



## Rosenthal Estate, Sunbury

# Conservation Management Plan Implementation

## Year 4 Monitoring

Prepared for  
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C/- Urban Design and Management P/L

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**Nature  
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# 1. INTRODUCTION, METHODS AND SUMMARY

T.F. & A. Millett, C/- Urban Design and Management Pty Ltd engaged Nature Advisory Pty Ltd (formerly Brett Lane and Associates) to conduct a monitoring assessment of the implementation of the Conservation Management Plan (EHP 2015a) for Rosenthal Estate residential development, located at 100 Vineyard Road, Sunbury.

The Conservation Management Plan (CMP) relates to two conservation reserves — the Eastern Reserve and the Western Reserve. The collective extent of these reserves is 12.64 hectares.

A site assessment of both reserves was undertaken on 31<sup>st</sup> December 2019 to:

- Assess the extent to which the year four management actions from the CMP had been implemented;
- Implement the monitoring requirements prescribed in the CMP; and
- Assess progress against management actions listed in Table 13 of the Offset Management Plan (EHP 2015b).

The number of species and the estimated cover of each species were recorded for each management zone within each reserve. Cover estimates were then extrapolated for each reserve (as a whole) by weighing data by the relative areas of the management zones.

Note that very high grassy biomass over much of the Western Reserve reduced the ability to observe low-lying flora during the current site monitoring. This was considered to limit the ability to accurately determine indigenous and introduced species diversity and cover.

A summary of the current monitoring results is provided below.

- In the Eastern Reserve, biomass and weed cover has been substantially reduced while native vegetation cover has been maintained.
- In the Western Reserve, biomass has been substantially reduced while weed cover has increased and native vegetation cover has decreased.

Implementation of the CMP in the past has been compromised by the following factors:

- High covers of several high-threat grass weeds since 2015;
- Difficulties in obtaining permission to burn the site; and
- Extremely dry seasonal conditions impacting most management actions but particularly the success rate of revegetation using tubestock.

Monitoring has been impacted by the following.

- The mass germination of soil stored weed seed post-burn — while these weeds have a high cover most of these weeds are low threat species

Future management actions will focus on the following:

- Eastern Reserve
  - Prioritise chemical control of noted high-threat grass weeds throughout the reserve.
  - Further hot (high intensity) burns in areas with high biomass (such as the western half of the reserve) and areas with high weed cover and cool burns in areas with greater indigenous flora cover.

- Potential revegetation using direct seeding and/or tubestock planting;
- Western Reserve
  - Prioritise chemical control of noted high-threat grass weeds within the northern two thirds of the reserve and at the interface of this area with the southern weed-dominated portion of the reserve.
  - Biomass reduction should be considered in the northern two thirds of the reserve.
  - Revegetation not recommended in 2020.

The actions being implemented are meeting the requirements of both the CMP and OMP for both the Eastern Reserve and Western Reserve. Despite this, it is recommended that weed control works be intensified in the Western Reserve in Year 5.

This investigation was undertaken by a team from BL&A comprising Verity Fyfe and Alan Brennan (Senior Ecologist & Project Manager).

## 2. EASTERN RESERVE

### 2.1. Monitoring results

Table 1 provides an assessment of the extent to which year four management actions set out in the CMP for the Eastern Reserve have been implemented. This table also references sections of this report which provide adaptive management recommendations. Table 2 details the photo-point locations, Table 3 the biomass cover, Table 4 the weed cover and Table 5 the indigenous species cover.

Key findings are listed below.

- Patchy burning has been implemented on the site, though further burning is recommended if possible – i.e. hot burns in weedy areas and cool burns in areas with a greater proportion of indigenous flora.
- Vegetation biomass has reduced from 95% in December 2018 to 75% currently, though biomass still remains high throughout much of the reserve, especially within the western half of the Eastern Reserve.
- Indigenous vegetation cover remains the same as for December 2018 (30%), despite observed evidence of patchy burns and chemical weed control.
- A total of 18 indigenous flora species were recorded (one less than in December 2018).
- Weed cover has reduced from 65% in December 2018 to 50% currently. This change is likely due to a combination of burning and chemical weed control, especially given the good conditions for growth experienced over the last year. Notable reductions in cover of high threat weeds such as Cooksfoot, Phalaris and Chilean Needle-grass were achieved.
- A total of 35 weed species were recorded (three less than in December 2018).
- No weed species were found to have increased in cover since December 2018.
- Effective control of high-threat grasses was clearly evident, though these weeds still pose a severe threat to native vegetation in the reserve. The following weeds – Serrated Tussock, Chilean Needle-grass, Texan Needle-grass and Tall Fescue – should be prioritised for control, even in weedy areas. Targeted control efforts of these weeds must be conducted more frequently and with more intensity in 2020 than in previous years.
- Evidence of past woody weed control was observed, though several small Sweet Briar plants are now beginning to re-establish along the southern boundary of the reserve. Another round of woody weed control is required in the near future to eliminate woody weeds from the reserve and avoid their re-establishment.
- Three new weeds have emerged on the site — Bathurst Burr, Yorkshire Fog and Great Brome. The former two are considered to be of high-threat and should be prioritised for control following effective control of the aforementioned high-threat grasses.
- Revegetation is an option for Management Zone B. It may be achieved through planting and/or direct seeding and should predominantly consist of indigenous grass species which are known to occur on the site. The optimum time for revegetation is likely to be in Autumn or early-mid Winter when competition from weeds is minimal.
- The actions being implemented are meeting the requirements of both the CMP and OMP.

