



## ALIEN INVASIVE SPECIES MONITORING, CONTROL AND ERADICATION PLAN

**Plettenberg Bay Country Club Golf Course, Plettenberg Bay,  
Western Cape.**



**PREPARED FOR:**  
**PREPARED BY:**

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**DATE:**

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08/05/2023

**Approval**

Department of Water Affairs, Biosecurity, Competent Authority

Approved: \_\_\_\_\_

Date: \_\_\_\_\_

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# 1. INTRODUCTION

**Eco Route Environmental Consultancy** has been appointed by the Proponent **Plettenberg Bay Country Club** to prepare an Alien Invasive Species (AIS) Monitoring, Control and Eradication Plan (Control Plan) in compliance with the National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA) and the Invasive Alien Species (IAS) Regulations, and Alien and Invasive Species Lists (2020) of South Africa. John Gibbs of **Indigenous Gardens** has been consulted as an independent horticultural specialist in preparation of the AIS Control Plan.

The purpose of this Alien Invasive Species Control Plan is to comply with the NEMBA Act. The timeframe for implementation is approximately five to ten years, unless the arborist and operator can clear-fell the extent of invasion covering the property in less than five years.

The estimated timeframe for implementation is 10 years (2023 to 2033).

The report will comprise a detailed Alien Invasive Species Control Plan and be submitted, to be approved by the DFFE; and provide the following required information:

- ❖ A map indicating the extent of the current invasion of invasive Plant Species.
- ❖ A systematic clearing approach.
- ❖ A control and maintenance plan for clearing and maintenance and for prioritization of high-risk areas along boundaries; including post clearing control and maintenance.
- ❖ Method for control of the individual Invasive Alien Species.

The Control Plan applies to the entire 66 hectares of the property including all the terrestrial, aquatic and riparian areas. It includes only invasive and alien plant species, as no invasive animals were observed during the site assessment. Surveys to detect invasive invertebrates were not conducted. Should invasive invertebrate species be detected an invertebrate specialist will be appointed and a management plan will be proposed.

## 1.1. Benefits of control

- Elimination of spread of these species into non-affected areas.
- Improvement of water quality and quantity.
- Legal compliance: landowners are required to eradicate or control declared weed and alien invader plants in terms of the Conservation of Agricultural Resources Act 43 of 1983 and the National Environmental Management: Biodiversity Act 10 of 2004.
- Improvement of biodiversity in conservation areas. Fast growing invader plants suppress indigenous flora, with a resultant loss in overall biodiversity.
- Commercial reasons: alien vegetation can spread from conservation areas into production land resulting in greater weed control costs.

## 1.2. Important factors influencing the effectiveness of a control programme

- Timeous implementation of control operations is important for alien plants.
- Operations must be directed towards killing alien vegetation. This is best achieved by using an effective herbicide chosen by the ECO and applied by using the "cut-stump; frilling or

ring barking methods. Under no circumstances may spraying with a “Rose” or multi- stream nozzle head be done.

### **1.3. Requirements for an effective AIS control programme**

- Identify the problem: extent, location and species of problem plant.
- Divide the problem areas into manageable units, taking budget and resource constraints into account.
- Identify any sensitive ecosystems, rare or endangered plants etc. which may be affected by a control programme. Identify the original ecosystem applicable to the area.
- Make provision for a number of follow up operations. The initial clearing operation is only part of the total programme. Failure to follow up will result in a failure of the entire programme.

While the importance of removing or clearing of alien or exotic vegetation is recognised, there should be control over the way in which this takes place. Often what generally appears to be covered by alien vegetation, actually contains pockets of sensitive vegetation or protected species. It is for this reason that clearing of such areas must be undertaken by hand (*Guidelines for the Control and Management of Activities in Sensitive Coastal Areas, first edition, 1998*).

**It is important to note that all of the above must be performed with instruction by the appointed ECO.**

## 2. PROJECT DETAILS

The Plettenberg Bay Country Club (PBCC) is a golf course located along the banks of the Piesang River in Plettenberg Bay on Portion 1 of Farm 456 Grootfontein (Lat: -34.066096, Lon: 23.349361), and is 66ha in extent. The golf course is an important feature for local sport and tourism and the local economy and attracts a significant number of European visitors each summer (during the European winter).

The Plettenberg Bay Country Club leases Portion 1 of Farm 456 Grootfontein from the Bitou Local Municipality and is responsible for the management and upkeep of the property. Section 73 of 3 of the National Environmental Act: Biodiversity Act, 2004 (Act 10 of 2004) state that the landowner is legally responsible for the removal and control of declared invasive plant species on their properties. The IAS Control Plan will require approval from the Bitou Municipality.

<b>Landowner:</b>	Bitou Local Municipality
<b>Local municipality:</b>	Bitou Local Municipality
<b>District municipality:</b>	Garden Route District Municipality
<b>Land zoning:</b>	Open Space Zone II
<b>land use:</b>	Golf course / nature reserve
<b>Property size:</b>	66.11 HA



**Portion 1 of Farm 456 Grootfontein,**  
Legend

Map Center: Lon: 23°20'54.2"E  
Lat: 34°3'58.2"S

Scale: 1:36 112

Date created: March 23, 2023



**Figure 1:** Location of the Plettenberg Bay Country Club in Plettenberg Bay.

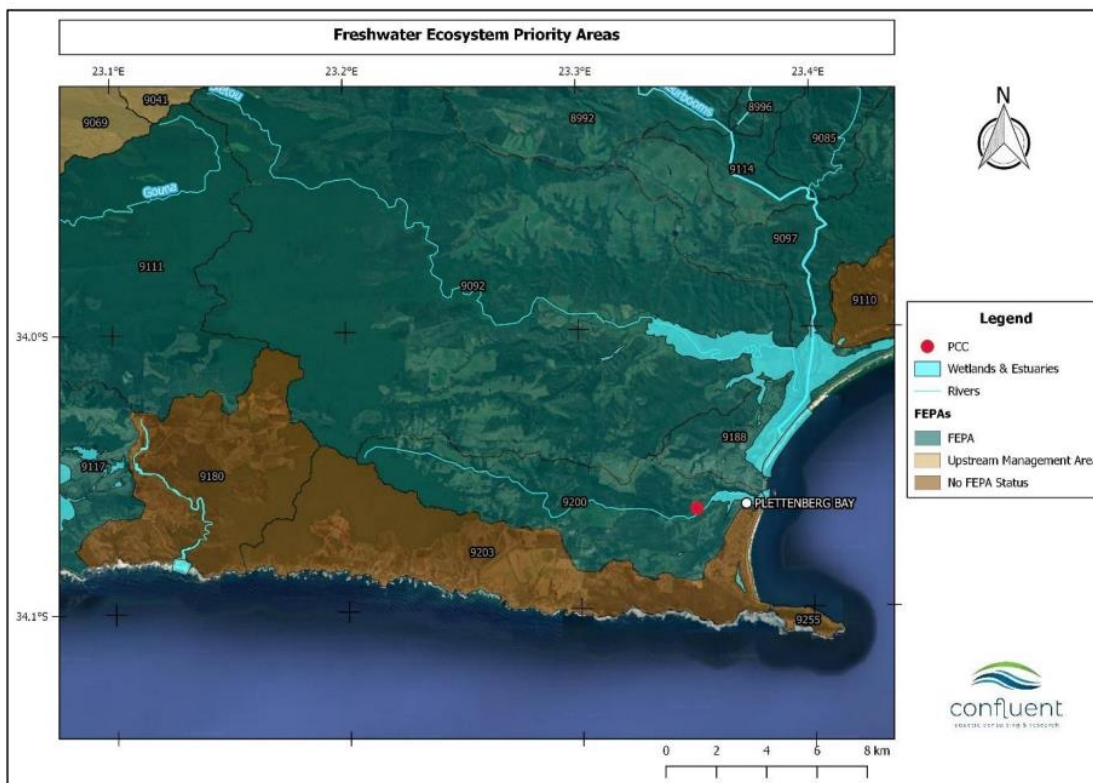
## 2.2. Environmental Considerations

### 2.2.1. National Freshwater Ecosystem Priority Atlas (NFEPA)

The PBCC is located within sub-quaternary catchment (SQC) 9200 (Figure 3), which according to the National Freshwater Ecosystem Priority Atlas (NFEPA, Nel et al., 2011), has been classified as a Freshwater Ecosystem Priority Area (FEPA). River FEPAs achieves biodiversity targets for river ecosystems and threatened/near-threatened fish species and were identified in rivers that are currently in a good condition (A or B ecological category). Their FEPA status indicated that they should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources (Nel et al., 2011). For river FEPAs, the whole SQC is identified as a FEPA, although the FEPA status applies to the actual river reach within such a sub-quaternary catchment. The shading of the whole sub-quaternary catchment indicates that the surrounding land and catchment area needs to be managed in a way that maintains the good ecological condition of the river reach, which in this case, is the Piesang River, which flows through the golf course. It is therefore important that any clearing activities that occur on the golf course do not result in any deterioration of the river or its catchment area. Clearing activities must ultimately aim to maintain or improve the ecological condition of the Piesangs River.

