewable energy developer founded in 1992. Enertrag SE has an established track record of renewable energy projects around the world, compromising over 1000 wind turbines with an installed capacity of over 760 MW, and over 500 employees.

Enertrag South Africa was established in 2017, to investigate and develop renewable energy projects in South Africa. The transition from coal-based energy supply to renewables in the Country is inevitable, as coal resources are depleted, coal-based power stations reach the end of their economic life and consider international obligations and commitments to reduce emissions.

4.0 PROJECT LOCATION AND EXTEND

The Dalmanutha Wind Energy Facility (Dalmanutha WEF) (9,400 ha) site is located approximately 7 km southeast of the Belfast town within Emakhazeni Local Municipality, Mpumalanga Province. Site access is via the R33 or the N4, which is approximately 220 meters from Dalmanutha WEF. The Dalmanutha WEF will have a capacity of up to 300 MW. Dalmanutha WEF will be located over eighteen farm portions covering approximately 4370 ha. The farm portions are namely:

- Berg-en-Dal Farm 378 No.1
- Tropical Paradise Trading 271 Farm 378 No.9
- Blyvoor Boerdery Farm 384 No.7
- PC Van Wyk Trust Farm 385 No.6 and No.7
- Ben Vilakazi Farm 385 No.8, 12 and 13
- Francois Van Rooyen Farm 385 No.10
- Weltervreden Holdings Farm 385 No.24
- Waaikraal Farm 385 No.24
- Wessel Hendrik Pieters Farm 403 No.3
- Wessel Hendrik Pieters Farm 403 No.4
- Lihle Group Farm 404 No.1
- Lihle Group Farm 404 No.2
- Zena Pieters Farm 405 No.3
- Simunye CPA Farm 412 No.1
- Wessel Hendrik Pieters Farm 467 No.0

There is an existing gravel road (Geluk Road) that goes through the parcels of land from north to south to allow for direct access to the project development area. The majority of the farms are utilized for cattle and horse farming. Minor agricultural activities were also observed during the site reconnaissance. Most of the areas are characterized by short grass and sparse trees. The locality map is shown in Figure 1.

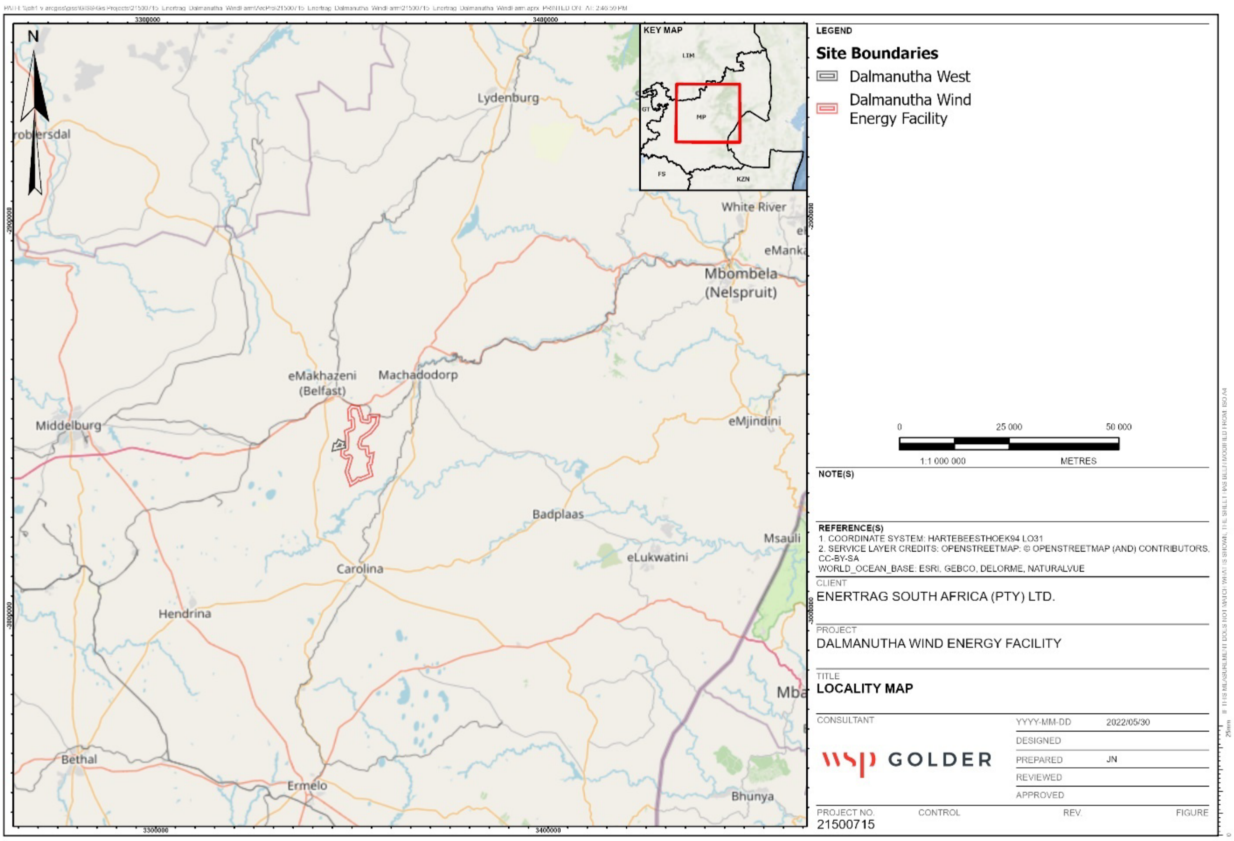


Figure 1: Locality Map

5.0 APPLICABLE LEGISLATION, GUIDELINES AND STANDARDS

5.1 The national water act (Act 36 of 1998)

Water resources management in South Africa is governed by the National Water Act (Act 36 of 1998) (NWA). The Department of Water and Sanitation (DWS) must, as custodians of water, ensure that resources are used, conserved, protected, developed, managed and controlled in a sustainable manner for the benefit of all persons and the environment.