**Table 1: Eastern Reserve – Year 4 management actions**

Action	Management action	Responsible entity	Timing of action	Implementation notes and recommendations
3.1	Conduct weed control	Landowner / Bushland Management Contractor	As per Table 2 of CMP	Evidence of weed control was observed throughout the reserve, however high covers of high threat weeds still remain. Weed control efforts must be conducted more frequently and with more intensity in 2020.  Weed management approach recommended (see Section 2.2.1).
3.2	Monitor populations of pest animals and conduct control works if required	Landowner / Pest Animal Contractor	Late summer / early autumn	Contractor to continue to monitor for pest animal activity during all site visits.
3.3	Conduct monitoring of all vegetation and Golden Sun Moth habitat	Suitably qualified ecological specialist	Two years after commencement of works	Undertaken in December 2019. No Golden Sun Moth recorded.
3.4	Maintain fences	Landowner/Fencing Contactor	As required	Fences and access gates in good repair.
3.5	Monitor organic litter and biomass density and develop ecological burn or fuel reduction plan if appropriate	Landowner / Bushland Management Contractor	Outside of the GSM active season (October – January)	Monitoring undertaken.  Further patchy biomass management recommended (see Section 2.2.2).
3.6	Monitor and assess works, and prepare progress report	Suitably qualified ecological specialist	Two years after commencement of works	Weed cover remains high. Continuing weed management required (see Section 2.2.1).
3.7	Commence supplementary planting within Management Zone B of each reserve	Landowner / Bushland Management Contractor / Local nursery	Early Spring Year 2 – subject to availability of plants and environmental conditions	Undertaken in August 2018. Optional for 2020.

**Table 2: Eastern Reserve – Year 3 and Year 4 photos**

Photo-point #	December 2018	December 2019
1		
2		

Photo-point #	December 2018	December 2019
3	 A photograph of a grassy field with a commercial area and buildings in the background. The date stamp '20.12.2018' is visible in the bottom right corner.	 A close-up photograph of tall, dry, golden-brown grass.
4	 A photograph of a grassy field with utility poles and buildings in the background. The date stamp '20.12.2018' is visible in the bottom right corner.	 A close-up photograph of tall, dry, golden-brown grass.



Photo-point #	December 2018	December 2019
5		
6		

Photo-point #	December 2018	December 2019
7		
8		

Photo-point #	December 2018	December 2019
9		

**Table 3: Eastern Reserve – biomass observations since December 2015**

Estimate	Dec 2015	Dec 2016	Dec 2017	Dec 2018	Dec 2019
Total native vegetation cover (%)	40	32	32	30	30
Total weed cover (%)	45	74	60	65	50
Vegetation related litter cover (%)	-	27	40	35	30
Biomass cover (%)	-	99	95	95	75
Biomass – main height range (m) (min)	-	0.3	0.3	0.3	0
Biomass – main height range (m) (max)	-	1.2	1.2	1.2	1.2

**Table 4: Eastern Reserve – weed cover observations since 2015**

Common name	Scientific name	High-threat	Projective foliage cover (%)				
			December 2015	December 2016	December 2017	December 2018	December 2019
<b>Weed species</b>							
African Box-thorn	<i>Lycium ferocissimum</i>	X	<1			1	<1
Artichoke Thistle	<i>Cynara cardunculus</i>	X	<1			<1	
Bearded Oat	<i>Avena barbata</i>	X	1	6	2	5	5
Blackberry	<i>Rubus fruticosus</i> spp. agg.	X	2	<1	<1	1	1
Brown-top Bent	<i>Agrostis capillaris</i>		1		1	1	
Chilean Needle-grass	<i>Nassella neesiana</i>	X	1	1	4	10	4
Flatweed	<i>Hypochaeris radicata</i>		1	1	1	2	<1
Perennial Rye-grass	<i>Lolium perenne</i>		10	22	15	10	10
Prairie Grass	<i>Bromus catharticus</i>		<1	1	3	3	1
Ribwort	<i>Plantago lanceolata</i>		2	<1	3	5	2
Serrated Tussock	<i>Nassella trichotoma</i>	X	10	13	3	4	4
Sheep Sorrel	<i>Acetocella vulgaris</i>		2		2	2	1
Soft Brome	<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>		<1	2	1	1	1
Spear Thistle	<i>Cirsium vulgare</i>	X	1	<1		1	
Sweet Briar	<i>Rosa rubiginosa</i>	X	1		1	1	1
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>	X	1			<1	
Tall Mallow	<i>Malva sylvestris</i>		<1	<1	<1		<1

