ENVIRONMENTAL MANAGEMENT SYSTEM
ISO 14001

PROCEDURE 4.4.6.6

SOP FOR CONTROL AND ERADICATION OF ALIEN INVASIVE VEGETATION

Tongaat Hulett DEVELOPMENTS

Registration No. 81/12378/07

Date	Authorised Person	Responsible Person	Proposed review date	Procedure revision no.	Page No.
August 2012	Rory Wilkinson	Bheki Shongwe	August 2013	2	Page 1 of 10

Use of Information

Kerry Seppings Environmental Management Specialists prepared the information provided here for use by Tongaat Hulett Developments (Pty) Ltd only. As such this information may only be used in the preparation of EIA's, reports, EMP's etc for use by Tongaat Hulett Developments (Pty) Ltd and may not be used in the preparation of reports for any other company or individual without the express permission of Kerry Seppings Environmental Management Specialists.

1.0 AIM

The aim of this document is to provide a guideline for the eradication and control of alien invasive plant species. This is a baseline document to which consultants, ecologists and landscapers working on Tongaat Hulett Developments projects should add and especially make comment with regards the success of various control methods etc.

2.0 RESPONSIBLE PERSON/S

The Environmental Consultant, Specialist Ecologist and Environmental control officer are responsible for implementing this procedure and developing it where appropriate.

3.0 ENVIRONMENTAL IMPACTS

Alien invasive plant species are known to possess a variety of physiological adaptations to disturbance and their invasive potential is exacerbated by the fact that they have a common ability to spread and reproduce rapidly and resist all but the most determined control attempts. Collectively these factors enable alien invasive species to penetrate and replace natural vegetation threatening natural ecosystems by reducing biodiversity), changing natural fire nutrient and hydrological regimes, increasing soil erosion, increasing transpiration rates in wet areas and modifying aquatic ecosystems. They increase the cost of water treatment and of managing the land, and also threaten agricultural productivity. Therefore alien pant control must be given high priority.

Furthermore, studies have shown that removal of alien venation is a financially sound practice as alien vegetation can decrease the financial value of an ecosystem by 140% in terms of the services it provides to the community (e.g. tourist interest, water quality and quantity, wildlife habitat, indigenous craft materials etc.) The cost of removal and control of alien invasive species is comparatively negligible at around 1and 5% of the net present value of the ecosystem.

4.0 PROCEDURES

Most eradication and control occurs using a combination of the techniques described below which can be collectively termed integrated control.

1) Mechanical eradication - physical removal or damage to the species. This includes procedures such as cutting, ring barking and uprooting. Clearance by hand is selective and leaves desirable species untouched. It is more effective in small invasions of shallow rooted plants. Most invaders will coppice when cut but if repeated during growing season cutting results in a depletion of root reserves which often results in death. Felling does not eliminate alien tree species by itself. Coppice growth usually results and is more difficult to control than the original problem. Coppice growth can however be prevented by striping bark off the remaining stump to below ground level. Ring barking of large trees can be successful but is a slow process. Every trace of the cambium must be removed from a ring of at least 0.5m wide. Felling of dried out trees is more difficult than living trees. The disadvantage of using this technique is that it is costly due to it being labour intensive and slow, it can also cause soil disturbance and improve conditions for germination of seeds from other undesirable species and risk of soil erosion.

2) Chemical eradication - the use of chemical agents to prevent growth and/or cause death of species. This includes stump poisoning; painting herbicides into cuts on the bark, basal bark spraying, and foliar spraying. Only herbicides registered for use against the specific weed to be eliminated should be used as they have been rigorously tested and the optimum mode of use has been determined (see SOP on raw material sourcing 4.4.6.5). Prior to use the following should also be noted: the level of persistence of the herbicide, residual herbicides preclude immediate re-growth or replanting; the degree of selectivity of herbicide is also critical as some kill all plants while others have no effect on non target species; the effect of the herbicide on animals and the effect that weather conditions will have on use, for example rain immediately after the treatment could nullify the treatment or in windy weather non target species may be reached by the spray. Two of the most commonly used herbicides are Roundup (Glyphosate) and Garlon (Triclopyr). Roundup kills all green plants and is usually applied as a spray. It is not poisonous to animals and deactivates on contact with the soil therefore land reclamation can begin as soon as the target species have died.

Garlon kills only broad-leaved plants and is harmless to grasses and animals. The residual effects are short lived and is applied as a leaf spray or painted on cut stumps

Special equipment and training and supervision of skilled and semi-skilled labour is required. Another disadvantage of this technique weather conditions and physiological conditions of the plant need to be correct. Certain application techniques are not target specific and can lead to environmental contamination and damage to desirable species. Best used conservatively.

