PLANT RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the Brakpan 1 Solar Energy Facility Plant Rescue and Protection Plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the EMPr to reduce the impact of the development of the solar facility and associated infrastructure on listed and protected plant species and their habitats during construction and operation. This subplan is required in order to ensure compliance with national and provincial legislation for vegetation clearing and any required destruction or translocation of provincially and nationally protected species within the development footprint.

The Plan first provides some legislative background on the regulations relevant to listed and protected species, under the Western Cape Nature Conservation Laws Amendment Act, 2000 and trees protected under the National List of Protected Tree Species. This is followed by an identification of protected species present within the Brakpan 1 Solar Energy Facility development area and actions that should be implemented to minimise impact on these species and comply with legislative requirements.

2. IDENTIFICATION OF SPECIES OF CONSERVATION CONCERN

Plant species are protected at the national level as well as the provincial level and different permits may be required for different species depending on their protection level. At the national level, pprotected trees are listed by the Department of Forestry, Fisheries, and the Environment under the National List of Protected Trees, which is updated on a regular basis. Any clearing of nationally protected trees requires a permit from DAFF. At the provincial level, all species red-listed under the Red List of South African plants (<u>http://redlist.sanbi.org/</u>) as well as species listed under the Western Cape Nature Conservation Laws Amendment Act, 2000 are protected and require provincial permits. The Western Cape Nature Conservation Laws Amendment Act lists a variety of species as protected but also several whole families and genera as protected. Of particular relevance to the current study are the following, which are extracted from the legislation and are not intended to provide a comprehensive list of all protected species, only those which are likely to be encountered in the area. The reader is referred to the schedules of the Act for a full list of species listed under the act.

3. IDENTIFICATION OF LISTED SPECIES

In this section, the listed species observed to occur within the surrounding area are identified and listed below. Those present and the number affected within the development footprint would be clarified following the pre-construction walk-through. The list is not considered exhaustive and additional species may be observed to be present during the pre-construction walk-through, which should be conducted at a favourable time of year, such that there is a maximal chance of picking up geophytes and other species which may not be easily observed at other times of the year.

The project area is located within the Nama Karoo Biome, which is a large, landlocked region on the central plateau of the western half of South Africa and extends into south-eastern Namibia. This is an arid biome with majority of the river systems being non-perennial. Apart from the Orange River and the few permanent streams in the southwest that originate in higher-rainfall neighbouring areas, the limited number of perennial streams that originate in the Nama-Karoo are restricted to the more mesic east. The low

precipitation is unreliable (coefficient of variation of annual rainfall up to 40%) and droughts are unpredictable and prolonged. The unpredictable rainfall impedes the dominance of leaf succulents and is too dry in summer for dominance by perennial grasses alone, and the soils are generally too shallow, and the rainfall is too low for trees. Unlike other biomes of southern Africa, local endemism is very low and consequently, the Nama-Karoo Biome does not contain any centre of endemism. Despite relatively low floristic diversity, the Nama-Karoo vegetation has a high diversity of plant life forms. These include cooccurring ephemerals, annuals, geophytes, C3 and C4 grasses, succulents, deciduous and evergreen chamaephytes and trees. This is probably a consequence of an ecotonal and climatically unstable nature of the region

Several species of flora protected under provincial legislation were recorded within the project area during the survey period, namely

- » Aizoaceae (Ruschia intricata)
- » Aizoaceae (Ruschia spinosa)
- » Aizoaceae (Trichodiadema sp).
- » Amaryllidaceae (Ammocharis coranica)
- » Hyacinthaceae (Dipcadi sp).

Notably, there are likely more protected flora species within the PAOI, but these were not recorded as the ideal survey period would have been during March as indicated by the Species Environmental Assessment Guideline (SANBI, 2020). This would have ensured that flora species are correctly identified, and a true representative sample of the species community structure is obtained. Therefore, it is imperative that a Search and Rescue effort be undertaken for protected plant species, and these species be relocated to proximal areas that will not be developed. A permit from the relevant authority, Cape Nature, must be obtained in order to achieve this. It is further recommended that not only protected species be relocated, but also succulent species of other taxonomic groups where it is feasible.

4. MITIGATION & AVOIDANCE OPTIONS

The primary mitigation and avoidance measure that must be implemented at the pre-construction phase is the Pre-construction Walk-Through of the development footprint. This defines which and how many individuals of listed and protected species are found within the development footprint. This information is required for the DFFE and Cape Nature Conservation permits which must be obtained before construction can commence.