5.2 The use of Water for Mining and Related Activities

Government Notice 704 (Government Gazette 20119 of June 1999) (hereafter referred to as GN704), was established to provide regulations on the use of water for mining and related activities aimed at the protection of water resources. The three main conditions of GN704 applicable to this project are:

- No residue or substance which causes or is likely to cause pollution of a water resource may be used in the construction of any dams, impoundments or embankments or any other infrastructure which may cause pollution of a water resource.
- Clean and dirty water systems must be kept separate and must be designed, constructed, maintained and operated to ensure conveyance of the flow of a 1:50-year recurrence interval storm event. Clean and dirty water systems should therefore not spill into each other more frequently than once in 50-years. Any dirty water dams should also have a minimum freeboard of 0.8 m above the full supply level.
- All dirty water or substances which may cause pollution should be prevented from entering a clean water resource (by spillage, seepage, erosion etc.) and it should be ensured that water used in any process is recycled as far as practicable.

5.3 South African Water Quality Guidelines

The NWA, Section 21 (f) and (g), states that the discharging of water containing waste into a water resource and disposing of waste which may detrimentally impact on a water resource should be prevented. The South African Water Quality Guidelines (SAWQG) are a series of documents published by (Department of Water Affairs) DWA, which forms an integral part of the water quality management strategy to safe keep and maintain the water quality in South Africa. These guidelines are used by the DWA as a primary source of information and decision-support to judge the fitness for use of water and for other water quality management purposes. The content of the SAWQG provides information on the ideal water quality and acceptable concentrations for various constituents of concern.

5.4 National Environmental Management Act

The National Environmental Management Act (NEMA), 1998 (Act No 107 of 1998) covers the control and management of environmental impacts and, *inter alia*, provides a framework for measures that “prevent pollution and ecological degradation; promotes conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.

6.0 BASELINE OVERVIEW

6.1 Climate

6.1.1 Rainfall

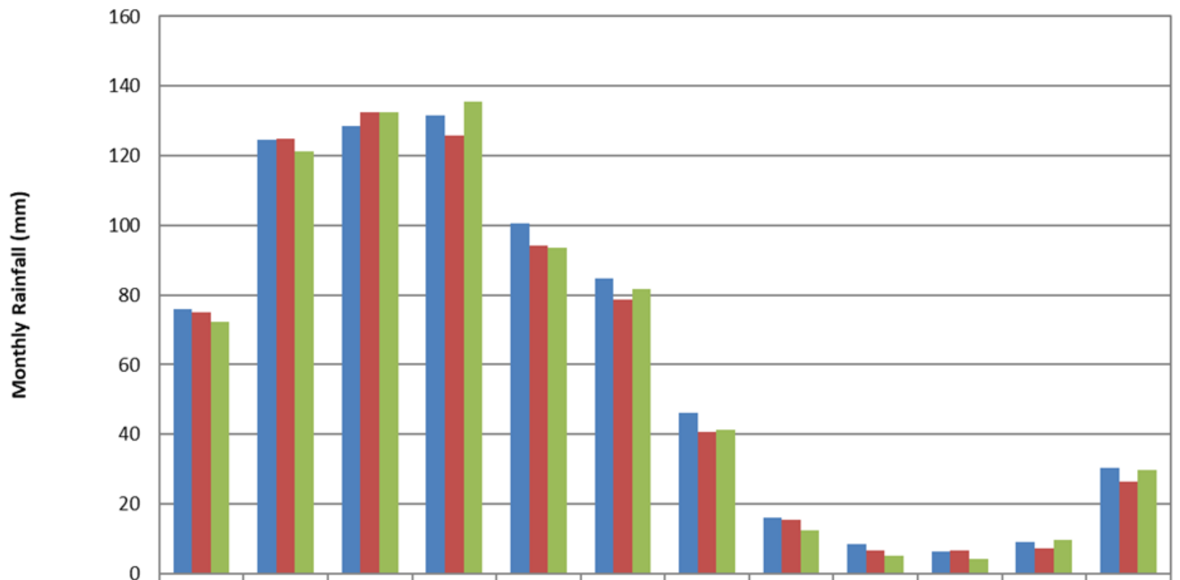
The rainfall data was generated using a rainfall simulator which was sourced through the Design Rainfall Estimation Program (Smithers & Schulze, 2002) and the Daily Rainfall Extraction Utility (Kunz, 2004). Data was sourced for rainfall stations that are within close proximity to the study area. The rainfall stations presented in Table 1 summarize the rainfall data used in the analysis.

Table 1: Metadata for the rainfall stations

Station number	Name	Distance (km)	Record period (years)	Period of records	Reliability (%)	MAP (mm)
0517257 W	Waaikraal	6.2	81	1919 - 2000	15.8	762
0517235 W	Brakspruit	12.2	80	1920 - 2000	50	733
0517072 W	Belfast (Pol)	13.9	80	1920 - 2000	39.5	739

6.1.1.1 Comparison of rainfall stations

The average monthly plot was used to compare the rainfall records as shown in Figure 2. The rainfall records cover the same time periods, and the average monthly rainfall depths for the different stations have a similar pattern. During the wet season, the highest average rainfall was recorded in the months of December and January. The driest months on average were recorded in June and July.



	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Waaikraal	76	124	129	131	101	85	46	16	8	6	9	30
Brakspruit	75	125	133	126	94	79	41	15	6	6	7	26
Belfast_(POL)	72	121	132	135	93	82	41	12	5	4	10	30

Figure 2 : Average monthly rainfall for the stations

The Waaikraal, Brakspruit and Belfast (POL) rainfall stations show a similar increasing trend as observed in Figure 3. The trends are consistent throughout, with no significant changes in slope. The Waaikraal rainfall station curve overlaps the Brakspruit and Belfast (POL) curves over time, indicating that slightly more rainfall was recorded for the station. However, Waaikraal rainfall station also has the least reliability (more patched data) amongst the three weather stations. Figure 3 shows the total cumulative rainfall over time.

