

HIGH LEVEL ALIEN INVASIVE PLANT SPECIES MANAGEMENT PLAN

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1. Introduction & Legal Context

The National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity. Chapter 5 of NEMBA deals specifically with species and organisms posing potential threats to Biodiversity.

The following definitions are pertinent to understanding the purpose and intention of the NEMBA, and the Regulations published thereunder:

alien species	(a) a species that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention;
control	in relation to an alien or invasive species, means- (a) to combat or eradicate an alien or invasive species; or (b) where such eradication is not possible, to prevent, as far as may be practicable, the recurrence, re-establishment, re-growth, multiplication, propagation, regeneration or spreading of an alien or invasive species
introduction	in relation to a species, means the introduction by humans, whether deliberately or accidentally, of a species to a place outside the natural range or natural dispersal potential of that species
invasive species	means any species whose establishment and spread outside of its natural distribution range- (a) threaten ecosystems, habitats or other species or have demonstrable potential to threaten ecosystems, habitats or other species; and may result in economic or environmental harm or harm to human health
listed invasive species	means any invasive species listed in terms of section 70(1). Section 70(1) compels the Minister to publish a national list of invasive species, and empowers the provincial authorities to publish similar lists relevant to a Province. Thus, "listed invasive species" include all species listed in the Alien and Invasive Species Lists, 2020 (GN1003), or in Schedule 13 to the Mpumalanga Nature Conservation Act (Act No 10 of 1998) (MNCA).
restricted activity	(b) in relation to a specimen of an alien species or listed invasive species, means- (i) importing into the Republic, including introducing from the sea, any specimen of an alien or listed invasive species; (ii) having in possession or exercising physical control over any specimen of an alien or listed invasive species; (iii) growing, breeding or in any other way propagating any specimen of an alien or listed invasive species, or causing it to multiply; (iv) conveying, moving or otherwise translocating any specimen of an alien or listed invasive species; (v) selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of an alien or listed invasive species; or any other prescribed activity which involves a specimen of an alien or listed invasive species;

Section 65(1) of NEMBA prohibits a person from carrying out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEMBA.

Section 73 (2) of NEMBA places an obligation on the owners of land where a listed invasive species occurs to:

- (a) notify any relevant competent authority, in writing, of the listed invasive species occurring on that land;
- (b) take steps to control and eradicate the listed invasive species and to prevent it from spreading; and
- (c) take all the required steps to prevent or minimise harm to biodiversity. NEMBA distinguishes three categories of species, that must be controlled, as follows:

- **Category 1a:** Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

The Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983) (CARA) provides for the control over the use of the natural agricultural resources in South Africa, to promote the conservation of soil, water sources and vegetation, and the combating of weeds and invader plants.

Declared Weeds and Invaders in South Africa are categorised according to one of the following categories in terms of CARA:

- **Category 1 plants:** are prohibited and must be controlled.
- **Category 2 plants:** (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- **Category 3 plants:** (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.

2. Purpose of the Management Plan

While it is acknowledged that the Mining Right Holder, Applicant or Contractor may not be the owner of the land, there remains a responsibility on parties in control of land to control the occurrence of alien invasive plants (whether listed or not) and weeds (AIPs).

The purpose of this Management Plan is therefore to specify general measures that must be undertaken at the Project, during all phases of development, to:

- ensure the identification of AIPs on the development site;
- prevent the spread of AIPs onto the development site, or from the development site onto adjacent land;
- facilitate the eradication of AIPs that may become established on the development site; and
- take all the reasonably required steps to prevent or minimise harm to biodiversity caused by AIPs on the development site.

3. Alien Invasive Plants likely to occur in the Mining Right Area (MRA)

Table 1 defines some of the AIPs that are expected to occur in the MRA. Note, this list is not exhaustive and merely indicates some of the problem species known to occur in the general region. The Mine's appointed ECO may amend this list according to on-site observations.

