

CSR Building Products Ltd





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Abbreviations

Abbreviation	Description
BC Act	Biodiversity Conservation Act 2016
вом	Bureau of Meteorology
CEEC	Critically Endangered Ecological Community
CPLS	Cumberland Plain Land Snail
DA	Development Application
ELA	Eco Logical Australia
EPBC Act	Environmental Protection and Biodiversity Act 1999
VMP	Vegetation Management Plan

1. Introduction

A Vegetation Management Plan (VMP) was prepared by Travers bushfire & ecology (Travers 2016) on behalf of CSR Building Products Ltd (CSR) as part of Development Application (DA) 893.1/2013 for the three-staged subdivision of CSR's site at 327-335 Burley Road, Horsley Park. The VMP pertains to Lot 205 which has been zoned as E2 Environmental Conservation lands under the State Environmental Planning Policy (Western Sydney Employment Area) 2009 (SEPP). Lot 205 encompasses approximately 11.51 hectares (ha) of Cumberland Plain Woodland (CPW) which is listed as a critically endangered ecological community (CEEC) under both the Commonwealth *Environmental Protection and Biodiversity Act 1999* (EPBC Act) and the NSW *Biodiversity and Conservation Act 2016* (BC Act).

CSR Building Products Ltd (CSR) has engaged Eco Logical Australia (ELA) to implement the VMP (Travers 2016) for Lot 205 to fulfil the NSW Land and Environment (L&E) Court deferred approval conditions as follows:

- Creation of a Positive Covenant of the site including Lot 205;
- Lot 205 shall be managed in accordance with a VMP in line with recommendations made by Travers bushfire & ecology in their Flora and Fauna Assessment Report, 10 March 2014

ELA has been undertaking the vegetation management works on-site since March 2018. Implementation progress reports are to be produced every six months for the first three years with annual progress reports for the remaining seven years of the maintenance program. ELA has prepared a six-month progress report (ELA 2018) and an Annual report (ELA 2019) for Year 1 covering the period from March 2018 to February 2019. This is the six-month progress report for Year 2 covering the period from March to August 2019.

1.1 Performance criteria

This report describes how the works carried out to date comply with the performance targets listed in the VMP (**Table 1**). This satisfies the requirements of the VMP and helps to fulfil CSR's statutory obligations.

Table 1: Performance targets listed in the VMP (Travers 2016)

Performance Criteria

- 1. A permanent, five-strand, plain wire protective fence is to be installed to the west of the site as located on Schedule 1 Vegetation Management Works. Two gates will be installed for maintenance access as located on Schedule 1 Vegetation Management Works. Existing fences to west and south to be repaired and upgraded.
- 2. Weed control and revegetation works are to be carried out by a qualified bushland regenerator to achieve the following weed control targets. The presence, abundance and cover of noxious and environmental weed species (maximum 10% weed coverage at the end of Year 1, progressively reducing to less than 1% at the end of Year 10).
- 3. A target 60% native vegetation cover applies at the end of Year 1, 75% native vegetation cover at the end of Year 3, and 95% native vegetation cover at the end of Year 10.
- 4. All highly invasive weed species are to be continuously suppressed and, if possible, eradicated from the restoration area in accordance with noxious weed control guidelines and permits issued by NSW Office of Water.
- 5. A 20 m wide Bushland Interface Zone will be established as shown on Schedule 1 Vegetation Management Works. Enrichment planting of shrub species only will be planted to create a dense shrub layer to minimise weeds. A minimum of

Performance Criteria

seven (7) shrub species for revegetation will be selected from Table 4 Revegetation Species List, however may be supplemented from species which typically occur in Cumberland Plain Woodland. Shrub planting densities are to on average, establish one (1) shrub every 12 m²

6. Revegetation will also be undertaken in disturbed areas as indicated in Schedule 1. A minimum of three (3) tree species, seven (7) shrub species and 14 groundcover species for revegetation will be selected from Table 4 Revegetation Species List, however may be supplemented from species which typically occur in Cumberland Plain Woodland. Plantings will achieve the following densities:

Trees – one (1) tree every 50 m² Shrubs – one (1) shrub every 12 m² Groundcovers – three (3) groundcover every 1 m²

7. Habitat enhancement for the Cumberland Plain Land Snail completed including:

Placement of a minimum of 30 x 3 m length hardwood logs harvested from the adjoining affected vegetation remnants; and Search, removal and euthanasia of exotic snails (minimum 4 searches per year)

- 8. Monitoring will be undertaken every two (2) years. A condition assessment and review of works will be undertaken every 12 months and a report will be produced by the site bush regeneration contractors. A site restoration audit will be undertaken every two (2) years until the completion of the 10-year maintenance period by an independent project ecologist assessing achievements and recommended mitigation measures.
- 9. A compliance statement is to be issued by the project ecologist at the completion of all fencing and primary revegetation works and upon completion of the maintenance period.
- 10. No greater than 25% of the Cumberland Plain Woodland reverse is burnt in any one year and all snails within the proposed burn areas to be relocated into refuge shelters within the site.

2. Works undertaken

2.1 Weed control

Works for the period from March to August 2019 continued to focus on secondary treatment of weeds throughout the VMP area. Primary weed control was completed the first reporting period (March to August 2018) and now secondary weed control has been concentrated on the regrowth of weeds. All weeds have been controlled as per the techniques and specifications included in the VMP (Travers 2016).

Woody weeds

Primary woody weed removal, in particular *Olea europaea subsp. cuspidata* (African Olive), *Lycium ferocissimum* (African Boxthorn) and *Lantana camara* (Lantana) were largely undertaken onsite during the first reporting period (March to August 2018). Woody weeds were treated using the cut and paint method. All adult specimens have been treated across the site.

Since then, any remaining adult specimens and emergent woody weeds were treated by brush cutter followed by painting of stumps with neat roundup® or by spot spraying seedlings using a selective herbicide. The only remaining woody weeds on site are juvenile individuals.

Vines

The main vine targeted on site is *Araujia sericifera* (Moth Plant). Vines have been largely controlled on site. All vines entering the canopy or climbing on fallen trees were targeted during the first reporting period (March to August 2018). Each vine was skirted and sprayed with a selective herbicide once on the ground, where they were piled around the base of native trees to help minimise the amount of vine in the canopy and shrub layer. Since then, any emerging vines have been treated by hand removal or by spot spraying with a selective herbicide to prevent them from re-entering the canopy.

Groundcovers

Eragrostis curvula (African Lovegrass) and *Bidens pilosa* (Cobbler's Pegs) have been continually targeted since implementation works commenced. Other emerging herbaceous weeds, particularly coloniser / fast growing weeds have been targeted prior to setting seed to minimise the amount of weed seed present in the soil bank.

A cumulative list of the main weeds treated since the beginning of the implementation phase is provided in **Table 2**.

Management treatments have included hand weeding (HW), skirting (SK), spot spraying (SP), brush cutting (BC), cutting and painting (CP) and scrape and painting (ScP).