### 2.2.2. Western Cape Biodiversity Spatial Plan

According to the Bitou WCBSB the entire golf course falls within a protected area known as the Plettenberg Bay Country Club Private Nature Reserve (Figure 4).



**Figure 2:** Map indicating the location the Plettenberg Bay Country Club in relation to FEPAs.



**Figure 3:** Map of the golf course in relation to the Western Cape Biodiversity Spatial Plan (WCBS).

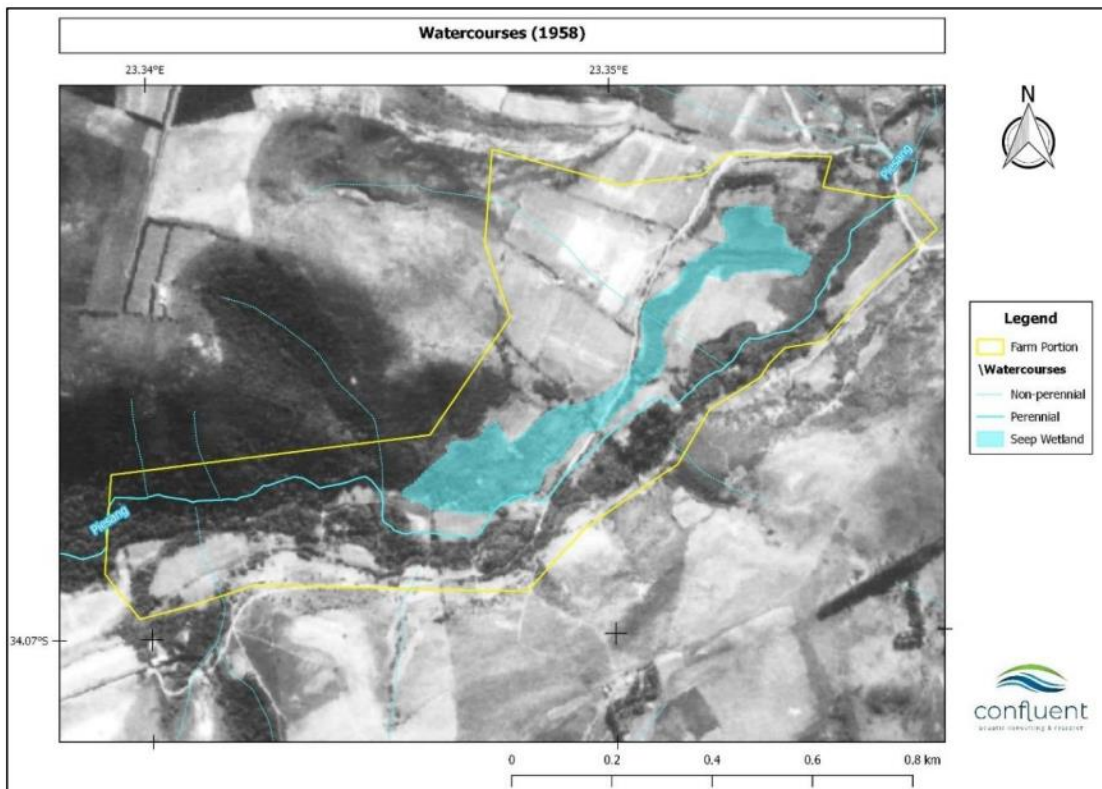
### 2.2.3. Watercourse Classification

According to the report by Freshwater Specialists, the entire reach of the Piesang River below the Roodefontein Dam that flows through the golf course can be classified as a perennial river. At a landscape level, the river flows through a relatively broad valley and the river is characterised by an active channel, with clearly discernible bed and banks. The geomorphological zonation is Upper Foothill, and is characterised by a moderately steep, cobble-bed or mixed bedrock-cobble bed channel, with plane bed, pool-riffle or pool-rapid reach types. The more undisturbed sections of the river (immediately below the Roodefontein dam) are well shaded by a dense riparian zone comprising of tall indigenous trees. As the river flows through the golf course, the riparian zone becomes far more diminished and is also absent along some stretches.

In addition to the river, there are remnant seep wetlands that formerly formed part of a much larger wetland seep system that stretched across the current golf course. Establishment of the course has converted much of this former wetland system into a series of artificial water features (i.e. small dams/water holes) that are interconnected by a system of shallow, grassed drainage canals. Water is not actively pumped into any of these dams, and their permanent inundation indicates that they have been excavated into a very shallow water table, which is consistent with conditions that would have caused the formation of a large seep wetland. This is further corroborated by the fact that boreholes located on the golf course actively decant to the surface without being actively pumped. The groundwater appears to be very rich in iron and there are widespread examples of a rusty coloured



precipitate in many of the water features, which is caused by the oxidation of anaerobic soluble ferrous iron (Fe<sup>2+</sup> - derived from groundwater) to insoluble ferric (Fe<sup>3+</sup>) iron-hydroxide.



**Figure 4:** Historical ortho-photo from 1958 showing the likely former extent of the wetland seep system. Note also the dense riparian zone along most of the length of the Piesang River.

#### 2.2.4. Piesangs River

The most serious impacts on the Piesang River are related to the regulation of flow caused by the Roodefontein Dam and the historical establishment of the golf course itself. Below the dam, the river initially runs through a section of indigenous vegetation and shows geomorphological characteristics typical of an Upper Foothills system, comprising of a relatively steep system with a cobble and boulder substrate. The river is shaded by a dense riparian canopy and instream emergent or aquatic vegetation is negligible. Once the river enters the golf course it becomes distinctly narrower, with steeper, higher banks, mostly grassed with kikuyu. The dense riparian canopy has been mostly removed along most of the length of the river through the golf course. Increased sunlight, together with modifications to the river substrate (which is more dominated by sediment as opposed to cobbles and boulders) and flow regime (i.e. reduced frequency and magnitude of flood events) has led to establishment of abundant instream vegetation (e.g. most notably *Typha capensis* as well as other sedges and grasses) which chokes long lengths of the river. The invasive water fern, *Salvinia molesta* was abundant throughout the river reach. A small instream dam is also located in the river which is used to abstract water for irrigation of the golf course. Remaining stretches of riparian vegetation are comprised of a mixture indigenous and alien vegetation (including Blackwood – *Acacia melanoxylon*, Black Wattle – *Acacia mearnsii*, Brazilian Pepper Tree - *Schinus terebinthifolia*). In summary a large loss of natural habitat, biota and basic ecosystem functions has occurred in the lower reaches of the Piesangs River.

### 2.2.5. Wetland Seep

The hydrology has been fundamentally altered through the creation of artificial water features which concentrates water at these points as opposed to allowing it to seep over a larger area. In terms of geomorphology and vegetation, the majority of the former extent of the wetland seep has been filled in and transformed into golf course (i.e. fairways, artificial water features etc.) and only a few remnant patches of natural wetland habitat remain. These remaining patches do however host a relatively high diversity of wetland plants and provide good habitat and refuge for a range of terrestrial and aquatic biota. The main impact on these remnant areas is invasion by alien tree species, including Blackwood - *Acacia melanoxylon*, Black Wattle – *Acacia mearnsii*, Brazilian Pepper Tree - *Schinus terebinthifolia*. The western seep had a high abundance of yellow-wood saplings around the periphery and removal of alien invasives would allow these indigenous trees to re-establish.



