

## Alien Invasive Plant Management Plan

### **OVERALL OBJECTIVE**

Manage alien and invasive plant species during the construction and operation of the Wind Energy Facility, through the implementation of an alien invasive species management and control programme.

### **PROBLEM OUTLINE**

Alien plants replace indigenous vegetation leading to severe loss of biodiversity and change in landscape function. Potential consequences include loss of biodiversity, loss of grazing resources, increased fire risk, increased erosion, loss of wetland function, impacts on drainage lines, increased water use etc.

In addition, the Conservation of Agricultural Resources Act (Act 43 of 1983), as amended in 2001, requires that land users clear *Declared Weeds* from their properties and prevent the spread of *Declared Invader Plants* on their properties.

Table 3 of CARA (the Conservation of Agricultural Resources Act) lists all declared weeds and invader plants. Alien plants are divided into 3 categories based on their risk as an invader.

- Category 1 - These plants must be removed and controlled by all land users. They may no longer be planted or propagated and all trade in these species is prohibited.
- Category 2 – These plants pose a threat to the environment but nevertheless have commercial value. These species are only allowed to occur in demarcated areas and a land user must obtain a water use license as these plants consume large quantities of water.
- Category 3 – These plants have the potential of becoming invasive but are considered to have ornamental value. Existing plants do not have to be removed but no new plantings may occur and the plants may not be sold.

The following guide is a useful starting point for the identification of alien species:

- Bromilow, C. 2010. *Problem Plants and Alien Weeds of South Africa*. Briza, Pretoria.

### **SPECIFIC MANAGEMENT OBJECTIVES:**

- Ensure alien plants do not become dominant in parts or the whole landscape;
- Initiate and implement a monitoring and eradication programme for alien and invasive species;
- Control alien and invasive species dispersal and encroachment; and
- Promote the natural reestablishment and planting of indigenous species.

## **VULNERABLE ECOSYSTEMS AND HABITATS**

Certain habitats and environments are more vulnerable to alien plant invasion and are likely to bear the brunt of alien plant invasion problems at the site. In addition, construction activities and changes in water distribution at the site following construction are also likely to increase and alter the vulnerability of the site to alien plant invasion.

Areas at the site which are likely to require specific attention include the following:

- Wetlands, drainage lines and other mesic<sup>1</sup> areas;
- Cleared and disturbed areas such as road verges, crane pads and construction footprints etc.; and
- Construction camps and lay-down areas which are cleared or are active for an extended period.

### Wetlands, drainage lines and other mesic areas

There are a relatively large number of drainage lines at the site as well as a number of natural and artificial wetlands. Disturbance within these areas often results in alien plant invasion on account of the greater water and nutrient availability in this habitat. Although there are no turbines within such areas, road crossings will be required. The disturbance footprint within such areas must be minimized and these areas should be checked for alien species more often than the surrounding landscape.

### Cleared and disturbed areas

Cleared and disturbed areas are clearly vulnerable to invasion on account of the lack of existing plant cover to resist invasion as well as the disturbance which created during construction which promotes the germination and establishment of alien plant species.

### Construction camps, batching plants, crushing areas and laydown areas

Construction camps, batching plants, crushing areas and lay down areas are either cleared of vegetation or prolonged activities in these areas result in negative impact on indigenous vegetation. In addition, repeated vehicle and human activity in these areas usually results in the import of alien plant seed on clothes, dirty vehicles or with construction machinery and materials.

## **GENERAL CLEARING & GUIDING PRINCIPLES**

- Alien control programs are long-term management projects and must include a clearing plan which includes follow up actions for rehabilitation of the cleared area. Alien problems at the site must be identified during preconstruction surveys of the development footprint. This may occur simultaneously to other required searches and surveys. The clearing plan must then form part of the preconstruction reporting requirements for the site.
- The plan should include a map showing the alien density & indicating dominant alien species in each area.
- Lighter infested areas should be cleared first to prevent the build-up of seed banks.
- Dense mature stands of woody species where present must be left for last, as they probably will not increase in density or pose a greater threat than they are at the moment.

