WEED MANAGEMENT PLAN

Southern Cross Bore Project, EL 28045

Prepared for Davenport Resources Limited by

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FRONTISPIECE

Left to right, clockwise: Rubber bush on Gillen Creek north of Southern Cross Bore, rubber bush flowers, rubber bush fruit, view of range from Southern Cross Bore.

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PURPOSE

The purpose of this Weed Management Plan (WMP) is to provide Davenport Resources Limited and contractor personnel with practical guidelines to assist with on ground management and control of weeds at the Southern Cross Bore Project, EL 28045.

SCOPE

This plan applies to all operations, sites and/or activities undertaken by Davenport Resources Limited and/or contractor personnel on Davenport Resources Limited business within the Southern Cross Bore Project.

1. INTRODUCTION

The Southern Cross Bore Project is located within Exploration Lease (EL) 28045, approximately 75 km north-east of Alice Springs, Northern Territory (NT) on The Garden Station. The following weed management plan (WMP) aims to provide advice on prevention of introduction of new weeds and descriptions of weeds to facilitate identification of species. The WMP provides practical control methods and ensures 'Declared' weeds under the *Weeds Management Act 2001* (WM Act) are managed in accordance with the Act.

2. RELEVANT LEGISLATION

The control of weeds is regulated by the NT government. The WM Act states that weed control is the responsibility of the land manager/ owner. This WMP focuses on weeds Declared in NT under the WM Act. For weeds that are Declared under Section 7 of The WM Act, there is a requirement for all land holders, land managers and land users to comply with the declaration classification

There are three classes of weeds under the WM Act:

- Class A - To be eradicated: Reasonable effort must be made to eradicate the plant within the NT.
- Class B - Growth and spread to be controlled: Reasonable attempts must be made to contain the growth and prevent the movement of the plant
- Class C: Not to be introduced to the NT.

Weeds of National Significance (WoNs) are nationally agreed priority plant species for control and management. Weed species are determined based on potential for invasiveness, potential to spread, and impact on socioeconomic and environmental assets (Australian Weeds Committee, 2007). A list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012. A strategic plan for each WoNS has been developed to identify responsibilities, strategies and actions for control (Australian Government Department of Environment and Energy, 2017). All WoNS are included in the NT Declared Weeds list.

The following list includes other relevant legislation:

Commonwealth

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Revised National Weeds Strategy 1999*
- *Agricultural and Veterinary Chemicals Code Act 1994*

Northern Territory

- *Weeds Management Act 2001* (WM Act)

3. EXISTING AND POTENTIAL WEEDS ON SITE

A Desktop survey was conducted using the NT Flora Atlas (NT Department of Environment and Natural Resources, 2015) and Environmental Protection and Biodiversity Conservation (EPBC) Protected Matters Search Tool (PMST) (Australian Government Department of Environment and Energy, 2017). The NT Flora Atlas revealed two weeds species recorded within a 20 km buffer of EL 209845, Rubber bush (*Calotropis procera*) and Spiked malvastrum (*Malvastrum americanum*). The EPBC PMST identified two environmental weeds as potentially occurring in the vicinity of EL 28045, Parkinsonia (*Parkinsonia aculeata*) and Buffel grass (*Cenchrus ciliaris*).

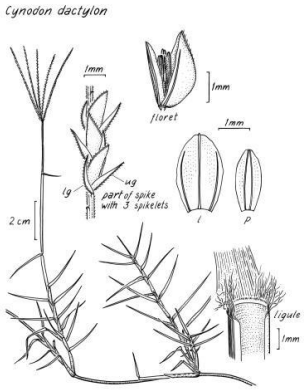
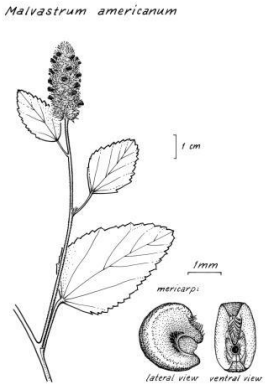
A site visit on 3rd March 2017 found one Declared weed species, Rubber bush (*Calotropis procera*) which is listed under Class B and Class C. A further four introduced plants, although not Declared under the WM Act, were recorded in EL 28045. These are Blackberry nightshade (*Solanum nigrum*), Buffel grass (*Cenchrus ciliaris*), Couch grass (*Cynodon dactylon)* and Spiked malvastrum (*M. americanum*). Parkinsonia was not recorded within EL 28045. Table 1 shows the existing and potential weeds on EL 28045. Table 2 is an identification guide for these weeds.