**Figure 5:** Photographs illustrating impacts on the lower reaches of the Piesangs River, including removal of the riparian zone, dense growth of in-stream aquatic vegetation (A and B), a small in-stream dam used for irrigation of the golf course (C) and the exotic *Hibiscus diversifolius* which was relatively abundant along the banks (D).

### 2.2.6. Vegetation Type

The property is mapped as Garden Route Shale Fynbos (FFh 9), according to the South African National Biodiversity Institute (2006-2018) Vegetation Map (Figure 9). This vegetation type is considered to be Endangered. A small section of the property is South Outeniqua Sandstone Fynbos (Vulnerable). Most of the property is with an Endangered Ecosystem Threat Status, with a small section within a Vulnerable Ecosystem Threat Status as shown in figure 10, below. This is linked to the conservation status of the vegetation types.



**ERF 1 of 456,  
Plettenberg Bay**

Legend  
VEGMAP 2012

- FFs 19 South Outeniqua Sandstone Fynbos
- FFh 9 Garden Route Shale Fynbos
- AZf 1 Cape Lowland Freshwater Wetlands

Map Center: Lon: 23°20'40.5"E  
Lat: 34°3'53.2"S

Scale: 1:18 056

Date created: September 29, 2022



Western Cape Government  
FOR YOU Agriculture

Figure 6: Vegetation Types.



**ERF 1 of 456,  
Plettenberg Bay**

Legend  
Ecosystem Threat Status 2016

Status

- EN
- LT
- VU

Map Center: Lon: 23°20'40.5"E  
Lat: 34°3'53.2"S

Scale: 1:18 056

Date created: September 29, 2022

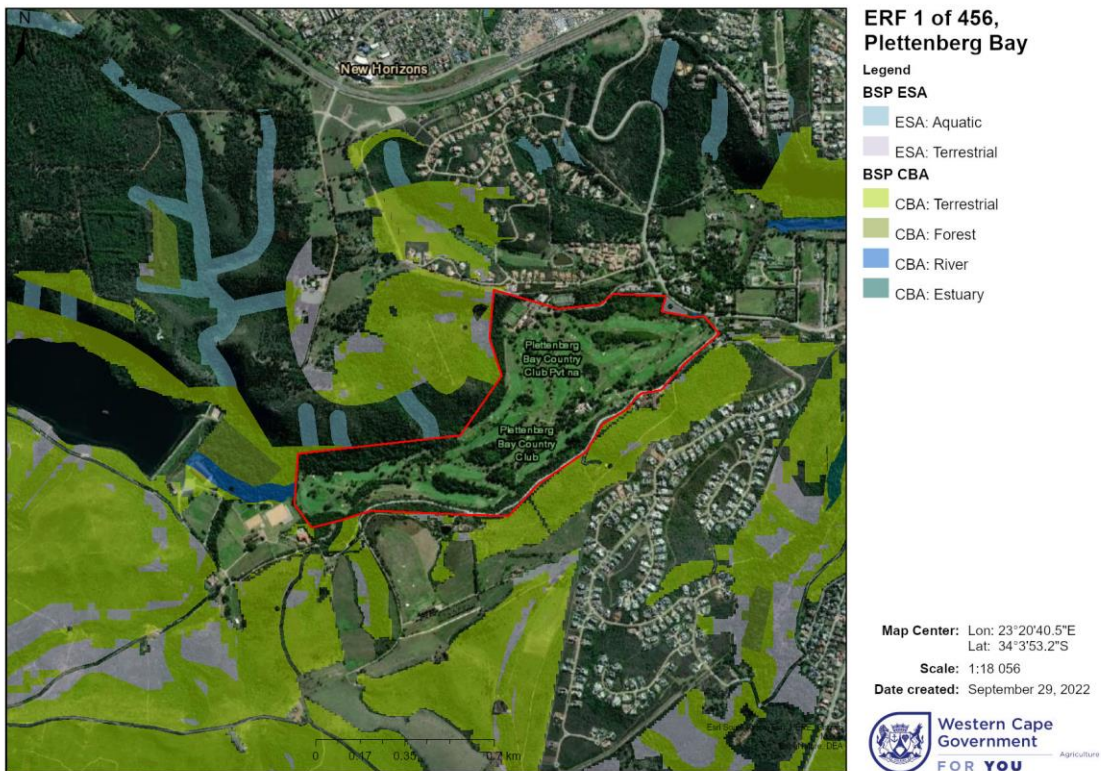


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Figure 7: Ecosystem Threat Status.

## 2.2.7. Critical Biodiversity Areas

The PBCC falls outside of a Critical Biodiversity area or Ecological Support Area (Figure 11).



**Figure 8:** Critical Biodiversity Areas.

## 3. LEGISLATION

The National Environmental Management Act, No 107 of 1998, creates a duty of care towards the environment. Within the preface of this Act, it is stated thus:

*"Everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development: the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must co-operate with, consult and support one another."*

Any person or business found to be responsible for illegally introducing an invasive plant or species, and allowing it to spread, may be compelled, by this Act to desist with their actions and remove the source of invasion.

The Conservation of Agricultural Resources Act, No 43 Of 1983 (CARA) was passed to protect soil, water resources and vegetation. This included measures to manage and control weeds and invader vegetation species. The CARA regulations declare several species of "weeds" or "invader plants." These species have been divided into three categories:

### **3.1. Category 1a Listed Invasive Species:**

Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the National Environmental Management: Biodiversity Act/ NEMBA (Act 10 of 2004) as species which must be combatted and eradicated.

A person in control of a Category 1a Listed Invasive Species must-

- (a) comply with the provisions of section 73(2) of the NEMBA;
- (b) immediately take steps to combat or eradicate listed invasive species in compliance with sections 75(1), (2) and (3) of the NEMBA; and
- (c) allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species.

If an Invasive Species Management Programme has been developed in terms of section 75(4) of the NEMBA, a person must combat or eradicate the listed invasive species in accordance with such programme.

### **3.2. Category 1b Listed Invasive Species:**

1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the NEMBA as species which must be controlled.

2) A person in control of a Category 1b Listed Invasive Species must-

- (a) control the listed invasive species in compliance with sections 75(1), (2) and (3) of the NEMBA.
- (b) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section 75(4) of NEMBA.

3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the NEMBA, a person must combat or eradicate the listed invasive species in accordance with such programme.

### **3.3. Category 2 Listed Invasive Species:**

1) Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the NEMBA as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.

2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive Species without a permit.

3) A landowner on whose land Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.

4) Unless otherwise specified in the Notice, any species listed as Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to Regulation 3 above.

5) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in *Government Gazette* No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.

6) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the NEMBA, a person must combat or eradicate the listed invasive species in accordance with such programme.

### **3.4. Category 3 Listed Invasive Species:**

1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the NEMBA, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of the NEMBA, as specified in the Notice.

2) Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3 below.

3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the NEMBA, a person must combat or eradicate the listed invasive species in accordance with such programme.

Should any invasive plant species occur, other than those stated in The Act, the land user must control them by species-specific control methods. Caution should ALWAYS be taken when dealing with noxious chemicals, and care should be taken to cause the least amount of harm to the environment.