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<sup>1</sup> In ecology, a mesic habitat is a type of habitat with a moderate or well-balanced supply of moisture, e.g., a mesic forest, a temperate hardwood forest, or dry-mesic prairie. Mesic habitats transition to xeric shrublands in a non-linear fashion, which is evidence of a threshold.

- Collective management and planning with neighbours may be required as seeds of aliens are easily dispersed across boundaries by wind or water courses.
- All clearing actions must be monitored and documented to keep track of which areas are due for follow-up clearing.

### **CLEARING METHODS**

Different species require different clearing methods such as manual, chemical or biological or a combination of both. However care must be taken that the clearing method (s) used does not encourage further invasion. As such, regardless of the method (s) used, disturbance to the soil should be kept to a minimum. Fire is not a natural phenomenon at the site and fire should not be used as a clearing method or vegetation management approach at the site. The best-practice clearing method for each species identified should be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website. <http://www.dwaf.gov.za/wfw/Control/>.

### **USE OF HERBICIDES FOR ALIEN CONTROL**

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment must be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- Specific care must be taken to prevent contamination of any water bodies. This includes: due care in storage, application, cleaning of equipment and disposal of containers, product and spray mixtures.
- Equipment must be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products used must have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighboring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following guidelines should be followed:

- *Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.*

### **ALIEN PLANT MANAGEMENT PLAN**

### **CONSTRUCTION PHASE ACTIVITIES**

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Action	Frequency
The ECO is to provide permission prior to any vegetation being cleared for development.	Daily
Clearing of vegetation must be undertaken as the work front progresses ( <b>i.e. in phases and not all at once</b> ) – mass clearing is not allowed unless the entire cleared area is to be rehabilitated immediately.	Weekly
Should re-vegetation not be possible immediately, the cleared areas must be protected with packed brush, or appropriately battered with fascine work. Alternatively, jute (Soil Saver) may be pegged over the soil to stabilise it.	Weekly
Cleared areas that have become invaded may be sprayed with appropriate <b>environmentally friendly</b> herbicides provided they break down when in contact with the soil. Residual herbicides should not be used.	Weekly
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material for this purpose must be brought onto site. Brush from cleared areas must be used as much as possible. Arid soils are usually very low in organic matter and the use of manure or other soil amendments is likely to encourage invasion.	Weekly
Clearing of vegetation must not be allowed within 50m of any wetland or pan, 80m of any wooded area, within 1:100 year floodlines, in conservation servitude areas or on slopes steeper than 1:3, unless permission is granted by the ECO for specifically allowed construction activities in these areas.	Weekly
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas (particular attention must be paid to imported material such as building sand or dirty earth-moving equipment). Stockpiles must be checked regularly and any weeds emerging from material stockpiles should be removed.	Weekly
Alien vegetation regrowth must be controlled throughout the entire site during the construction period.	Monthly
The alien plant removal and control method guidelines must adhere to best-practice for the species involved. Such information can be obtained from the DWAF Working for Water website.	Monthly
Clearing activities must be contained within the affected zones and may not spill over into demarcated No-Go areas.	Daily
Pesticides may not be used. Herbicides may be used to control listed alien weeds and invaders only.	Monthly
Drainage lines and other sensitive areas must remain demarcated with appropriate fencing or hazard tape while construction activities within the area are underway. These areas are no-go areas (this must be explained to all workers) that must be excluded from all development activities.	Daily

**MONITORING – CONSTRUCTION PHASE**

The following monitoring actions must be implemented during the construction phase of the development.

<b>Monitoring Action</b>	<b>Indicator</b>	<b>Timeframe</b>
Document alien species present at the site	List of alien species	Preconstruction
Document alien plant distribution	Alien plant distribution map	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

**OPERATIONAL PHASE ACTIVITIES**

The following management actions are aimed at reducing the abundance of alien species within the site and maintaining non-invaded areas clear of aliens.

<b>Action</b>	<b>Frequency</b>
Surveys for alien species must be conducted regularly. Every 3 months for the first two years after construction and biannually thereafter. All aliens identified must be cleared.	Every 3 months for 2 years and biannually thereafter
Re-vegetation with indigenous, locally occurring species must take place in areas where natural vegetation is slow to recover or where repeated invasion has taken place.	Biannually, but re-vegetation should take place at the start of the rainy season.
Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, must be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.	When necessary
No alien species must be cultivated on-site. If vegetation is required for esthetic purposes, then non-invasive, water-wise locally-occurring species should be used.	When necessary

**MONITORING – OPERATIONAL PHASE**

The following monitoring and evaluation actions must take place during the operational phase of the development.