Common name	Scientific name	High-threat	Projective foliage cover (%)				
			December 2015	December 2016	December 2017	December 2018	December 2019
Toowoomba Canary-grass	<i>Phalaris aquatica</i>	X	10	1	1	7	1
Barley Grass	<i>Hordeum sp.</i>		NA	<1	<1	<1	<1
Cape Weed	<i>Arctotheca calendula</i>		NA	<1			
Clustered Dock	<i>Rumex conglomeratus</i>		NA	<1	<1	<1	
Cocksfoot	<i>Dactylis glomerata</i>	X	NA	16	20	20	15
Common Peppergrass	<i>Lepidium africanum</i>		NA	<1	<1	<1	<1
Common Sow-thistle	<i>Sonchus oleraceus</i>		NA	<1	3	3	<1
Curled Dock	<i>Rumex crispus</i>		NA	<1	<1	<1	
Hogweed	<i>Polygonum aviculare</i>		NA	<1	<1	<1	<1
Hop Clover	<i>Trifolium campestre</i> var. <i>campestre</i>		NA	<1	<1	<1	<1
Indian Mustard	<i>Brassica X juncea</i>		NA	<1	<1	1	1
Medic	<i>Medicago sp.</i>		NA	<1	<1		
Narrow-leaf Clover	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>		NA	<1	<1	<1	<1
Onion Grass	<i>Romulea rosea</i>		NA	<1	<1	<1	<1
Ox-tongue	<i>Helminthotheca echioides</i>		NA	<1	<1	1	<1
Panic Veldt-grass	<i>Ehrharta erecta</i> var. <i>erecta</i>	X	NA	<1	<1	<1	
Paspalum	<i>Paspalum dilatatum</i>	X	NA		1	2	1
Paterson's Curse	<i>Echium plantagineum</i>	X	NA			<1	1

Common name	Scientific name	High-threat	Projective foliage cover (%)				
			December 2015	December 2016	December 2017	December 2018	December 2019
Prickly lettuce	<i>Lactuca serriola</i>		NA	<1	1	1	<1
Red-flower Mallow	<i>Modiola caroliniana</i>		NA	<1	2		<1
Rough Dog's-tail	<i>Cynosurus echinatus</i>		NA	2	2	1	2
Squirrel-tail Fescue	<i>Vulpia bromoides</i>		NA	2	2	1	1
Tall Fescue	<i>Festuca arundinacea</i>	X	NA	<1	<1	<1	<1
Texas Needle-grass	<i>Nassella leucotricha</i>	X	NA	<1	<1	<1	<1
Big Heron's-Bill	<i>Erodium botrys</i>		NA			<1	
Bathurst Burr	<i>Xanthium spinosum</i>	X					<1
Yorkshire Fog	<i>Holcus lanatus</i>	X					<1
Great Brome	<i>Bromus diandrus</i>						<1
<b>Total number of species</b>				<b>33</b>	<b>35</b>	<b>38</b>	<b>35</b>

**Table 5: Eastern Reserve – Year 4 indigenous flora species**

Common name	Scientific name	Management Zone		Total
		A	B	
Blue Devil	<i>Eryngium ovinum</i>	X		X
Bristly Wallaby-grass	<i>Rytidosperma setaceum</i>	X		X
Brown-back Wallaby-grass	<i>Rytidosperma duttonianum</i>	X	X	X
Club Sedge	<i>Isolepis</i> sp.		X	X
Common Wheat-grass	<i>Anthosachne scaber</i>	X	X	X
Fibrous Spear-grass	<i>Austrostipa semibarbata</i>	X	X	X
Finger Rush	<i>Juncus subsecundus</i>	X	X	X
Grey Tussock-grass	<i>Poa sieberiana</i>	X		X
Kangaroo Grass	<i>Themeda triandra</i>	X	X	X
Kneed Spear-grass	<i>Austrostipa bigeniculata</i>	X	X	X
Lemon Beauty-heads	<i>Calocephalus citreus</i>	X		X
Quizzical Spear-grass	<i>Austrostipa stuposa</i>	X		X
Rough Spear-grass	<i>Austrostipa scabra</i>	X	X	X
Sheep's Burr	<i>Acaena echinata</i>	X	X	X
Short Wallaby-grass	<i>Rytidosperma carphoides</i>	X		X
Slender Bindweed	<i>Convolvulus angustissimus</i> subsp. <i>omnigracilis</i>	X		X
Slender Dock	<i>Rumex brownii</i>	X	X	X
Variable Willow-herb	<i>Epilobium billardierianum</i>	X	X	X
Matt Spurge	<i>Euphorbia dallachyana</i>	X	X	X
<b>Total Number of species</b>		<b>18</b>	<b>12</b>	<b>19</b>



## 2.2. Adaptive management recommendations

### 2.2.1. Weed control

The overall cover of weeds within the Eastern Reserve exhibited a decrease from 65% in 2018 to 50% currently. It is assumed that this reduction is due to a combination of mosaic burning, which has occurred within the reserve in the last year, and herbicide application.

The following high-threat weeds were identified as being the highest priority for control within the Eastern Reserve:

- Serrated Tussock;
- Chilean Needle-grass;
- Texas Needle-grass;
- Tall Fescue; and
- Cocksfoot (within 'better' areas only).