Where listed plant species fall within the development footprint and avoidance is not possible, then it may be possible to translocate the affected individuals outside of the development footprint. However, not all species are suitable for translocation as only certain types of plants are able to survive the disturbance. Suitable candidates for translocation include most geophytes and succulents. Although there are exceptions, the majority of woody species do not survive translocation well and it is generally not recommended to try and attempt to translocate such species. Recommendations in this regard would be made following the walk-through of the facility footprint before construction, where all listed and protected species within the development footprint will be identified and located.

5. RESCUE AND PROTECTION PLAN

5.1. Pre-construction

- » Identification of all listed species which may occur within the site, based on the SANBI POSA database as well as the specialist BA studies for the site and any other relevant literature.
- » Before construction commences at the site, the following actions should be taken:
 - A walk-through of the final development footprint by a suitably qualified botanist/ecologist to locate and identify all listed and protected species which fall within the development footprint. This should happen during the flowering season at the site which, depending on rainfall, is likely to be during spring to early summer (August-October).
 - A walk-through report following the walk-through which identifies areas where minor deviations to
 roads and other infrastructure can be made to avoid sensitive areas and important populations of
 listed species must be compiled. The report should also contain a full list of localities where listed
 species occur within the development footprint and the number of affected individuals in each
 instance, so that this information can be used to comply with the permit conditions required by the
 relevant legislation. Those species suitable for search as rescue should be identified in the walkthrough report.
 - A permit to clear the site and relocate species of concern is required frm Cape Nature before construction commences. A tree clearing permit is also required from DFFE to clear protected trees from the site.
 - Once the permits have been issued, there should be a search and rescue operation of all listed species that cannot be avoided, which have been identified in the walk-through report as being suitable for search and rescue within the development footprint. Affected individuals should be translocated to a similar habitat outside of the development footprint and marked for monitoring purposes.

5.2. Construction

- » Vegetation clearing should take place in a phased manner, so that large cleared areas are not left standing with no activity for long periods of time and pose a wind and water erosion risk. This will require coordination between the contractor and EO, to ensure that the EO is able to monitor activities appropriately.
- » All cleared material should be handled according to the Revegetation and Rehabilitation Plan and used to encourage the recovery of disturbed areas.
- » EO to monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the EO and any listed species present which are able to survive translocation should be translocated to a safe site.
- » All areas to be cleared should be demarcated with construction tape, survey markers or similar. All construction vehicles should work only within the designated area.
- » Plants suitable for translocation or for use in rehabilitation of already cleared areas should be identified and relocated before general clearing takes place.
- » Any listed species observed within the development footprint that were missed during the preconstruction plant sweeps should be translocated to a safe site before clearing commences.
- » Many listed species are also sought after for traditional medicine or by collectors and so the EO and ECO should ensure that all staff attend environmental induction training in which the legal and conservation aspects of harvesting plants from the wild are discussed.

» The EO should monitor construction activities in sensitive habitats such as in dune areas carefully to ensure that impacts to these areas are minimised.

5.3. Operation

- » Access to the site should be strictly controlled and all personnel entering or leaving the site should be required to sign in and out with the security officers.
- The collecting of plants or their parts should be strictly forbidden and signs stating so should be placed at the entrance gates to the site.

6. MONITORING & REPORTING REQUIREMENTS

The following reporting and monitoring requirements are recommended as part of the plant rescue and protection plan:

- Pre-construction walk-through report detailing the location and distribution of all listed and protected species must be compiled. This should include a walk-through of all infrastructure including all new access roads, cables, buildings and substations. The report should include recommendations of route adjustments where necessary, as well as provide a full account of how many individuals of each listed species will be impacted by the development. Details of plants suitable for search and rescue must also be included.
- Permit applications to NC-DENC and DFFE. This requires the walk-through report as well as the identification and quantification of all listed and protected species within the development footprint. The permit is required before any search and rescue or vegetation clearance can take place. Where large numbers of listed species are affected, a site inspection and additional requirements may be imposed by NC-DENC and/or DFFE as part of the permit conditions. All documentation associated with this process needs to be retained and the final clearing permit should be kept at the site.
- » Active daily monitoring of clearing during construction by the EO must be undertaken to ensure that listed species and sensitive habitats are avoided. All incidents should be recorded along with the remedial measures implemented.
- » Post construction monitoring of plants translocated during search and rescue to evaluate the success of the intervention. Monitoring for a year post-transplant should be sufficient to gauge success.