Table 1 Existing and Potential weeds identified within EL 28045, Southern Cross Bore Project

Species name	Common name	WoNS or Declared under WM Act	Source	Location and prevalence in EL 28045
Calotropis procera	Rubber bush	Declared Class B & Class C	• NT Flora Atlas • Recorded on ground	Common in and on the bank of the Gillen Creek
Cenchrus ciliaris	Buffel grass	-	• EBPC PMST • Recorded on ground	Buffel grass is widespread. During a site visit on 3rd March 2017 after good rains, there was a dense coverage along Gillen Creek, drainage lines/ areas and other scattered occurrences within the lease
Cynodon dactylon	Couch grass	-	• Recorded on ground	Forms a high percent of ground cover on the banks of the Gillen Creek and is restricted to well-watered creek banks.
Malvastrum americanum	Spiked malvastrum	-	• Recorded on ground • NT Flora Atlas	Widespread across the site and central Australia, particularly in disturbed areas around watering points, yards and along the roadside.
Parkinsolia aculeata	Parkinsonia	WoNs Declared Class B & Class C	• EPBC PMST	Not recorded in EL 28045
Solanum nigrum	Blackberrry nightshade	-	• Recorded on ground	Low numbers of Blackberry nightshade occur small populations in scattered locations on the banks of Gillen Creek.

Table 2 Identification guide for existing and potential weeds on EL 28045

Species name	Pictures	Description	Habitat	Means of spread
Calotropis procera Rubber bush	 Rubber bush habit  Fruit  Flowers and leaves	• Small tree or spreading shrub up to 4m tall. • Bark is thick, soft and corky, brown to white in colour. • Leaves are opposite and attached to the branch (they do not have a stem). 5 – 20 cm long, up to 10cm wide. Grey- green colour. • Flowers are waxy, purple and white with five petals. • Fruits are green and mango shaped, 7 – 12 cm long. Fruits contain small seeds with silky hairs.	• Disturbed sites • Roadsides • Waste areas • Pastures • Open woodland	• Seeds are dispersed by wind, water and attachment to animals, clothing and vehicles. • Suckering from roots increases size and density of population.
Cenchrus ciliaris Buffel grass	  Images: (NT Government, 2013)	• Long lived dense tussock grass up to 1m tall. • Leaves are blueish-green, hairy with pointed tips, flat or folded. • Stalks are tough and branched with swollen bases. Leaves are produced at the basal and higher nodes. Rhizomes up to 0.5 m long. • Infloresence is spike like, long and cylindrical, 2.5–15 cm long. • The seeds enclosed in a cluster of bristles, giving 'fluffy' appearance.	• Diverse range of soils. • Favours drainage lines, creeks, rivers and alluvial flats, particularly in the shade of trees. • Also on plains, rocky areas and slopes. • Disturbed areas.	• Seeds are dispersed by wind, water and attachment to animals, clothing and vehicles.

Species name	Pictures	Description	Habitat	Means of spread
Cynodon dactylon Couch grass	  Images: (NT Government, 2013)	• Perennial sprawling grass about 15-20 cm tall. • Leaves are flat and 1.5-9 cm long, 1-2 mm wide. • The inflorescence consists of 3-7 slender spikes up to 60 mm long.	• Grows on sandy to clay soils in well-watered areas • Watercourses and on floodplain margins. • Disturbed sites.	• Spreads rapidly by stolons and rhizomes (horizontal, root-like stem usually found underground
Malvastrum americanum Malvastrum	  Image: (NT Government, 2013)	• An upright deep-rooted long-lived herb up to 60 cm – 1 m tall. • Most parts of plant covered with short, scattered, hairs. • Hairy leaves about 1-6 cm x 0.5-3.5 cm. • Flowers are small and numerous and crowded on dense spikes.	• Wide variety of soils. • Disturbed areas.	• Seeds can be spread by animals water, birds, vehicles and machinery. • Can produce root suckers.