### **3.5. Invasive Alien Species Management Programs**

In some instances, Section 75 of the NEMBA Act calls for an Invasive Species Management Program to be implemented, which should include the following details:

- ❖ Details about the property (size, address, maps, land use, name of landowner etc.).
- ❖ Listed species present on the property.
- ❖ Extent and distribution of the invasive species on the property.
- ❖ Objectives and actions:
  - *Control Invasive Plant infestation*

- Prevention
- Early Detection & Rapid Response (EDRR) and eradication
- ❖ Monitoring

Landowners are required to manage all listed AIS that occur on their land. However, not all properties require a Control Plan. The Department of Environmental Affairs (DEA) developed criteria whereby Invasive Alien Species (IAS) Control Plans are required:

**Criteria for properties requiring IAS Control Plans:**

Property size Hectares (ha) Square meters (m <sup>2</sup> )	Requirements	Timeframes for clearing
< 0.05 Ha (5000 m <sup>2</sup> )	Clear and remove plant material to approved Green Garden Waste site	30 days
0.051 – 1 Ha(5001 m <sup>2</sup> - 10,000 m <sup>2</sup> )	Clear and remove plant material to approved Green Garden Waste site; or apply for fuel reduction burn (See details below); or chip; or utilize. Or alternatively submit a Control Plan with acceptable timeframes to the Department of Environmental Affairs	90 days (at least by the end of November (start of the fire season)
– 5 Ha 10,001 m <sup>2</sup> to 50,000 m <sup>2</sup>	Clear or submit Control Plan with timeframes acceptable to the Department of Environmental Affairs	120 days to clear or 30 days to submit a control plan
> 5.1 Ha > 50,001 m <sup>2</sup>	Submit Control Plan with timeframes acceptable to the Department. Prioritize the urban edge boundaries that are high-risk fire risk. Fire breaks are to be in place. Permits are required to keep category 2 plants except when they are in riparian areas, or where they pose a fire risk, in these cases there are to be treated as category 1b and cleared.	30 days to submit control plan. On approval: Start implementing within reasonable timeframe 5 - 10 years

The Plettenberg Bay Country Club is located on Portion 1 of Farm 456 Grootfontein (Lat: -34.066096, Lon: 23.349361) and is 66ha in extent. This requires the landowner to submit a Control Plan with timeframes acceptable to the Department which must be implemented within a reasonable timeframe (5 - 10 years). The Control Plan must also be approved by the Bitou Municipality as the landowners of Portion 1 of Farm 456 Grootfontein.

## 4. ALIEN INVASIVE SPECIES CONTROL PLAN

### 4.1. Purpose and scope of the plan

The purpose of this Invasive Species control plan in compliance with the National Environmental Management Biodiversity Act, 2004 (Act 10, of 2004) and Invasive Species Regulations (October 2014) hereinafter referred to as NEMBA.

The timeframe for implementation is 10 years (2023 to 2033).

The plan applies to the entire 66 hectares of the property that is under the management of the Plettenberg Bay Country Club including all the terrestrial, aquatic, and riparian areas. It includes invasive alien plant species only and does not include invasive animals as none were observed during the site assessment. Surveys to detect invasive invertebrates were not conducted and should invasive invertebrate species be detected, an invertebrate specialist will be appointed and a management plan will be proposed.

The playability and rating of a hole on the golf course is affected by position and size of trees. Such trees can be considered as 'feature trees'. Some of these trees are AIP (blackwood, poplar, pines, etc) and listed category invaders. In such cases the category of the tree must be determined, and if applicable a permit must be attained from the relevant authority in terms of the Conservation of Agricultural Resources Act, No 43 Of 1983 (CARA).

### 4.2. Strategic Objectives

Framework for the prevention, eradication and control of alien and listed AIS.

#### 4.2.1. Objective 1: Prevention

To put measures in place to prevent the introduction of new NEMBA listed invasive plants and animals onto the property, and invasive species from spreading from the property to neighbouring properties.

Preventative actions

- No listed invasive and alien plant species will be planted.
- Areas bordering onto neighbouring land will be prioritized for control to prevent existing invasive plants from spreading beyond the boundaries of the property.
- No listed invader animal species will be introduced on the property.
- These prevention measures will be communicated to all users of the property (where applicable).



#### **4.2.2. Objective 2: Early Detection & Rapid Response (EDRR)**

To put measures in place whereby new and secondary invasive species are detected early and removed before establishing sustainable populations and start spreading (Early Detection and Rapid Response)

Early Detection and Rapid Response actions:

- Regularly survey the property to detect any new or emerging invader plant species.
- Report category 1a species immediately to the Department of Forestry, Fisheries and the Environmental (DFFE) and ask for assistance with the control of the species.
- Do not allow emerging or new species to produce seeds or off-spring, or start growing vegetatively, act immediately by removing them.
- Update species list by including these species and indicate where on the property they were located.
- Increase surveillance in the areas where the species occur to ensure the plants re-sprout or re-occur.

#### **4.2.3. Objective 3: Restricted Activities and Duty of Care**

To adhere to Restricted Activities and Duty of Care as determined by NEMBA & Regulations concerning invasive and alien species.

Actions NEMBA Regulation 6(a-g) Restricted Activities:

- Prevent spreading or allowing the spread of any specimen of a listed invasive species.

Actions Section 69 & 71 Duty of Care relating to alien species:

- Take all required steps to prevent or minimise harm to biodiversity.
- Notify the competent authority, in writing, of the listed invasive species occurring on the property.
- Take steps to control and eradicate the listed invasive species and to prevent it from spreading.

#### **4.2.4. Objective 4: Appropriate means and method of control**

To ensure the means and methods of control are appropriate to the species and environment and are implemented in such a way that it minimizes the risk to biodiversity and the environment.

Actions to ensure appropriate means and control methods:

- Implement measures to prevent the starting of wildfires, including spreading to neighbouring land and to be ready and able to combat fires on the farm should they occur.
- Mechanical and hand tools must be best suited to the work and the size of plants being cleared and in a good working condition.
- Control methods must be appropriate for the species and the environment.
- Control methods are to be implemented in such a way that it prevents harm to biodiversity and the environment.

#### 4.2.5. Objective 5: Fire prevention and preparedness

Implement measures to prevent the starting of wildfires on the property, wildfires spreading to neighbouring land, and ensuring fire-preparedness and ability to combat fires on the property should they occur.

Actions: Fire prevention and preparedness

- Manage fuel loads by controlling invasive plants.
- Prepare and maintain a fire break around the property, ensure -
  - it is wide enough and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighboring land;
  - it does not cause soil erosion; and
  - it is reasonably free of inflammable material capable of carrying a veldfire across it.
- Train staff to combat fires.
- Keep adequate, appropriate, and serviceable firefighting equipment.
- Join the Fire Southern Cape Fire Protection Association (SCFPA).

#### 4.2.6. Objective 6: Implement Control Plan

To bring the invasive plant infestation on the property under control by 2033 by reaching the desired state.

Category	Desired state – by 2033
Category 1 b trees	All mature trees are removed; follow-up control programme in place. All the management units are in maintenance. Overall infestation does not exceed 10% of the property. These will include seedlings and re-sprouting trees, mainly blackwood's and poplars. Acacia species will be under control with the correct control methods. <b>It is important that identified 'feature' trees are not removed.</b>
Category 1b herbaceous species	Less than 2%
Category 1b annual species	Less than 2%
Category 2 species	All mature trees are removed; follow-up control programme in place. All the management units are in maintenance. Overall infestation does not exceed 10% of the property. These will include seedlings and re-sprouting trees, mainly blackwood's and poplars. Acacia species will be under control with the correct control methods.
Category 3 species	All mature trees are removed; follow-up control programme in place. All the management units are in maintenance. Overall infestation does not exceed 10% of the property. These will include seedlings and re-sprouting trees, mainly blackwood's and poplars. Acacia species will be under control with the correct control methods.

### 4.3. Alien Vegetation Clearing

Alien Vegetation Clearing can be broken down into the following PHASES:

PHASE 1: Removal by cutting, excavating, burning, ringbarking, hand pulling, herbicide spraying and biological measures.

PHASE 2: The removal of all biomass by either burning, chipping or removing usable material.

PHASE 3: (Follow up) which is critical to the success of the AIS clearing to achieve the following:

- Rehabilitation of the infested area to its natural or near natural state or
- To exercise the land rights as per the agricultural rights (horticultural or agricultural purposes).