ANNEX 1. LIST OF PLANT SPECIES

List of plant species known from the surrounds of the broader study area and development area for Brakpan 1 Solar Energy Facility, based on observations from the site, as well as, the SANBI SIBIS database.

Family	Species	Family	Species
ACANTHACEAE	Acanthopsis hoffmannseggiana	ACANTHACEAE	Barleria lichtensteiniana
ACANTHACEAE	Barleria rigida	ACANTHACEAE	Blepharis mitrata
ACANTHACEAE	Monechma desertorum	ACANTHACEAE	Monechma divaricatum
ACANTHACEAE	Monechma incanum	ACANTHACEAE	Monechma spartioides
ACANTHACEAE	Peristrophe cernua	AIZOACEAE	Aizoon asbestinum
AIZOACEAE	Aizoon schellenbergii	AIZOACEAE	Galenia africana
AIZOACEAE	Plinthus karooicus	AIZOACEAE	Trianthema parvifolia var. parvifolio
AMARANTHACEAE	Amaranthus praetermissus	AMARANTHACEAE	Amaranthus thunbergii
AMARANTHACEAE	Leucosphaera bainesii	AMARANTHACEAE	Sericocoma avolans
APOCYNACEAE	Adenium oleifolium	APOCYNACEAE	Brachystelma huttonii
APOCYNACEAE	Ceropegia sp.	APOCYNACEAE	Gomphocarpus tomentosus subsp. tomentosus
APOCYNACEAE	Huernia hystrix subsp. hystrix	APOCYNACEAE	Orbea variegata
APOCYNACEAE	Sarcostemma pearsonii	ASPARAGACEAE	Asparagus lignosus
ASPHODELACEAE	Aloe claviflora	ASPHODELACEAE	Aloe dichotoma
ASTERACEAE	Berkheya annectens	ASTERACEAE	Brachylaena ilicifolia
ASTERACEAE	Cineraria geraniifolia	ASTERACEAE	Cineraria saxifraga
ASTERACEAE	Cotula sericea	ASTERACEAE	Dicoma capensis
ASTERACEAE	Dimorphotheca cuneata	ASTERACEAE	Dimorphotheca sinuata
ASTERACEAE	Dimorphotheca zeyheri	ASTERACEAE	Eriocephalus microphyllus var. pubescens
ASTERACEAE	Euryops brachypodus	ASTERACEAE	Felicia echinata
ASTERACEAE	Felicia filifolia subsp. filifolia	ASTERACEAE	Felicia hyssopifolia subsp. hyssopifolia
ASTERACEAE	Felicia muricata subsp. cinerascens	ASTERACEAE	Felicia muricata subsp. muricata
ASTERACEAE	Felicia ovata	ASTERACEAE	Gazania leiopoda
ASTERACEAE	Geigeria ornativa	ASTERACEAE	Geigeria pectidea
ASTERACEAE	Gnaphalium capense	ASTERACEAE	Gnaphalium vestitum
ASTERACEAE	Gymnostephium ciliare	ASTERACEAE	Helichrysum sp.
ASTERACEAE	lfloga sp.	ASTERACEAE	Kleinia longiflora
ASTERACEAE	Leysera tenella	ASTERACEAE	Matricaria sp.
ASTERACEAE	Metalasia pulcherrima forma pulcherrima	ASTERACEAE	Nidorella auriculata
ASTERACEAE	Nidorella sp.	ASTERACEAE	Osteospermum grandidentatum
ASTERACEAE	Osteospermum imbricatum	ASTERACEAE	Osteospermum junceum
ASTERACEAE	Othonna eriocarpa	ASTERACEAE	Pegolettia retrofracta
ASTERACEAE	Pentzia dentata	ASTERACEAE	Pentzia incana
ASTERACEAE	Pentzia pinnatisecta	ASTERACEAE	Pentzia spinescens
ASTERACEAE	Pteronia sordida	ASTERACEAE	Pteronia teretifolia
ASTERACEAE	Pteronia unguiculata	ASTERACEAE	Schistostephium crataegifolium
ASTERACEAE	Senecio asperulus	ASTERACEAE	Senecio erubescens var. erubescens
ASTERACEAE	Senecio hastatus	ASTERACEAE	Senecio juniperinus var. juniperinus
ASTERACEAE	Senecio macroglossus	ASTERACEAE	Senecio monticola