Species name	Pictures	Description	Habitat	Means of spread
Parkinsolia aculeate Parkinsonia	 Parkinsonia tree or habit  Leaves  Flowers  Seeds Images (NT Weed Management Branch, 2016)	• Thorny, branched, spreading shrub or small tree up to 6m tall. • Bright green branchlets with woody spines at the stems. • Thin, long drooping leaves with numerous small oval shaped leaflet. • Flowers are positioned on the stalk. Small and yellow with 5 petals.	• Growing near watercourses or other water sources (i.e. bores and dams). • Open woodlands. • Pastoral land. • Disturbed sites.	• Seed pods can be carried large distances from up-steam infestations. Mass germination events may occur after flooding. • Seeds can also be spread in mud by attaching to animals and machinery • The seeds have a thick and extremely hard coat and can stay viable in the soil for many years.
Solanum nigrum Blackberrry nightshade	 Blackberry nightshade  Flower  Mature berries	• An upright herbaceous plant growing to approx. 1 m. • Stems are sparsely hairy or occasionally hairless and are rough in texture. They are green or purplish-green when young. • Leaves are alternately arranged (2-13 cm long and 1-8 cm wide). oval, elongated or egg-shaped and taper to a point at the tip. Leaf edges are either entire, bluntly toothed or slightly lobed. • Flowers are small and star-shaped (7-12 mm across) with 5 petals. Coloured white with a purple tinge. • Fruit are small, globular berries 5-8 mm across. Purplish – black in colour or green when immature.	• Sheltered temporarily moist areas on rocky ranges, on the margins of temporary swamps, claypans, along watercourses and run-on areas. • Also occurs in a range of disturbed situations	• Water dispersion • Birds

4. WEED RISKS

Weeds species are opportunistic and often germinate on disturbed ground. There may be a risk of weed spread from exploration activities including:

- Movement of contaminated machinery, vehicles and equipment;
- Spreading of contaminated gravel, road-fill, topsoil;
- By attachment to animals (both feral and native) and through ingestion;
- The construction of roads; and
- Discharge of water may increase the potential for weeds by providing additional nutrients.

5. WEED MANAGEMENT STRATEGIES

5.1 WEED PREVENTION

Prevention is the most effective method of weed control. Davenport Resources Limited will undertake to following weed prevention measures:

- Vehicles brought to site will cleaned of weed seed to prevent introduction of new species;
- Any sand or gravel brought to site must be weed seed free;
- Clearing control measures will be implemented to ensure that no unnecessary clearing occurs to minimise ground susceptible to weed invasion;
- All staff will be able to recognise the existing or potential weeds onsite. Weeds will be reported to the Environmental Manager;
- Staff will use only established roads and tracks and avoid weed-infested sites and avoid disturbing new ground;
- If areas containing weeds are encountered, all equipment, machinery will be cleaned and vehicles will be washed or blown down to prevent transfer of weeds to uncontaminated areas;
- No use of roads in wet and muddy conditions;
- Road grading in areas of weeds should be from the outside of the infestation back into the centre of the distribution; and
- Weed plant material will be disposed by burning and/or burying at an appropriate depth.

5.2 WEED REMOVAL

Weed removal will be prioritised according to the legislative status of the species (whether it is declared under the WM Act) and its potential threat to biodiversity. Table 3 presents the priority classes and level of management associated with each. Declared weeds (i.e Rubber bush) will be managed as Priority 1 (Actively managed). Parkinsonia was identified in the EPBC PMST as potentially occurring on the site. However the species was not observed within or in the vicinity of EL 28045 during the site visit by LES in March 2017. If Parkinsonia is identified within EL 28045 it will be reported to the NT Weeds Management Branch and managed as a Priority 1.

Although Buffel grass is not a Declared weed, it is introduced is a potential threat to biodiversity, through habitat loss for native fauna species and out-competing native flora species. Buffel grass is also an important consideration for fire management as the species has a high fuel load and can create a fire hazard (NT Department of Land Resource Management, n.d). Therefore Buffel grass will be managed as a Priority 2 (All reasonable measures will be taken to ensure exploration activities do not spread the species. Managed as a second priority).

All other introduced plants that are not Declared weeds are Priority 3 (All reasonable measures will be taken to ensure exploration activities do not spread the species). Table 4 outlines weed management strategies for Priority 1 and Priority 2 weeds.

Table 3 Priority categories for weed removal in EL 28045

Priority class	Management measures	Weeds
1	Actively managed	• Rubber bush • Parkinsonia (if present)
2	All reasonable measures will be taken to ensure exploration activities do not spread the species. Managed as a second priority	• Buffel grass
3	All reasonable measures will be taken to ensure exploration activities do not spread the species.	• Spiked malvastrum • Blackberry nightshade • Couch grass

Table 4 Weed management strategies.