<b>Monitoring Action</b>	<b>Indicator</b>	<b>Timeframe</b>

Document alien species distribution and abundance over time at the site.	Alien plant distribution map.	Biannually
Document alien plant control measures implemented & success rate achieved.	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site.	Quarterly
Document rehabilitation measures implemented and success achieved in problem areas.	Decline in vulnerable bare areas over time.	Biannually

### **DECOMMISSIONING PHASE ACTIVITIES**

The following management actions are aimed at preventing the invasion, by alien plant species, of the re-vegetated areas created during the decommissioning phase. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to operation.

<b>Action</b>	<b>Frequency</b>
All damaged areas shall be rehabilitated if the infrastructure is removed and the facility is decommissioned.	Once off
All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	Once off, with annual follow up re-vegetation where required.
Maintain alien plant monitoring and removal programme for 3 years after rehabilitation.	Biannually

### **MONITORING – DECOMMISSIONING PHASE**

The following monitoring and evaluation actions must take place during the decommissioning phase of the development.

<b>Monitoring Action</b>	<b>Indicator</b>	<b>Timeframe</b>
Monitor newly disturbed areas where infrastructure has been removed to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation.	Alien plant surveys and distribution map	Biannually until such time as the natural vegetation has recovered sufficiently to resist invasion.
Monitor re-vegetated areas to detect and quantify any aliens that may become established for 3 years after	Alien plant surveys and distribution map	Biannually for 3 years

decommissioning and rehabilitation.		
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate.  A decline in alien distribution and cover over time at the site	Annually for 3 years

## OPEN SPACE MANAGEMENT PRINCIPLES

The following elements are considered part of the Open Space Management Plan. The principles contained within the Alien Invasive Management Plan should also be considered to form part of the Open Space Management Plan.

### Access Control:

- » Access to the facility should be strictly controlled.
- » All visitors and contractors should be required to sign-in.
- » Signage at the entrance should indicate that disturbance to fauna and flora is strictly prohibited.

### Prohibited Activities:

The following activities should not be permitted by anyone except the landowner or his representatives:

- » No fires within the site.
- » No hunting, collecting or disturbance of fauna and flora, except where required for the safe operation of the facility and only by the Environmental Officer on duty and with the appropriate permits and landowner permission.
- » No driving off of demarcated roads.
- » No interfering with livestock.

### Fire Risk Management:

Although fires are not a regular occurrence at the site, fires may occasionally occur. Ignition risk sources in the area include the following:

- » Lightning strikes
- » Personnel within the facility
- » Infrastructure such as transmission lines

The National Veld and Forest Fires Act places responsibility on the landowner to ensure that the appropriate equipment as well as trained personnel are available to combat fires. Therefore, the management of the facility should ensure that they have suitable equipment as well as trained personnel available to assist in the event of fire.

**Firebreaks**

Extensive firebreaks are not recommended as a fire-risk management strategy at the site. The site is very large compared to the extent of the infrastructure and the maintenance of firebreaks would impose a large management burden on the operation of the facility. In addition, the risk of fires is not distributed equally across the site and within many of the lowlands of the site, there is not sufficient biomass to carry fires and the risk of fires within these areas is very low. Rather targeted risk management should be implemented around vulnerable or sensitive elements of the facility such as substations or other high-risk components. Within such areas, the extent over which management action needs to be applied is relatively limited and it is recommended that firebreaks are created by mowing and that burning to create firebreaks is not used as this in itself poses a risk of runaway fires. Where such firebreaks need to be built as per approved designs, such as around the substation, a strip of vegetation 5-10 m wide can be cleared manually and maintained relatively free of vegetation through manual clearing on an annual basis. However, if alien species colonise these areas, more regular clearing should be implemented.

**REFERENCES:**

AGIS (2006) Weeds and Invasive Plants Atlas ([www.agis.agric.za/wip](http://www.agis.agric.za/wip))