

# GREEN DOOR environmental

## ENVIRONMENTAL MANAGEMENT PROGRAMME

The Proposed Establishment of the 245 ha Nsuze Irrigation Scheme (Non-Sensitive Areas) located on Reserve No. 19 of the Farm No. 15389, near Kranskop, KwaZulu Natal

PREPARED FOR THE DEPARTMENT OF RURAL DEVELOPMENT AND LAND REFORM

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*Residential  
Commercial  
Industrial  
Agriculture  
Linear  
Service*

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# Contents

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>2</b>	<b>AIM OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME</b>	<b>9</b>
<b>3</b>	<b>ENVIRONMENTAL COMPLIANCE</b>	<b>9</b>
<b>3.1</b>	<b>Responsibilities for Environmental Management</b>	<b>9</b>
<b>3.2</b>	<b>Training of Employees</b>	<b>10</b>
<b>3.3</b>	<b>Complaints Register and Environmental Incident Book</b>	<b>10</b>
<b>3.4</b>	<b>Environmental Monitoring</b>	<b>11</b>
<b>3.5</b>	<b>Non-Compliance with the EMPr</b>	<b>11</b>
<b>3.6</b>	<b>EMPr Amendments / EMPr Instructions</b>	<b>11</b>
<b>4</b>	<b>LEGISLATIVE FRAMEWORK</b>	<b>12</b>
<b>4.1</b>	<b>The Constitution of the Republic of South Africa Act (ACT 108 of 1996)</b>	<b>12</b>
<b>4.2</b>	<b>National Environmental Management Act (ACT 107 of 1998)</b>	<b>12</b>
<b>4.3</b>	<b>Sustainable Development</b>	<b>13</b>
<b>4.4</b>	<b>Polluter Pays Principle</b>	<b>13</b>
<b>5</b>	<b>THE ACTIVITY</b>	<b>14</b>
<b>5.1</b>	<b>Location, Access and Land Description</b>	<b>14</b>
<b>6</b>	<b>PRE-CONSTRUCTION (pre-site preparation)</b>	<b>15</b>
<b>7</b>	<b>CONSTRUCTION &amp; REHABILITATION (site preparation)</b>	<b>18</b>
<b>8</b>	<b>OPERATION</b>	<b>23</b>
<b>9</b>	<b>CONCLUSION</b>	<b>25</b>
	<b>APPENDIX A: COMPLAINTS REGISTER FORMAT</b>	<b>26</b>
	<b>APPENDIX B: ENVIRONMENTAL INCIDENT REPORT BOOK FORMAT</b>	<b>27</b>
	<b>APPENDIX C: ALIEN VEGETATION CONTROL PROGRAMME</b>	<b>28</b>
	<b>APPENDIX D: RUNOFF CONTROL PLAN</b>	<b>33</b>

# 1 INTRODUCTION

The Department of Rural Development and Land Reform (DRDLR) proposes to establish the Nsuzze Irrigation Scheme (Non-Sensitive Areas) located on Reserve No. 19 of the Farm No. 15389, near Kranskop, KwaZulu-Natal. This Basic Assessment is for the 16 non-sensitive sites, which total 245 ha. The plots are listed in Table 1.

This project aims to unlock the irrigation potential of the rivers to promote food production. The project consists of 22 scattered plots which comprise a mix of cultivated and uncultivated lands, ranging from between two (2ha) and 34ha in size. The DEA has confirmed that two separate Basic Assessment Applications can be made; one that incorporates the sensitive areas and one which assesses the non-sensitive areas. Each Basic Assessment Application provides generic information on the project and surrounding area, along with site specific information on the individual areas proposed to be irrigated.

The following Environmental Management Programme (EMPr) is for the establishment of an irrigation scheme on the non-sensitive plots identified for this application. It does not include the cultivation of any soils. The plots are listed in Table 1 below.

**Table 1:** Locations of the non-sensitive plots:

No.	Plot No.	GPS
1	1	28°52'5.27"S 31° 2'50.78"E
2	5	28°50'49.29"S 31° 3'20.28"E
3	6	28°50'33.72"S 31° 3'33.43"E
4	7	28°50'19.63"S 31° 4'8.15"E
5	8	28°50'13.93"S 31° 4'23.80"E
6	9	28°50'9.64"S 31° 4'37.01"E
7	10	28°49'56.37"S 31° 4'47.47"E
8	11	28°49'39.79"S 31° 4'59.78"E
9	12	28°49'19.66"S 31° 4'55.59"E
10	13	28°49'3.93"S 31° 4'25.97"E
11	16	28°48'36.06"S 31° 5'22.73"E
12	17	28°48'19.23"S 31° 5'2.94"E
13	18	28°48'10.93"S 31° 4'34.15"E
14	28	28°53'33.64"S 31° 1'54.00"E
15	29	28°51'2.54"S 31° 0'10.93"E
16	31	28°49'16.66"S 30°58'53.64"E

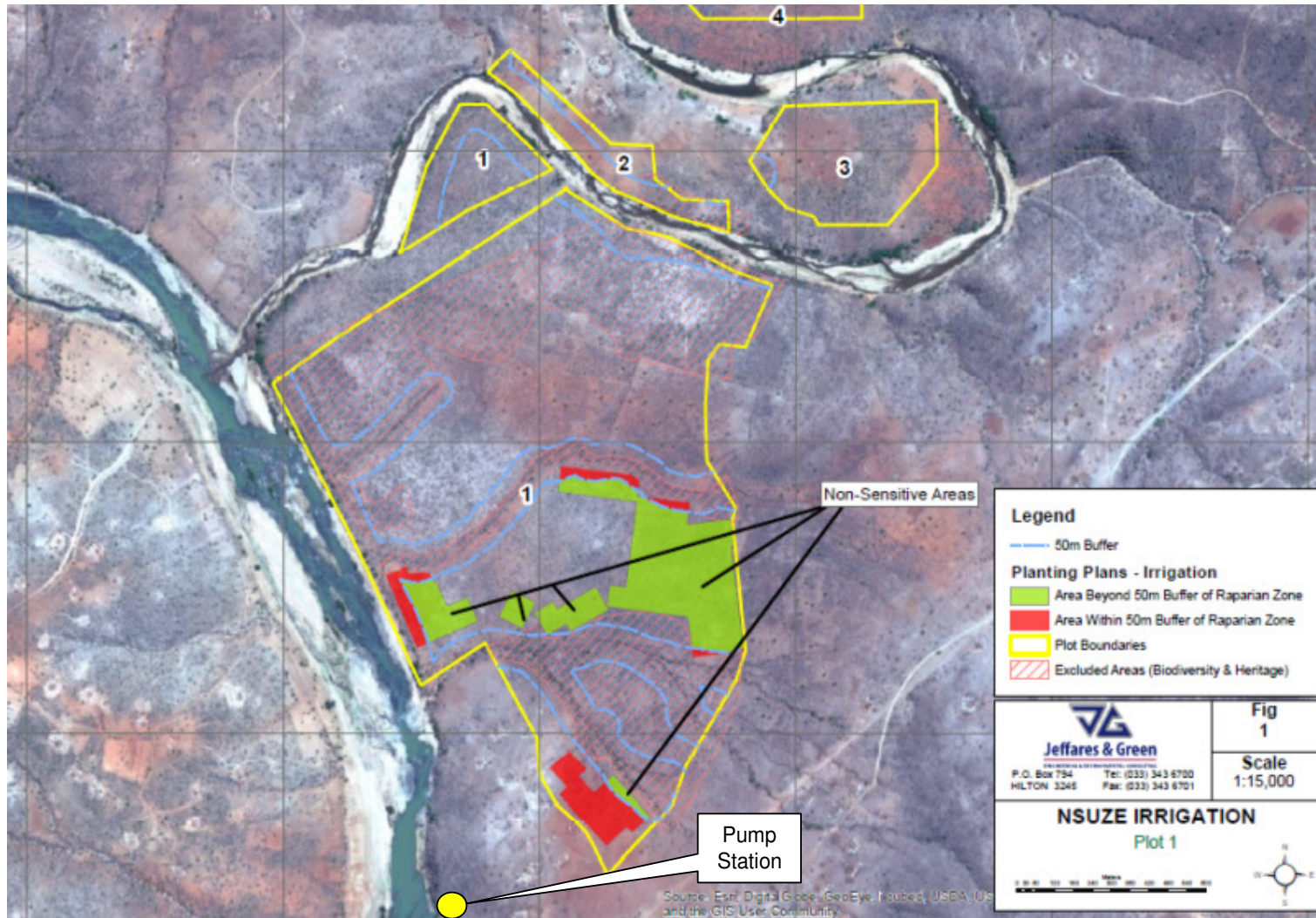


Figure 1: Aerial photo showing Non-Sensitive Plot No. 1 the location of the pump station.