The cover of Serrated Tussock, Texas Needle-grass and Tall Fescue was similar to that recorded in 2018, while the cover of Chilean Needle-grass had reduced by 60% (currently 4%) and the cover of Cocksfoot had reduced by 25% (currently 15%). Phalaris cover has reduced by 86% (down to 1%). Despite the overall reduction of these weeds, a more concerted effort is required to control them. The most cost-effective means of achieving this would be via more frequent and more intensive spot spraying of herbicide. It is recommended that these weeds are prioritised for control, regardless of where they are located within the reserve, due to the magnitude of the threat they pose to native vegetation.

Other than the above-mentioned high threat grasses, which should be controlled throughout the reserve, weed control efforts should concentrate on the least weedy parts of the reserve, before progressing through to the weediest parts of the reserve. As such, the large swathe of Cocksfoot occupying the western extent of the Eastern Reserve should not be a priority for treatment.

Weed control should occur during times of the year when weeds are actively growing so that treatment is most effective.

Three new weeds have emerged within the reserve, including two high-threat weeds — Bathurst Burr and Yorkshire Fog. The high-threat weeds listed below should be prioritised for control. Due to their ability to quickly colonise, these weeds should be closely monitored and controlled immediately following any works that exposes bare earth as well as following any future burns:

- Yorkshire Fog;
- Bearded Oat;
- Rye-grass;
- Toowoomba Canary-grass;
- Paspalum;
- Spear Thistle;
- Paterson's Curse; and
- Bathurst Burr.

Additionally, several small Sweet Briar plants were observed at the southern extent of the reserve. These should be controlled via the 'cut and paint' method before they become larger, more abundant and harder to control.

### ***2.2.2. Biomass management***

Evidence on site suggests that at least a few patchy biomass management burns were conducted within the Eastern Reserve during 2019.

Further hot (high intensity) burns in areas with high weed cover and cool burns in areas with greater indigenous flora cover are recommended to be undertaken in 2020. This will reduce biomass, most importantly the cover of weeds (including dead/sprayed weeds), as well as facilitate the recruitment of indigenous species.

### ***2.2.3. Revegetation***

Much of the low-lying ephemeral drainage line which divides the south-eastern higher ground from the remainder of the higher ground, known as Management Zone B, almost exclusively supported weeds. The existing management plan prescribes revegetation for Management Zone B although no evidence of revegetation was observed. It is understood that revegetation in this zone did not occur due to the continuing dry conditions and works focussing on biomass reduction and weed control. Revegetation of Management Zone B is not a priority at the current time. The focus should be on weed control in Year 5.

## 3. WESTERN RESERVE

### 3.1. Monitoring results

Table 6 provides an assessment of the extent to which year four management actions set out in the Conservation Management Plan for the Western Reserve have been implemented. This table also references sections of this report which provide adaptive management recommendations. Table 7 details the photo-point locations, Table 8 the biomass cover, Table 9 the weed cover and Table 10 the indigenous species cover.

Key findings are listed below.

- Vegetation biomass has decreased from 96% in December 2018 to 85% currently, though biomass still remains high throughout much of this reserve, especially within the southern third, despite the implementation of biomass control burns.
- Indigenous vegetation cover has decreased from 35% in December 2018 to 25% currently. This change is likely due to the north-ward expansion of weeds from the weed-dominated southern portion of the reserve.
- A total of 18 indigenous flora species were recorded (same as December 2018).
- Weed cover has increased from 60% in December 2018 to 65% currently. This increase is not surprising given the overall high cover of weeds that has consistently been recorded on the site since 2015, the expected increase in weed germination post-fire and the good spring and early summer conditions for plant growth experienced over the last year.
- A total of 30 weed species were recorded (same as December 2018).
- The following weeds increased in cover – Cocksfoot, Tall Fescue, Rye Grass, Toowoomba Canary-grass since December 2018.
- Effective control of high-threat grasses was clearly evident, though these weeds still pose a severe threat to native vegetation in the reserve. The following weeds – Serrated Tussock, Chilean Needle-grass, Texan Needle-grass, Tall Fescue and Cocksfoot – should be prioritised for control within the northern two thirds of the reserve. Targeted control efforts of these weeds should be conducted more frequently and with more intensity than in previous years.
- Woody weed control had been undertaken in the past, but several plants still remain in the southern portion of the reserve, with smaller plants beginning to re-establish along the reserve's southern boundary. Another round of woody weed control is required in the near future to eliminate woody weeds from the reserve and avoid their re-establishment.
- Past revegetation efforts have had limited success. At this stage revegetation is not considered to be worthwhile, as the reserve has much improvement to gain and the focus should be on drastically reducing the presence of high-threat grass weeds in this area.
- Management actions are being implemented and are meeting requirements as per the CMP and OMP. However, management in Year 5 needs to focus on controlling high-threat weeds within the northern two thirds of the Western Reserve via chemical means, and these efforts need to be conducted more frequently and with more intensity.

