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Reg No 2018/462716 /07

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20 June 2021

To whom it may concern

AQUATIC ASSESSMENT OPINION HIGHLANDS CENTRAL WIND ENERGY FACILITY (WEF): PROPOSED AMENDMENTS TO THE ENVIRONMENTAL AUTHORISATION (DEFF REF: 14/12/16/3/3/1/1958)

EnviroSci (Pty) Ltd was appointed to review the proposed layout amendments against the previous aquatic impact assessment submitted in 2018/2019, noting that the Aquatic Impact Assessment was compiled by the same lead author as the undersigned.

The proposed wind energy facility (DEA Reference number 14/12/16/3/3/1/1958) received Environmental Authorisation (EA) on 29 January 2020. Subsequent to the EA being issued, a different turbine option has been considered, although being larger (with a slight increase in turbine footprint), the increased generation capacity allows for a reduction in the overall number of turbines (Table 1). The project amendments included are summarised below:

Table 1: The proposed amendments to the authorised wind energy facility are as follows, with the impacts associated with the aquatic environment and assessed in this opinion shown in blue

Component	Approved	Proposed amendment
Number of turbines:	Up to 12 turbines	Up to 10 turbines
Generation capacity of the WEF:	Up to 72 MW	No Change
Generation capacity per turbine:	Up to 6 MW	Remove generation capacity per turbine
Rotor / blade diameters:	Maximum of 150 m	Maximum of 175 m
Hub height:	Up to 135 m	Up to 180 m
Tip height:	Up to 200 m	Up to 267.5 m
Foundation Size:	up to approximately 25 m x 25 m in total and up to 5 m deep per turbine	up to approximately 35 m x 35 m in total and up to 7 m deep per turbine
Hard Stand area per turbine:	5000 m ²	6000 m ²
Battery Storage	N/A (Not currently included in project description)	Battery Energy Storage System (BESS) adjacent to the substation on the temporary laydown area (with a footprint of approximately 1ha, and a height of approximately 8m).
Length of internal roads	Approximately 50 km	Approximately 45 km

In addition, the following amendments are proposed:

- Slight adjustments to the turbine positions in the preliminary layout are proposed, in order to minimise wake effects, as well as to avoid the proposed new blade length extending into areas identified as highly sensitive for birds and bats.
- Correction of editorial error in the project title on page 1 of the EA and Condition 1, where reference is made to 70 MW instead of 72 MW.

- The proposed Battery Energy Storage System (BESS), adjacent to the substation (on the temporary laydown area), would have a footprint of approximately 1 ha, and a height of approximately 8 m, and would include the following:

Type of Battery	: Battery Storage Facility comprising Lithium-ion, Sodium-sulphur, Vanadium Redox Flow or an alternative battery technology
Life span of BESS	: Assume the same as duration of facility
Motivation for BESS	: Battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use. In essence, this technology allows renewable energy to enter the base load and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.
Footprint	: Approximately 1 ha
Connection type	: AC Connection on Grid
System Power	: Up to 870 MWh
No. of batteries used	: Variable, preferably containerized systems
Inverters used	: Specific type will be chosen according to performance requirements of use cases
Height of BESS	: Approximately 8 m

According to the Applicant, the proposed amendments will not result in an increase in the size of the approved development footprint for the project. (In this regard, the EA currently states the following: *“The Proposed development site is approximately 10 000 hectares. This is the total area covered, in which all six components will be located. The actual infrastructure footprint will be around 1% of this for the Highlands Central WEF”*. The final EIA Report indicated that: *“Typically, in wind energy facilities, the amount of surface area covered by turbines and associated infrastructure such as roads is less than 1% of the total site. The footprint of the facility is estimated at 41 ha”*. The development footprint with the proposed amendments would be approximately 39 ha¹.

¹ Note: The estimated 41 ha development footprint for the authorized project includes the access roads that go through Highlands North WEF to reach the Highlands Central WEF. The approximately 39 ha development footprint estimated for the proposed amendment has been estimated on the same principle, i.e. the 39 ha includes the access road that goes through Highlands North WEF to reach the Highlands Central WEF. Therefore, if all three WEFs are constructed, the total footprint of the combined WEFs would be smaller than the sum of all three individual WEFs (given that sections of access roads would be shared). To provide a “worst case scenario”, however, the entire access road must be included in each WEF’s EA.