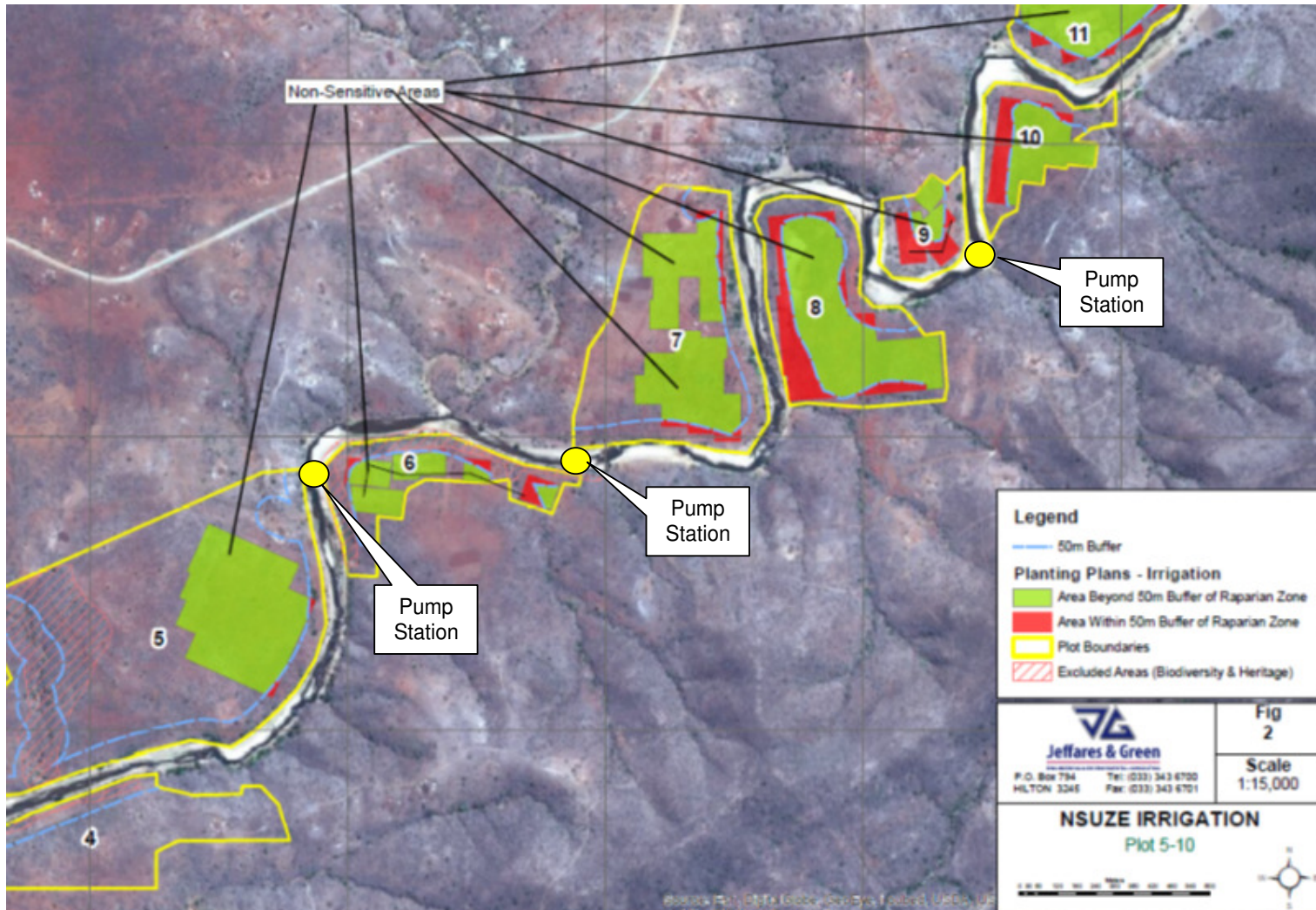


Figure 2: Aerial photo showing Non-Sensitive Plots No. 5 - 10 the location of the pump stations.