**Table 6: Western Reserve – Year 4 management actions**

Action	Management action	Responsible entity	Timing of action	Implementation notes and recommendations
3.1	Conduct weed control and implement revegetation plan	Landowner / Bushland Management Contractor	As per Table 2 of CMP	Evidence of weed control was observed within the northern two thirds of the reserve, however very high covers of high threat weeds still remain. Weed control efforts must be conducted more frequently and with more intensity, prioritising the northern two-thirds of the reserve. Weed management approach recommended (see Section 3.2.1).
3.2	Monitor populations of pest animals and conduct control works if required	Landowner / Pest Animal Contractor	Late summer / early autumn	Contractor to continue to monitor for pest animal activity during all site visits.
3.3	Conduct monitoring of all vegetation and Golden Sun Moth habitat	Suitably qualified ecological specialist	Two years after commencement of works	Undertaken in December 2019. No Golden Sun Moth recorded.
3.4	Maintain fences	Landowner/Fencing Contactor	As required	Fences and access gates in good repair.
3.5	Monitor organic litter and biomass density and develop ecological burn or fuel reduction plan if appropriate	Landowner / Bushland Management Contractor	Outside of the GSM active season (October – January)	Monitoring undertaken. Biomass levels remain very high overall. Different biomass management recommended (see Section 3.2.2).
3.6	Monitor and assess works, and prepare progress report	Suitably qualified ecological specialist	Two years after commencement of works	Weed cover remains high. Weed management recommended (see Section 3.2.1).
3.7	Commence supplementary planting within Management Zone B of each reserve	Landowner / Bushland Management Contractor / Local nursery	Early Spring Year 2 – subject to availability of plants and environmental conditions	Undertaken in August 2018. Revegetation not recommended for the reserve during 2020 (see Section 3.2.3).

**Table 7: Western Reserve – Year 3 and Year 4 photos**

Photopoint #	December 2018	December 2019
17		
18		

Photopoint #	December 2018	December 2019
19		
20		

Photopoint #	December 2018	December 2019
21		
23		

Photopoint #	December 2018	December 2019
24		
25		



Photopoint #	December 2018	December 2019
26		
29		

Photopoint #	December 2018	December 2019
32		
33		

Photopoint #	December 2018	December 2019
34		
35		

Photopoint #	December 2018	December 2019
36		
37		

Photopoint #	December 2018	December 2019
38		
39		

**Table 8: Western Reserve – biomass observations since 2015**

Observation	Dec 2015	Dec 2016	Dec 2017	Dec 2018	Dec 2019
Total native vegetation cover (%)	35	50	40	35	25
Total weed cover (%)	50	59	50	60	65
Vegetation related litter cover (%)	-	12	20	15	30
Biomass cover (%)	-	96	94	96	85
Biomass – main height range (m) (min)	-	0.4	0.4	0.4	0.2
Biomass – main height range (m) (max)	-	1.1	1.1	1.3	2

**Table 9: Western Reserve – weed cover observations since 2015**

Common name	Scientific name	High-threat	Projective foliage cover (%)				
			December 2015	December 2016	December 2017	December 2018	December 2019
<b>Weed species</b>							
African Box-thorn	<i>Lycium ferocissimum</i>	X	<1	<1	<1	<1	
Artichoke Thistle	<i>Cynara cardunculus subsp. flavescens</i>	X	<1	<1	<1	<1	<1
Bearded Oat	<i>Avena barbata</i>	X	1	4	3	3	3
Brown-top Bent	<i>Agrostis capillaris</i>		<1		1	2	<1
Chilean Needle-grass	<i>Nassella neesiana</i>	X	5	1	3	3	2
Drain Flat-sedge	<i>Cyperus eragrostis</i>		1	<1	<1	<1	
Flatweed	<i>Hypochaeris radicata</i>		<1	2	1	2	1
Galenia	<i>Galenia pubescens var. pubescens</i>	X	2	<1	1	1	2
Narrow-leaf Clover	<i>Trifolium angustifolium var. angustifolium</i>		1	<1	1	1	<1
Perennial Rye-grass	<i>Lolium perenne</i>	X	5	21	10	8	10
Prairie Grass	<i>Bromus catharticus</i>		<1	2	2	2	2
Prunus	<i>Prunus sp.</i>		<1	<1	<1	<1	<1
Red-flower Mallow	<i>Modiola caroliniana</i>			<1	<1	<1	<1
Ribwort	<i>Plantago lanceolata</i>		<1	1	1	2	1
Serrated Tussock	<i>Nassella trichotoma</i>	X	10	8	5	4	4
Sheep Sorrel	<i>Acetosella vulgaris</i>		2	<1	1	1	<1
Soft Brome	<i>Bromus hordeaceus subsp. hordeaceus</i>		<1	4	3	3	3