Family	Species	Family	Species
ASTERACEAE	Senecio othonniflorus	ASTERACEAE	Senecio puberulus
ASTERACEAE	Senecio retrorsus	ASTERACEAE	Senecio sp.
ASTERACEAE	Tarchonanthus camphoratus	ASTERACEAE	Tarchonanthus littoralis
AYTONIACEAE	Plagiochasma rupestre var. rupestre	BIGNONIACEAE	Rhigozum obovatum
BIGNONIACEAE	Rhigozum trichotomum	BORAGINACEAE	Ehretia rigida subsp. rigida
BORAGINACEAE	Heliotropium ciliatum	BORAGINACEAE	Lappula heteracantha
BUDDLEJACEAE	Buddleja saligna	CAMPANULACEAE	Wahlenbergia capillacea subsp. capillacea
CAMPANULACEAE	Wahlenbergia tenella var. tenella	CAPPARACEAE	Boscia foetida subsp. foetida
CAPPARACEAE	Cadaba aphylla	CHENOPODIACEAE	Salsola glabrescens
CHENOPODIACEAE	Salsola namibica	CHENOPODIACEAE	Salsola rabieana
COLCHICACEAE	Ornithoglossum viride	CRASSULACEAE	Cotyledon orbiculata var. orbiculata
CRASSULACEAE	Cotyledon woodii	CUCURBITACEAE	Coccinia rehmannii
DIPSACACEAE	Scabiosa angustiloba	EBENACEAE	Euclea undulata
ERIOSPERMACEAE	Eriospermum flagelliforme	EUPHORBIACEAE	Euphorbia avasmontana var. sagittaria
EUPHORBIACEAE	Euphorbia gariepina subsp. balsamea	EUPHORBIACEAE	Euphorbia glanduligera
EUPHORBIACEAE	Euphorbia inaequilatera var. inaequilatera	EUPHORBIACEAE	Euphorbia mauritanica var. mauritanica
EUPHORBIACEAE	Euphorbia rudis	EUPHORBIACEAE	Euphorbia spinea
ABACEAE	Acacia karroo	FABACEAE	Acacia mellifera subsp. detinens
ABACEAE	Amphithalea williamsonii	FABACEAE	Argyrolobium harveyanum
ABACEAE	Aspalathus subtingens	FABACEAE	Aspalathus tridentata subsp. staurantha
ABACEAE	Dipogon lignosus	FABACEAE	Indigastrum argyraeum
ABACEAE	Indigofera alternans var. alternans	FABACEAE	Indigofera angustata
ABACEAE	Indigofera auricoma	FABACEAE	Indigofera heterotricha
ABACEAE	Indigofera holubii	FABACEAE	Indigofera zeyheri
ABACEAE	Parkinsonia africana	FABACEAE	Pomaria lactea
ABACEAE	Prosopis glandulosa var. glandulosa	FABACEAE	Prosopis velutina
ABACEAE	Ptycholobium biflorum subsp. biflorum	FABACEAE	Tephrosia angulata
ABACEAE	Tephrosia capensis var. capensis	FABACEAE	Tephrosia dregeana var. dregeana
ABACEAE	Tephrosia grandiflora	GERANIACEAE	Monsonia burkeana
GERANIACEAE	Monsonia umbellata	GERANIACEAE	Pelargonium anethifolium
GERANIACEAE	Pelargonium inquinans	GERANIACEAE	Pelargonium reniforme subsp. reniforme
Gesneriaceae	Streptocarpus sp.	GISEKIACEAE	Gisekia pharnacioides var. pharnacioides
HYACINTHACEAE	Albuca setosa	HYACINTHACEAE	Dipcadi ciliare
HYACINTHACEAE	Dipcadi viride	HYACINTHACEAE	Ledebouria undulata
HYACINTHACEAE	Ornithogalum tenuifolium subsp. tenuifolium	IRIDACEAE	Dierama pulcherrimum
RIDACEAE	Tritonia strictifolia	LOPHIOCARPACEA E	Lophiocarpus polystachyus
ORANTHACEAE	Tapinanthus oleifolius	MALPIGHIACEAE	Triaspis hypericoides subsp. nelsoni
MALVACEAE	Hermannia abrotanoides	MALVACEAE	Hermannia flammea
MALVACEAE	Hermannia gracilis	MALVACEAE	Hermannia modesta
MALVACEAE	Hermannia mucronulata	MALVACEAE	Hermannia salviifolia var. grandistipula
MALVACEAE	Hermannia sp.	MALVACEAE	Hermannia spinosa
MELIACEAE	Nymania capensis	MENISPERMACEAE	Cissampelos capensis