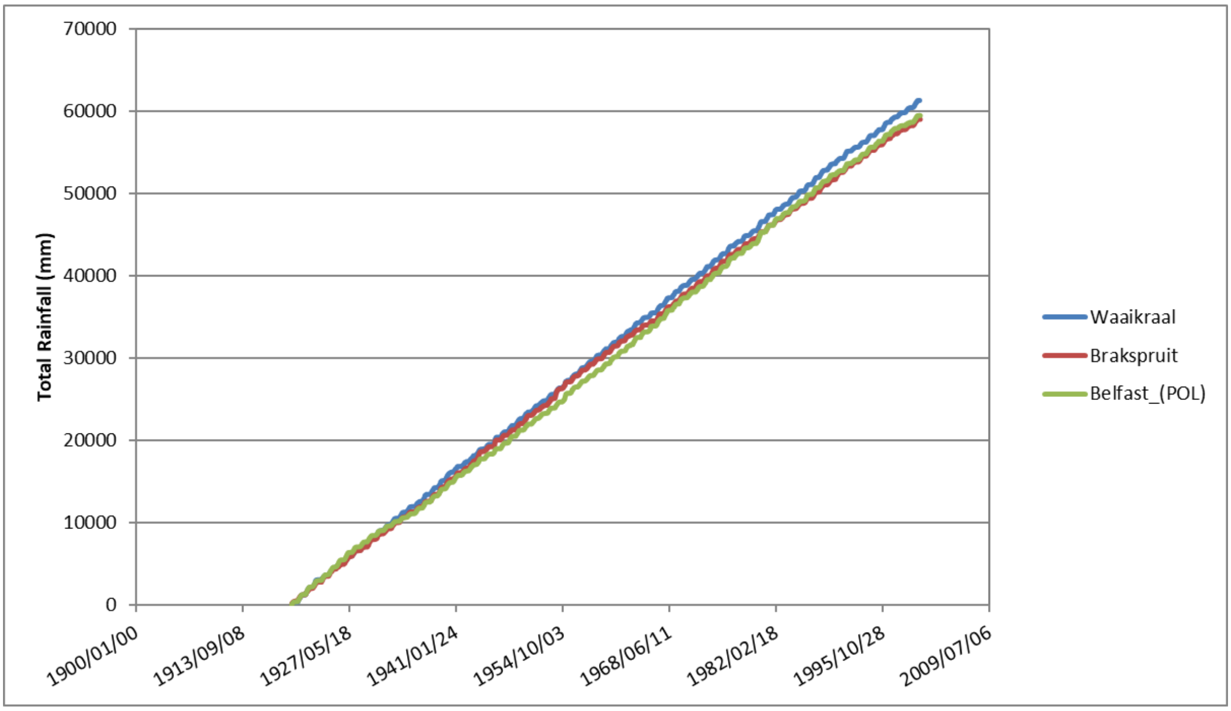


Figure 3: Cumulative rainfall for the stations analysed

The station 0517235 W Brakspruit was chosen as the station used in the study for the following reasons:

- The station is within proximity of the site.
- The station has the highest reliability of the datasets available (having the lowest percentage of patched or missing data).

6.1.1.2 Brakspruit rainfall station

Brakspruit rainfall station is situated approximately 12 kilometres from the site with 80-years of recorded data. It has the highest reliability (less patched data) of the analysed stations. The maximum recorded 24-hour rainfall depth is 140 mm, recorded on the 16th of December 1953, as shown in Figure 4. Figure 5 shows the annual rainfall depths. The mean annual precipitation for the station is 733 mm.