Common name	Scientific name	High-threat	Projective foliage cover (%)				
			December 2015	December 2016	December 2017	December 2018	December 2019
Spear Thistle	<i>Cirsium vulgare</i>	X	3	<1	1	1	<1
Sweet Briar	<i>Rosa rubiginosa</i>	X	5	<1	1	1	1
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>	X	1		<1	1	<1
Toowoomba Canary-grass	<i>Phalaris aquatica</i>	X	10		6	7	8
Yorkshire Fog	<i>Holcus lanatus</i>	X	4	3	4	3	
Big Heron's-bill	<i>Erodium botrys</i>		NA	<1	<1	<1	
Cocksfoot	<i>Dactylis glomerata</i>	X	NA	10	10	20	24
Common Peppergrass	<i>Lepidium africanum</i>		NA	<1	<1	1	<1
Curled Dock	<i>Rumex crispus</i>		NA	<1	<1	<1	
Fiddle Dock	<i>Rumex pulcher subsp. pulcher</i>		NA		<1	<1	
Garden Dandelion	<i>Taraxacum officinale spp. agg.</i>		NA	<1	<1	<1	<1
Indian Mustard	<i>Brassica X juncea</i>		NA	<1	<1	<1	<1
Onion Grass	<i>Romulea rosea</i>		NA	1	<1	<1	
Ox-tongue	<i>Helminthotheca echioides</i>		NA	<1	<1	1	<1
Paterson's Curse	<i>Echium plantagineum</i>	X	NA	<1	<1	<1	
Rough Dog's-tail	<i>Cynosurus echinatus</i>		NA	<1	<1	<1	
Rough Sow-thistle	<i>Sonchus asper</i>		NA	<1	1	1	<1
Squirrel-tail Fescue	<i>Vulpia bromoides</i>		NA	9	4	4	4
Tall Fescue	<i>Festuca arundinacea</i>	X	NA	1	1	1	3



Common name	Scientific name	High-threat	Projective foliage cover (%)				
			December 2015	December 2016	December 2017	December 2018	December 2019
Texas Needle-grass	<i>Nassella leucotricha</i>	X	NA	1	1	1	<1
Trefoil	<i>Lotus sp.</i>		NA	1	1	1	
Variegated Thistle	<i>Silybum marianum</i>	X	NA	<1	<1	<1	<1
Fennel	<i>Foeniculum vulgare</i>		NA			<1	<1
Great Brome	<i>Bromus diandrus</i>						<1
Hawthorn	<i>Crataegus monogyna</i>	X					<1
Couch	<i>Cynodon dactylon</i>						<1
<b>Total number of species</b>				<b>35</b>	<b>39</b>	<b>40</b>	<b>33</b>

**Table 10: Western Reserve – Year 4 indigenous flora species**

Common name	Scientific name	Management Zone		Total
		A	B	
Black Sheoak	<i>Allocassuarina littoralis</i>	X		x
Blue Devil	<i>Eryngium ovinum</i>	X	X	X
Bristly Wallaby-grass	<i>Rytidosperma setaceum</i>	X		X
Brown-back Wallaby-grass	<i>Rytidosperma duttonianum</i>	X		X
Common Tussock-grass	<i>Poa labillardierei</i>		X	X
Common Wallaby-grass	<i>Rytidosperma caespitosum</i>	X		X
Common Wheat-grass	<i>Anthosachne scabra</i> s.l.	X	X	X
Fibrous Spear-grass	<i>Austrostipa semibarbata</i>	X	X	X
Fine-head Spear-grass	<i>Austrostipa oligostachya</i>	X		X
Grassland Wood-sorrel	<i>Oxalis perennans</i>	X		X
Grey Tussock-grass	<i>Poa sieberiana</i>	X		X
Kangaroo Grass	<i>Themeda triandra</i>	X	X	X
Knead Spear-grass	<i>Austrostipa bigeniculata</i>	X	X	X
Pale Rush	<i>Juncus pallidus</i>	X	X	X
Purple Coral Pea	<i>Hardenbergia violacea</i>	X		X
River Red-gum	<i>Eucalyptus camaldulensis</i>	X	X	X
Rough Spear-grass	<i>Austrostipa scabra</i>	X	X	X
Rush	<i>Juncus</i> sp.	X		X
Sheep's Burr	<i>Acaena echinata</i>	X		X
Short Wallaby-grass	<i>Rytidosperma carphoides</i>	X		X
Sifton Bush	<i>Cassinia sifton</i>	X		X

Common name	Scientific name	Management Zone		Total
		A	B	
Slender Bindweed	<i>Convolvulus angustissimus</i> subsp. <i>omnigracilis</i>	X		X
Slender Dock	<i>Rumex brownii</i>	X	X	X
Small St John's Wort	<i>Hypericum gramineum</i>	X		X
Spear Grass	<i>Austrostipa</i> sp.		X	X
Supple Spear-grass	<i>Austrostipa mollis</i>	X		X
Variable Willow-herb	<i>Epilobium billardierianum</i>	X	X	X
Weeping Grass	<i>Microlaena stipoides</i> var. <i>stipoides</i>	X		X
Windmill-Grass	<i>Chloris truncate</i>	X		X
Wiry Dock	<i>Rumex dumosus</i>	X		X
<b>Total number of species</b>		<b>28</b>	<b>12</b>	<b>30</b>

## 3.2. Adaptive management recommendations

### 3.2.1. Weed control

The overall cover of weeds within the Western Reserve exhibited an increase from 60% in 2018 to 65% currently. The increase in cover occurred despite clear evidence of patchy burns and chemical weed control.