Table 2: Weed treatment table

Species	Common name	Weed control
Woody Weeds		
Grevillea robusta	Silky Oak	СР

Ligustrum lucidum Large Leaved Privet CP, SP, HW Ligustrum sinense Small Leaved Privet CP, SP, HW Lyclum ferocissimum African Boxthorn CP, SP Ochno serrulata Ochna ScP Olea europaea subsp. cuspidata African Olive CP, SP Ricinus communis Castor Oil Plant BC, SP Rosa rubignosa Sweet Briar CP Vine Weeds Araujia sericifera Moth Plant SK, SP, HW Asparagus asparagoides Bridal Creeper SP, HW Herbaceous weeds / Groundcovers Anagallis arvensis Scarlett Pimpernel SP Brassica oleracea Wild Cabbage Hrw, SP Bromus catharticus Prairie Grass Hrw, SP Conyza bonariensis Fleabane BC, SP Conyza bonariensis Fleabane BC, SP Eragrostis curvula African Lovegrass BC, SP Panic Veldt Grass SP Eragrostis curvula African Lovegrass BC, SP Panic Veldt Grass SP Penniseturu clandestinum Kikuyu BC, SP Panitago lanceolata Plantain SP Senecio madagascariensis Fireweed Hrw, SP Senecio pterophorus African Daisy SP Setaria pumila subsp. pumila Pigeon Grass SP Sida rhombifolia Paddy's Lucerne Hrw, SP Solanum nigrum Blackberry Nightshade Hrw, SP Solanum sisymbrifigalium Viscid Nightshade BC, SP Solonum sisymbrifigalium Viscid Nightshade BC, SP Solonum sisymbrifigalium Viscid Nightshade BC, SP Solonum sisymbrifigalium Viscid Nightshade Hrw, SP Solonum sisymbrifigalium Viscid Nightshade Hrw, SP Solonum soloraceus Common Sowthistie	Common name Weed control
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Plantago lanceolataPlantainSPSenecio madagascariensisFireweedHW, SPSenecio pterophorusAfrican DaisySPSetaria pumila subsp. pumilaPigeon GrassSPSida rhombifoliaPaddy's LucerneHW, SPSolanum nigrumBlackberry NightshadeHW, SPSolanum pseudocapsicumMadeira Winter CherryHW, SPSolanum sisymbriifoliumViscid NightshadeBC, SPSonchus oleraceusCommon SowthistleHW, SP	Caterpillar Grass SP
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Solanum sisymbriifoliumViscid NightshadeBC, SPSonchus oleraceusCommon SowthistleHW, SP	Blackberry Nightshade HW, SP
Sonchus oleraceus Common Sowthistle HW, SP	Madeira Winter Cherry HW, SP
	Viscid Nightshade BC, SP
	Common Sowthistle HW, SP
Verbena bonariensis Purpletop BC, SP	Purpletop BC, SP

2.2 Monitoring methods

The site was assessed on 22 August and 3 September 2019 by ELA Restoration Ecologist Andrew Norvill, using general observations and floristic data collected using nine survey plots, which were established in the previous monitoring period. General observations, as per the VMP (Travers 2016), were made during a site walk-over with the following being recorded:

- Weed presence / absence
- Bushland floristic diversity
- Structural integrity of the bushland
- Condition of fencing

2.2.1 Weather onsite during surveys

Climate data has been collated for the nearest weather station to Horsley Park, at Horsley Park Equestrian Centre AWS (33.85°S, 150.86°E) from Bureau of Meteorology data, accessed on 20 September 2019 (see **Figure 1** and **Figure 2**).

The 2019 Rainfall data (**Figure 1**) has been measured against the mean and median rainfall data for this weather station. Rainfall for this reporting period (March to August 2019), has been below the mean and median data for all months (except for March 2019). In particular, April and May 2019 where there was only 11 mm and 10mm of rain respectively.

The 2019 Maximum temperature data (**Figure 2**) has also been measured against the mean and median maximum temperature for this same weather station. Monthly maximum temperatures have been higher than the mean maximum temperature for all months across this current reporting period.

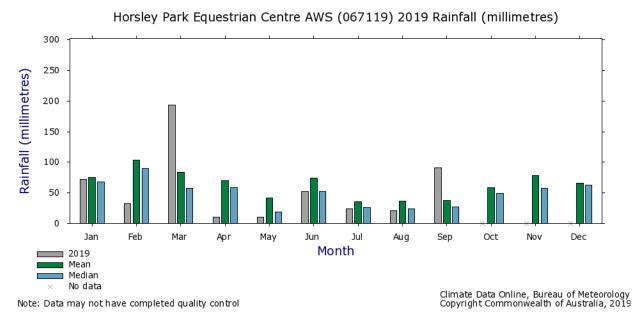


Figure 1: Mean rainfall for 2019 (BOM 20 September 2019)

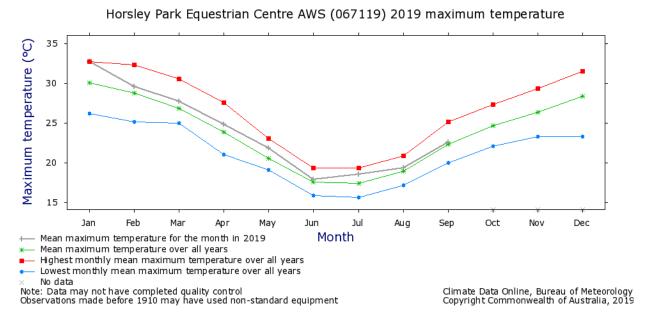


Figure 2: Mean maximum temperature for 2019 (BOM 20 September 2019)

2.2.2 Vegetation quadrats and transects

Nine survey plots were used to assess achievement against the performance targets listed in **Table 1**. **Figure 3** shows the location of the survey plots within the VMP area. The position of these plots was determined as per Schedule 1 of the VMP (Travers 2016) with each plot consisting of a 20x20 m quadrat.

In each quadrat the form (e.g. tree, shrub, grass, vine, forb), percentage cover and abundance for all native and exotic overstorey, midstorey and ground cover species present was recorded.

2.2.3 Cumberland Plain Land Snail search

Throughout this reporting period the site was assessed for Cumberland Plain Land Snails (CPLS) on two occasions, 27 June 2019 and 2 October 2019 by ELA Restoration Ecologist Andrew Norvill and ELA Bush Regenerators Melinda Cook, Ryan Walker and Grant King. Assessments were focused on areas where CPLS would likely occur. This included:

- Leaf litter and bark situated at the base of Eucalyptus trees.
- Depressions and damp areas.
- Fallen logs and other debris
- Hardwood logs that were placed throughout the site as habitat enhancement.

Each CPLS was photographed, and the location recorded using a handheld Global Position System (GPS) and placed back amongst the leaf litter where it was initially found. The number of snails found at each location was recorded.

During the assessment on 2 October 2019, a total of 18 live CPLS's were found just outside of the VMP boundary. These snails were translocated into the VMP with their new location recorded using a GPS (see **Figure 8**).

2.3 Photo point monitoring

Eighteen fixed photo monitoring points were established during the previous reporting period. They can be found at the beginning and end points of each transect (see **Figure 3**). Comparative photos were taken from the same locations during this reporting period. The photos from each monitoring point, are included in **Appendix A**.