PHASE 4: Implement a long term maintenance plan in order to combat further germination of AIS as a result of:

- The seedbank has been exposed and disturbed as a result of clearing, this will result in germination of the seeds from within the AIS seedbank in situ.
- The resulting germination rate and density will far higher than the original infestation.
- There will still be further germination of seeds disbursed by wind / birds from surrounding properties that are infested with AIS.

## 5. Ways to Eradicate Alien Invasive Plants

The **first step** of the Alien Invasive Species Control Plan will be to undertake an inception and educational meeting, where the people employed to undertake this activity are able to identify the correct species as aliens and the manner in which to remove and control them.

The **second step** will be to identify the AIS and start a process of removing the individuals that occur on the site. The removal of the alien species must be in a stepwise manner and be undertaken within a single area at a time. This will ensure that all individuals are removed at the same time to reduce re-infestations. Below are a number of methods that may be employed to undertake the activity of removing alien plant species such as mechanical, chemical and biological. These methods are dependent on the size and nature of the plant that is to be removed.

### 5.1. Types of Recommended Treatments for AIS

#### 5.1.1. Felling and Herbicide Treatment

This method applies to AIS that can regenerate by coppicing (regrow from the cut stump). When felling. Always cut the AIS as horizontal and close to the ground as possible so as not to leave sharp points that could be a danger to others. A registered herbicide with the Department of Agriculture is then applied to the cut stump.

A sticker agent may also be needed depending on the type of herbicide used plus the use of vegetable dye should be added to your herbicide mix to allow for tracking of what has and what has not been sprayed.

Herbicide when used in this method is applied via solid cone nozzle the herbicide must be applied to the cut stump as soon as possible to allow the herbicide to be absorbed by the plant via the xylum phloem canals ( a plants version of veins and arteries).

These veins are found cambium layer which is the area between the bark and the wood, and this is where the herbicide must be applied. i.e the outer rim of the cut stump.

Cut material (biomass) needs to be removed / stacked depending further use or burnt / chipped. When felling AIS don't to block riparian zones with cut material.

### **5.1.2. Felling**

This applies to species of invasive plants that cannot regenerate by coppicing e.g. most pine species. As with treatment 1 cut as horizontally and close to the ground as possible.

Cut material (biomass) needs to be removed / stacked depending further use or burnt / chipped. When felling AIS don't to block riparian zones with cut material.

### **5.1.3. Clearing with an Excavator**

This is done when the end goal is use the land for horticultural or agricultural practises. This involves pushing the AIS into piles for burning after the first burn these piles can be consolidated into another pile and burnt again.

Should any biomass remain after the second burn, an excavator may be used to bury the remaining biomass.

The excavator is perfect for ripping out root balls so there is no need for the use of herbicide with this method. A positive for using this method is an area of soil that is free from stumps and roots, allowing for easy ripping ploughing / planting.

### **5.1.4. Ringbarking**

Used on AIS in areas where it is impossible to remove the biomass or where felling would damage the surrounding indigenous habitat.

This involves simply cutting a ring half a meter up the trees trunk exposing cambium layer then painting the exposed cambium layer with approved herbicide from the Department of Agriculture.

### **5.1.5. Folio Spraying with Herbicide**

This method is mainly restricted to follow up phases over areas where the seed bank has germinated on mass. When doing this wait till the newly germinated AIS have reached a height of 1 meters as at this point of growth this will result in killing the early and late germinating seedlings.

This process will have to be repeated depending on the depth of the seedbank which correlates to the frequency of AIS germination.

#### **5.1.6. Hoeing or pulling seedlings by hand.**

This method should be a way of life i.e. if AIS species is observed, hand pulling is recommended where possible. It is best to pull by hand after rainfall.

This method also applies to areas that are sensitive, e.g. riparian zones where herbicide is not allowed or areas where the use of an herbicide could harm surrounding natural ecosystems or commercial crops.

## **5.2. Chemical Methods**

The use of chemicals in controlling and removing of IAP should not be excluded as a possible option. Once the IAP are more manageable the use of chemicals should be reduced or excluded completely. The best option would be to pursue a combination of mechanical and chemical control in the early stages.

The only negative impact of the use of chemicals is that if used incorrectly may result in plant species being able to develop some form of resistance to the herbicide. If herbicides are used as a foliar spray, drift will cause non-target species to be impacted upon. The only method that should be undertaken is the cutting of the plants prior to the treatment of the remaining stems using a "stem painting" technique.

It is imperative that the herbicides used are dye treated or that the end-user add a dye to ensure that all stems that have been treated are easily identified. Note, the application of the chemical solution must follow directly after the cutting of the vegetation. Therefore, a small area should be selected and all cutting and stem painting be undertaken on that area prior to moving to the next area.

DFFE herbicide quantity estimation ([Invasive alien plant control management plan | Department of Environmental Affairs \(dffe.gov.za\)](#)) is attached to this document as a guide.

## **5.3. Biological Control**

This entails using a natural enemy (bacteria, fungus, weevils, mites) of the intended IAP to attack specific parts of the plant (roots, stem, flowers) to either kill the plant, reduce its vigour, or reduce reproductive output. Only certain species have registered bioagents, the most successful stories of biocontrol being the *Opuntia* genus and *Acacia* species. Please contact DFFE or SANBI for directions on how to obtain these agents.

DFFE have provided a guide on bio-control agents for terrestrial plant species ([Invasive alien plant control management plan | Department of Environmental Affairs \(dffe.gov.za\)](#)), attached to this document.

## 5.4. Environmental Safety

In order to minimise the impact of the operation on the natural environment the following must be observed.

- ❖ Area contamination must be minimised by careful accurate application with a minimum amount of herbicide to achieve good control.
- ❖ All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- ❖ Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site.
- ❖ To avoid damage to indigenous or other desirable vegetation product should be selected that will have the least effect on non-target vegetation.
- ❖ Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation, e.g. TG-1 or equivalent.
- ❖ The correct protective clothing is to be used in line with manufacturer's instructions and / or the Occupational Health & Safety Act, Act 85 of 1993 (and amendments) and,
- ❖ All MSDS sheets are to be made available on site along with a Medical First Aid Kit.

## 5.5. Disposal of IAP Vegetation

- ❖ Plant material should be used beneficially wherever possible, as opposed to disposing of it at a landfill site where it takes up valuable airspace, or let it further propagate on unchecked, vacant land.
- ❖ Woody and dry material, provided no seeds are present, can be chipped and used as mulch or made available to the local community for firewood.
- ❖ Wet material and aquatic weeds should be combined with other organic matter and composted. Alternatively, it may be possible to use it for basket making, animal feed or other uses.
- ❖ Burning of alien vegetation waste material is prohibited.
- ❖ Burying of alien vegetation waste material in or near the stream, drainage lines, dams, wetlands and their buffer zones is prohibited.