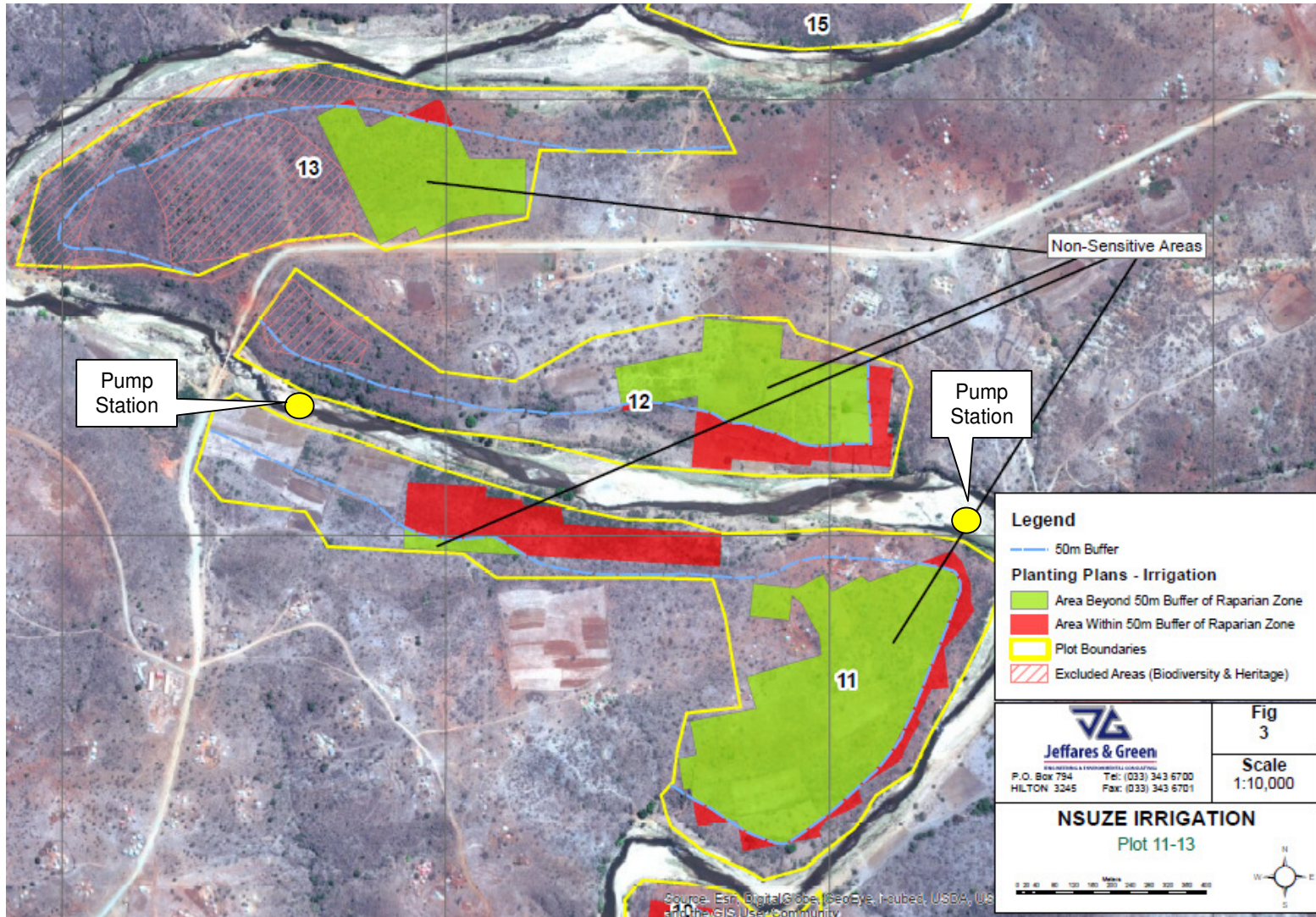


Figure 3: Aerial photo showing Non-Sensitive Plots No. 11 - 13 the location of the pump stations.





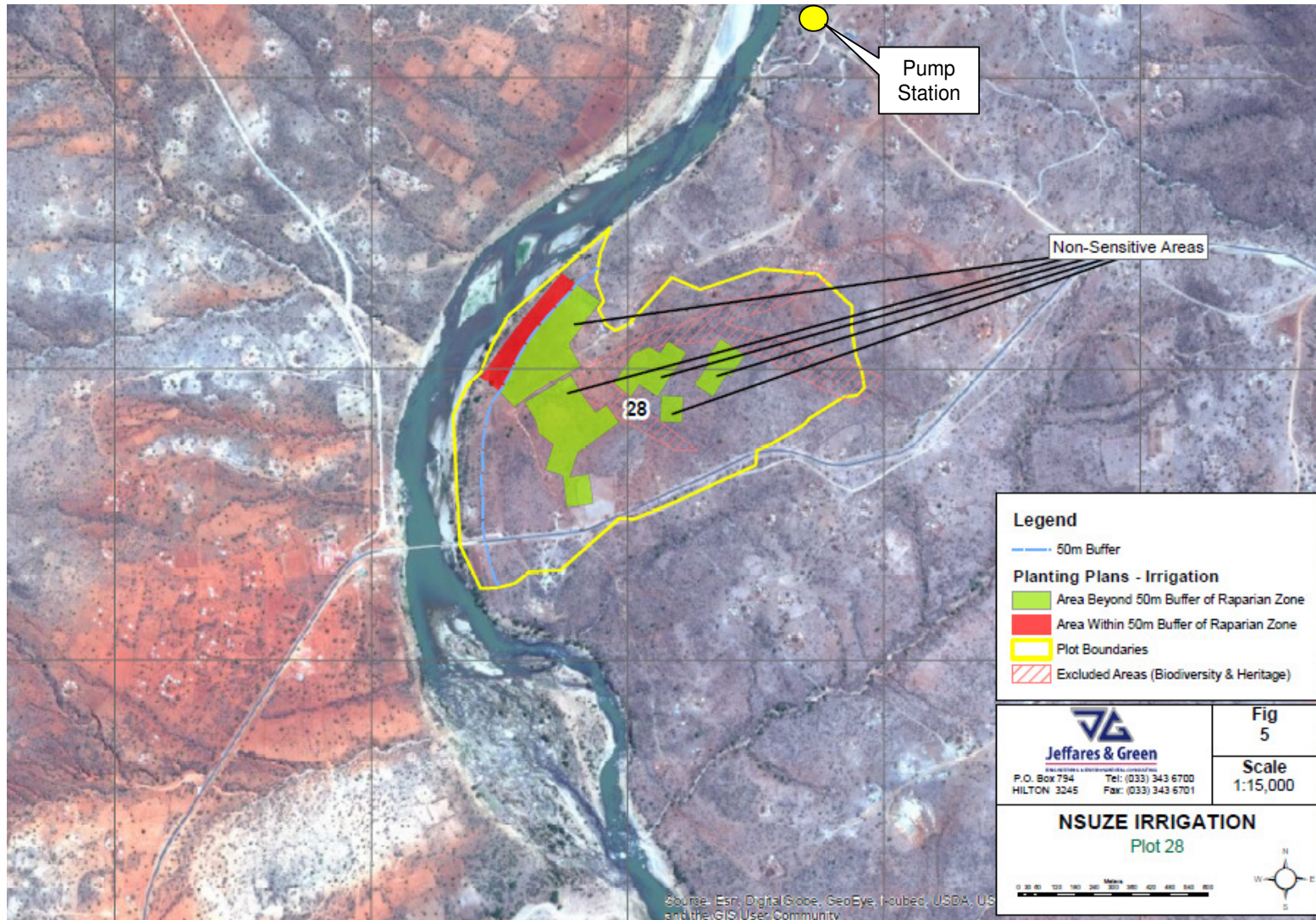


Figure 5: Aerial photo showing Non-Sensitive Plot No. 28 the location of the pump station.