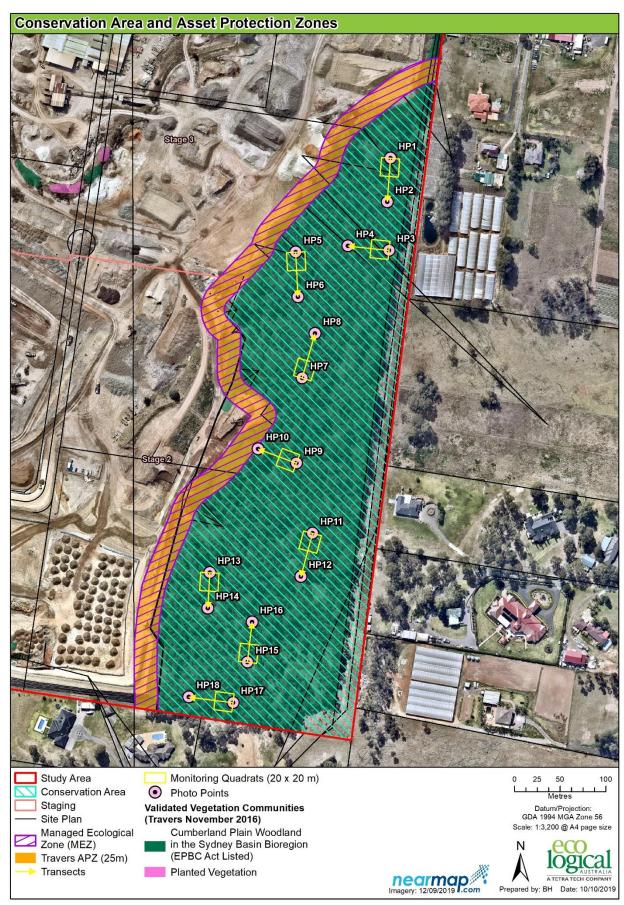


Figure 3: Vegetation quadrats and photo monitoring points

3. Results

3.1 Vegetation monitoring results

A summary of results from the monitoring of vegetation quadrats and transects is provided below. All monitoring data collected from ELA in 2018-19, is provided in **Appendix B**

1. Species richness (Figure 4)

- An increase in native species richness within the quadrats from 38 in August 2018, to 45 in August 2019
- A decrease in weed species richness from 21 in August 2018, to 18 in August 2019

2. Mean ground layer and mid storey cover abundance (Figure 5 and Figure 6)

- An increase in native ground layer abundance from 75% in August 2018 to 83% in August 2019
- A slight reduction in exotic ground layer abundance from 8% in August 2018 to 7% in August 2019
- A decrease in native mid storey abundance from 62% in August 2018, to 58% in August 2019
- A decrease in exotic mid storey abundance from 3% in August 2018 to 1% in August 2019.

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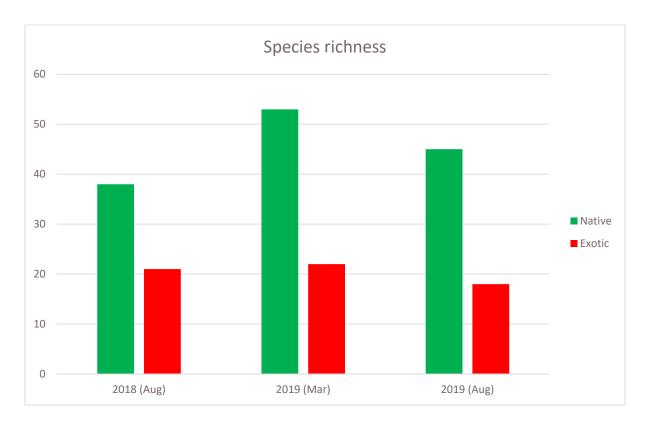


Figure 4: Species richness across all quadrats

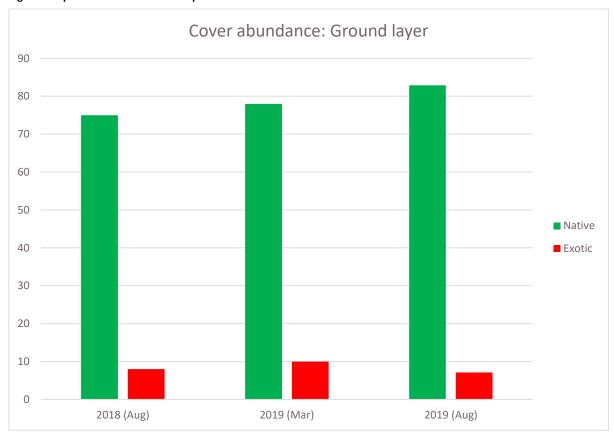


Figure 5 : Mean cover abundance Ground layer

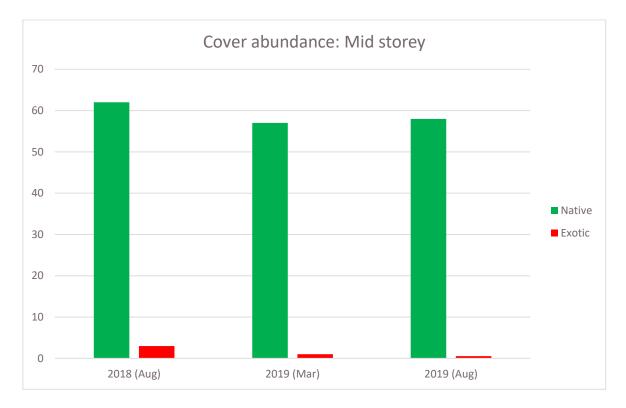


Figure 6: Mean cover abundance Mid Storey

3.2 CPLS survey results

Two surveys for CPLS recorded the following (also see **Figure 7**):

- 25 live CPLS
- 57 CPLS shells
- 0 live exotic snails
- 19 exotic snail shells

The location where the snails were recorded is provided in **Figure 8** for the CPLS and **Figure 9** for the exotic snails.