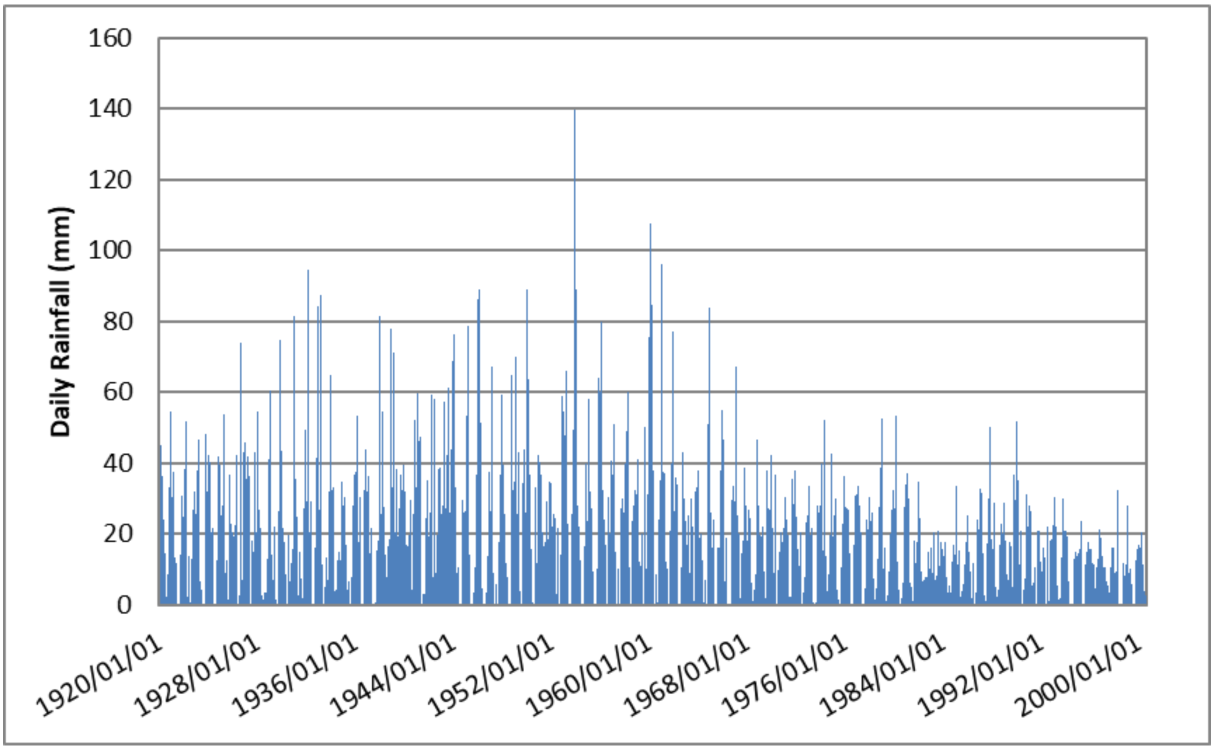


Figure 4: Brakspruit weather station daily rainfall

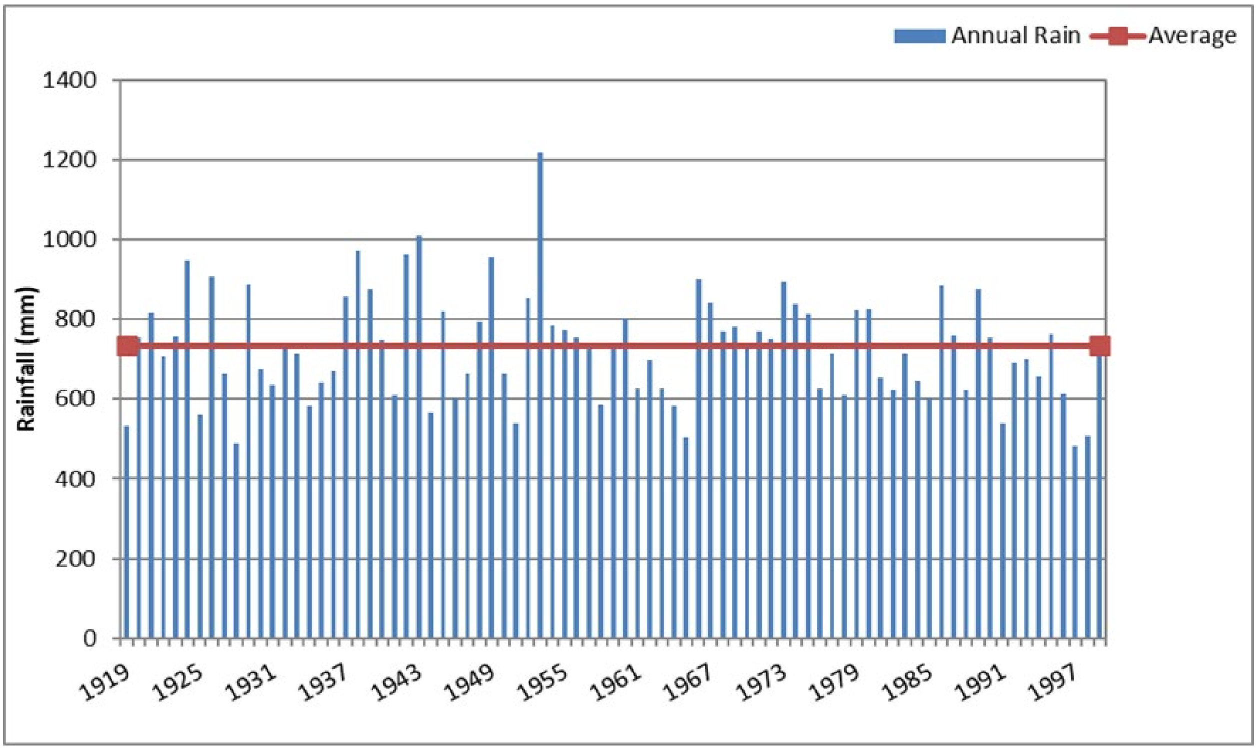


Figure 5: Brakspruit weather station annual rainfall readings and mean annual precipitation (MAP)

6.1.1.3 Design rainfall estimation

The 24-hour rainfall depths for several recurrence intervals at the Brakspruit station were calculated from the data available. To determine the likely magnitude of storm events, a statistical approach, using chi square statistics method (NIST/SEMATECH e-Handbook of Statistical Methods), was applied to the available recorded daily rainfall depths. This method statistically analyses the maximum daily rainfall depths for each year to determine the different recurrence intervals. The probability distribution with the best fit (R^2=0.988) was found to be the Log Pearson III distribution (see Figure 5), this was used to estimate the 24-hour storm rainfall depths associated with the various recurrence intervals as summarised in Table 2.

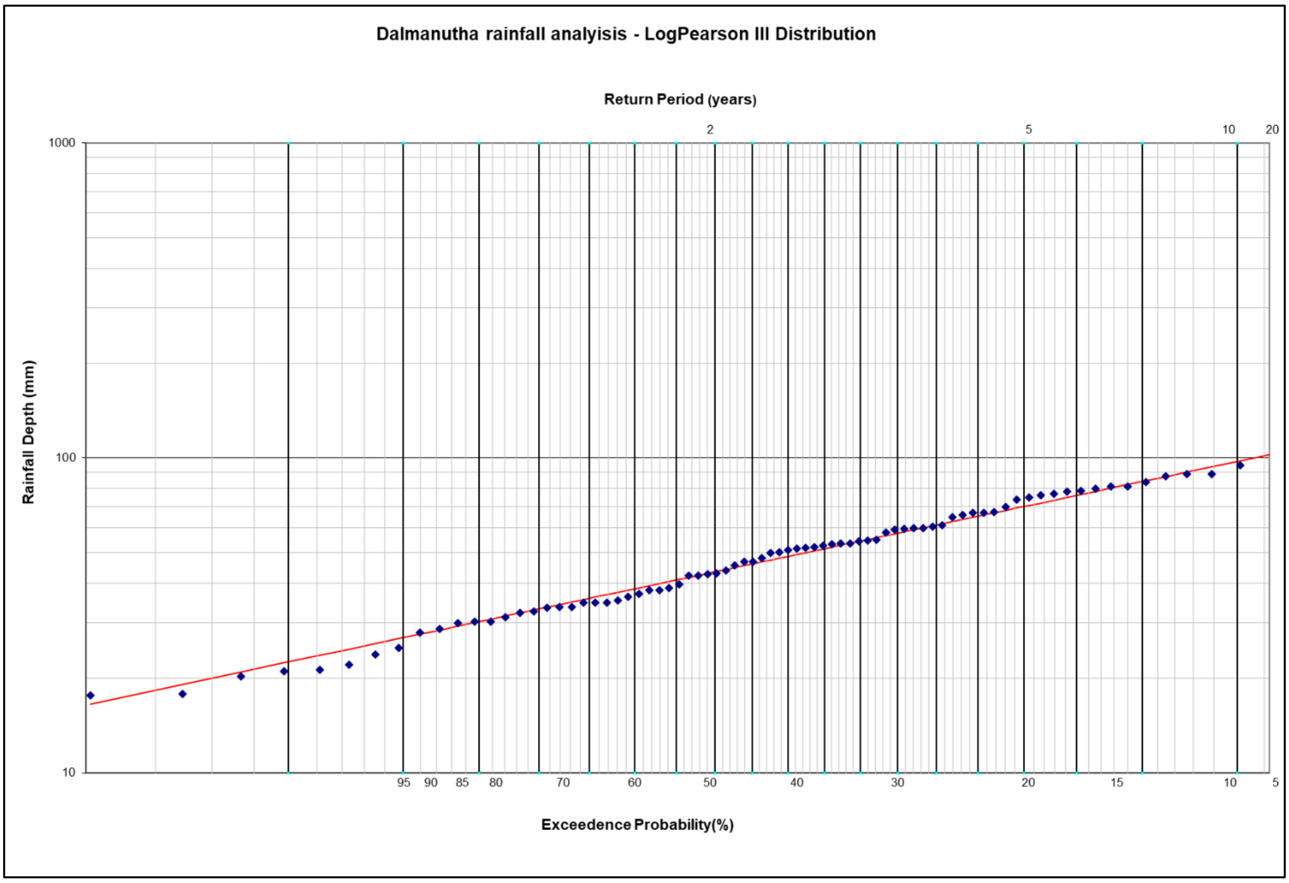


Figure 5: Brakspruit station Log-Pearson III distribution

Table 2: Computed 24-hour rainfall depths for various annual recurrence intervals