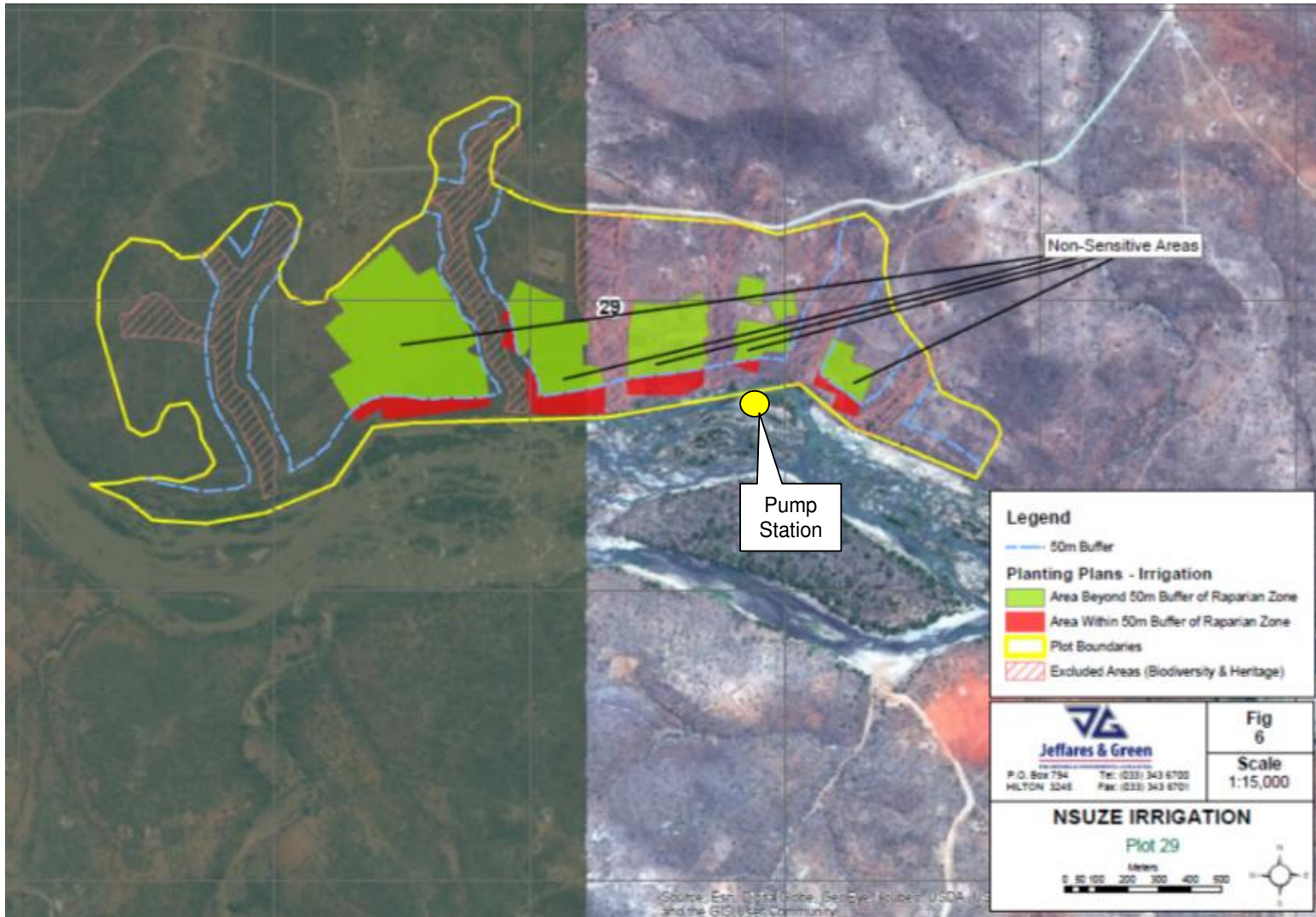


Figure 6: Aerial photo showing Non-Sensitive Plot No. 29 the location of the pump station.

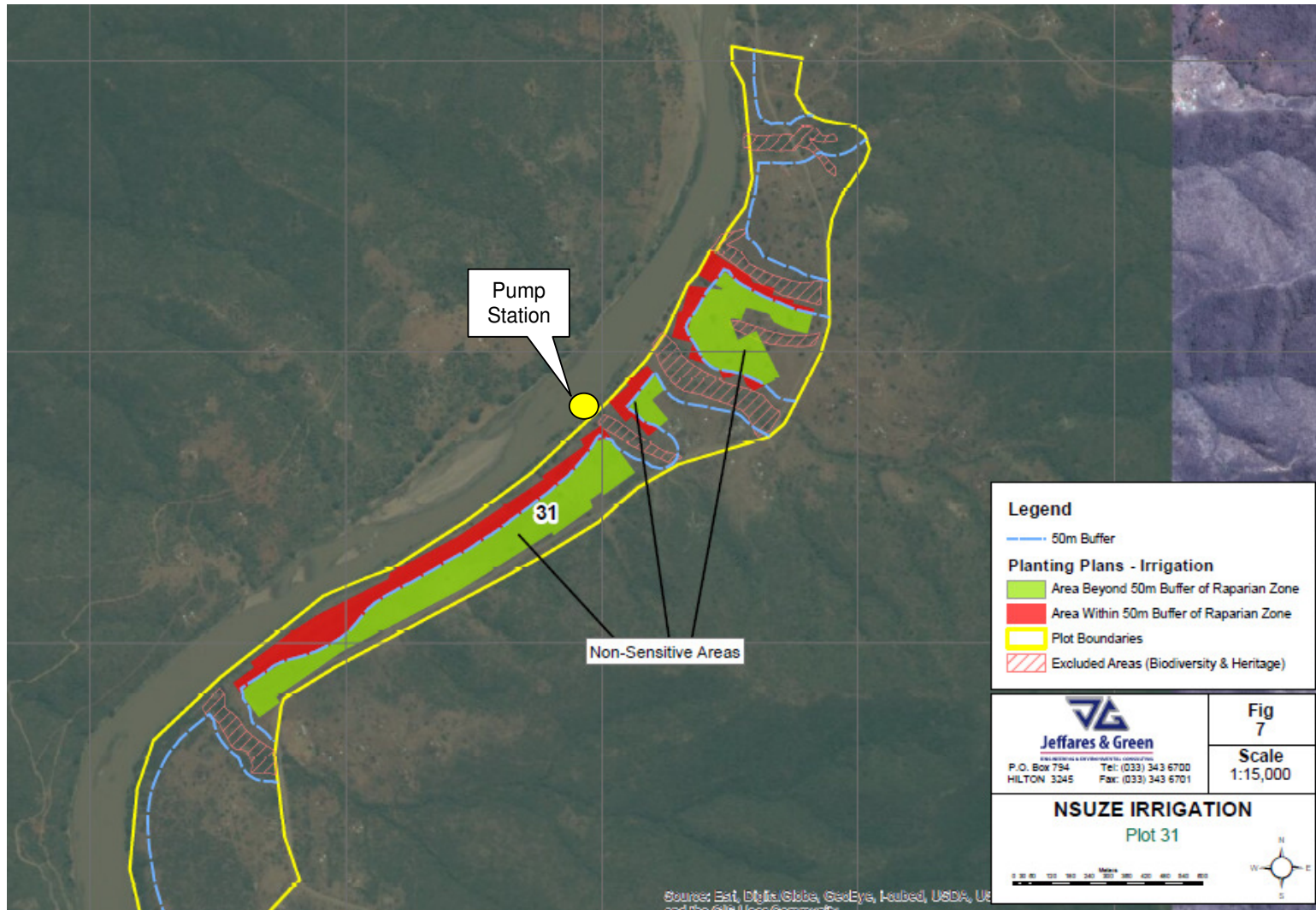


Figure 7: Aerial photo showing Non-Sensitive Plot No. 31 the location of the pump station.

## 2 AIM OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME

The aim of this Environmental Management Programme (EMPr) is to identify and minimise, as far as possible, potential impacts that the project may have on the surrounding biophysical and socio-economic environment during the following phases:

- i. Pre-construction and planning;
- ii. Construction (site preparation); and
- iii. Operational.

The purpose of the EMPr is to:

- Encourage good management practices through planning and commitment to environmental issues;
- Define how the management of the environment is reported and performance evaluated;
- Provide rational and practical environmental guidelines to:
  - Minimise disturbance of the natural environment;
  - Prevent or minimise all forms of pollution;
  - Protect indigenous flora and fauna;
  - Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment; and,
  - Adopt the best practicable means available to prevent or minimise adverse environmental impacts.
- Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of wastes;
- Describe all monitoring procedures required to identify impacts on the environment; and
- Make the working community aware of environmental obligations.

## 3 ENVIRONMENTAL COMPLIANCE

### 3.1 RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT

The Civil Engineer, contracted by the DRDLR, will be responsible for environmental management on site during all three phases (pre-construction and planning, construction, and operation). Surrounding residents, tenants or landowners must be notified in advance of any potentially disturbing activities.

The independent Environmental Assessment Practitioner (EAP) is required to act as the Environmental Control Officer (ECO) and conduct regular inspections of the construction

activities and implementation of the EMPr throughout the duration of the pre-construction and construction phases. During these phases, the ECO will produce a brief monitoring report after each audit, and submit it to the Client, as well as to the Compliance Department of the KwaZulu-Natal Department of Environmental Affairs (DEA).

### 3.2 TRAINING OF EMPLOYEES

The Contracted Engineer (during pre-construction, construction) and the DRDLR (during operation) have a responsibility to ensure that all those people involved in the project are aware of and are familiar with the environmental requirements for the project. This EMPr should be part of the Terms of Reference (ToR) for all Contractors, Sub-contractors, Suppliers, Staff and Visitors. All senior and supervisory staff members are required to familiarise themselves with the full contents of this EMPr. They must know and understand the specifications of the EMPr and be able to assist other staff members in matters relating to the EMPr.