## 6. IDENTIFIED AIS AND MANAGEMENT UNITS

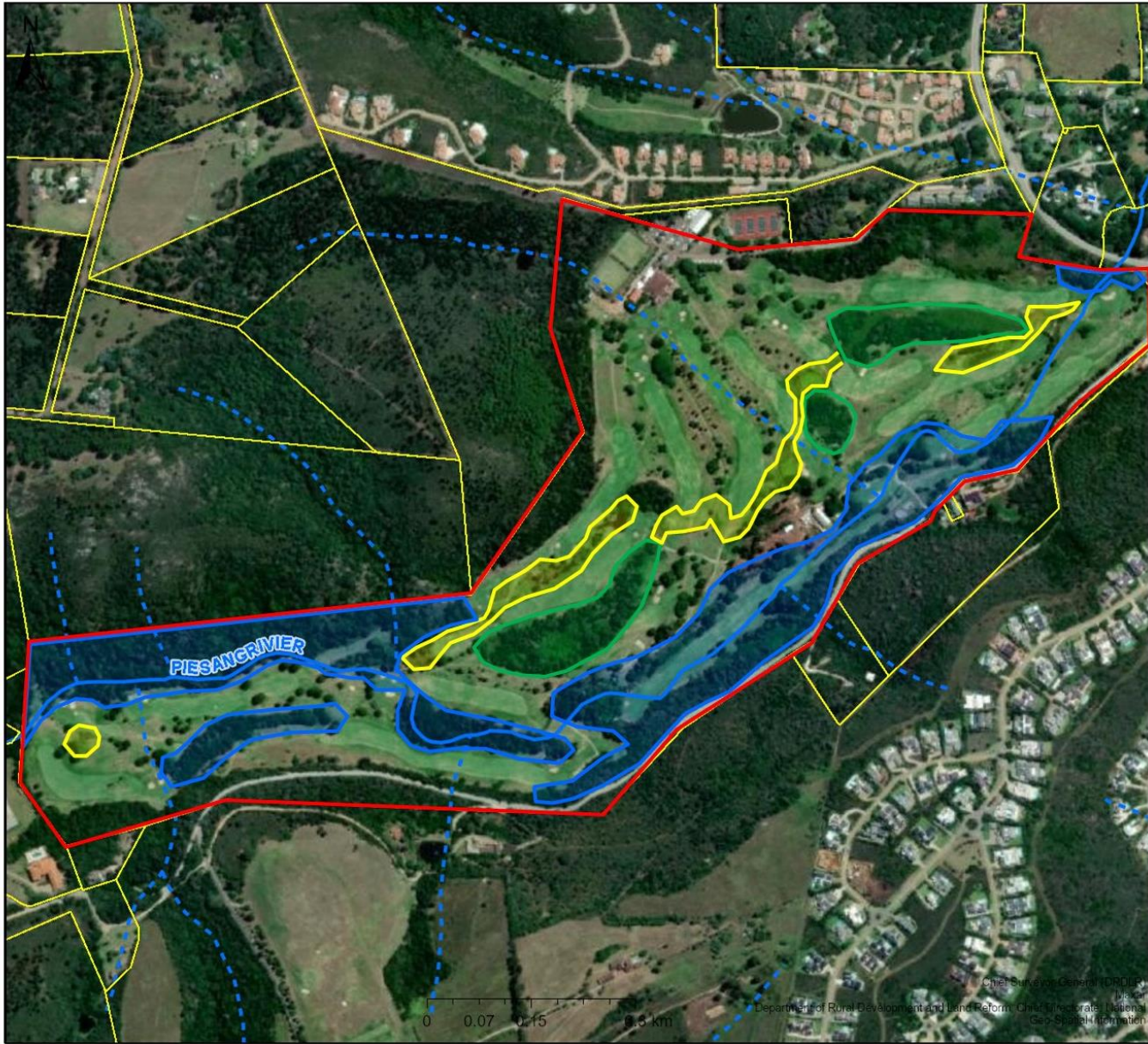
### 6.1. Alien Invasive Species List

IAP	Common name	Category
<i>Solanum mauritianum</i>	Bugweed	1b
<i>Acacia saligna</i>	Port Jackson's willow	1b
<i>Ailanthus altissima</i>	Tree of heaven	1b
<i>Paraserianthes lophantha</i>	Australian albizia	1b
<i>Psidium cattleianum</i>	Strawberry guava	1b
<i>Robinia pseudoacacia</i>	Black locust	1b
<i>Tecoma stans</i>	Yellow bells	1b
<i>Tamarix chinensis</i>	Chinese tamarisk	1b
<i>Triplaris americana</i>	Ant tree	1a
<i>Acacia podalyriifolia</i>	Pearl acacia	1b
<i>Schinus terebinthifolius</i>	Brazilian pepper tree	3
<i>Parkinsonia aculeata</i>	Jerusalem thorn	1b
<i>Acacia mearnsii</i>	Black Wattle	2
<i>Acacia melanoxylon</i>	Australian Blackwood	2
<i>Tipuana tipu</i>	Tipu tree	3
<i>Melia azedarach</i>	Syringa	1B, 3 in urban areas
<i>Populus alba</i>	White poplar	2
<i>Quercus palustris</i>	Pin Oaks	Not listed
<i>Ricinus communis</i>	Castor oil plant	2
<i>Lantana</i>	Lantana	1b
<i>Hibiscus diversifolius</i>	Prickly hibiscus	Not listed
<i>Salvinia molesta</i>	Kariba Weed	1b

- Prickly hibiscus (*Hibiscus diversifolius*) – common along the banks of the Piesang River.
- Brazilian pepper tree (*Schinus terebinthifolia*) – common within remnant wetland areas
- Blackwood (*Acacia melanoxylon*) – common along the Piesangs River and within remnant wetland areas
- Poplar (*Populus alba*) – common in the western most remnant wetland.
- Kariba Weed (*Salvinia molesta*) - found in the watercourses (including dams and the Piesang River).

Management unit	Hectares	Extent of overall invasion (%)	Comment	Priority
Piesang River riparian area	10 HA	± 50%	The riparian is very vulnerable to AIS infestations. The riparian areas are very important ecological zones.	High
Remnant Wetland	4 HA	±10%	Invasive alien tree species, including Blackwood, Black Wattle, and Brazilian Pepper Tree.	Low
Artificial Watercourses	2.5 HA	±50%	Heavy infestation by Kariba weed.	High
Remaining Areas	49.5 HA	±5 %	The remaining HA forms part of the golf course with scattered AIS. It is important that identified 'feature' trees are not removed.	Medium
<b>Total</b>	<b>66 HA</b>			





**Portion 1 of Farm 456  
Grootfontein,**

**Legend**

- Farm Portions
- Rivers**
- Perennial
- Non-Perennial
- Piesang River Riparian
- Remnant Wetlands
- Artificial watercourses
- Remaining Area

**Map Center:** Lon: 23°20'51.7"E  
Lat: 34°3'55.6"S

**Scale:** 1:9 028

**Date created:** May 8, 2023



## 7. METHOD STATEMENTS FOR AIS CONTROL

### 7.1. Invasive Riparian Species

- Activity can be undertaken in and along all artificial and natural watercourses (including remnant wetland areas). Activity can be undertaken throughout the year.
- Correctly identify alien invasive species – consult independent experts if necessary;
- Young plants and saplings can be pulled by hand or using an appropriate tool (e.g. Tree Popper). Care must be taken to replace and compact disturbed soil after removal (i.e. stamped down by foot);
- Trees or shrubs that are too large to be pulled must be felled using a saw or chainsaw. The freshly cut stump must be immediately painted with a herbicide that is registered for control of the alien tree species. Important species and registered herbicides include, inter alia: o Hibiscus diversifolius: Glyphosate (Roundup) o Schinus terebinthifolia: Triclopyr (Garlon) o Acacia melanoxylon: Triclopyr (Garlon) o Populus alba: Imazapyr (Chopper or Hatchet)
- Herbicide must be mixed with a dye to identify stumps that have already been treated and prevent overuse/over application of the herbicide;
- All cut/felled plant material must be removed from the watercourse and/or riparian zone.
- Follow-up control must be conducted annually to prevent regrowth and the production of seed still remaining in soil.
- Revegetate areas with indigenous vegetation where necessary.

### 7.2. Invasive Aquatic Species

- Activity can be undertaken in all natural and artificial watercourses throughout the property. Activity can be undertaken throughout the year.
- The *Salvinia molesta* (Kariba Weed) can be removed by any means (hand or excavator) from artificial water courses and by hand from the Piesangs River.
- Biocontrol using the *C. salviniae* biocontrol agent is recommended. Once an assessment of the estimated biomass of the weed has been undertaken, the Department of Forestry Fisheries and Environment (DFFE) must be contacted to arrange release of the biocontrol agent (contact Debbie Muir: [dsharp@dffe.gov.za](mailto:dsharp@dffe.gov.za)).
- Following the release of the biocontrol, routine monitoring must be undertaken to estimate the presence and absence, and numbers of the biocontrol agents to determine whether any supplemental release is required.
- Once the biocontrol agents have been released, chemical control of the weed should not be undertaken. NO chemical control should be used without guidance from DFFE.

### 7.3. Herbicides

It is recommended to have a herbicide register that is signed off by an accredited PCO officer and for the PCO to conduct the training for herbicide applicators.