3) Biological eradication - the use of natural processes or species to counter growth. Different methods include insect and plant diseases, seedling suppression, fire, and incorporating browsers Fire is used at the moment to control bush encroachment, but more research and finance will be needed before diseases and browsers can be introduced.

It is relatively cheap over the long term. The disadvantage is that most agents are not effective when plants have a low density and slow process unsuitable when rapid control is required.

4) Integrated Control
Combination of two or more of the above methods. Mechanical control may be used to prepare a plant for the application of herbicides. Similarly, fire can be used to reduce initial heights of plants or kill seeds and seedlings. Bio-control agents attack the seed can be used to reduce seedlings, in combination with herbicides on standing trees.

Species specific control

1) *Lantana camara*: hand pull seedlings; bush cutters and slashers for the initial control of large bushes and selective weeding as a follow up method should be burnt as it takes to long to break down naturally chemical treatment of coppice and small bush (3% solution of Roundup) chemical treatment of cut stump (1% Tardon Super:Diesel).

2) *Chromolaena odorata*: hand pull seedlings; mechanical control of large plants same as *Lantana camara*; chemical control of coppice and small bush plants (3% Roundup or 1% Garlon) chemical treatment of cut stump (2% Garlon:Diesel) *Chromolaena odorata* is moderately easy to remove but requires repeated follow-up operations. In certain areas where *Chromolaena* and *Lantana* have been burnt the use of herbicide on the coppice rootstock has been very effective. This is especially important around forest and bushclump edges, where to disturb the soil by digging stumps would only encourage alien plant seedling growth.

3) *Acacia mearnsii*: handpull seedlings; mature trees can be ring barked and /or felled with a chain saw and left to rot as they do not burn easily; chemical control of seedlings (1% Roundup:Water); chemical treatment of cut stump (2% Garlon:Diesel). *Acacia mearnsii* is difficult to control and time-consuming follow-up is essential

4) *Melia azedarach*: handpull seedlings; ringbark mature trees chemical control of seedlings (1.5% Roundup spray)(Conant 1985).

5) *Solanum mauritianum*: handpull seedlings; cut down mature plants to 10cm for chemical treatment; chemical control of seedlings and coppice (1.5% Roundup) chemical treatment of cut stump (2% Garlon:Diesel).

6) *Ricinus communis*: handpull seedlings, chemical control of seedlings (Roundup 1.5%).

7) *Rubus cuneifolius*: repeated mowing; chemical control (0.5% Garlon:Water) sprayed on leaves.

8) *Schinus terebinthifolius*: Handpull seedlings or burn; fell large trees and apply 2% Garlon:Diesel to cut stump.

10) *Eucalyptus* spp: Ring bark or felling of large trees, chemical treatment of seedlings or coppice (0.75% Roundup or Garlon:Water); chemical control of cut stump (2% Garlon:Diesel).

11) *Sesbania punicea*: handpull seedlings; uproot plants: Chemical control of coppice (0.5% Garlon:Water); chemical treatment of cut stump (1.5% Garlon:Water).

Category specific control methods for alien invasive species are given in the Agricultural Resources Act, the relevant sections of which have been included below. Please refer to the template of alien invasive plant species (procedure 4.4.6.7).

Declaration of weeds and invader plants

15. (1) Plants of the kinds specified in column 1 of Table 3 as category 1 plants are hereby declared weeds to the extent indicated in column 3 of the said Table opposite the names of the respective kinds of plants.

(2) Plants of the kinds specified in column 1 of Table 3 as category 2 plants and as category 3 plants are hereby declared invader plants to the extent indicated in column 3 of the said Table opposite the names of the respective kinds of plants.".

Combating of category 1 plants

15A. (1) Category 1 plants may not occur on any land or inland water surface other than in biological control reserves.

(2) A land user shall control any category 1 plants that occur on any land or inland water surface in contravention of the provisions of sub-regulation (1) by means of the methods prescribed in regulation 15E.

(3) No person shall, except in or for purposes of a biological control reserve –

(a) establish, plant, maintain, multiply or propagate category 1 plants;

(b) import or sell propagating material of category 1 plants or any category 1 plants;

(c) acquire propagating material of category 1 plants or any category 1 plants.

(4) The executive officer may, on good cause shown in writing by the land user, grant written exemption from compliance with the requirements of sub-regulation (1) on such conditions as the executive officer may determine in each case.

Combating of category 2 plants

15B. (1) Category 2 plants may not occur on any land or inland water surface other than a demarcated area or a biological control reserve.

(2) (a) The executive officer may on application in writing demarcate an area as an area where category 2 plants may occur, be established and be maintained.

(b) An area in respect of which a water use license for stream flow reduction activities has been issued in terms of section 36 of the National Water Act, 1998 (Act No. 36 of 1998) shall be deemed to be a demarcated area.