It is recommended that an environmental awareness training programme for all staff members should be arranged before commencing with any work. All staff members must be appropriately briefed about the EMPr and relevant occupational health and safety issues. This training should be regularly repeated to ensure that all staff members are familiar with the requirements of the EMPr. In addition, this training should be repeated for any new personnel that join the operation.

### 3.3 COMPLAINTS REGISTER AND ENVIRONMENTAL INCIDENT BOOK

Any complaints received from the community (during all three phases) must be registered and recorded by a supervisory staff member on site. The complaint must be brought to the attention of the ECO, who will ensure that the staff respond accordingly. The following information must be recorded:

- Time, date and nature of the complaint;
- Response and investigation undertaken; and
- Actions taken and by whom.

Refer to Appendix A.

All complaints received must be investigated and a response (even if pending further investigation) is to be given to the complainant within 7 days.

All environmental incidents occurring on the site must be recorded (during all three phases).

The following information must be provided:

- Time, date, location and nature of the incident; as well as,
- Actions taken and by whom.

Refer to Appendix B.

### 3.4 ENVIRONMENTAL MONITORING

Environmental monitoring of the pre-construction and construction phases of the development will be undertaken by the ECO. Monitoring must be undertaken to ensure compliance with all aspects of the EMPr. During the operational phase, environmental monitoring will also be conducted. The frequency of the audits during both the construction and operational phases will be determined by the DEA.

In order to facilitate communication between the ECO, the DRDLR, the Contracted Engineer and staff, it is important that a suitable chain of command is structured that will ensure that the ECO's recommendations have the full backing of those involved before being conveyed to the necessary person. In this way, penalties as a result of non-compliance with the EMPr may be justified as failure to comply with instruction from the highest authority.

During all phases of the development, the ECO will communicate any environmental issues to the Contracted Engineer, who will in turn, communicate these concerns to the appropriate individual. If an environmental incident occurs on site, details of the incident must be logged (refer to Appendix B).

### 3.5 NON-COMPLIANCE WITH THE EMPr

Difficulties may be encountered with carrying out mitigation measures that could result in future non-compliance. The Contracted Engineer shall put in place procedures to motivate staff members to comply with this EMPr, and to deal with acts of non-compliance, or malicious damage to the environment. Penalties for non-compliance need to be discussed with the Supervisory staff at the earliest stage.

### 3.6 EMPr AMENDMENTS / EMPr INSTRUCTIONS

No EMPr amendments (relaxation or revision of any mitigation measure) shall be allowed without approval from the relevant authority (DEA). Motivations for amendments to the EMPr may be discussed with the ECO.

The ECO may propose EMPr amendments on behalf of the proponent or issue EMPr instructions (corrective actions, remediation and rehabilitation). These amendments or instructions issued by ECO shall be implemented within the specified time frame.

## 4 LEGISLATIVE FRAMEWORK

### 4.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA ACT (ACT 108 OF 1996)

The Constitution of the Republic of South Africa is the legal source for all law, including environmental law, in South Africa. The Bill of Rights is fundamental to the Constitution of the Republic of South Africa and in, Section 24 states that:

*Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

### 4.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act (NEMA) is South Africa's overarching environmental legislation and has, as its primary objective to provide for co-operative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith (Government Gazette, 1998).

The Act provides for the right to an environment that is not harmful to the health and well being of South African citizens; the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (Government Gazette, 1998).

In terms of Section 28 (1) of the NEMA:

*“(1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. (2)...the persons on whom subsection (1) imposes an obligation to take reasonable measures, including and owner or land, a person in control of land or premises, or a person who has a right to use the land or premises on which or in which – (a) any activity or process is or was performed or undertaken; or (b) any other situation exists, which causes or has caused or is likely to cause significant pollution or degradation of*

*the environment. (3) The measures required in terms of subsection (1) may include measures to – (a) investigate, assess and evaluate the impact on the environment; (b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment; (c) cease, modify or control any act, activity or process causing pollution or degradation; (d) contain or prevent the movement of pollutants or the cause of degradation; (e) eliminate the source of the pollution or degradation; or (f) remedy the effects of the pollution or degradation...*

#### 4.3 SUSTAINABLE DEVELOPMENT

The principle of Sustainable Development has been established in the Constitution of the Republic of South Africa (108 of 1996) and given effect by NEMA. Section 1 (29) of NEMA states that:

*“1(29)...Sustainable development means the integration of social, economic and environmental factors into the planning, implementation and decision-making process so as to ensure that development serves present and future generations.”*

Similarly the guiding principles established in Section 2 (3) of NEMA state that:

*“2(3) Development must be socially, environmentally and economically sustainable. (4) (a) Sustainable development requires the consideration of all relevant factors including the following: (i) That the disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be altogether avoided, are minimised and remedied; (ii) that pollution and degradation of the environment are avoided, or where they cannot be altogether avoided, are minimised and remedied...(vii) that negative impacts on the environment and on peoples environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.”*

Thus Sustainable Development requires that there is an integration of social, environmental and developmental concerns and that greater attention to each of these aspects of development will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future (United Nations Department of Economic and Social Affairs, Division for Sustainable Development, 1992).

#### 4.4 POLLUTER PAYS PRINCIPLE

The ‘polluter pays’ principle provides that ‘the cost of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising



further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment'. NEMA imposes a duty of care (Section 28 of NEMA) on every person who causes, has caused or may cause significant pollution or degradation of the environment to take reasonable measures to prevent the pollution or degradation of the environment from occurring, continuing or reoccurring. Insofar as such harm to the environment is authorised by law or cannot reasonably be avoided, NEMA requires that the pollution must be minimised and rectified.

## 5 THE ACTIVITY

### 5.1 LOCATION, ACCESS AND LAND DESCRIPTION

The proposed establishment of the Nsuze Irrigation Scheme (Non-Sensitive Areas) located on Reserve No. 19 of the Farm No. 15389, near Kranskop, KwaZulu Natal.

The project site is approximately 25km north-east of Kranskop and extends along the banks of the Tugela and Nsuze Rivers. This project aims to unlock the irrigation potential of the rivers to promote food production. This project consists of 16 scattered plots which comprise a mix of cultivated and uncultivated lands, ranging from between two (2ha) and 34ha in size. Also proposed is the establishment of:

- Ten submerged abstraction pump stations each with a footprint of 6.3 m<sup>2</sup> and installed with a centrifugal sump pump set;
- Nine booster pump stations each with a footprint of 17.2m<sup>2</sup> and installed with a centrifugal pump set;
- Eleven steel panel reservoirs with a range of holding capacity between approximately 600m<sup>3</sup> and 2000m<sup>3</sup>; and
- Dragline sprinkler system comprising a bulk supply main with buried laterals. Connected to the laterals, by 25 m -36 m lengths of dragline hose, are sprinkler nozzles mounted on stands.

Access to the project area is off the R74 Road towards Kranskop. Proceed to Ntunjambili and then turn towards the Thukela River Valley along the D1640 Road and travel for approximately 10 km towards a bridge that crosses the river. The proposed areas for the irrigation development are situated all along the Tugela and Nsuze Rivers (northern and eastern bank).

## 6 PRE-CONSTRUCTION (pre-site preparation)

### PRELIMINARY ACTIVITIES

Potential environmental impacts, impact sources and objectives are described, and environmental management mitigation measures to be implemented during pre-construction are specified.

In the tables that follow, Environmental Control Officer and Contracted Engineer have been abbreviated to ECO and CE respectively.