The register must contain the following:

1. Volume off stock i.e. Herbicide and its trade name.
2. Stock issued and balance remaining.

3. Date.
4. Mix ratio.
5. Mix amount and amount returned to stores.
6. Environmental conditions on the day of application.
7. Description where the herbicide is applied.

There are herbicide options that are accredited by the Department of Agriculture that can be used for each AIS. To simplify control measures it is recommended to use herbicides that can cover most of the different AIS's without the need to carry a large amount of different herbicides.

The following is a breakdown of the following tradenames of the various herbicides needed:

1. Glyphosate - trade name is Round-up
2. Triclopyr - trade name is Garlon 4
3. Tebutiuron - trade name is Opt-out killer
4. Imazapyr - trade name is Chopper

When applying the above herbicides, the mixing ratio can be made standard which will eliminate the need for different mixes. The mixing ratios per species is the minimum mix needed for the herbicide to work against that specific species, having a slightly higher mix ratio will not impact on the effectiveness of the herbicide.

#### 7.4. Timeframes

Action	Frequency	Timeframes
Clearing: <ul style="list-style-type: none"> <li>➤ Excavator to only be used outside the riparian area</li> <li>➤ Felling</li> <li>➤ Ringbarking</li> <li>➤ Slashing / Hand pulling</li> </ul>	Once Off	2023 -2033
Follow up: <ul style="list-style-type: none"> <li>➤ Hoeing</li> <li>➤ Folio spray</li> <li>➤ Hand pulling seedlings</li> </ul>	Annually	In perpetuity

## 7.5. Control Methods and Treatments

AIS	Initial Treatment	Follow-up treatment
<p><i>Solanum mauritianum</i> Bugweed</p>	<p>These can be felled by chainsaw and the material removed from site or chipped (these chips could be of further use to the golfclub from a landscaping point of view). The cut stump must then be treated immediately with a herbicide, the herbicide registered for this use by the national department of agriculture is one that contains the active ingredient Triclopyr it's a soluble liquid mixed at a ratio of 3 percent with water ie. 3lt per 100lt of water. Your herbicide mix is to be applied directly to the stump around the cambium layer, stumps are to no higher than 150mm when felling is done.</p>	<p>Actively growing seedlings can be pulled by hand or you can folio spray with a herbicide this usually occurs in the summer months after germination and applies to saplings up to one meter in height. The herbicide used here must be one that contains the active ingredient glyphosate and is mixed with water at a ratio of 0.5 percent ie. 500ml per 100lt of water. In the case where there is coppice growth from a previously cut stump a ratio of 1 percent is used ie. 1lt per 100lt of water.</p>
<p><i>Acacia saligna</i> Port Jackson willow</p>	<p>Depending on the size of the tree they can be hand pulled if small saplings or felled if trees are felled the cut material needs to be removed from site or chipped and removed the same herbicide mix for cut-stump treatment of the bugweed can be used here .</p>	<p>Seedlings can be pulled by hand and should be a on going operation that would require regular monitoring. You can also folio spot spray with a glyphosate at a 1.5 percent solution mix on seedlings up to a height of 60cm.</p>
<p><i>Ailanthus altissima</i> Tree of Heaven</p>	<p>The larger specimens should be felled and a cut stump treatment of with triclopyr at a 3 percent mix can also be used here seedlings can be pulled by hand before taproot development.</p>	<p>Hand pulling of germinated seedlings has proved to be the most effective method with this species and will need constant monitoring as these seedlings need to be pulled out prior to taproot development.</p>
<p><i>Paraserianthes lophantha</i> Cape or Crested Wattle</p>	<p>There are biological controls available for this species that works in conjunction against <i>Acacia saligna</i> which are herbivorous insect species which are made up of 5 seed weevil species 2 flower-galling fly species and 2 bud galling wasp species all of which suppress the reproductivity of the host plant</p>	<p>Seedlings can be pulled by hand or a folio spray with glyphosate at a ratio of one percent or 100ml per 10lt of water can be used on the seedlings but both options will require constant monitoring and follow-up action.</p>

	. This method has been used in the cape but offer long term solutions and can take a few years to produce results for quicker results fell the tree's and remove the cut material or chip and remove and use a cut stump treatment with triclophyr at a 5 percent mix applied to the cambium layer with a stump height no greater than 150mm	
<i>Psidium cattleianum</i> Strawberry Guava	Tree's to be felled and the cut material removed or chipped and removed, this plant is fast becoming a really massive problem in south Africa thanks to animals and birds dispersing the seed by eating the fruit and passing through the digestive tract . There are a number of herbicides that can work as a cut stump treatment but by far the most effective is a herbicide containing picloram or triclopyr and is painted onto the cambium layer with a stump no higher than 150mm in a undiluted form.	All seedlings need to be hand pulled a folio spray with herbicide can work but I would like to suggest with constant monitoring all that's needed is to pull out the seedlings upon germination.
<i>Robinia pseudoacacia</i> Black Locust	These tree's need to felled and the cut material removed or chipped a cut stump treatment with triclopyr mixed at a ratio of 3 percent Smaller seedlings can be folio sprayed with glyphosate mixed with water with a mix ratio of 4 percent with water.	Seedlings can be hand pulled but all previously cut stumps must be checked for sprouts here a folio spray with triclopyr at a 3 percent mix.
<i>Tecoma stans</i> Yellow Bells	There are no registered herbicides for the species in south Africa as of now there are however 3 biological controls a lady leaf eating beetle , a leafmining fly and a rust fungus that have been released already in south Africa but require a substantial infestation to establish themselves . A cut-stump treatment with triclopyr at a 3 percent mix should be tried if you decide to cut the shrub down and remove the material.	If the biological controls establish themselves within the golf course they will continue with their job, that been said in your monitoring of the species any new ones can be hand pulled.

<i>Tamarix chinensis</i> Saltcedar	A cut-stump treatment with the cut material removed or chipped the herbicide active ingredient is triclopyr at a 50 percent mix applied directly to the cambium layer with a stump no higher than 150mm.	By grubbing or hand pulling.
<i>Triplaris americana</i> Ant Tree	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be removed or chipped.	Hand pulling seedlings or a folio spray with a glyphosate mixed at a one percent ratio with water of the two hand pulling would be far better and works well in conjunction with monitoring.
<i>Acacia podalyriifolia</i> Pearl Wattle	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed.	Hand pulling seedlings, a folio spray with a glyphosate and grubbing can work with this species your herbicide needs to be mixed at a one percent ratio with water of the three hand pulling would be far better and works well in conjunction with monitoring.
<i>Schinus terebinthifolius</i> Brazilian Pepper Tree	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed or a basal stem application of triclopyr wetting all bark of root crown and stem up to a height of 0.5 meters if felling removes and or chip all material.	Simple hand pulling of seedlings when spotted while monitoring.
<i>Parkinsonia aculeata</i> Jerusalem Thorn	These tree's need to felled and the cut material removed or chipped a cut stump treatment with triclopyr mixed at a ratio of 3 percent Smaller seedlings can be folio sprayed with glyphosate mixed with water with a mix ratio of 4 percent with water.	Simple hand pulling of seedlings when spotted while monitoring or folio spray seedlings with glyphosate mixed with water at a percent mix ratio.
<i>Acacia mearnsii</i> Black Wattle	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed.	Simple hand pulling of seedlings when spotted while monitoring there is also the option of folio spraying with a hormonalcide for mass regermination but hand pulling is guaranteed to work.
<i>Acacia melanoxylon</i> Blackwood	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut	Simple hand pulling of seedlings when spotted while monitoring there is also the option of folio spraying with a