Therefore the most significant amendment being applied for by the applicant would seem to be the increase in hub height, rotor diameter, the generation capacity together with a revision of a shortended road layout. The aforementioned amendments, as well as the inclusion of the BESS have little bearing on the aquatic environment as the footprints of the construction camp, substation / BESS, hardstands, and turbine footings have no direct impact on the aquatic environment (Figure 1). Based then on a review of the layout against the delineated aquatic systems, the amendments would have little bearing on the aquatic environment as the potential impacts and significance of the impacts would remain the same.

Table 2, summarises the findings of the impact assessment comparison between the authorised and amendment layout (Figure 1). As the impacts and their significance (with and without mitigation) were similar the reversibility, irreplaceability, extent, duration, severity, probability and status also remains unchanged, thus Table 2 only indicates the overall significance.

Table 2: Impact summary table comparing authorised versus amended layout

Issue & Impact	Authorised layout impact significance rating with mitigation	Amendment Layout impact significance rating with mitigation	Comment
Loss of aquatic species of special concern	Not assessed as not applicable	Not assessed as not applicable	No additional impacts were anticipated as no aquatic species of special concern were observed but as recommended in the authorised project a preconstruction walkdown must be conducted.
Loss of remaining wetlands with High sensitivity	Not assessed as not applicable	Not assessed as not applicable	All important riverine areas have been avoided, with a limited number (5 ²) of crossings within minor drainage lines and watercourses, however to minimise any indirect impacts (e.g. changes to hydrology) a final walkdown should also be conducted post authorisation to assist with the development of the stormwater management plan and Rehabilitation and Monitoring plan. This is already included in the original proposed mitigation.
Loss of riparian systems and water courses	Low - negative	Low - negative	All important riverine areas have been avoided, with a limited number (5) of crossings within minor drainage lines and watercourses , however to minimise any indirect impacts (e.g. changes to hydrology) a final walkdown should also be conducted post authorisation to assist with the development of the stormwater management plan and Rehabilitation and Monitoring plan. This is already included in the original proposed mitigation.
Impact on aquatic systems through the possible increase in	Low - negative	Low - negative	No additional mitigations are required, although the development of a

² The number of crossings is the cumulative total of new roads that will be required for the WEF, which may include road crossings of the other Highland WEFs to gain access to this site, especially if the adjoining WEFs are not approved and or constructed within different timeframes

surface water runoff on downstream sedimentation and erosion			stormwater management plan is reiterated.
Potential impact on localised surface water quality	Low - negative	Low - negative	No additional mitigation are required.
Cumulative impacts	Low - negative	Low - negative	The positive cumulative impact will only occur if river/wetland rehabilitation occurs, however none occur within or will be affected by the proposed footprints

The proposed increased size of the turbines and increased footprint (of the turbine foundations and hardstandings) has had no direct impact on the aquatic environment, as the overall changes are mostly vertical (increases in height), which necessitated a change in the road layout (due to the reduction in the number of turbines), but more importantly the positions and changes to the associated infrastructure still avoid the most sensitive areas of the delineated aquatic zones including their respective buffers. This includes the proposed Battery Energy Storage System.

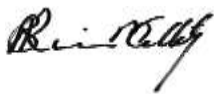
In conclusion, the potential impact of the proposed amendments and amended layout on the aquatic environment will remain unchanged from the original impact assessment if all the proposed mitigations are upheld. There is however an overall advantage to the proposed layout as the overall number of watercourse crossing has been reduced, although the impact significance would remain LOW for all the impacts.

Thus, based on the findings of this study, no objection to the authorisation of any of the proposed amendments, assuming that all mitigations proposed in the reports submitted are carried out. Similarly, in the assessment of potential cumulative impacts, no additional impacts or changes to the previously assessed impacts would be required due to the proposed amendments.

No changes to the original mitigations or EMPr considerations are required.

Please don't hesitate to contact me directly should you have any further queries.

Yours Sincerely



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FIGURE 1: Amended project layout (blue lines), when compared to the observed watercourses with 32m buffer.