RE-VEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the rehabilitation plan is to ensure that areas cleared or impacted during construction activities on Lichtenburg 1 are rehabilitated to its original state before the operation phase commences, and that the risk of erosion from these areas is reduced. The purpose of the rehabilitation plan for the site can be summarised as follows:

» Achieve long-term stabilisation of all disturbed areas.
» Minimise visual impact of disturbed areas.
» Ensure that disturbed areas are rehabilitated to a condition similar to that found prior to disturbance.

This Rehabilitation Plan should be read in conjunction with other site-specific plans, including the Erosion Management Plan, Soil Management Plan, Alien Invasive Plant Management Plan, and Plant Rescue and Protection Plan. Prior to the commencement of construction, a detailed Rehabilitation Plan and Method Statement for the site should be compiled with the aid of a suitably qualified, professionally registered specialist (with a botanical or equivalent qualification).

2. RELEVANT ASPECTS OF THE SITE

The project site is situated in the Grassland biome and Dry Highveld Grassland Bioregion. The vegetation in and surrounding the project site is Carletonville Dolomite Grassland (Gh 15). During the Ecological survey conducted by Botha (2018), only one vegetation association was identified within the solar development footprint, whilst two vegetation associations were identified within the powerline corridor namely:

» Association 1: *Elionurus muticus – Helichrysum callicamum* Savanna Grassland (both the solar footprint and the powerline corridor). This savanna type comprises a dominant open grassland with some scattered shrubs and trees (mainly *Searsia pyroides, S. Lancea, Celtis africana, Gymnosporia buxifolia* and *Grewia flava*). Taller trees are relatively scarce and may be clumped together. Such clumps are scarce within the project site and typically comprise of *Searsia lanceae, S. pyroides, Ziziphus mucronata, Celtis africana, Gymnosporia buxifolia* and *Asparagus laricinus*. Species of conservation importance that was observed within the unit were occasional *Boophone disticha* plants. Other conservation important plants much less frequently observed include; *Ammocharis coranica, Orbea lutea* and *Aloe greatheadii* var. *davyana*.

» Association 2: *Hyparrhenia hirta – Elionurus muticus* Palaeo-drainage Grassland (only within the powerline corridor). These palaeo-channels are relicts of historically wetter periods and merely exhibit characteristics (edaphic) of wetter periods but have lost all of its hydrological functions. Although there are still very slight incisions of the channels, it is mostly filled with a moderately to thin layer of sand and/ or silt and clay covering bedrock and stones of dolomite and chert. These palaeo-drainage lines are characterised by a plant species composition different from the surrounding dryer areas and is almost entirely covered with graminoids with some forbs. Shrubs and trees are almost absent from this channel with only occasionally the presence of *Grewia flava* and *Searsia lancea*. The grass layer is moderately

tall (1m – 1.7m) and overwhelmingly dominates this plant community, typically comprising of *Themeda triandra, Cymbopogon caesius, Hyparrhenia hirta, Aristida congesta, A. junciformis, Eragrostis rigidior, E. curvula, E. chloromelas, E. plana, Cynodon dactylon* and *Diheteropogon amplectens*. Trampled and severely overgrazed areas are typically covered by *Aristida congesta, Eragrostis plana, Gomphrena celosioides, Bidens pilosa, Seriphium plumosum, Argemone ochroleuca, Verbena bonariensis* as well as *Schkuria pinnata.* Regarding conservation important species, only one conservation important species was observed within this palaeo-drainage grassland namely *Ammocharis coranica* and was only observed occasionally and occurring as a singular species.

3. REHABILITATION METHODS AND PRACTISES

- Clearing of invaded areas should be conducted as per the Alien Management Plan, included in the EMPr.
- No harvesting of vegetation may be done outside the area to be disturbed by construction activities.
- Indigenous plant material must be kept separate from alien material.
- Indigenous seeds may be harvested for purposes of revegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- Topsoil should be reserved wherever possible on site, to be utilised during rehabilitation.
- Sods used for revegetation should be obtained directly from the site, but not from the sensitive areas. Sods should contain at least a 50 mm topsoil layer and be minimally disturbed, in particular to existing root systems. Sods must ideally be obtained from areas as close as possible to the region that is to be rehabilitated.
- Water used for the irrigation of re-vegetated areas should be free of chlorine and other pollutants that might have a detrimental effect on the plants.
- All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.
- In areas where soil saver is used, it should be pegged down to ensure that it captures soil and organic matter flowing over the surface.
- The final rehabilitated area should resemble the current composition and structure of the soil as far as practicably possible.
- Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible.
- No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been rehabilitated.
- Where rehabilitation sites are located within actively grazed areas, they should be fenced off; this must be undertaken in consultation with the landowner.
- Any runnels, erosion channels or wash-aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.
- Re-vegetated areas should be monitored frequently and prepared and revegetated from scratch should inadequate signs of surface coverage or grown be evident after two growth seasons. Adequate recovery must be assessed by a qualified botanist or rehabilitation specialist.

- The stockpiled vegetation from the clearing operations should be reduced to mulch where possible, and retained along with topsoil to encourage seedbank regrowth and soil fertility.
- Mulches must be collected in such a manner as to restrict the loss of seed.
- Much must be stored for as short a period as possible.
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- Where herbicides are used to clear vegetation, species-specific chemicals should be applied to individual plants only. General spraying should be strictly prohibited, and only the correct herbicide type should be applied.
- Once rehabilitated, areas should be protected to prevent trampling and erosion.
- Fencing should be removed once a sound vegetative cover has been achieved.

4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Developer will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that should be monitored:

- Associated nature and stability of surface soils.
- Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately, as per the alien management plan and mitigation measures contained within the EMPr.

Rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

- Rehabilitation areas should be monitored every 4 months for the first 12 months following construction, or as per the recommendations of the relevant specialist.
- Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore the timeframe between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control and rehabilitation strategy.
- Any areas showing erosion, should be adaptively managed with particular erosion control measures, depending on the situation.

If the current state of the environment prior to construction (which will be disturbed during the construction phase) is not achieved post impact, within the specified rehabilitation period, maintenance of these areas must continue until an acceptable state is achieved (excluding alien plant species or weeds). Additional rehabilitation methods may be necessary to achieve the current state before construction commences.

Monitoring of the rehabilitation success, as well as follow-up adaptive management, combined with the clearing of emerging alien plant species should all continue for as long as is considered necessary, depending on regrowth rates.