The increase in weed cover was notably within the northern two thirds of the reserve which supports the most intact native vegetation on the site. It appears that the southern portion of the reserve, which is dominated by high-threat grassy weeds, is expanding north-ward. Increased management action in Year 5 is required to reduce the cover of high-threat weeds within the northern two thirds of the reserve.

The following high-threat weeds were identified as being the highest priority for control within the Western Reserve:

- Serrated Tussock;
- Chilean Needle-grass;
- Texas Needle-grass;
- Tall Fescue; and
- Cocksfoot.

The cover of Serrated Tussock and Chilean Needle-grass Texas Needle-grass was similar to that recorded in 2018 (combined cover of 7%), while the cover of Tall Fescue had increased from 1% to 3% currently, and the cover of Cocksfoot had increased from 20% to 24% currently.

It is recommended that these weeds are prioritised for control within the northern two-thirds of the reserve and at the interface of this area with the southern weed-dominated portion of the reserve. A concerted effort is required in Year 5 to control these weeds and the most cost-effective means of control would be via more frequent and more intensive spot spraying of herbicide.

The spread of Serrated Tussock seed by wind is considered likely to significantly compromise the quality of native vegetation within the reserve if this species is not efficaciously controlled. It is imperative that the correct formula of herbicide is used and that each individual plant is thoroughly saturated with herbicide. Care must be taken to avoid off-target damage to indigenous flora, as well as any native fauna that may co-occur in the vicinity.

The additional high-threat weeds listed below should be prioritised for control within the northern two-thirds of the reserve, following effective control of the above-mentioned high-threat grass weeds. Due to their ability to quickly colonise, these weeds should be closely monitored and controlled immediately following any works that exposes bare earth as well as following any future burns:

- Bearded Oat;
- Rye-grass;
- Toowoomba Canary-grass;
- Paspalum;

- Spear Thistle; and
- Artichoke Thistle.

Once clear progress has been made controlling high-threat weeds in the northern two-thirds of the reserve, the following weeds concentrated within the southern portion of the reserve should be prioritised for control:

- Sweet Briar;
- Hawthorn;
- Plum; and
- Fennel.

It is recommended that the amount of weed control works undertaken in the northern two-thirds of the Western Reserve (and its effectiveness) needs to increase in Year 5.

### **3.2.2. Biomass management**

Biomass-management burnings took place in the northern two-thirds of the reserve in 2019, though by December 2019 overall weed cover had increased from 60% to 65% across the entire reserve. The overall cover of *Nassella* species has remained near previous year levels and the biomass (including dead plant material) cover remains very high. The low-lying southern portion of the reserve still supports extremely high weed cover. This area is dominated by Cocksfoot with high covers of Chilean Needle-grass, Texas Needle-grass and Toowoomba Canary-grass. Only a very small amount of scattered indigenous flora has been observed in this area (e.g. wallaby grasses, Weeping Grass and Bidgee-widgee).

It is recommended that biomass reduction by controlled burn within the northern two-thirds of the Western Reserve be again considered. Effective chemical control of high-threat grass infestations must follow any burn.

At this stage, the extremely weedy southern portion of the reserve is not recommended for biomass reduction. This may be considered only when the remaining northern portion of the reserve has been markedly restored.

### **3.2.3. Revegetation**

Revegetation conducted to date has had mixed success. Overall, only approximately 50% of plants have survived. This lower than expected survival rate is likely to be due to the generally very dry conditions.

The southern portion of the reserve includes low-lying, wetter ground, and almost exclusively supports weeds. There is no point attempting to restore the southern portion when the northern two-thirds of the reserve has much improvement to gain.

Revegetation within the northern two thirds of the reserve is also not recommended, as the focus should be on drastically reducing the presence of high-threat grass weeds in this area.

Revegetation in the form of direct seeding may be a viable option for the reserve in the future.