Family	Species	Family	Species
MESEMBRYANTHEM ACEAE	Lithops bromfieldii	MESEMBRYANTHEM ACEAE	Psilocaulon coriarium
ACEAE MESEMBRYANTHEM ACEAE	Psilocaulon granulicaule	ACEAE MESEMBRYANTHEM ACEAE	Ruschia vulvaria
MOLLUGINACEAE	Limeum aethiopicum subsp. aethiopicum var. aethiopicum	MOLLUGINACEAE	Limeum myosotis var. confusum
MOLLUGINACEAE	Mollugo cerviana var. cerviana	NEURADACEAE	Grielum humifusum var. humifusum
NYCTAGINACEAE	Phaeoptilum spinosum	OCHNACEAE	Ochna arborea var. arborea
OLEACEAE	Olea capensis subsp. capensis	ORCHIDACEAE	Holothrix burchellii
OROBANCHACEAE	Hyobanche sanguinea	OXALIDACEAE	Oxalis bowiei
OXALIDACEAE	Oxalis imbricata var. violacea	PASSIFLORACEAE	Adenium repanda
PEDALIACEAE	Sesamum capense	PHYLLANTHACEAE	Phyllanthus incurvus
PHYLLANTHACEAE	Phyllanthus maderaspatensis	PLANTAGINACEAE	Plantago sp.
POACEAE	Anthephora pubescens	POACEAE	Aristida adscensionis
POACEAE	Aristida congesta subsp. barbicollis	POACEAE	Cenchrus ciliaris
POACEAE	Enneapogon desvauxii	POACEAE	Enneapogon scaber
POACEAE	Eragrostis annulata	POACEAE	Eragrostis biflora
POACEAE	Eragrostis echinochloidea	POACEAE	Eragrostis porosa
POACEAE	Eragrostis rotifer	POACEAE	Eragrostis sp.
POACEAE	Fingerhuthia africana	POACEAE	Panicum Ianipes
POACEAE	Schmidtia kalahariensis	POACEAE	Setaria verticillata
POACEAE	Sporobolus nervosus	POACEAE	Stipagrostis anomala
POACEAE	Stipagrostis ciliata var. capensis	POACEAE	Stipagrostis obtusa
POACEAE	Stipagrostis uniplumis var. neesii	POACEAE	Stipagrostis uniplumis var. uniplumis
POACEAE	Tragus berteronianus	POLYGALACEAE	Polygala seminuda
POLYGONACEAE	Persicaria attenuata subsp. africana	PORTULACACEAE	Portulaca quadrifida
PORTULACACEAE	Talinum arnotii	ROSACEAE	Cliffortia linearifolia
ROSACEAE	Cliffortia serpyllifolia	RUBIACEAE	Kohautia caespitosa subsp. brachyloba
RUBIACEAE	Kohautia cynanchica	RUBIACEAE	Nenax microphylla
RUBIACEAE	Pavetta capensis subsp. capensis	SANTALACEAE	Thesium gnidiaceum var. gnidiaceum
SCROPHULARIACEA E	Aptosimum albomarginatum	SCROPHULARIACEA E	Aptosimum lineare var. lineare
SCROPHULARIACEA E	Aptosimum marlothii	SCROPHULARIACEA E	Aptosimum procumbens
SCROPHULARIACEA E	Aptosimum spinescens	SCROPHULARIACEA E	Jamesbrittenia atropurpurea subsp. pubescens
SOLANACEAE	Lycium oxycarpum	SOLANACEAE	Solanum capense
SOLANACEAE	Solanum nigrum	THYMELAEACEAE	Gnidia burchellii
THYMELAEACEAE	Gnidia nana	THYMELAEACEAE	Gnidia sp.
THYMELAEACEAE	Struthiola argentea	VERBENACEAE	Chascanum cuneifolium
VERBENACEAE	Chascanum incisum	ZYGOPHYLLACEAE	Tribulus terrestris
ZYGOPHYLLACEAE	Tribulus zeyheri subsp. zeyheri	ZYGOPHYLLACEAE	Zygophyllum dregeanum
ZYGOPHYLLACEAE	Zygophyllum flexuosum	ZYGOPHYLLACEAE	Zygophyllum lichtensteinianum
ZYGOPHYLLACEAE	Zygophyllum rigidum		