Table 1: Alien Invasive Plants expected in the MRA

Species	Common Name	NEMBA Category	CARA Category	MNCA Category
<i>Argemone ochroleuca</i>	White flowered Mexican poppy	1b	1	Not Listed (NL)
<i>Campuloclinium macrocephalum</i>	Pompom weed	1b		NL
<i>Cirsium vulgare</i>	Common thistle	1b	1	Invader weeds and plants
<i>Cortaderia jubata</i>	Pampas grass	1b	1	Invader weeds and plants
<i>Datura ferox</i>	Long spined thorn apple	1b	1	
<i>Datura stramonium</i>	Common thorn apple	1b	1	Invader weeds and plants
<i>Eucalyptus camaldulensis</i>	Red river gum	b	2	Invader weeds and plants
<i>Ipomoea purpurea</i>	Common morning-glory	1b	3	
<i>Ligustrum lucidum</i>	Broad-leaved privet	1b	3	NL
<i>Malvastrum coromandelianum</i>	Common false mallow	1b	NL	NL
<i>Melia azedarach</i>	Syringa	1b	3	Invader weeds and plants
<i>Opuntia ficus-indica</i>	Prickly pear	1b		
<i>Pinus sp.</i>	Pine Tree	2	1	
<i>Phytolacca octandra</i>	Forest inkberry	1b	NL	NL
<i>Pyracantha coccinea</i>	Scarlet firethorn	1b	NL	NL
<i>Robinia pseudacacia</i>	Black locust	1b	2	NL
<i>Solanum elaeagnifolium</i>	Silver-leaf bitter apple	1b	1	NL
<i>Solanum mauritianum</i>	Bugweed	1b	1	Invader weeds and plants
<i>Solanum sisymbriifolium</i>	Dense-thorned bitter apple	1b	1	Invader weeds and plants
<i>Tamarix ramosissima</i>	Pink tamarix	1b	3	NL
	Purple top/Tall	1b	NL	NL

Species	Common Name	NEMBA Category	CARA Category	MNCA Category
<i>Verbena bonariensis</i>	verbena			
<i>Verbena brasiliensis</i>	Brazilian verbena	1b	NL	NL
<i>Agave sisalana</i>	Sisal	2	2	Invader weeds and plants
<i>Acacia mearnsii</i>	Black wattle	2	2	Invader weeds and plants
<i>Pinus patula</i>	Patula pine	2	2	Invader weeds and plants
<i>Populus sp.</i>	Poplar	2	2	
<i>Populus x canescens</i>	Grey poplar	2	2	NL
<i>Acacia baileyana</i>	Bailey's wattle	3	3	NL
<i>Acer buergerianum</i>	Chinese maple	3	NL	NL
<i>Acer negundo</i>	Box elder	3	NL	NL
<i>Fraxinus angustifolia</i>	Narrow -leaved ash	3	NL	NL
<i>Morus alba</i>	White mulberry	3	3	NL
<i>Phytolacca dioica</i>	Belhambra	3	3	NL
<i>Abelia grandiflora</i>	Glossy abelia	NL	NL	NL
<i>Acanthus mollis</i>	Bear's breeches	NL	NL	NL
<i>Agave americana</i>	American agave	NL	NL	Invader weeds and plants
<i>Alternanthera pungens</i>	Khaki weed	NL	NL	NL
<i>Bidens pilosa</i>	Common blackjack	NL	NL	Invader weeds and plants
<i>Bidens bipinnata</i>	Spanish blackjack	NL	NL	NL
<i>Cedris deodara</i>	Deodar cedar	NL	NL	NL
<i>Celtis sinensis</i>	Chinese nettle tree	NL	NL	NL
<i>Chenopodium album</i>	White goosefoot	NL	NL	NL
<i>Cupressus sempervirens</i>	Mediterranean cypress	NL	NL	NL
<i>Erigeron bonariensis</i> (=Conyza)	Flax-leaf fleabane	NL	NL	NL

Species	Common Name	NEMBA Category	CARA Category	MNCA Category
<i>Eriobotrya japonica</i>	Loquat	NL	NL	NL
<i>Euonymus japonicus</i>	Box-leaf euonymus	NL	NL	NL
<i>Hedera canariensis</i>	Canarian ivy	NL	NL	NL
<i>Lagerstroemia indica</i>	Pride of India	NL	NL	NL
<i>Malva parviflora</i>	Cheeseweed	NL	NL	NL
<i>Oenothera rosea</i>	Rosy evening primrose	NL	NL	NL
<i>Pennisetum clandestinum</i>	Kikuyu	NL	NL	NL
<i>Phoenix canariensis</i>	Canary Island date palm	NL	NL	NL
<i>Plantago lanceolata</i>	Buckhorn plantain	NL	NL	NL
<i>Platanus occidentalis</i>	American sycamore	NL	NL	NL
<i>Populus simonii</i>	Simon poplar	NL	NL	NL
<i>Portulaca oleracea</i>	Garden purslane	NL	NL	NL
<i>Prunus persica</i>	Peach	NL	NL	NL
<i>Richardia brasiliensis</i>	Brasilian clover	NL	NL	NL
<i>Quercus robur</i>	Common oak	NL	NL	NL
<i>Quercus ruber</i>	English oak	NL	NL	NL
<i>Robinia pseudoacacia</i>	False acacia	1b	2	
<i>Salix babylonica</i>	Weeping willow	NL	2	NL
<i>Sonchus oleraceus</i>	Common sow thistle	NL	NL	NL
<i>Tagetes minuta</i>	Tall khaki weed	NL	NL	NL
<i>Ulmus parviflora</i>	Chinese elm	NL	NL	NL
<i>Ulmus minor</i>	European field elm	NL	NL	NL
<i>Xanthium strumarium</i>	Rough cocklebur	1b	1	