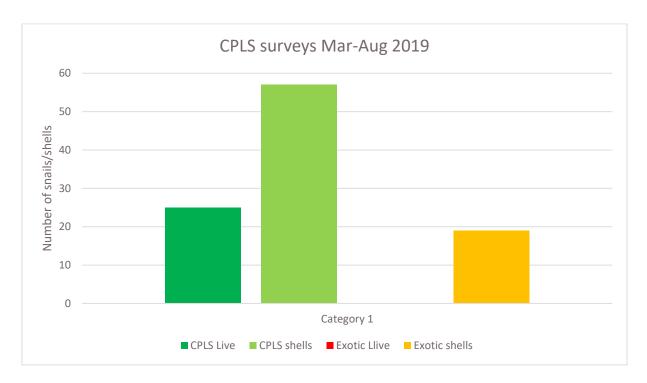


Figure 7: Cumberland Plain Land Snail search survey results and count

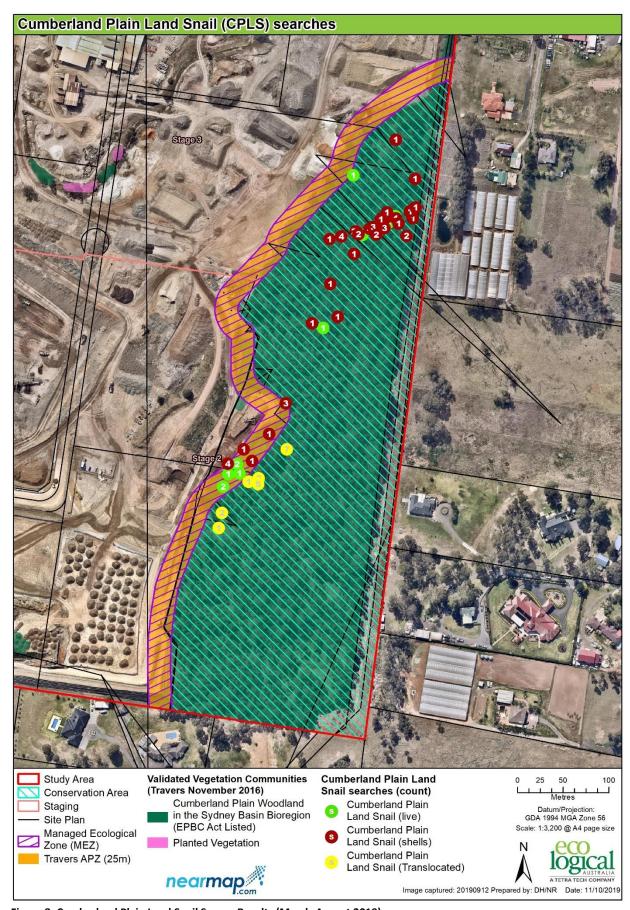


Figure 8: Cumberland Plain Land Snail Survey Results (March-August 2019)

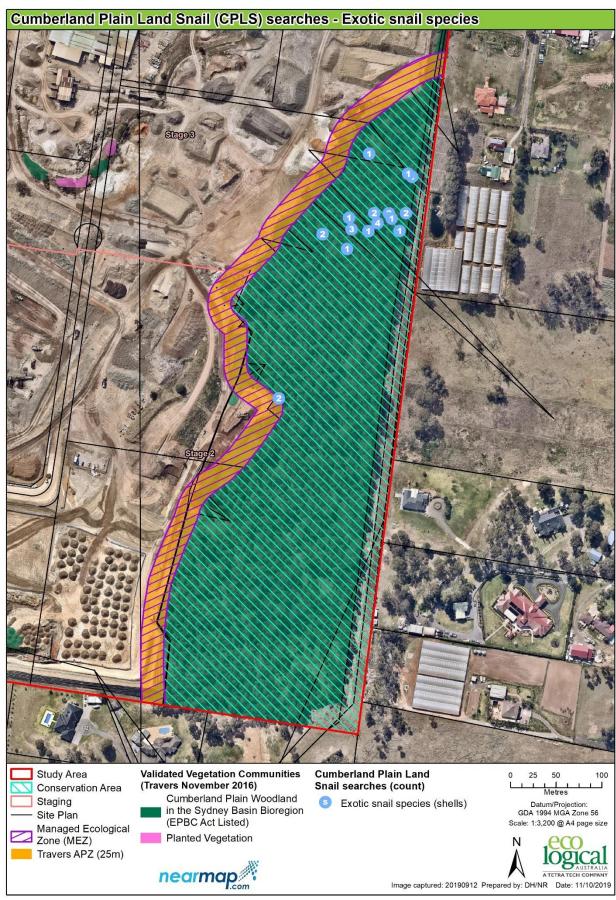


Figure 9: Exotic Snail Survey Results (March-August 2019)

3.3 Fauna observations

Incidental observations of native fauna onsite from the commencement of on ground works includes:

Birds

- Australian Wood Duck (Chenonetta jubata)
- Crested Pigeon (Ocyphaps lophotes)
- Peregrine Falcon (Falco peregrinus)
- Galah (Eolophus roseicapolla)
- Sulphur-Crested Cockatoo (Cacatua galerita)
- Rainbow Lorikeet (Trichoglossus haematodus)
- Pallid Cuckoo (Cacomantis pallidus)
- Dollarbird (Eurystomus orientalis)
- Superb Fairy-Wren (Malurus cyaneus)
- Yellow Thornbill (Acanthiza nana)
- Spotted Pardalote (Pardalotus punctatus)
- Yellow-Faced Honeyeater (Lichenostomus chrysops)
- White-Plumed Honeyeater (Ptilotula penicillata)
- Noisy Miner (Manorina melanocephala)
- Black-Faced Cuckoo Shrike (Coracina novaehollandiae)
- Golden Whistler (Pachycephala pectoralis)
- Grey Shrike-Thrush (Colluricincla harmonica)
- Grey Butcherbird (Cracticus torquatus)
- Australian Magpie (Cracticus tibicen)
- Pied Currawong (Strepera graculina)
- Grey Fantail (Rhipidura albiscapa)
- Willie Wagtail (Rhipidura leucophrys)
- Australian Raven (Corvus coronoides)
- Magpie-Lark (Grallina cyanoleuca)
- Eastern Yellow Robin (Eopsaltria australis)
- Welcome Swallow (Hirundo neoxena)
- Common Myna (Acridotheres tristis) *
- Double-Barred Finch (Taeniopygia bichenovii)
 - *Denotes introduced species

Mammals

- Eastern Grey Kangaroo (Macropus giganteus)
- Swamp Wallaby (Wallabia bicolor)

Reptiles

- Red-Bellied Black Snake (Pseudechis porphyriacus)
- Eastern Blue-tongue Lizard (Tiliqua scincoides scincoides)

Snails

• Cumberland Plain Land Snail (Meridolum corneovirens)

4. Conclusions

4.1 Progress of works

Works have been mostly focused on primary and secondary weed control throughout the more degraded sections of the site along the northern and eastern boundaries. These areas are still currently in the secondary phase of weed control and require regular follow up to help control seed propagation and further spreading of weeds into well maintained areas.

The main areas marked for revegetation are currently being prepared through brush cutting and careful spot spraying so that all plants can be installed in Autumn 2020.

Overall the site is progressing well with most of the VMP performance criteria either met or on track to be met. The site is also on-track to fulfil its overall Year 10 performance criteria targets. All weed control measures undertaken to date have been effective and there has been a significant reduction in cover of African Olive, African Boxthorn, Lantana, African Lovegrass and overall weed presence.

Regular weed control maintenance will continue to be required to treat all emerging weeds, especially in and around natural regeneration areas where herbaceous weeds such as *Bidens pilosa* (Cobbler's Pegs) are sprouting in areas where woody weed removal has been undertaken. In these areas, especially where native groundcover is thicker, hand weeding will be the preferred method of weed control as accurate spot spraying becomes increasingly more difficult.