Return period in years	5	10	20	25	50	100	200	500	100
24-hours Rainfall Depth (mm/d)	70	84	97	102	114	127	139	156	168

6.1.2 Evaporation

The average S-Class pan evaporation is 1268.3 mm/year measured at X2E002 station. The station is approximately 14 km away from the site area. The highest average monthly evaporation occurs in December, as shown in Table 3 . Figure 6 plots the monthly average evaporation and the monthly average rainfall readings for the Dalmanutha area. From the figure, it is observed that the mean annual evaporation is generally higher than the rainfall throughout the year, except for the month of November.

Table 3: Average S-Pan evaporation

Month	S-Pan evaporation (mm/month)
January	144.8
February	141.2
March	118.6
April	87.7

Month	S-Pan evaporation (mm/month)
May	84.8
June	59.9
July	68.6
August	89.5
September	112.7
October	110.6
November	104.3
December	161
Total	1283.7

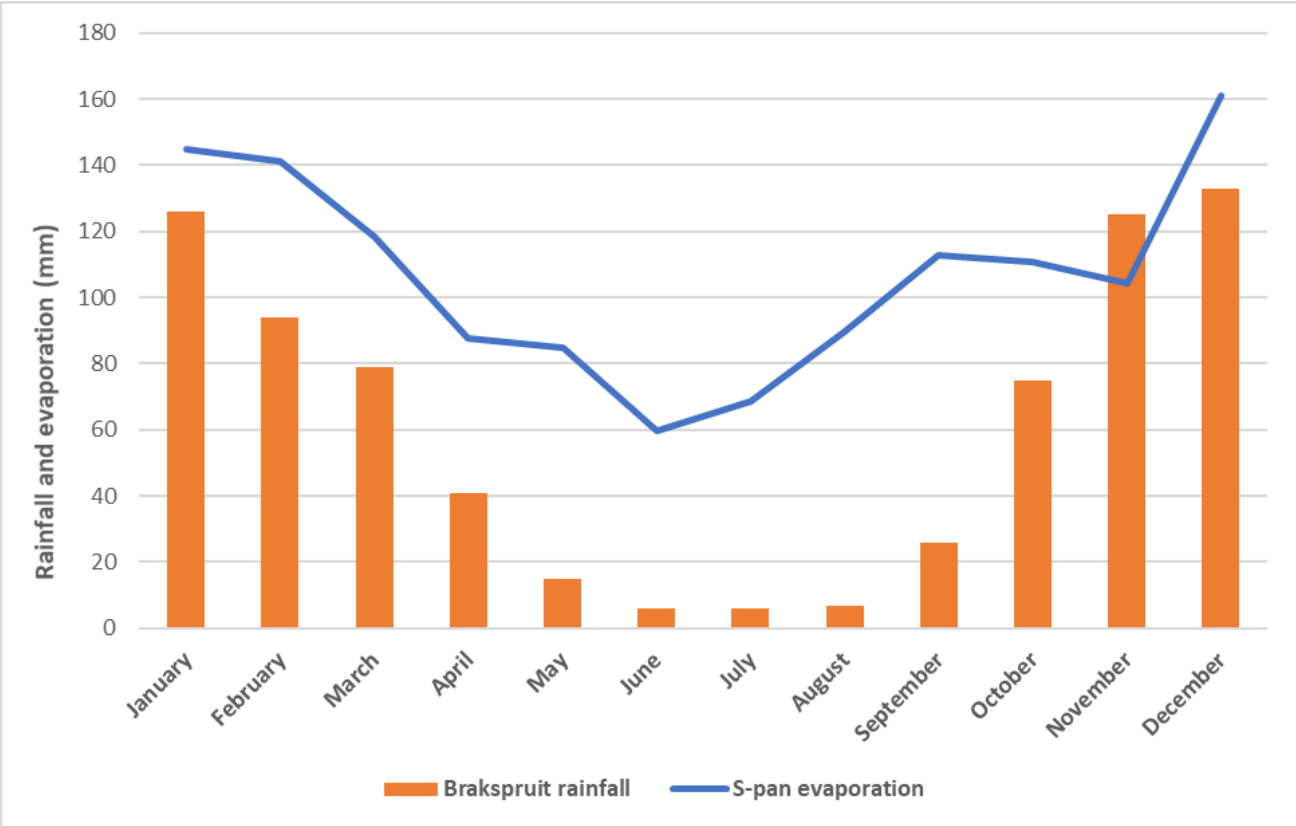


Figure 6: Rainfall and evaporation comparison

6.2 Temperature

As is typical throughout South Africa, there is a distinct seasonal variation in temperature. The mean monthly temperatures are highest between November and February, which are summer months. Temperatures gradually drop with the lowest temperatures being recorded during June and July, which are winter months in South Africa. Temperatures, wind velocities and evaporation are linked. The higher the temperature and the wind velocity, the more likely it is for the evaporation rates to be high. The mean maximum annual temperature for the project area is 25°C and the mean minimum annual temperature is 0°C to 2°C.

7.0 HYDROLOGICAL DESCRIPTION

7.1 Catchment description

Regionally the area is located in the Komati River catchment of Drainage Region X. Locally, the site lies within the quaternary catchment X11D, as shown in Figure 7. The catchment is situated within the Inkomati Water Management Area (WMA). The mean annual runoff (MAR) for the X11D catchment is 88 mm (WR2012). This catchment receives 744 mm rainfall per year and experiences 1413 mm of evaporation annually. Numerous non-perennial rivers drain in an easterly direction into the perennial Waalkraalloop river and in a westerly and southerly direction into the perennial Klein Komati River. The terrain of the proposed WEF lies at an elevation of approximately 1630 m in the northern section, to 1888 m in the southern section as shown in Figure 8. Areas with a relatively high elevation are depicted in green, whilst areas with a relatively low elevation are depicted in pink.