Priority	Weed plant species	Control method	Timing	Herbicide and concentration	Rate	Instructions
1. Actively Manage	Rubber bush (*Calotropis procera*)	Mechanical	Dry season	-	-	Mechanical: Larger plants can be bulldozed, stick raked, blade ploughed or chain pulled. Effort must be taken to remove roots and seed pods. Chemical control can be undertaken to control regeneration from root suckers or new seedlings.
		Chemical	October - March	Triclopyr 300g/L + Picloram 100g/L Conqueror® + or Aminopyralid 8g/L Grazon™ Extra	750ml per 100L water (for Triclopyr and Picloram) or 500 – 750ml per 100L water (for Aminopyralid)	For seedlings only: Foliar spray: More effective on plants < 2m as thorough coverage on all leaves is required. Do not use in pasture or in vegetation/areas that may be grazed or cut for stockfeed.
				Triclopyr 240g/L + Picloram 120g/L Access™	1L/60L diesel (for basal bark method) l/10L diesel (for thin line method) 1/60L diesel (for cut stump method)	For adult plants: Basal bark < 5cm stem diameter. Spray all stems. Spray to point of runoff. Basal bark method: Basal bark plants with stems over 5cm basal diameter. Ensure all stems on multi-stemmed plants are treated. Spray the bark around the stems from ground level to a minimum height of 30 cm, wetting thoroughly to allow the spray mix to soak through the corky bark. Thin line: Stems up to 5cm stem diameter Thin line method: The same as basal bark but for stems up to 5cm in diameter. Cut stump: For plants up to 10cm diameter and 3m high. Stems should be cut as close to ground level as possible Cut stump method: Cut off completely at the base (no higher than 15 cm from ground). Herbicide solution is then sprayed or painted on to the exposed surface of the cut It is imperative that the herbicide solutions are applied as soon as the trunk or stem is cut. A delay of more than 10 seconds for water-based herbicides and 1 minute for diesel soluble herbicides between cutting and applying the chemical will give poor results.

Priority	Weed plant species	Control method	Timing	Herbicide and concentration	Rate	Instructions
1. Actively Manage (If found with EL 28045)	Parkinsonia (*Parkinsonia aculeata*)	Physical	Any time	-	-	For small plants - hand pulling or grubbing with a mattock.
		Mechanical	Dry season	-	-	Larger plants can be bulldozed, stick raked, blade ploughed or chain pulled. The roots must be removed to a depth of about 200 mm to prevent regrowth.
		Chemical	March to May	**Aminopyralid 8 g/L + Triclopyr 300 g/L + Picloram 100 g/L** Grazon® Extra	350ml / 100 L 3 L / ha	For seedlings only: Foliar spray for plants up to 2m or two years old - Uptake Spraying Oil required. Avoid spraying if plants are stressed or bearing pods - Uptake Spraying Oil required.
				Triclopyr 240 g/L + Picloram 120 g/L Access®	1 L / 60 L (diesel) 1 L / 60 L (diesel)	For seedlings or adult plants:. Basal bark < 5cm stem diameter. Cut stump > 5cm stem diameter.
				Tebuthiuron 200 g/k	1.5g / m2	For seedlings or adult plants: Granulated herbicide - ground applied. Do not use within 30m of desirable trees or apply to continuous area > 0.5 ha. Do not use if fire is eminent. Apply when there is soil moisture or prior to rain.
2. Ensure all reasonable measures are taken to ensure exploration activities do not spread and manage as a second priority	Buffel Grass (*Cenchrus ciliaris)*	Physical	Any time	-	-	Chipping out with a mattock can be done any time and can be very effective in removal for long (several year) periods before control is required again.
		Chemical	After rain (during periods of active growth)	Roundup® (360g/L)	100ml/15L	Foliar spraying of Buffel grass will require at least two treatments within a growing season. The initial treatment should occur following rain, when there is active growth. A follow up treatment should be undertaken in two to four weeks time, provided regrowth is evident (NT Department of Land Resource Management, n.d). Spot spraying can be conducted when weeds are amongst other plants. Adjust the nozzle appropriately and be careful to avoid non-target plants. Ideal conditions are mild temperatures, little to no wind and moderate to high humidity.

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