The progress of works to achieve the performance criteria is shown in Table 3

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Table 3 : Performance criteria achievement (Travers 2016)

Performance Criteria	Completed	Comment
 A permanent, five-strand, plain wire protective fence is to be installed to the west of the site as located on Schedule Vegetation Management Works. Two gates will be installed for maintenance access as located on Schedule Vegetation Management Works. Existing fences to west and south to be repaired and upgraded. 	Yes	-
2. Weed control and revegetation works are to be carried out by a qualified bushland regenerator to achieve the following weed control targets. The presence, abundance and cover of noxious and environmental weed species (maximum 10% weed coverage at the end of Year 1, progressively reducing to less than 1% at the end of Year 10).	Yes	-
3. A target 60% native vegetation cover applies at the end of Year 1, 75% native vegetation cover at the end of Year 3, and 95% native vegetation cover at the end of Year 10.	On track	Native groundcover at 83%. Native midstorey cover at 58%
4. All highly invasive weed species are to be continuously suppressed and, if possible, eradicated from the restoration area in accordance with noxious weed control guidelines and permits issued by NSW Office of Water.	On track	Exotic groundcover is currently 7%
5. A 20 m wide Bushland Interface Zone will be established as shown on Schedule 1 – Vegetation Management Works. Enrichment planting of shrub species only will be planted to create a dense shrub layer to minimise weeds. A minimum of seven (7) shrub species for revegetation will be selected from Table 4 Revegetation Species List, however may be supplemented from species which typically occur in Cumberland Plain Woodland. Shrub planting densities are to on average, establish one (1) shrub every 12 m2	No	The Bushland Interface Zone is yet to be established
6. Revegetation will also be undertaken in disturbed areas as indicated in Schedule 1. A minimum of three (3) tree species, seven (7) shrub species and 14 groundcover species for revegetation will be selected from Table 4 Revegetation Species List, however may be supplemented from species which typically occur in Cumberland Plain Woodland. Plantings will achieve the following densities: Trees – one (1) tree every 50 m2 Shrubs – one (1) shrub every 12 m2 Groundcovers – three (3) groundcover every 1 m2	No.	Revegetation works to be undertaken in autumn of 2020
7. Habitat enhancement for the Cumberland Plain Land Snail completed including: Placement of a minimum of 30 x 3 m length hardwood logs harvested from the adjoining affected vegetation remnants; and Search, removal and euthanasia of exotic snails (minimum 4 searches per year)	On track.	24 Hardwood logs have been placed within the site
8. Monitoring will be undertaken every two (2) years. A condition assessment and review of works will be undertaken every 12 months and a report will be produced by the site bush regeneration contractors. A site restoration audit will	On track	Monitoring is currently being undertaken every 6 months,

Performance Criteria	Completed	Comment
be undertaken every two (2) years until the completion of the 10-year maintenance period by an independent project ecologist assessing achievements and recommended mitigation measures.		according to Section 4.1 of the VMP (Travers 2016)
9. A compliance statement is to be issued by the project ecologist at the completion of all fencing and primary revegetation works and upon completion of the maintenance period.	N/A	The compliance statement is due every 2 years with the first one due March 2020.
10. No greater than 25% of the Cumberland Plain Woodland reserve is burnt in any one year and all snails within the proposed burn areas to be relocated into refuge shelters within the site.	N/A	There are no burns planned in the foreseeable future so no need to relocate any snails

4.2 Site issues

To date, only 24 of the 30 x 3 m length hardwood logs have been placed within the VMP. Given the permanent, five strand plain wire protective fence has already been installed and vehicular access has been prevented, the relocation of the remaining seven hardwood logs into the site will be difficult. A recommendation would be to place several smaller logs into piles that are approximately 3 m in length or to create habitat structures which would provide similar habiatat.

The VMP is subject to edge effects impacting on the bushland, especially where the VMP area lies adjacent to exotic grassland along the eastern boundary and disturbance from the development footprint along the western boundary. These boundaries will need to be regularly maintained to keep exotic grass seed to a minimum and prevent seed from entering the VMP area.

During site surveys, goats were observed grazing the exotic shrub layer to the west of the VMP area. Scats have also been identified within the VMP area. To meet the revegetation performance criteria goats will need to be controlled and prohibited from entering the site, especially once revegetation has commenced.

Climatic conditions, notably the lack of rainfall since the previous reporting period has had an effect on native species richness. Well below average rainfall throughout the 2019 autumn and winter months has resulted in the number of native species recorded on site decreasing from 53 in the previous report to 45. Species such as *Brunoniella australis* (Blue Trumpet) and *Dichondra repens* (Kidney Weed) were noticeably impacted by the dry conditions as their cover abundance reduced significantly.

Future works proposed in the VMP area include:

- Continued removal of any further woody weed regrowth.
- Weed control of any emerging saplings throughout the site.
- Continued CPLS searches (minimum of 4 per year).
- Continued site preparation for revegetation in autumn 2020
- Implementation of all revegetation, including the Bushland Interface Zone.
- Continued monitoring and reporting.

5. References

Australian meteorology website. Data provided by Australian Bureau of meteorology. Accessed 31.10.2019. Accessed at:

http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_display_type=dataSGraph&p_stn_num=067 119&p_nccObsCode=136&p_month=13&p_startYear=2019

Australian meteorology website. Data provided by Australian Bureau of meteorology. Accessed 31.10.2019. Accessed at:

http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_display_type=dataSGraph&p_stn_num=067 119&p_nccObsCode=122&p_month=13&p_startYear=2019

Eco Logical Australia 2018. 327-335 Burley Road, Horsley Park Vegetation Management Plan Implementation Progress Report: March 2018 – September 2018. Prepared for CSR Buildings Products Ltd.

Eco Logical Australia 2019. 327-335 Burley Road, Horsley Park Vegetation Management Plan Implementation Progress Report: September 2018 – March 2019. Prepared for CSR Buildings Products Ltd.

Travers bushfire & ecology. 2016. Vegetation Management Plan, 327 – 335 Burley Road, Horsley Park.

Appendix A Photo monitoring points



HP1 July 2018



HP1 September 2019



HP2 July 2018



HP2 September 2019



HP3 July 2018



HP3 September 2019



HP4 July 2018



HP4 September 2019



HP5 July 2018



HP5 September 2019



HP6 July 2018



HP6 September 2019



HP7 July 2018



HP7 September 2019



HP8 July 2018



HP8 September 2019



HP9 July 2018



HP9 September 2019



HP10 July 2018



HP 10 September 2019



HP11 July 2018



HP11 September 2019



HP12 July 2018



HP12 September 2019



HP13 July 2018



HP13 September 2019



HP14 July 2018



HP14 September 2019



HP15 July 2018



HP15 September 2019



HP16 July 2018



HP16 September 2019



HP17 July 2018



HP17 September 2019



HP18 July 2018



HP18 September 2019

Appendix B Quadrat data

Native vegetation (September 2018)