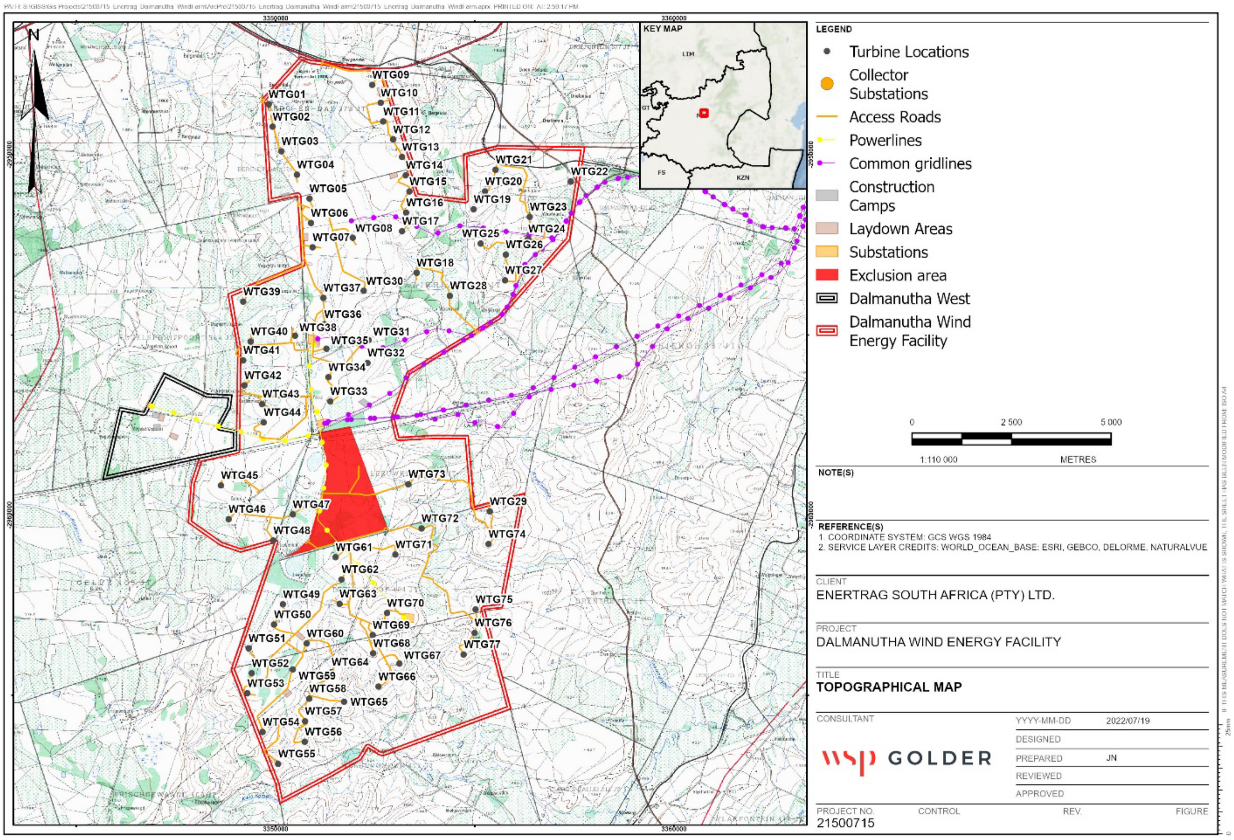


Figure 7: Hydrology map

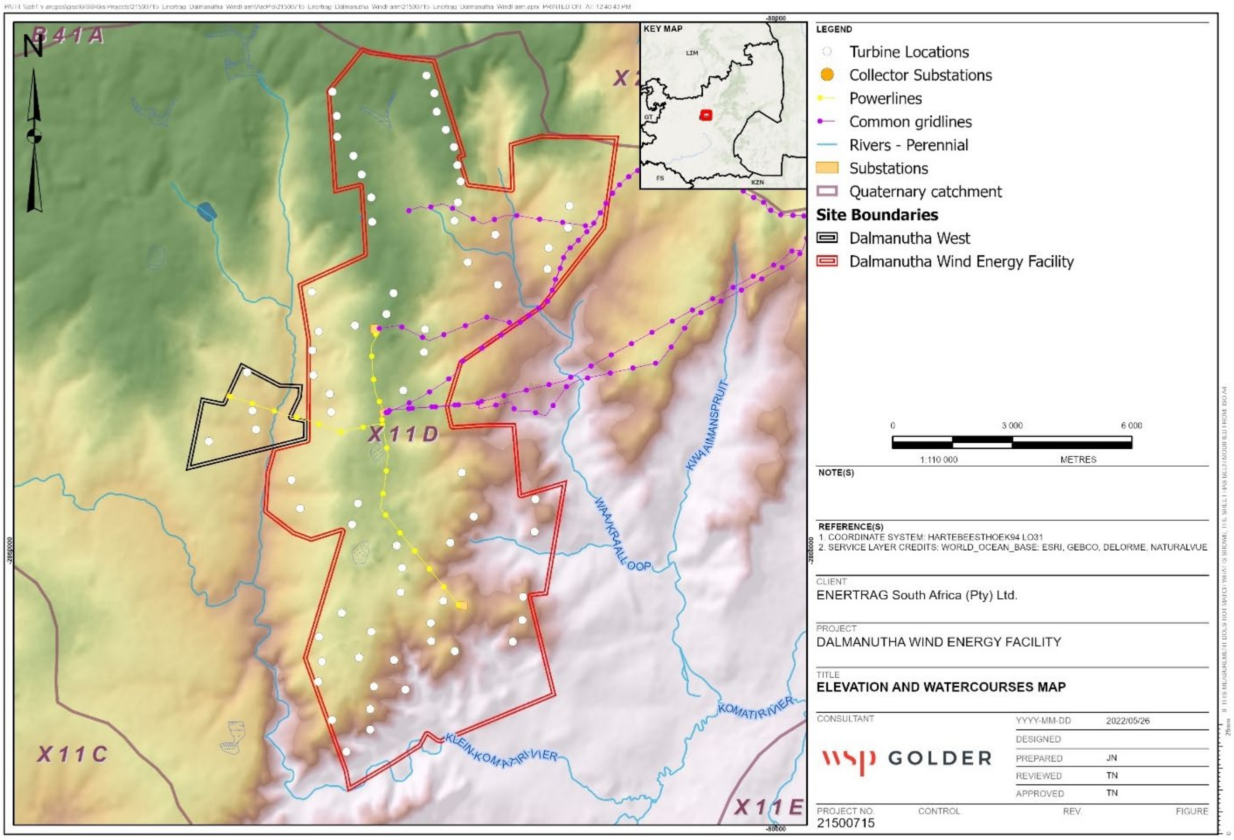


Figure 8: Elevation and watercourses map

8.0 IMPACT ASSESSMENT

Based on the existing information in the area, a preliminary impact assessment was conducted and outlined in the section below. The impacts will be verified by relevant specialists during the EIA Phase. The key issues and concerns for the surface water study have been unpacked in the subsections below.

8.1 Major areas of concern for surface water impact

The following section describes those activities that would have an impact on the surface water resources in the area in which the associated activities are proposed. For the purposes of this scoping impact assessment, the proposed project has been subdivided into the construction, operational, and closure phases. The cumulative impacts will only be included in the EIA phase.

The major activities of concern relating to the surface water resources are:

Construction phase

- Contamination of stormwater runoff
- Erosion at the construction site

Operational phase

- Contamination of stormwater runoff
- Erosion during operations

Closure/decommissioning phase

- Contamination of stormwater runoff.

8.2 Impact assessment methodology

The significance of the identified impacts on the various environmental components were determined using the approach outlined below. An impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability; and consequence (Table 6), where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability and consequence are detailed in Table 4 and Table 5 respectively.

Table 4: Significance screening tool

		Consequence scale			
Probability scale		1	2	3	4
	1	Very Low	Very Low	Low	Medium
	2	Very Low	Low	Medium	Medium
	3	Low	Medium	Medium	High
	4	Medium	Medium	High	High

Table 5: Probability scores and descriptors

Score	Descriptor
4	**Definite**: The impact will occur regardless of any prevention measures
3	**Highly Probable**: It is most likely that the impact will occur
2	**Probable**: There is a good possibility that the impact will occur
1	**Improbable**: The possibility of the impact occurring is very low

Table 6: Consequence score descriptions

Score	Negative	Positive
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time

Score	Negative	Positive
		consuming (or some combination of these), as achieving them in this way.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.

The nature of the impact must be characterized as to whether the impact is deemed to be positive (+ve) (i.e., beneficial) or negative (-ve) (i.e., harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (Table 7) has been applied according to the nature and significance of the identified impacts.

Table 7: Impact Significance Colour Reference System to indicate the Nature of the impact

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	Negligible
Very Low	Very Low
Low	Low
Medium	Medium
High	High

8.3 Construction phase impacts

8.3.1 Contamination of stormwater runoff

Stormwater runoff could, in the case of the temporary construction yards and laydown areas, potentially come in contact with areas dedicated for the handling of contaminants such as fuel storage areas or in the case of wind turbine sites or the substation / control building, with areas where potential contaminants such as concrete is being handled. This could result in contaminated stormwater runoff being discharged downstream. During construction, it is expected that the magnitude of the impact will be **low** and will require mitigation to reduce the risk.

8.3.1.1 Mitigation