<b>GENERAL</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Staff must be sourced from the local community where possible.	CE	Ongoing	-	
<b>ABLUTIONS</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ The construction of long drop toilets is forbidden on site.	CE	Ongoing	Site inspection	
◆ Under no circumstances may open areas or the surrounding bush be used as a toilet facility.	CE	Ongoing	Site inspection	
◆ Under no circumstances may local drainage lines or streams be used as a toilet or cleaning facility by workers on site.	CE	Ongoing	Site inspection	
<b>PROVISION FOR SITE WASTE DISPOSAL</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ If staff produce domestic waste on site (e.g. during lunch), this waste must be removed from the site and disposed of via a formal disposal streams. Recycling is recommended where possible.	CE	Ongoing	Site inspection	
<b>STOCKPILING OF SOIL</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ The stockpiling of soil or any other materials shall not be allowed near a watercourse, wetland or water body to prevent pollution or impediment to surface runoff.	CE	Ongoing	Site inspection	
<b>ENVIRONMENTAL EDUCATION AND AWARENESS</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>

<ul style="list-style-type: none"> <li>◆ It must be ensured that all staff have a basic level of environmental awareness training. The CE must ensure that all workers are aware of the following: <ul style="list-style-type: none"> <li>– What is meant by “environment”;</li> <li>– Why the environment needs to be protected and conserved;</li> <li>– How construction activities can impact on the environment;</li> <li>– What can be done to mitigate against such impacts; and</li> <li>– Social responsibility during construction (being considerate to residents etc.).</li> </ul> </li> </ul>	CE/ECO	During staff induction / Ongoing	Site inspection and staff interviews	
<ul style="list-style-type: none"> <li>◆ Translators are to be used if necessary, to ensure that all staff understand what is required of them in terms of the EMPr.</li> </ul>	CE	Ongoing	Site inspection and liaison with Foreman	
<ul style="list-style-type: none"> <li>◆ The CE must be on hand to explain any technical issues and to answer questions.</li> </ul>	CE	Ongoing	-	
<b>WORKER CONDUCT ON SITE</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✕</b>
<ul style="list-style-type: none"> <li>◆ A general regard for the social and ecological well being of the site and surrounding areas is expected of the staff. Staff need to be made aware of the following rules: <ul style="list-style-type: none"> <li>– No alcohol / drugs to be allowed on site;</li> <li>– No firearms allowed on site or in vehicles transporting staff to / from the site;</li> <li>– Prevent excessive noise;</li> <li>– No harvesting of firewood from the site or from areas adjacent to it;</li> <li>– No damaging or removal of any plant or animal from areas adjacent to cultivation sites.</li> <li>– Trespassing on properties adjoining the site is forbidden; and</li> <li>– Driving under the influence of alcohol is prohibited.</li> </ul> </li> </ul>	CE/ECO	During staff induction, followed by ongoing monitoring.	Site inspection and liaison with Foreman	
<b>FAUNA AND FLORA</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✕</b>
<ul style="list-style-type: none"> <li>◆ Care must be taken to avoid the introduction of invasive plant species to the site</li> </ul>	CE/ECO	Ongoing	Site inspection	

and surrounding areas (Appendix C).				
◆ No trees / shrubs / groundcover may be removed or vegetation stripped without the prior permission of the ECO.	ECO	Before and during construction	Site inspection	

Additional Notes:

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## 7 CONSTRUCTION & REHABILITATION (site preparation)

### MANAGEMENT OF CONSTRUCTION ACTIVITIES AND STAFF

<b>SITE ACCESS</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ The CE is to ensure that all access roads (if required) are maintained in good working condition.	CE	When necessary	Site inspection	
<b>STORMWATER MANAGEMENT</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Stormwater from higher lying areas should be channelled away from the irrigation system into natural drainage lines or the River.	CE	Ongoing	Site inspection	
◆ Suitable erosion control methods must be implemented in the areas around the irrigation systems. These measures could include: <ul style="list-style-type: none"> <li>– The suitable use of sand bags or Hessian sheets.</li> <li>– The prompt rehabilitation of exposed soil areas within indigenous vegetation to ensure that soil is protected from the elements.</li> <li>– The removal of vegetation, only as it becomes necessary for work to proceed.</li> <li>– Prevent the unnecessary removal of vegetation especially on steep slopes.</li> </ul>	CE	Ongoing	Site inspection	
<b>WASTE MANAGEMENT</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Any domestic waste created on site is to be removed from the site and disposed of in a formal waste disposal stream. Recycling is recommended where possible.	CE	Ongoing and during site establishment	Site inspection	
<b>FAUNA AND FLORA</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>

<ul style="list-style-type: none"> <li>◆ The following requirements must be met to ensure the protection of the vegetation: <ul style="list-style-type: none"> <li>– All staff members are required to attend the Foreman's environmental awareness training sessions;</li> <li>– Employees will be subject to fines, should they be caught removing or damaging sensitive flora on or surrounding the property.</li> <li>– 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 – e.g. seeds).</li> <li>– Disturbance to birds, animals and reptiles and their habitats should be minimised wherever possible.</li> </ul> </li> </ul>	CE/ECO	During staff induction / Ongoing	Site inspection and liaison with Foreman	
<ul style="list-style-type: none"> <li>◆ The trapping and killing of wild animals and disturbance to their habitats must be prohibited. Strict controls and penalties must be enforced. Any incidences must be reported to the Compliance Department of DAEMA and Ezemvelo KZN Wildlife.</li> </ul>	CE	Ongoing	Site inspection and liaison with Foremen	
<b>REMOVAL OF VEGETATION</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	✓ / ✗
<ul style="list-style-type: none"> <li>◆ Site clearing activities should only be conducted immediately prior to construction, to reduce the amount of time topsoil being exposed, and thus the potential for erosion.</li> </ul>	CE/ECO	Ongoing	Site inspection	
<b>ALIEN VEGETATION</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	✓ / ✗
<ul style="list-style-type: none"> <li>◆ The CE is to control and eradicate the spread of alien vegetation. Refer to Appendix C.</li> </ul>	CE	Ongoing	Site inspection	
<ul style="list-style-type: none"> <li>◆ Alien plants that have been removed must be discarded at an appropriate refuse site. Should alien vegetation have seeds, it should be transferred to a storage area where it can be burned in a controlled manner.</li> </ul>	CE	When required	Site inspection	
<b>DUST / AIR POLLUTION</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	✓ / ✗
<ul style="list-style-type: none"> <li>◆ Appropriate dust suppression measures must be used when dust generation is unavoidable (dampening).</li> </ul>	CE	Ongoing	Site inspection	
<ul style="list-style-type: none"> <li>◆ Vehicles and machinery are to be kept in good working order and to meet manufacturers specifications for safety, fuel consumption etc.</li> </ul>	CE	Ongoing	Site inspection	
<ul style="list-style-type: none"> <li>◆ Should excessive emissions be observed, the CE is to have the equipment seen to as soon as possible.</li> <li>◆ All vehicles should comply with speed limits on the access road. Vehicles should be properly maintained and regularly serviced to ensure that exhaust emissions are controlled.</li> </ul>	CE	As directed by the F	Site inspection	