Species				% Projec	ted foliage co	over in quadr	ats			% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Acacia decurrens								40		4
Acacia falcata						<1	<1			0
Acacia longifolia							7			1
Aristida ramosa				<1	25	70	20	5		13
Aristida vagans		<1	20			2			<1	2
Arthropodium milleflorum					<1					0
Brunoniella australis	<1	5	3	5	5	<1	2	5	10	4
Bursaria spinosa	75	50	82	80	15		55	30	80	52
Cheilanthes sieberi		<1							<1	0
Chloris ventricosa					2					0
Cymbonotus lawsonianus							<1			0
Daviesia ulicifolia			<1							0
Desmodium varians	<1			<1						0
Dianella longifolia		<1		<1		<1	<1	<1	<1	0
Dichondra repens	5	2	3	<1	10	<1	2	<1	<1	2
Dichopogon sp.		<1								0
Dillwynia sieberi		<1							2	0
Eremophila debilis					<1					0
Eucalyptus crebra				75	10	2				10

Species				% Projec	ted foliage c	over in quadr	ats			% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Eucalyptus eugenoides						25			10	4
Eucalyptus moluccana	5	10	20							4
Eucalyptus tereticornis	32	32	42	20	70	30	<1	20	30	31
Ficus sp.	<1									0
Glycine microphylla	<1	<1	<1	<1	<1					0
Glycine tabacina	<1		<1	<1	<1	<1		<1	<1	0
Indigofera australis	<1									0
Lomandra multiflora subsp. multiflora			<1	<1	<1		<1	<1	2	0
Microlaena stipoides	70	60	50	30	10	10	<1	5	30	29
Oxalis perennans	<1					<1				0
Phyllanthus virgatus					<1	<1				0
Poa labillardieri			<1		5		<1	<1		1
Pratia purpurascens									3	0
Pultenea microphylla							<1	2		0
Rumex sp.	<1									0
Solanum prinophyllum	<1	<1	<1	<1				<1		0
Sporobolus creber				<1						0
Syncarpia glomulifera								15		2
Themeda australis		5	2	2	25	2	50	10	30	14

Exotic vegetation (September 2018)

Species	% Projected foliage cover in quadrats									% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Araujia sericifera*	<1	<1		<1	<1					0
Bidens pilosa*	2	2			2					1
Conyza bonariensis*		<1	<1							0
Ehrharta erecta*	5		1		3					1
Eragrostis curvula*								<1	<1	0
Hyparrhenia hirta*						<1				0
Jacaranda mimosifolia*				<1						0
Lantana camara*	10	<1	5	<1						2
Lycium ferrocissimum*		<1								0
Ochna serrulata*	<1									0
Olea europaea subsp. cuspidata*	<1		<1	<1						0
Paspalum dilatatum*	<1	<1			<1				2	0
Plantago lanceolata*						1	<1	<1		0
Senecio madagascariensis*				<1			<1			0
Senecio pterophorus*		<1				<1	<1	<1	<1	0
Setaria parviflora*						<1				0
Sida rhombifolia*	<1	<1	10	<1	<1	1	<1	<1	<1	1
Solanum pseudocapsicum*	<1	<1	<1	<1	<1	<1		<1		0
Solanum sisymbriifolium*		<1								0
Sonchus oleraceus*	<1			<1	<1					0
Verbena bonariensis*		<1				<1				0

Native vegetation (March 2019)

Species	% Projected foliage cover in quadrats									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Acacia decurrens								20		2
Acacia falcata						1	1			0
Acacia implexa							10			1
Aristida ramosa			<1	<1	15	40	20	25		11
Aristida vagans		<1	5			2		<1		1
Arthropodium milleflorum							<1			0
Asperula conferta						<1	<1	<1		0
Brunoniella australis	10	10	20	5	5	10	10	10	10	10
Bursaria spinosa	75	50	70	80	15	30	70	30	80	56
Cayratia clematidea	5									1
Centella asiatica					5		2			1
Cheilanthes sieberi	<1	<1	<1	<1		<1				0
Chloris ventricosa					2	5	2	2		1
Cymbopogon refractus					10	1	<1	<1	<1	1
Cyperus sp.			<1	<1				<1	<1	0
Daviesia ulicifolia			<1							0
Desmodium varians	2	2	<1	<1		1	<1	<1		1
Dianella longifolia		<1		<1	1	<1	<1	<1	<1	0
Dichondra repens	10	5	2	<1	10		2	<1	<1	3
Dillwynia sieberi		<1							2	0
Echinopogon caespitosus var. caespitosus			<1							0

Species	% Projected foliage cover in quadrats									% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Einadia hastata	<1									0
Einadia trigonos				<1						0
Eremophila debilis			<1	<1			<1			0
Eucalyptus crebra				75	10	2				10
Eucalyptus eugenoides						25			10	4
Eucalyptus moluccana	5	10	20		1			1		4
Eucalyptus tereticornis	30	30	40	20	70	25	40	20	30	34
Ficus sp.	<1									0
Glycine microphylla	<1	<1	<1	<1				<1		0
Glycine tabacina	5	2	<1	<1		<1	<1	<1	<1	1
Hypoxis hygrometrica var. hygrometrica		<1	<1	<1		<1	<1	<1		0
Indigofera australis	1									0
Lagenophora stipitata			<1	<1			<1	<1		0
Lomandra filiformis			<1						<1	0
Lomandra multiflora subsp. multiflora		<1	1	1					2	0
Mentha satureioides				<1					<1	0
Microlaena stipoides	20	60	20	20	10	20	1	25	20	22
Oxalis perennans	1	<1				<1		<1	<1	0
Pandorea pandorana		<1								0
Paspalidium distans				<1						0
Phyllanthus virgatus		<1	<1			<1		<1	<1	0
Plantago gaudichaudii					1	<1		<1		0
Poa labillardieri			<1		5		<1			1

Species				% Projec	ted foliage co	over in quad	rats			% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Pratia purpurascens									2	0
Pultenea microphylla							3	2		1
Rumex sp.	<1									0
Sigesbeckia orientalis ssp. orientalis				<1						0
Solanum prinophyllum	1	<1	<1	<1				<1		0
Sporobolus creber								<1		0
Syncarpia glomulifera								15		2
Themeda australis		2	2	2	20	2	30	10	30	11
Wahlenbergia gracilis								<1		0

Exotic vegetation (March 2019)

Species	% Projected foliage cover in quadrats									% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Araujia sericifera*	<1	<1		<1						0
Bidens pilosa*	5	5	<1	1	<1	<1	<1		<1	1
Brassica fruticulosa*	<1									0
Conyza bonariensis*	<1			<1						0
Ehrharta erecta*	10		<1	1	3					1
Eragrostis curvula*						<1		<1		0
Hyparrhenia hirta*		<1								0
Lantana camara*	<1	1	1	1	<1					0
Lycium ferrocissimum*								<1	<1	0
Ochna serrulata*	<1		<1		<1					0
Olea europaea subsp. cuspidata*		<1		<1						0
Paspalum dilatatum*	<1	<1	<1	<1	<1	<1	1	<1	2	0
Plantago lanceolata*		<1				<1	<1	<1		0
Rosa rubiginosa					<1					0
Senecio madagascariensis*	<1	<1		<1	<1	1	<1	<1		0
Senecio pterophorus*	<1	<1			<1		<1	<1		0
Setaria parviflora*	<1		<1	<1		1	<1	<1		0
Sida rhombifolia*	<1	<1	<1	<1	<1	<1	<1	<1	<1	0
Solanum pseudocapsicum*				<1		<1				0
Solanum sisymbriifolium*			<1	<1		<1				0
Sonchus oleraceus*	<1	<1		<1						0