(3) The executive officer shall demarcate an area for the occurrence, establishment and maintenance of category 2 plants only if –

(a) the category 2 plants in the area are cultivated under controlled circumstances; and

(b) the land user concerned has been authorised to use water in terms of the National Water Act, 1998 (Act No. 36 of 1998); and

(c) the category 2 plants or products of category 2 plants in the area are demonstrated to primarily serve a commercial purpose, use as a woodlot, shelter belt, building material, animal fodder, soil stabilisation, medicinal or other beneficial function that the executive officer may approve; and

(d) all reasonable steps are taken to curtail the spreading of propagating material of the category 2 plants outside the demarcated areas.

(4) When an area is demarcated for the occurrence, establishment and maintenance of category 2 plants the executive officer may impose such additional conditions as may reasonably be deemed necessary to keep the category 2 plants in the area in check.

(5) No person shall sell propagating material of category 2 plants or any category 2 plants to another person unless such other person is a land user of a demarcated area or of a biological control reserve.

(6) No person shall acquire propagating material of category 2 plants or any category 2 plants unless such material or such plants are intended for use in a demarcated area or in a biological control reserve.

(7) Propagating material of category 2 plants or category 2 plants shall only be imported or sold in accordance with the provisions of the Plant Improvement Act, 1976 (Act No. 53 of 1976), the Agricultural Pests Act, 1983 (Act No. 36 of 1983) and the environment conservation regulations.

(8) A land user shall control any category 2 plants that occur on any land or inland water surface in contravention of the provisions of sub-regulation (1) by means of the methods prescribed in regulation 15E.

(9) Unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland.

(10) The executive officer may, on good cause shown in writing by the land user, grant written exemption from compliance with one or more of the requirements of sub-regulations (1), (3), (5), (6), (8) and (9) on such conditions as the executive officer may determine in each case.

Combating of category 3 plants

15C. (1) Category 3 plants shall not occur on any land or inland water surface other than in a biological control reserve.

(2) Subject to the provisions of sub-regulation (3), the provisions of sub-regulation (1) shall not apply in respect of category 3 plants already in existence at the time of the commencement of these regulations.

(3) (a) No land user shall allow category 3 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland.

(b) The executive officer may impose such additional conditions as may reasonably be deemed necessary with regard to category 3 plants already in existence at the time of the commencement of these regulations.

(c) A land user must take all reasonable steps to curtail the spreading of propagating material of category 3 plants.

(d) The executive officer may, after consultation with the land user, issue a direction in terms of section 7 of the Act that category 3 plants in existence at the time of the commencement of these regulations must be controlled by means of the measures prescribed in regulation 15F.

(4) No person shall, except in or for purposes of a biological control reserve –

(a) plant, establish, maintain, multiply or propagate category 3 plants;

(b) import or sell propagating material of category 3 plants or any category 3 plants;

(c) acquire propagating material of category 3 plants or any category 3 plants.

(5) The executive officer may, on good cause shown in writing by the land user, grant written exemption from compliance with one or more of the requirements of sub-regulations (1), (3) and (4) on such conditions as the executive officer may determine in each case.

Designation of biological control reserves

15D. (1) The executive officer may on application in writing designate an area as a biological control reserve.

(2) The executive officer shall designate an area as a biological control reserve only if –

(a) the area concerned is used for the breeding of biological control agents by a biological control expert; and

(b) no other measures that may destroy or render the biological control ineffective are applied in that area; and

(c) the area concerned serves as a refuge from where biological control agents can move or be distributed to other infestations of category 1, 2 and 3 plants.

Methods of control

15E. (1) Where category 1, 2 or 3 plants occur contrary to the provisions of these regulations, a land user shall control such plants by means of one or more of the following methods of control as is appropriate for the species concerned and the ecosystem in which it occurs:

(a) Uprooting, felling, cutting or burning;
(b) Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer;

(c) Biological control carried out in accordance with the stipulations of the Agricultural Pests Act, 1983 (Act No. 36 of 1983), the Environment Conservation Act, 1989 (Act No. 73 of 1989) and any other applicable legislation;

(d) Any other method of treatment recognised by the executive officer that has as its object the control of the plants concerned, subject to the provisions of sub-regulation (4);

(e) A combination of one or more of the methods prescribed in paragraphs (a), (b), (c), and (d), save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.

(2) The methods contemplated in sub-regulation (1) shall also be applied with regard to the propagating material and the re-growth of category 1, 2 and 3 plants in order to prevent such plants from forming seed or re-establishing in any manner.

(3) The performance of an act of control is not in itself proof that the objects of the control methods have been achieved and follow-up operations are mandatory to achieve the appropriate level of combating.

(4) Where uncertainty exists about the presence or efficacy of any biological control agent, a biological control expert shall be consulted.

(5) Any action taken to control category 1, 2 and 3 plants shall be executed with caution and in a manner that will cause the least possible damage to the environment.