<b>EQUIPMENT / MACHINERY</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ It must be ensured that only trained staff may operate machinery on site.	CE	Ongoing	Site inspection	
◆ Ensuring that all personnel are aware of the impacts and hazards associated with the tasks they perform and are equipped with the knowledge and skills to mitigate against these.	CE	Ongoing	Site inspection	
<b>DISRUPTION OF INFRASTRUCTURE AND SERVICES</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Should the workers be approached by members of the public or other stakeholders, they are to assist them in locating the CE or supervisory staff.	CE	Ongoing	-	
◆ The CE is to inform surrounding residents of disruptive activities at least 24 hours in advance.	CE	At least 24 hours before the activity is to take place	Liaison with Foreman and neighbours	
<b>COMMUNICATION WITH INTERESTED &amp; AFFECTED PARTIES (I&amp;AP's)</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ The CE is responsible for ongoing communication with all I&AP's.	CE	Ongoing	Liaison with Foreman	
◆ Queries and complaints are to be handled by: – Documenting details of such communications; – Submitting these for inclusion into the complaints register; – Bringing issues to the immediate attention of the CE; and – Taking remedial action as per the CE and / or ECO's instructions.	CE/ECO	Ongoing		
<b>HERITAGE RESOURCES</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Amafa must be notified immediately if any cultural material is discovered during the course of the development. Amafa can be contacted at 033 394 6543.	CE	Ongoing	Site inspection	
<b>BUFFER ZONES – FRESHWATER ECOSYSTEMS</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ The following best management practices are adopted to further promote the protection of the freshwater ecosystems: – Rehabilitation of the buffer zones, with the removal of alien invasive plant species (Appendix C), to ensure an undisturbed vegetative community; – Stabilization of the existing erosion features within or directly downstream of the proposed	CE/ECO	Ongoing	Site inspection	

<p>agricultural areas;</p> <ul style="list-style-type: none"> <li>– The development of an agricultural runoff control plan (including contour banks, waterways etc.) by an agricultural engineer (Appendix D); and</li> <li>– Enforcement and management of the buffer zones to ensure that there is no encroachment that would reduce the efficacy of the buffer zones.</li> </ul>				
<b>RUNOFF CONTROL PLANNING</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	✓ / ✗
<p>◆ To limit the impacts of surface runoff from agricultural lands on the freshwater ecosystems, the following principles should be adopted:</p> <ul style="list-style-type: none"> <li>– Natural watercourses should be respected and wherever possible used for the disposal of runoff from adjacent fields;</li> <li>– Multiple discharge points at regular intervals for those agricultural areas directly adjacent to the riparian habitat;</li> <li>– The erosional features within the sites would need to be appropriately stabilised to ensure that no further erosion occurs, especially from water entering the erosion features from the adjacent slopes. These features should be transformed into stable, vegetated waterways;</li> <li>– Flow through the buffer zone should be via diffuse flow and concentrated flow should be avoided. This would assist in reducing the concentration of flows and hence the risks of erosion and further degradation of the receiving environments; and</li> <li>– The runoff entering the buffer zone should not exceed 1.5m/sec as this is considered to reduce the pollutant removal performance of the buffer area.</li> </ul>	CE/ECO	Ongoing	Site inspection	
<b>RIPARIAN MANAGEMENT AND REHABILITATION</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	✓ / ✗
<p>◆ Rehabilitation/enhancement of the riparian habitats onsite where feasible, promoting the effectiveness and opportunity for the system to provide benefits and services, including:</p> <ul style="list-style-type: none"> <li>– Deactivation of erosional features, ensuring no further lateral erosion takes place;</li> <li>– Reducing the sediment export from the systems by trapping of sediment within the existing dongas, using suitably engineered energy breakers and or the construction of sediment traps; and</li> <li>– Eradication of alien invasive plant species within the riparian areas.</li> </ul>	CE/ECO	Ongoing	Site inspection	



Additional Notes:

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## 8 OPERATION

### OPERATIONAL ACTIVITIES

The following EMPr stipulations should be adhered to at all times during the operational phase.

<b>SURFACE AND GROUNDWATER MANAGEMENT</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Monitoring of the stormwater management around the irrigation systems must be conducted at regular intervals.	CE	Ongoing	Site inspection	
◆ Any areas of erosion should be rehabilitated as soon as possible.	CE	Ongoing	Site inspection	
<b>ALIEN VEGETATION</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ The establishment of invasive alien plant species during the operational phase of the development must be prevented (i.e. regular weeding and / or spraying). It is preferable to use manual removal where possible rather than chemical control. Where chemicals are used, only those that are known to be harmless to fauna should be employed	CE	Ongoing	Site inspection	
<b>NOISE</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ All equipment, vehicles and machinery must be properly maintained to minimise unnecessary noise.	CE	Ongoing	Site inspection	
<b>LOGGING OF INCIDENTS</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Any incidents associated with the operation must be recorded in The Environmental Incident Record Book	CE	Ongoing.	Register inspection	
◆ An Environmental Incident Record Book must be available to record the details of any environmental incidents (date, time, location, cause, nature of incident, action taken, people involved).	CE	Ongoing.	Register inspection	
◆ All incidents must be recorded accurately, regardless of their extent	CE	Ongoing.	Register inspection	
<b>DECOMMISSIONING</b>	<b>RESPONSIBILITY</b>	<b>OCCURRENCE</b>	<b>METHOD</b>	<b>✓ / ✗</b>
◆ Should the irrigation systems be decommissioned, an adequate cover crop must be	CE	Ongoing.	Register inspection	

planted to stabilise the soil, in order to prevent erosion. Erosion control structures must also be installed.				
♦ The site should be allowed to rehabilitate naturally. Alien invasive plants should be continually cleared and not allowed to establish. An Alien Vegetation Control Programme would have to be implemented on site.	CE	Ongoing.	Register inspection	

Additional Notes:

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## 9 CONCLUSION

In terms of NEMA, everyone is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally responsible manner. Furthermore, in terms of NEMA, the cost to repair any environmental damage shall be borne by the person responsible for the damage.

If the above-mentioned management recommendations are adopted it is anticipated that most of the negative environmental impacts associated with the pre-construction, construction, post-construction and operational phases of the development can be mitigated against. An appointed ECO will need to regularly monitor the site to ensure that the required environmental controls are in place and working effectively.





## APPENDIX C: ALIEN VEGETATION CONTROL PROGRAMME

### ***Relevant Legislation***

The Conservation of Agricultural Resources Act (CARA) is an Act of the National Department of Agriculture (NDA) and makes provision for the conservation of the natural agricultural resources of South Africa through:

- Maintaining the production potential of land;
- Combating and prevention of erosion;
- Preventing the weakening or destruction of the water sources;
- Protecting the vegetation; and
- Combating weeds and invader plants.

Part 1 of the Act deals with the cultivation control measures. Sections of the Act relevant to the establishment of the plantations are listed below:

- *Section 7 (1) states that 'no land user shall utilize the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 meters horizontally outside flood area in a manner that causes or may cause the deterioration of or damage to the natural agricultural resources'.*
- *Section 9 (1) states that 'every land user shall... protect the veld on his farm unit effectively against deterioration and destruction'.*

Amended Regulations 15 and 16 of CARA were promulgated on 30 March 2001. These changes were necessitated by the accelerating deterioration of South Africa's natural resources due to invasion by alien invasive plants, as well as a heightening public awareness with regard to environmental matters.

With the amendments, the Act now boasts a far more comprehensive list of species that are declared weeds and invader plants and has also divided the species into three categories.

Category 1 species (e.g. Triffid Weed, Lantana) are generally the worst offenders. They are declared weeds and may not occur on any land or on any inland water surface throughout South Africa. No person is allowed to sell, advertise, exhibit, transmit, send, deliver for sale, and exchange or dispose of any weed. It is also illegal to cause or permit the dispersal of any weed from one place to another.

Category 2 species (e.g. pine and eucalyptus) are also problematic but are commonly grown for commercial purposes or any viable and beneficial function, such as woodlots, fire belts, building material, animal fodder and soil stabilization. These invader plants can only

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be grown in areas demarcated as sites where such plants may be established, retained and strictly controlled.

The land user also has to ensure that steps are taken to curb the spread of propagating material of the invader plants to land and inland water surfaces outside the demarcated areas. Category 2 species are regarded as weeds outside of these demarcated areas, and landowners are required to take steps to control the species where they occur on their properties.