Species		% Projected foliage cover in quadrats										
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover		
Verbena bonariensis*		<1				<1				0		

Native vegetation (September 2019)

Species				% Projected	foliage cove	r in quadrats				% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Acacia decurrens								20		2
Acacia falcata						1	1			0
Acacia implexa							7			1
Aristida ramosa		30	20	20	30	40	30	30		22
Aristida vagans		<1	2	<1	<1	2	<1	<1		0
Asperula conferta						<1				0
Brunoniella australis	2	2	2	2	2	5	2	2	2	2
Bursaria spinosa	75	50	70	80	15	30	70	30	80	56
Cayratia clematidea	5									1
Centella asiatica					<1		<1			0
Cheilanthes sieberi	<1					<1				0
Chloris ventricosa					5	2	5	2		2
Cymbopogon refractus					5	2	<1	<1	<1	1
Cyperus sp.			<1				<1			0
Daviesia ulicifolia			<1							0
Desmodium varians	1	1	<1	<1	<1	<1	<1	<1		0
Dianella longifolia		<1			1	<1	<1	<1	<1	0
Dichondra repens	2	2	1	<1	5	<1	1	1	<1	1
Dillwynia sieberi		<1							2	0
Einadia hastata	<1									0
Eremophila debilis				<1			<1			0

Species				% Projected	foliage cove	r in quadrats				% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Eucalyptus crebra				75	10	2				10
Eucalyptus eugenoides						25			10	4
Eucalyptus moluccana	5	10	20		1			1		4
Eucalyptus tereticornis	30	30	40	20	70	25	40	20	30	34
Ficus sp.	<1									0
Glycine microphylla	<1	<1	<1	<1	<1	<1		<1	<1	0
Glycine tabacina	5	2	<1	<1	<1	<1	<1	<1	<1	1
Goodenia hederacea							<1	<1		0
Indigofera australis	1									0
Kennedia rubicunda			<1							0
Lomandra filiformis			<1		<1	<1		<1	<1	0
Lomandra multiflora subsp. multiflora		<1	1	1	<1	<1	<1		2	0
Mentha saturejoides			<1							0
Microlaena stipoides	60	40	20	20	15	20	15	40	50	31
Oxalis perennans	<1								<1	0
Paspalidium distans			<1							0
Plantago gaudichaudii					<1	<1		<1		0
Poa labillardieri			<1		5		5	<1		1
Pratia purpurascens									2	0
Pultenea microphylla							3	2		1
Solanum prinophyllum	1		<1	<1	<1			<1		0
Sprobolus creber								<1		0
Syncarpia glomulifera								15		2

Species		% Projected foliage cover in quadrats										
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover		
Themeda australis		2	2	2	15	10	20	5	20	8		

Exotic vegetation (September 2019)

Species				% Projected	foliage cove	r in quadrats				% Total
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	cover
Bidens pilosa*	<1	<1	<1		<1	<1	<1		<1	0
Cirsium vulgare		<1								0
Conyza bonariensis*	<1									0
Ehrharta erecta*	10		<1	<1		<1				1
Eragrostis curvula*						<1		<1		0
Hypochaeris radicata*				<1						0
Lantana camara*			<1	<1						0
Lycium ferrocissimum*		<1	<1							0
Ochna serrulata*				<1	<1					0
Olea europaea subsp. cuspidata*			<1	<1						0
Paspalum dilatatum*		<1					<1	<1	2	0
Plantago lanceolata*							<1	<1		0
Senecio madagascariensis*	<1					<1	<1	<1	<1	0
Senecio pterophorus*		<1			<1		<1	<1		0
Sida rhombifolia*	<1	<1	<1	<1		<1	<1		<1	0
Solanum nigrum*	<1								<1	0
Solanum pseudocapsicum*	<1		<1	<1		<1				0
Solanum sisymbriifolium*									1	0

Appendix C Observed flora species not found within the quadrats

Family	Scientific name	Common name
Trees		
Mimosaceae	Acacia decurrens	Black Wattle
Myrtaceae	Angophora floribunda	Rough-barked Apple
Myrtaceae	Corymbia maculata	Spotted Gum
Myrtaceae	Eucalyptus crebra	Narrow-leaved Ironbark
Myrtaceae	Eucalyptus eugenioides	Thin-leaved Stringybark
Myrtaceae	Eucalyptus moluccana	Grey Box
Myrtaceae	Eucalyptus tereticornis	Forest Red Gum
Santalaceae	Exocarpos cupressiformis	Native Cherry
Moraceae	Ficus spp.	Fig
Myrtaceae	Melaleuca decora	White Feather Honeymyrtle
Myrtaceae	Melaleuca styphelioides	Prickly-leaved Tea Tree
Myrtaceae	Syncarpia glomulifera	Turpentine
Shrubs		
Mimosaceae	Acacia falcata	Sickle Wattle
Mimosaceae	Acacia fimbriata	Fringed Wattle
Mimosaceae	Acacia implexa	Hickory
Mimosaceae	Acacia longifolia var. longifolia	Sydney Golden Wattle
Mimosaceae	Acacia saligna*	Orange Wattle
Mimosaceae	Acacia ulicifolia	Prickly Moses
Pittosporaceae	Bursaria spinosa var. spinosa	Native Blackthorn
Asteraceae	Cassinia sp.	-
Solanaceae	Cestrum parqui*	Chilean Cestrum
Fabaceae	Daviesia ulicifolia	Gorse Bitter Pea
Fabaceae	Dillwynia sieberi	Prickly Parrot-pea
Apocnynaceae	Gomphocarpus fruticosus*	Narrow Leaf Cotton Bush
Proteaceae	Hakea salicifolia	Willow Hakea
Fabaceae	Indigofera australis	Native Indigo
Verbenaceae	Lantana camara*	Lantana
Oleaceae	Ligustrum lucidum*	Large-leaved Privet
Solanaceae	Lycium ferocissimum*	African Boxthorn

