Plan of study for Aquatic Specialists Study

Project Brief

The project is undertaking a Scoping and Environmental Impact Assessment (S&EIA) for a 400 MW Solar PV facility in the Northern Cape.

The plan of study is to undertake a desktop analysis and compile a high level Scoping Report describing the study area, assessment objectives, proposed methodologies to achieve those objectives, and where applicable, the anticipated timeframe to complete the entire assessment, a breakdown of the times required to complete the different phases of the assessment, identification of critical milestones (required for continuation to the next phase in the assessment) and the optimum times (of the day and of the year) to undertake your assessment.

Study area

The development of a 400 MW Solar Photovoltaic (PV) facility is proposed on the Remainder of Farm Goede Hoop 26C and Portion 3 of Farm Goede Hoop 26C, between De Aar and Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa

The size of the proposed development footprint for the 400 MW solar PV facility is approximately 600 ha. This area includes four interconnected 100 MW solar PV plants (150ha each), with associated infrastructure. The PV system will be connected via transmission lines to the authorised substation on Phase 1. The substation ties into the existing ESKOM 400KV overhead powerlines. Existing roads will be used for main access, which may need to be enlarged to allow large equipment to access the site during construction.

The study area lies near the eastern edge of the Nama Karoo biome and is mapped according to the national vegetation types (Mucina and Rutherford, 2006) as being of the vegetation type Northern Upper Karoo which is considered to be least threatened.

The Aquatic Biodiversity Sensitivity of the study area is “Very High” owing to the presence of a “Strategic Water Source Area” as well as “Wetlands and Estuaries” (Screening Report compiled by Ecoleges Environmental Consultants and dated 02 February 2022).

The main water feature in the area is tributaries to the Brak River, a seasonal tributary within the Orange River System which flows in an arc from south-east to north-west, eventually feeding into the Orange River basin. The ephemeral drainage line running through the project area is an unnamed tributary to the D62D – 05610 tributary with its confluence just downstream of the Project Area.

The river flows to the north of the study area with a number of its tributaries crossing the area as it flows in a northerly direction. All the small tributaries in the area are ephemeral or intermittent and are discernible only as slightly shallow depressions with no clear associated vegetation and slightly clayey soils.

Assessment objectives

The principal aims of an aquatic assessment will be to determine how the development (and its separate elements, e.g., solar PV panels, pylons and road crossings) will impact on the aquatic ecological integrity of the area (particularly any important/sensitive aquatic invertebrate populations) by

(1) identifying, describing (assessing) and delineating any wetlands, pans and/or watercourses in the study area,

(2) demarcating appropriate ecological buffers along adjacent wetlands, pans and/or watercourses, and

(3) undertaking a Risk Assessment of certain activities associated with the development (to determine if S21(c) and (i) water uses can be authorised under a General Authorisation), specifically:

- Upgrading three existing road crossings (including installing culverts),
- Erecting a perimeter fence (and creating a fire-break road) that may cross a watercourse in two potential locations,
- Developing a solar PV system within 100m of a watercourse and/or 500 m from a wetland or pan (including the possible wetland system near Corner C),
- Installing underground water pipes, aboveground storage tanks and a deionization plant in proximity to both boreholes (with pans), and
- Three potential watercourse crossings for underground cables (used to take electricity from the field transformers to the on-site substation).

Proposed methodologies

Riparian Delineation & Scientific Buffer determination**:** Riparian delineation and habitat evaluation was done according to the DWAF Guidelines (2005) and DWAF updated manual (2008).

Scientific Buffer determination**:** Determination of Buffer zone requirements for the drainage system: Excel based Buffer Zone Tools (Macfarlane and Bredin, 2017).

Site Specific historic and current PES & EIS relating to the following characteristics:

Assess the ecological status, importance and sensitivity of the site as required for section 21 (c) and (i) water uses by the Department of Water and Sanitation (DWS):

- EcoClassification and EcoStatus Determination are used to define Ecological importance and sensitivity (WRC Report No. TT 377-08).
- Present Ecological State (PES): The PESEIS data from the Department of Water and Sanitation Desktop PESEIS assessment (DWS, 2014), supplies most of the current status information of the relevant sub-quaternary river reaches (SQRs) for South Africa.
- Assessment of ecological importance and sensitivity (Kleynhans et al - DWAF, 1999).

Flow and sediment regimes: Flow and sediment regimes at appropriate flows will be obtained from existing DWS data base and other relevant studies (DWA, 2010),

Vegetation: Riparian habitat surveys (Riparian Vegetation Index — VEGRAI): The index is based on the interpretation of the influence of riparian vegetation structure and function on in-stream habitat.

Riparian and in-stream Habitat: The habitat indices to be used in this survey are the Invertebrate Habitat Assessment System (IHAS) and the Habitat Quality Index (HQI). Sites will be evaluated according to the Index of Habitat Integrity (IHI) model. For the fish section the Habitat Cover Ratings (HCR) and Site Fish Habitat Integrity Index (SHI) were also applied.

Biota - Aquatic surveys:

- Aquatic habitat assessments
- Macro-invertebrates - SASS5 for invertebrates
- Fish - FRAI-based surveys

Water quality in relation to the flow regime, including the following characteristics of the water:

- Biological: Macro Invertebrate Response Assessment Index (MIRAI)

Impact/Risk Assessment: The Risk Assessment will be done in accordance with the Risk Matrix (Based on DWS 2014 publication: Section 21 (c) and (i) water use Risk Assessment Protocol and as contained as Appendix A in GN509 of 26 August 2016) and is to be carried out by considering the risk rating of the proposed project activities after implementing mitigation measures.

A cumulative impact assessment of the proposed development shall also be performed, by comparing the Department's Renewable Energy EIA Application Data (https://egis.environment.gov.za/renewable_energy) with the latest Google Earth satellite imagery to identify and assess only those Solar PV facilities that have been developed within 30km of this development (Phase 3).

Mitigation and/or management measures: A proactive approach to risk-based water use authorisation requires that, wherever possible, impacts should be addressed with suitable mitigation measures that should aim to render such impacts negligible.

Anticipated timeframe to complete the entire assessment

The assessment of the following activities will determine the anticipated timeframe to complete the entire assessment:

- Assessing the presence and sensitivity of the local aquatic ecology of:
    - Wetlands/pans
    - Drainage lines
- Assessing the impacts of activities and infrastructure relating to the following:
    - PV system (solar panel arrays, inverters, and field transformers)
    - On-site substation
    - Transmission pylons (overhead powerline)
    - Road crossings
    - Boreholes
    - Cabling routes
    - Construction camp (to be converted into operational area)
    - Borrow pit, and
    - Perimeter fence (with fire-break road).

Assessing these aspects in a project area of approximately 600 ha will be completed in a period of 7 days. All of these aspects will be considered in the Risk Assessment and form part of the Impact Study.

Identification of critical milestones

As mentioned in the following section (optimum times), the best time to do the study will be when there is surface water in the system. Since the wet season is approaching, the sooner the better. After the surveys the report will be completed in at least a 2 months period.

Optimum times (of the day and of the year) to undertake your assessment

The best time to do the study will be when there is surface water in the system. However, this is an ephemeral system with erratic flows and presence of surface water is very seldom present. Therefore, surveys can be done whenever vegetation is still with leaves, thus from late spring to early fall.