Category 3 plants (e.g. Jacarandas) are generally ornamental plants that may be retained, but no new planting or trade or propagating of these plants is permitted.

If weeds or invader plants occur contrary to the provisions of these regulations, the land user must control them by means of any of the control methods that are appropriate for the species concerned. Any action taken to control weeds or invader plants must be executed with caution and in a manner that will have minimal environmental impact. If a landowner fails to comply with these regulations, a criminal case may then be brought against the landowner and the NDA may issue a directive setting a date by when the property must be cleared.

### ***Removal Methods***

#### **Department of Water Affairs**

In keeping with these requirements, the Department of Water Affairs (DWA), in their Working for Water programme, recommends the following regarding alien invasive species:

Any control programme for alien vegetation must include the following 3 phases:

- Initial control: drastic reduction of existing population;
- Follow-up control: control of seedlings, root suckers and coppice growth; and
- Maintenance control: sustain low alien plant numbers with annual control.

The following is extracted from the Working for Water website ([www.dwaf.gov.za/wfw/Control](http://www.dwaf.gov.za/wfw/Control)) and gives detail on species-specific methods to remove Bugweed and Gum Trees:

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<b>BUGWEED (<i>Solanum mauritianum</i>)</b>			
PLANTS	METHOD	PRODUCT	RATE
Big Trees	Cut down & spray coppice	STARANE 200 (Fluroxypyr 200g/l)	125ml/10 litres water (0.5 litres/Ha – spray when 500mm tall)
		MAMBA (Glyphosphate 360g/l) TOUCH DOWN (Glyphosphate Trimesium 480g/l)	150ml/10 litres water (3 litres/Ha) 2 litres/Ha (spray when 500mm tall)
	Cut stump	TIMBREL 3A (Triclophyr Amine Salt 360g/l)	300ml/10 litres water (2.25 litres/Ha – cut surface only)
	Frill	TIMBREL 3A (Triclophyr Amine Salt 360g/l)	300ml/10 litres water (1.5 litres/Ha)

<b>GUMS TREES (<i>Eucalyptus sp.</i>)</b>			
PLANTS	METHOD	PRODUCT	RATE
Seedlings	Hand pull	None	On observation
Coppice *	Foliar spray	BRUSH OFF (Metsulphuron Methyl 500g/kg) plus MAMBA (Glyphosphate 360g/l)	200g/Ha (3 litres/Ha – apply to coppice 1.5 – 1.8m tall) 3 litres/Ha
Felled Trees		Applicable non-residual, selective herbicide should be used in compliance with the Manufacturers specifications.	
Note : * Spot spray coppice: 16 litres water, 16g BRUSH OFF, 1% MAMBA, 0.5% ACTIPRON			

<b>LANTANA (<i>Lantana camara</i>)</b>	
PLANTS	METHOD
Seedlings	Hand pull or foliar spray with Mamba at 300ml/10l water or Touchdown at 6l/ha
Trees	Foliar spray with Touchdown at 6l/ha
Biocontrol	The sap sucker <i>Falconia intermedia</i> . Contact Fritz Heystech at ARC-PPRI Tel: (012) 329 3269

<b>LONG-LEAVED WATTLE (<i>Acacia longifolia</i>)</b>	
PLANTS	METHOD
Seedlings	Hand pull or foliar spray with Garlon 4 or Viroaxe at 60ml/10l water
Trees	Cut down, wait for coppice and spray as above or on cut stump/frill apply Timbrel 3A at 300ml/10l water
Biocontrol	The seed weevil <i>Melanterius ventralis</i> . Contact Fiona Impson at ARC-PPRI Tel: (012) 887 4690

<b>BLACK WATTLE (<i>Acacia mearnsii</i>)</b>	
PLANTS	METHOD
Seedlings	Hand pull or foliar spray with Touchdown at 3l/ha or foliar spray with Garlon 4 or Viroaxe at 25-75ml/10l water (Use at a lower rate for seedlings, higher rate for small trees)
Trees	On cut stump/frill apply Timbrel 3A at 300ml/10l water or treat with Ecoplug (For inaccessible or dangerous areas)
Biocontrol	The seed weevil <i>Melanterius ventralis</i> . Contact Fiona Impson at ARC-PPRI Tel: (012) 887 4690

<b>MAURITIUS THORN (<i>Caesalpinia decapetala</i>)</b>	
PLANTS	METHOD
Seedlings	Foliar spray of Garlon 4 or Viroaxe at 50ml/10l water or Mamba at 150ml/10l water.
Trees	On cut stump/frill apply Timbrel 3A at 300ml/10l water.
Biocontrol	The seed weevil <i>Sulcobruchus subuturalis</i> . Contact Willem Coetzer at ARC-PPRI Tel: (012) 329 3269

<b>GREY POPLAR (<i>Populus X canescens</i>)</b>	
<b>PLANTS</b>	<b>METHOD</b>
<b>Seedlings</b>	Foliar spray of Garlon 4 or Viroaxe at 50ml/10l water
<b>Trees</b>	Applicable non-residual, selective herbicide should be used in compliance with the Manufacturers specifications.

<b>PRICKLY PEAR (<i>Opuntia sp.</i>)</b>	
<b>METHOD</b>	
	Inject into 2-4 premade holes per plant in 2ml doses: MSMA at 1l/1l water or Mamba at 1l/2l water or Touchdown 330ml/10l water

<b>CASTOR OIL PLANT (<i>Ricinus communis</i>)</b>	
<b>METHOD</b>	
	Applicable non-residual, selective herbicide should be used in compliance with the Manufacturers specifications.

<b>PEANUT BUTTER CASSIA (<i>Senna didymobotrya</i>)</b>	
<b>METHOD</b>	
	Applicable non-residual, selective herbicide should be used in compliance with the Manufacturers specifications.

<b>GUAVA (<i>Psidium guajava</i>)</b>	
<b>METHOD</b>	
	Applicable non-residual, selective herbicide should be used in compliance with the Manufacturers specifications.

<b>BALLOON VINE (<i>Cardiospermum grandiflorum</i>)</b>	
<b>METHOD</b>	
	No herbicide registered for this species. Foliar spray of 0.75% Garlon 4 could work

<b>OLEANDER (<i>Nerium sp.</i>)</b>	
<b>METHOD</b>	
	No herbicide registered for this species. 2% Garlon 4 with diesel on cut stump could \ work (Do not use any products of the plant – <b>very poisonous</b> )

### ***Re-vegetation***

Re-vegetation of previously disturbed areas, i.e. areas cleared of alien species, should be undertaken using indigenous species. Sufficient time, irrigation, rest periods and organic fertilisers should be applied to rehabilitated areas to promote establishment of plants.

### ***Ongoing Management***

The following activity must be undertaken to ensure the ongoing removal of alien vegetation from the site:

- Performance Indicators: Introduction of 'new' invasive species must be prohibited and the spread of existing weeds must be minimised. Indigenous plant species must be assessed for their successful establishment.
  - Monitoring and Reporting: Visual site assessment. This is to be done initially by the ECO during the construction phase, then by the Foreman during operation.
  - Corrective Action: Education of personnel with regard to spread and maintenance of alien plants. Ongoing implementation of alien plant removal
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methods is to be done, as described above followed up with re-vegetation using indigenous species.

***Re-vegetation***

Re-vegetation of previously disturbed areas, i.e. areas cleared of alien species, should be undertaken using indigenous species. Sufficient time, irrigation, rest periods and organic fertilisers should be applied to rehabilitated areas to promote establishment of plants.

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**APPENDIX D: RUNOFF CONTROL PLAN**

**TO BE APPENDED BY ENGINEER**