Application of other laws

15F. Nothing contained in this regulation shall derogate in any way from any obligation imposed on any land user in terms of any other law.".

Indicators of bush encroachment

16. (1) Indigenous plants of the kinds specified in column 1 of Table 4 are regarded as indicator plants indicating bush encroachment in the areas specified in column 2 of the said Table opposite the names of the respective kinds of plants.

(2) A land user of an area in which natural vegetation occurs and that contains communities of indicator plants shall follow practices to prevent the deterioration of natural resources and to combat bush encroachment where it occurs.

(3) One or more of the following practices shall be followed with regard to communities of indicator plants contemplated in sub-regulation (2) in order to remove the cause of the deterioration of the natural resources and to improve and maintain the production potential of the natural pastoral land:

(a) Uprooting, felling or cutting;

(b) Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer;

(c) The application of control measures regarding the utilisation and protection of veld in terms of regulation 9;

(d) The application of control measures regarding livestock reduction or removal of animals in terms of regulations 10 and 11;

(e) Any other method or strategy that may be applicable and that is specified by the executive officer by means of a directive.".

References

Every effort has been made to reference all sources used, however, some of the information gathered was taken from our own reports and sources of information and have not been referenced here.

1) Environmental Scoping Report (Kzn DAEA EIA Reference No. 3534) On The Proposed Zimbali South Development Located Within The Kwadukuza Local And Ilembe District Municipalities Near The Town Of Ballito On The North Coast Of The Province Of Kwazulu – Natal. October 2002. Guy Nicholson Consulting CC.

2) Proposed Development Of A Petrol Filling Station Along The M4 Between Umhlanga And Umhloti. Environmental Scoping Report. August 2000. Michelle Yates.

3) Illala Ridge Residential Development Scoping Report. EIA 2234. June 2001. Scott Wilson (SA) (PTY) Ltd.

4) Prestondale North Residential Development:Scoping Report And EMP. EIA 3031. May 2002. Sivest SA (Pty) Ltd.

5) Scoping Report. Mhlanga Forest Estate Development. EIA Reference No. 0999. December 1999. Scott Wilson (SA) (Pty) Ltd.

6) Scoping Report. M4 Realignment. Zimbali. November 1998. Van Riet And Louw.

7) Sibaya Resort And Entertainment World. Draft Environmental Impact Assessment. October 1998. Afrisun.

8) Afrisun KZN's Proposed Sibaya Casino Development. Baseline Report On The Terrestrial Fauna, With Special Reference To The Avifauna, Predicted Environmental Impacts And Suggested Mitigatory Measures. October 1998. Boon. Wildlife And Environment Society Of South Africa.

9) Environmental Management Plan For The Management Of The Construction Of Realignment Of The M4 Provincial Main Road To The West Of The Existing And The Proposed Areas Of Zimbali. EIA 1859. February 2003. Guy Nicholson Consulting Cc.

10) Environmental Management Plan For The Management Of The Construction Of Zimbali South Development. EIA 3534. November 2003. Guy Nicholson Consulting Cc.

11) Environmental Scoping Report For The Proposed Primary School Development At Prestondale North, Umhlanga Rocks. EIA 3034. June 2002. Gaea Projects.

12) La Lucia Ridge Office Estate Extensions. Scoping Report. November 1998. Gibb Africa.

13) Environmental Scoping Report (EIA Ref.1730) On The Proposed Development Of The Effingham- Avoca Within The North And South Central Local Council Of The Metropolitan Durban. February 2001. Guy Nicholson Consulting.

14) Mt Edgecombe South Residential Development. EIA 4667. Draft Scoping Report. Sivest. May 2004.

15) Mhlanga Forest Estate Environmental Management Plan. 2nd Draft. EIA Ref:0999. August 2003. Sivest.

16) Environmental Management Plan For The La Lucia Ridge Office Estate. November 1999. Guy Nicholson Consulting Cc.

17) Environmental Site Planning And Management Report. Zimbali Coastal Forest Estate Proposed Beach Facility Development. October 1998. EDP.

18) Jon Wyatt, Mondi Wetlands Project, 1997 SECOND EDITION, Wetland Fix series, Parts 1-6. (www.wetland.org.za)

19) HAWAAN FOREST ESTATE ENVIRONMENTAL IMPACT ASSESSMENT REPORT DESIGN DEVELOPMENT By Geoff Nichols May 2003

http://www.environment.gov.za/Enviro-Info/nat/erod.htm

http://sacoast.uwc.ac.za/education/resources/sacoast/Biophysical/sandybeaches.htm
http://www.csir.co.za

http://www.stormwatercenter.net/Library/Practice/79.pdf

http://www.durban.gov.za/eThekwini/

http://sacoast.uwc.ac.za/coastal%20maps/spaceindex.htm