Construction areas such construction yards, wind turbine sites and the substation / control building site should be protected from external stormwater runoff approaching these sites, by implementing cut-off drains or berms along the upstream boundary of the area to divert stormwater runoff away from the site and discharge diverted stormwater as per pre-development conditions.

Stormwater runoff must be kept separate from areas dedicated to containing hazardous substances such as bunded areas for wash bays, fuel storage areas and refueling areas.

Should the measures described above be implemented during construction, then the impact significance will reduce to **low – very low**.

8.3.2 Erosion during construction

During the construction of roads, the removal or disturbance of vegetation could result in the concentration of flow and consequently in accelerated erosion along roads where steep slopes dominate, which will result in an increase of suspended solids and sedimentation of the downstream environment. Erosion of the proposed roads is further possible at watercourse crossings due to the concentration of flow. Removal or disturbance of vegetation from areas such as new roads, the construction yards and the substation / control building could also result in erosion due to the soil stability being affected. During construction, it is expected that the magnitude of the impact will be **moderate** and will require mitigation to reduce the risk.

8.3.2.1 Mitigation

In summary, the following mitigation measures are proposed:

- Avoid clearing during the wet season when short heavy downpours can be expected. This should help limit erosion.
- Utilize existing roads as opposed to clearing new roads to the site. This should also help limit erosion.
- Minimize the extent of earthworks.
- Ensure adequately designed berms and stormwater collection facilities to capture sediment before water is released into the environment. All stormwater management systems should be compliant with Regulation GN 704; and
- Encourage the use of natural flow paths downstream of construction sites.
- The discharge of stormwater should be spread over a wide area to reduce the energy as a result of concentrated flow and return to spread flow downstream of the construction site.
- Re-use stockpiled soil within as short a period as possible.

Should the measures described above be implemented during construction, then the impact significance will reduce from **moderate – very low**.

8.4 Operational phase impacts

8.4.1 Contamination of stormwater runoff

Stormwater runoff in the vicinity of the substation / control building and wind turbines could come into contact with dedicated areas where hazardous substances are handled such as fuels and oils which could result in contaminated stormwater runoff being discharged downstream. During the operational phase, it is expected that the magnitude of the impact will be **low** and will require mitigation to reduce the risk.

8.4.1.1 Mitigation

Prevent stormwater runoff from coming into contact with dedicated areas where hazardous substances are handled, by diverting flow with berms and cut-off drains to divert stormwater runoff away from the site and discharge diverted stormwater as per predevelopment conditions, and good housekeeping.

8.4.2 Erosion during operation

In the operational phase, the potential impacts due to the additional hardened surfaces include erosion of the surrounding environment. Eroded soil particles carried to downstream water resources can also result in the decrease in quality of nearby watercourses, due to sedimentation. The impact significance in the operation phase is expected to be **moderate**.