Family	Scientific name	Common name
Berberidaceae	Nandina domestica*	Sacred Bamboo
Ochnaceae	Ochna serrulata*	Mickey Mouse Plant
Oleaceae	Olea europaea subsp. cuspidata*	African Olive
Fabaceae	Pultenaea microphylla	-
Euphorbiaceae	Ricinus communis*	Castor Oil Plant
Rosaceae	Rosa rubignosa*	Sweet Briar
Asteraceae	Senecio pterophorus*	African Daisy
Solanaceae	Solanum linnaeanum*	Apple-of-Sodom
Groundcovers		
Myrsinaceae	Anagallis arvensis*	Scarlet Pimpernel
Poaceae	Aristida ramosa	Wire Grass
Poaceae	Aristida vagans	Three-awn Speargrass
Poaceae	Aristida warburgii	Wire Grass
Anthericaceae	Arthropodium milleflorum	Pale Vanilla Lily
Rubiaceae	Asperula conferta	Common Woodruff
Poaceae	Austrostipa pubescens	Tall Speargrass
Poaceae	Axonopus fissifolius*	Narrow-leafed Carpet Grass
Asteraceae	Bidens pilosa*	Cobbler's Pegs
Brassicaceae	Brassica fruticulosa*	Twiggy Turnip
Acanthaceae	Brunoniella australis	Dwarf Blue Trumpet
Brassicaceae	Cardamine hirsuta*	Hairy Bittercress
Apiaceae	Centella asiatica	Indian Pennywort
Sinopteridaceae	Cheilanthes sieberi	Rock Fern
Poaceae	Chloris gayana*	Rhodes Grass
Poaceae	Chloris ventricosa	Tall Chloris
Asteraceae	Cirsium vulgare*	Spear Thistle
Asteraceae	Conyza bonariensis*	Flaxleaf Fleabane
Brassicaceae	Coronpus didymus*	Lesser Swine-cress
Poaceae	Cortaderia selloana*	Pampas Grass
Apiaceae	Cyclospermum leptophyllum*	Slender Celery
Asteraceae	Cymbonotus lawsonianus	Bear's Ear
Poaceae	Cymbopogon refractus	Barbed Wire Grass
Poaceae	Cynodon dactylon	Common Couch

Family	Scientific name	Common name
Cyperaceae	Cyperus eragrostis*	Umbrella Sedge
Phormiaceae	Dianella longifolia	Pale Flax-lily
Poaceae	Dichelachne micrantha	Short-hair Plume Grass
Convolvulaceae	Dichondra repens	Kidney Weed
Poaceae	Echinopogon caespitosus var. caespitosus	Tufted Hedgehog Grass
Poaceae	Ehrharta erecta*	Panic Veldtgrass
Chenopodiaceae	Einadia hastata	Berry Saltbush
Chenopodiaceae	Einadia trigonos	Fishweed
Poaceae	Entolasia marginata	Bordered Panic
Poaceae	Eragrostis brownii	Brown's Lovegrass
Poaceae	Eragrostis curvula*	African Lovegrass
Asteraceae	Erechtites valerianifolia*	Brazilian Fireweed
Scrophulariaceae	Eremophila debilis	Winter Apple
Apiaceae	Foeniculum vulgare*	Fennel
Geraniaceae	Geranium solanderi	Cutleaf Cranesbill
Poaceae	Hyparrhenia hirta*	Coolatai Grass
Clusiaceae	Hypericum gramineum	Small St John's Wort
Asteraceae	Hypochaeris radicata*	Flatweed
Hypoxidaceae	Hypoxis hygometrica var. hygrometrica	Golden Weather-grass
Juncaceae	Juncus acutus*	Sharp Rush
Juncaceae	Juncus continuus	-
Juncaceae	Juncus usitatus	Common Rush
Poaceae	Lachnagrostis filiformis	Blown Grass
Asteraceae	Lagenophora stipitata	Blue Bottle-daisy
Lomandraceae	Lomandra longifolia	Spiky-headed Mat-rush
Lomandraceae	Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush
Fabaceae	Lotus suaveolans*	Hairy Bird's Foot Trefoil
Lamiaceae	Mentha satureioides	Creeping Mint
Poaceae	Microlaena stipoides var. stipoides	Weeping Grass
Malvaceae	Modiola caroliniana*	Red-flowered Mallow
Oxalidaceae	Oxalis perennans	-
Poaceae	Panicum effusum	Hairy Panic
Poaceae	Paspalidium distans	Watercrown Grass

Family	Scientific name	Common name
Poaceae	Paspalum dilatatum*	Paspalum
Malvaceae	Pavonia hastata*	Pink Pavonia
Poaceae	Pennisetum clandestinum*	Kikuyu
Polygonaceae	Persicaria decipiens	Slender Knotweed
Phyllanthaceae	Phyllanthus virgatus	Seed-under-leaf
Plantaginaceae	Plantago gaudichaudii	Narrow Plantain
Plantaginaceae	Plantago lanceolata*	Ribwort
Poaceae	Poa labillardieri	Tussock Grass
Lobeliaceae	Pratia purpurascens	White Root
Acanthaceae	Pseuderanthemum variabile	Pastel Flower
Fabaceae	Pultenaea microphylla	Spreading Bush-pea
Iridaceae	Romulea rosea var. australis*	Onion Grass
Polygonaceae	Rumex sp.	-
Asteraceae	Senecio madagascariensis*	Fireweed
Poaceae	Setaria parviflora*	Pigeon Grass
Malvaceae	Sida rhombifolia*	Paddy's Lucerne
Asteraceae	Sigesbeckia orientalis ssp. orientalis	Indian Weed
Solanaceae	Solanum nigrum*	Blackberry Nightshade
Solanaceae	Solanum prinophyllum	Forest Nightshade
Solanaceae	Solanum pseudocapsicum*	Jerusalem Cherry
Solanaceae	Solanum sisymbriifolium*	Sticky Nightshade
Asteraceae	Sonchus oleraceus*	Common Sow-thistle
Poaceae	Sporobolus africanus*	Parramatta Grass
Poaceae	Sporobolus creber	Slender Rat's Tail Grass
Lamiaceae	Stachys arvensis*	Stagger Weed
Asteraceae	Taraxacum officinale*	Dandelion
Poaceae	Themeda australis	Kangaroo Grass
Commelinaceae	Tradescantis fluminensis*	Wandering Jew
Fabaceae	Trifolium repens*	White Clover
Verbenaceae	Verbena bonariensis*	Purpletop
Campanulaceae	Wahlenbergia gracilis	Australian Bluebell
Vines		
Apocnyaceae	Araujia sericifera*	Moth Plant

Family	Scientific name	Common name
Rosaceae	Rubus fruticosus*	Blackberry
Vitaceae	Cayratia clematidea	Native Grape
Fabaceae	Desmodium varians	Slender Tick-Trefoil
Chenopodiaceae	Einadia nutans subsp. linifolia	Climbing Saltbush
Fabaceae	Glycine clandestina	Twining Glycine
Fabaceae	Glycine microphylla	Small-leaf Glycine
Fabaceae	Glycine tabacina	Variable Glycine
Fabaceae	Hardenbergia violacea	False Sarsparilla
Convolvulaceae	Ipomoea cairica*	Coastal Morning Glory
Convolvulaceae	Ipomoea indica*	Blue Morning Glory
Bignoniaceae	Pandorea pandorana	Wonga Vine
Apocynaceae	Parsonsia straminea	Common Silkpod
Fabaceae	Vicia sativa subsp. sativa*	Common Vetch
Water plants		
Juncaceae	Juncus cognatus*	-
Onagraceae	Ludwigia peploides subsp. montevidensis	Water Primrose
Juncaginaceae	Triglochin microtuberosum	Water Ribbons
Typhaceae	Typha orientalis	Broadleaf Cumbungi

^{*} denotes exotic species