4. Control Strategy

The control of AIPs should use methods that are appropriate for the species concerned and for the area where the species occurs. Often, a combination of control methods is the most appropriate way to ensure effective control. In general, four control methods exist:

- physical control (uprooting, felling, cutting, ring barking), or
- chemical control (treatment with registered herbicides), or
- biological control (using biological control agents), or
- integrated control (combination of control methods).

Ongoing control is required to achieve long-term goals of eradication and prevent the recurrence of AIPs in areas where control was previously implemented. Repetitive follow-up actions will therefore be mandatory until the required control has been achieved.

As far as possible, AIPs must be removed prior to seed production (typically occurring in early summer). Chemical control through the application of herbicides should only take place during the growing season to ensure efficacy.

The following control strategy is proposed:

8.1 Control Strategy

Measures to prevent the introduction of new AIPs into the study area and from spreading from the property to neighbouring properties, potentially including:

- No new AIPs are to be planted or introduced into the development area.
- Construction areas must be rehabilitated immediately following construction, including re-vegetating disturbed areas, to ensure the establishment of viable indigenous plant populations, and preventing AIPs from colonising disturbed areas;
- NEMBA Category 1b species should be prioritised for control, due to the known invasive success of these species.

8.2 Early Detection & Rapid Response

- The Development Footprint areas must be surveyed by the Mine's ECO to detect any new or emerging AIPs (weekly in construction phase, and until rehabilitation of construction areas has proven successful, and quarterly in operational phase).
- Emerging or new AIPs detected must be addressed with urgency. These plants must be eradicated before they can produce seed (or off-spring, or start growing vegetatively, depending on the species), as it will be more challenging and costly to eradicate them later on.
- The ECO must update the species list by recording all AIPs locations on a map of the development area. The Map must be updated as control is implemented in an area, and as new AIPs are detected in an area.

8.3 Monitoring & Control

The following phases are required in the AIP control programme:

- **Initial Control Phase:** with the aim of eradicating, or drastically reducing the existing AIP population;
- **Follow-up Control Phase:** with the aim to deplete the seed bank (specific tactics for seed bank management can be employed, including control of coppice regrowth, root suckers and seedlings).
- **Maintenance Phase:** During this phase, AIP's are no longer considered a problem. It is important to monitor the situation of infestation during the growing season of the plants to avoid re-infestation and to keep the control cost at a minimum. Potential seed source for re-infestation and causative agent for reintroduction should also be identified and monitored.

8.4 Prioritisation

It is recommended that the ECO compile a detailed plan of the development area at the onset of construction, and record the alien invasive species on the development area. From this plan, species with higher categorisation should be prioritised for control.

The areas where new AIPs are detected (expected to be the areas disturbed by construction) must be prioritised for prevention of AIPs, but where AIPs are detected, the higher-categorised (NEMBA Category 1) should be prioritised for control.

8.5 Rehabilitation & Restoration

Clearing of AIP infestations may leave the soil surface exposed and vulnerable to soil erosion, and re-colonisation of an area by AIPs. Soil stabilisation and revegetation and establishment of vegetation cover will be required, following mechanical control of AIPs.

It is recommended that bare areas remaining after AIP clearance, be seeded with an indigenous grass species mixture, comprising species of the Eastern Highveld Grassland vegetation type.

8.6 Disposal of Plant Material

- All plant material removed should be taken to an area isolated from surrounding natural areas with a bunded surface, from where it should be taken to a registered garden refuse centre or landfill site.
- All plant material should be covered with a tarpaulin during transportation by road to prevent any blow-off from the vehicle.
- It is not recommended that any species be chipped and used as mulch, as there may be seeds present within the mulch that will spread to areas beyond the present AIP communities (unless it can be confirmed that no seeds are present).
- Wood from large trees could be made available to the public or surrounding communities for firewood.