8.4.2.1 Mitigation

In summary, the following mitigation measures are proposed:

- Design stormwater management facilities to comply with regulation GN 704.
- Stormwater infrastructure installed to mitigate possible hydrological impacts must be regularly maintained throughout the lifespan of the infrastructure to ensure its optimum functionality.
- Protection of the wind turbine base by means of a cut-off drain or berm along the uphill side of the base.
- Apply erosion protection measures such as stone-pitching downstream of steep roadside channels.

Should the measures described above be implemented during the operation phase, the impact significance will reduce from **moderate – very low**.

8.4.3 Flooding

During the operation of the wind farm site, an increase in stormwater runoff is expected due to an increase in impervious surfaces, i.e., proposed roads and turbine foundations. However, this increase in hardened surfaces can be considered as negligible. Therefore, very little to no increase in peak flow in the watercourses are expected, hence the impact significance is expected to be **low**.

8.4.3.1 Mitigation

Protect structures such as the wind turbine bases and substation / control building from localised flooding by constructing cut-off berms / diverting flow on the uphill side in flood prone areas.

Should the measures described above be implemented during the operation phase, the impact significance will reduce from **low – very low**.

8.5 Closure/decommissioning

8.5.1 Contamination of stormwater runoff

Similarly, to the construction phase, the runoff during the rehabilitation (decommissioning/ closure) phase may contain contaminants. In addition, soil compaction to reshape the landform may cause increased runoff which may still contain higher concentrations of contaminants and sediment.

The magnitude is therefore rated as low, with a short-term duration, extending to the site. The probability is low with the resultant impact significance of the runoff during rehabilitation expected to be **low**.

8.5.1.1 Mitigation

All pollution control mechanisms are to be in accordance with GN 704, and all necessary pollution control mechanisms must be protected and repaired or established when stockpiles or residue deposits are reclaimed, removed, or rehabilitated so that water pollution is minimized and abated.

Should the measures described above be implemented then the impact significance should be reduced from **low – very low**.

8.6 Impact assessment summary

The predicted environmental impacts resulting from the proposed project activities in the scoping phase are listed in Table 8, along with their significance ratings before and after mitigation.

Table 8: Impact assessment summary

Project Name	Dalmanutha Wind Energy Scoping Surface Water Impact Assessment																		
Impact Assessment																			
CONSTRUCTION																			
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Stormwater runoff	Contamination of stormwater runoff - Stormwater runoff could potentially come in contact with areas dedicated for the handling of contaminants such as fuel storage areas or in the case of wind turbine sites or the substation / control building, with areas where potential contaminants such as concrete is being handled. This could result in contaminated stormwater runoff being discharged downstream.	Construction	Negative	Moderate	3	1	3	3	3	**30**	**N2**	2	1	1	2	2	**12**	**N1**
					Significance	**N2 - Low**							**N1 - Very Low**						
Impact 2:	Erosion	Erosion at the construction site - During the construction of roads, the removal or disturbance of vegetation could result in the concentration of flow and consequently in accelerated erosion along roads where steep slopes dominate, which will result in an increase of suspended solids and sedimentation of the downstream environment.	Construction	Negative	Moderate	2	2	3	2	4	**36**	**N3**	2	1	1	2	2	**12**	**N1**
					Significance	**N3 - Moderate**							**N1 - Very Low**						
OPERATIONAL																			
Impact number	**Receptor**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**		**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	
Impact 1:	Stormwater runoff	Contamination of stormwater runoff - Stormwater runoff could potentially come in contact with areas dedicated for the handling of contaminants such as fuel storage areas or in the case of wind turbine sites or the substation / control building, with areas where potential contaminants such as concrete is being handled. This could result in contaminated stormwater runoff being discharged downstream.	Operational	Negative	Moderate	4	1	3	2	2	**20**	**N2**	2	1	1	2	2	**12**	**N1**
					Significance	**N2 - Low**							**N1 - Very Low**						
Impact 2:	Erosion	Erosion at the construction site - Eroded soil particles in the operational phase carried to downstream water resources can also result in the decrease in quality of nearby watercourses, due to sedimentation.	Operational	Negative	Moderate	2	2	3	2	4	**36**	**N3**	2	1	1	2	2	**12**	**N1**
					Significance	**N3 - Moderate**							**N1 - Very Low**						
Impact 3:	Flooding	Flooding of structures/substation - During the operation of the wind farm site, an increase in stormwater runoff is expected due to an increase in impervious surfaces.	Operational	Negative	Moderate	3	1	3	2	2	**18**	**N2**	2	1	1	2	2	**12**	**N1**
					Significance	**N2 - Low**							**N1 - Very Low**						
DECOMISSIONING																			
Impact number	**Receptor**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**		**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	
Impact 1:	Stormwater runoff	Contamination of stormwater runoff- Soil compaction to reshape the landform may cause increased runoff which may still contain higher concentrations of contaminants and sediment.	Decommissioning	Negative	Moderate	4	1	3	2	2	**20**	**N2**	2	1	1	2	2	**12**	**N1**
					Significance	**N2 - Low**							**N1 - Very Low**						

9.0 CONCLUSIONS AND RECOMMENDATIONS

Due to the nature of the construction activities, it can be concluded that the majority of the surface water impacts would be of a water quality nature. The potential impacts primarily include erosion and stormwater runoff coming in contact with areas dedicated to collection, containment and treatment of hazardous substances such as fuel storage areas as well as localized flooding. Mitigation measures must be put into place to prevent or reduce the impact on the downstream environment.

Stormwater management is required both during and after the construction of the WEF to prevent damage to property, degradation of the water quality in nearby water resources and negative impacts to the surrounding environment. The impacts during construction phase are temporary, while impacts during operational phase are permanent and could result in a greater cumulative impact, which will be addressed in the EIA phase. Impacts during both these phases should be controlled at the source, to minimize or prevent the long-term and short-term impacts.

10.0 REFERENCES

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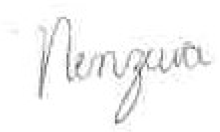

Tebatso Menziwa
Candidate Civil Engineer

Eugeshin Naidoo
Senior Civil Engineer

TM/EN/ab

Reg. No. 2002/007104/07
Directors: RGM Heath, MQ Mokulubete, MC Mazibuko (Mondli Colbert), GYW Ngoma

https://golderassociates.sharepoint.com/sites/155080/project files/6 deliverables/21500715_353056_7_final report/21500715-353056-7_dalmanutha_wef_scopassess_20july2022_final.docx

APPENDIX A

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