	material to be chipped or removed or a basal stem application of triclopyr wetting all bark of root crown and stem up to a height of 150mm if felling removes and or chip all material from site.	triclopyr at 3 percent mix for mass regermination but hand pulling is guaranteed to work.
<i>Tipuana tipu</i> Tipu Tree	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed or a basal stem application of triclopyr wetting all bark of root crown and stem up to a height of 150mm if felling remove and or chip all material from site.	Simple hand pulling of seedlings when spotted while monitoring there is also the option of folio spraying with a triclopyr at a 3 percent mix for mass regermination but hand pulling is guaranteed to work.
<i>Melia azedarach</i> Syringa	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed or a basal stem application of triclopyr wetting all bark of root crown and stem up to a height of 250mm if felling remove and or chip all material from site.	Simple hand pulling of seedlings when spotted while monitoring there is also the option of folio spraying with a triclopyr at a 3 percent mix for mass regermination but hand pulling is guaranteed to work the best.
<i>Populus alba</i> White Poplar	Fell the tree's and use a cut stump treatment with imazapyr at a 5 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed.	Hand pulling you could use a folio spray but because its within a wetland area best to pull by hand.
<i>Quercus palustris</i> Swamp Spanish Oak	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed.	By hand pulling of small seedlings to be done in conjunction with monitoring.
<i>Ricinus communis</i> Caster Oil Plant	Fell the tree's and use a cut stump treatment with imazapyr at a 3 percent mix applied to the cambium layer with stumps no higher that 150mm all cut material to be chipped or removed.	By hand pulling of small seedlings to be done in conjunction with monitoring.
<i>Lantana camara</i> Lantana	Fell the tree's and use a cut stump treatment with triclopyr at a 3 percent mix applied to the cambium	Hand pulling or a folio spray of a herbicide with the active ingredient tebuthiuron mixed at 833gr of wetttable granules

	layer , bark and exposed roots with stumps no higher than 150mm all cut material to be chipped or removed.	per 5lt of water of spray 2ml per plant for young seedlings and double that for shrub's up to 1 meter and triple that for shrubs between 1 to 2 meters.
<i>Hibiscus diversifolius</i> Swamp Hibiscus	Fell the shrub/tree and remove or chip cut material use a cut-stump treatment with glyphosate at a 50 percent mix.	You can hand pull seedlings or folio spray with glyphosate mixed with water at a 1.5 percent ratio to the water.
<i>Salvinia molesta</i> Kariba Weed	Within artificial waterways one can use machinery to remove the weed but in natural occurring riparian zones all this has to be done by hand this vegetation must be disposed of away from any water source.	This is going to be same as the initial treatment and will be done in conjunction with your monitoring, there is a biological control for the Kariba weed the <i>C. salvinia</i> and should you wish to explore this option first make contact with the Department of forestry and fisheries and the environment to arrange the release of this biological control.



## 8. MONITORING

Monitoring involves repeated observations or recording of data to be able to track progress and determine the efficacy of control methods. A very basic monitoring programme applies to private land.

WHAT	FREQUENCY	HOW	RESPONSE
How effective are the control methods	4-6 months after every operation	Survey cleared areas and look for regrowth	Continue with methods or adapt to be more effective
Do the infestation levels decrease	Annually	Visual, photos	Continue clearing – you are doing well
How much herbicides were used	After every operation	Herbicide records / register	Keep track of cost and ensure no wastage
Does the forest recover in the cleared areas?	Annually	Photos, survey	If it does – you are doing well, if not, look at clearing methods, clearing intervals or consult an expert
How many jobs were created	After every operations	Timesheets	Send to DFFE

## 9. RECOMMENDATIONS

The following recommendations are made to protect and enhance sensitive ecological features on site:

- Wetlands should be treated as sensitive. A buffer zone along the margins should be maintained to protect the wetlands from direct impacts. Alien invasive species management should be implemented within these buffers, as well as within the wetlands, to protect them from this degrading process.
- Forest margins should be treated as sensitive ecological areas. A buffer zone along the margins should be maintained to protect the forest edges from direct impacts. Alien invasive species management should be implemented within these areas.
- An ongoing AIS management programme should continue to take place on site. This will protect sensitive habitats from degradation and could potentially be the biggest contribution to maintaining and protecting biodiversity on site and in surrounding areas.
- Practical fire break position will depend on a co-management agreement with neighbouring property owners. The SCFPA must be consulted in the preparations of fire breaks.
- Timeframes for the clearing of management unit compartments will need to be established by the appointed contractor or the applicant and submitted to DFFE for approval.
- Health and safety requirements including the use of PPE must be adhered too and is the responsibility of the appointed contractor/ applicant.
- Herbicide register to be maintained and an authorised PCO to sign off register and train herbicide applicators.

## Appendix A: Safety, Health and Environment (SHE)

It is the landowner's responsibility to ensure a safe working environment and that the teams working on the property adhere to the minimum safety requirements. This can be achieved by sourcing appropriately trained and experienced teams. The principle of "leave no trace" applies.

The landowner should liaise with the contractor to ensure the following minimum SHE requirements are adhered to:

### Toilet facilities

- The contractor is responsible for providing a mobile toilet on site for the duration of the work.
- Clean water must be made available in suitable containers for drinking and mixing herbicides.
- The landowner should allow the contractor to fill containers on the farm.

### Team's skills requirements

- Chainsaw operators in possession of valid certificates.
- Herbicide applicators certified.

### Work methods and equipment

- Equipment must be suitable for the work and in good working condition.
- Adhere to work methods stipulated in the site specification.

### Herbicides

- Refer to Section 7.

### Vehicle and driver

- The driver must be in possession of a valid PrDP.
- The vehicle must be road worthy.
- Tools must be transported in the trailer, separately from the workers.

### Safety precautions

- Certified SHE Rep on site.
- Certified Safety Office on site.
- The SHE Rep must conduct daily safety talks.
- The first aid kit must be on site.

### COID

- The contractor must be in possession and present proof of a valid certificate of good standing with the Compensation Commissioner.
- Any incidents must be reported to the landowner.
- An indemnity form must be signed stating that the contractors accepts full liability for any COID related matters and that the landowner will not be held liable should the contractor not comply with minimum standards.
- The contractor deals with COID cases and not the landowner.
- Near misses, incidents and accident register must be kept.

## Insurance

- The contractor must be appropriately insured for the vehicle and equipment.
- The contractor must provide proof of third party and liability insurance.
- Sign an agreement whereby the contractor accepts liability for damages in case of negligence.

## Storage of fuel and herbicides

- Fuel and herbicides must be left in a shady area, away from the resting/eating area.
- The area must be clearly marked with bunting.
- The bunting must be removed on completion of the job.
- Herbicide mixing and refuelling must be conducted on a spill blanket.
- A spade must be on site to cover any accidental spillage.
- A serviced and functional fire extinguisher must be kept at the fuel refilling area.

## Preventing fires

- No smoking while working, assign a designated smoking area.
- Remove cigarette butts.
- No smoking during windy conditions.
- Keep 1 fire beater for every team member within reach of the workers.
- No chainsaw work during Code Red days - Fire Danger Indices (FDIs) obtainable from FPA.

## Correct PPE are being worn at all times:

Item	Supervisor	Machine operator	General workers SHE Rep; 1 <sup>st</sup> Aid Rep; Driver	Specialized herbicide applicator
Sunhat (follow up operations)	✓	✓	✓	✓
Hard hat (when chainsaws are being used)	✓	✓	✓	✓
Hard hat with visor and certified earmuffs (SABS or EU),	x	✓	x	x
T-shirt	✓	✓	✓	✓
Conti suit	✓	✓	✓	✓
FESA approved chainsaw pants (eleven layers) with broad belt or braces	x	✓	x	x
Whistle	✓	✓	x	x
Safety boots	✓	✓	✓	✓
Gumboots (only when working in riverine/wetland areas)	✓	✓	✓	✓
Chainsaw safety boots	x	✓	x	x
Gloves	✓	✓	✓	✓
Chainsaw operators gloves	x	✓	x	x
Safety goggles	✓	✓	✓	✓
Cape (when using a knapsack)	x	x	x	✓
Mask (when applying herbicides)	x	x	x	✓

Rubber gloves (for mixing herbicides)	x	x	x	✓
Rubber apron (for mixing herbicides)	x	x	x	✓
Rain suit (during rainy conditions)	✓	✓	✓	✓

It is recommended that the requirements are stipulated in the work specifications and the contractor accept accountability in writing.