## 4. REFERENCES

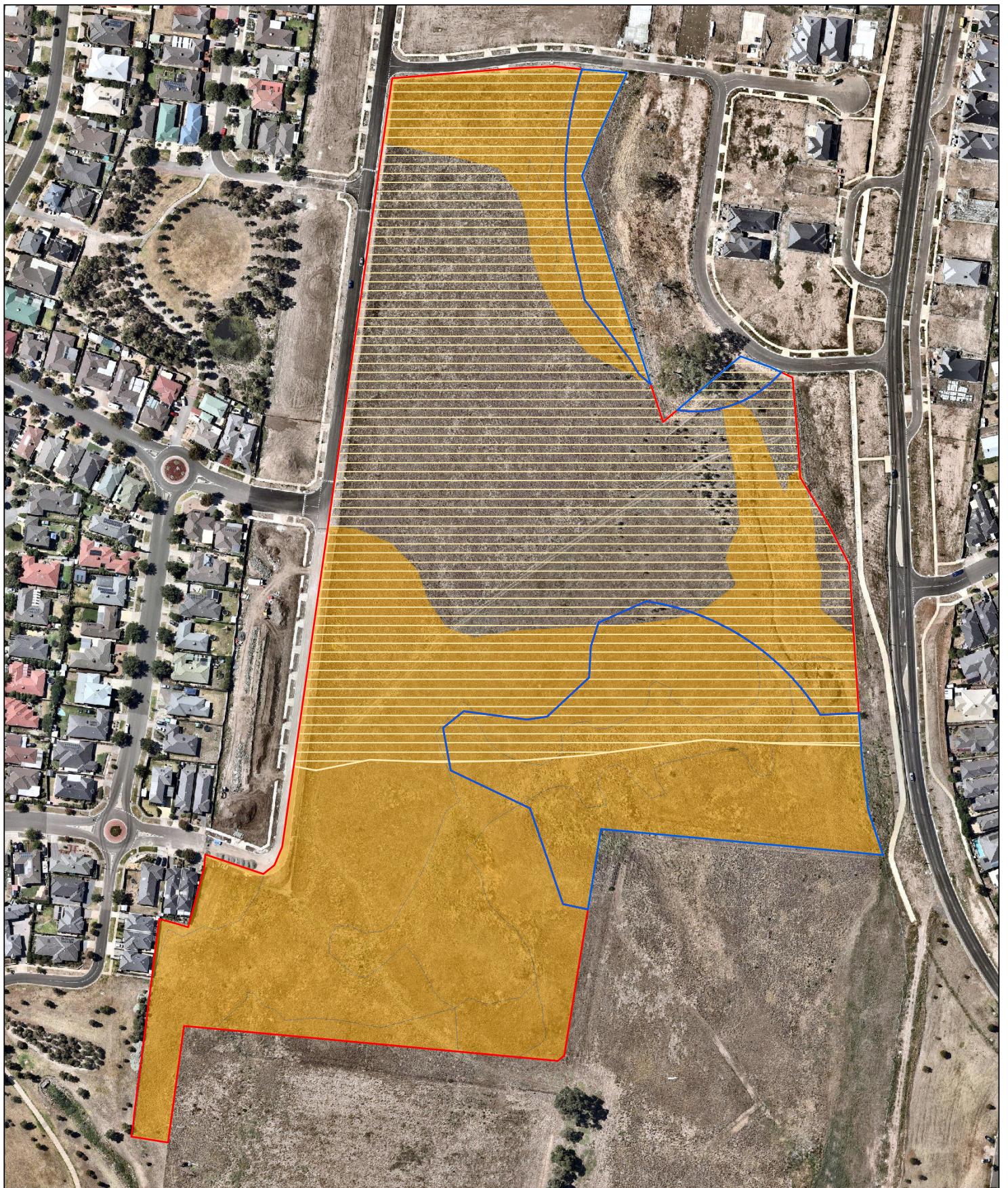
Brett Lane & Associates (BL&A) 2017, Rosenthal Estate Conservation Management Plan Year 1 Monitoring - Report No. 15148 (2.0), Brett Lane & Associates Pty Ltd, Hawthorn East, consultant report prepared for Urban Design & Management Pty Ltd.

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Ecology and Heritage Partners (EHP) 2015a, Conservation Management Plan: Rosenthal Estate, 100 Vineyard Road, Sunbury, Victoria, Consultant report for Urban Design and Management Pty. Ltd.

Ecology and Heritage Partners (EHP) 2015b, Offset Management Plan: Rosenthal Estate, 100 Vineyard Road, Sunbury, Victoria, Consultant report for Urban Design and Management Pty. Ltd.


[Appendix 1: Western Reserve – weed and biomass management area](#)



**Appendix 1: Proposed 2020 weed and biomass management for Western Reserve**

**Project:** 100 Vineyard Road, Sunbury **Client:** TF and A Millett **Date:** 23/01/2020

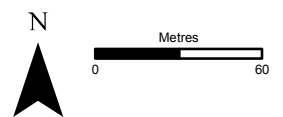
 Prioritise for weed control and biomass management

 Weedy areas

**Management zones**

 A

 B



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Appendix 2: Progress against management actions listed in Table 13 of the Offset Management Plan (EHP 2015b)

Year	Action	Management action	Responsible authority / personnel	Timing of action	Report reference	Date completed	
		biomass reduction plan if appropriate					
3	3.6	Continue supplementary planting within Management Zone B of each reserve	Landowner/Bushland Contractor	Management	Early Spring Year 3 – subject to availability of plants and environmental conditions	Section 3.2.5	—
4	4.1	Conduct weed control and continue revegetation plan	Landowner/Bushland Contractor	Management	Refer to Table 2	Section 3.2.4	DECEMBER 2019
4	4.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	Management	After peak breeding season - late summer/early autumn	Section 3.2.6	NOT RECALLED
4	4.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Management	Four years after commencement of works	Section 3.3.1	DECEMBER 2019
4	4.4	Maintain fences	Landowner/Fencing Contractor	Management	As required	Section 3.2.2	DEC. 2019
4	4.5	Monitor organic litter and grass density and enact ecological burn or other biomass reduction plan if appropriate	Landowner/Bushland Contractor/CFA	Management	Outside of the GSM active season	Section 3.2.3	BURNT MAY 2019
4	4.6	Assess success of supplementary planting efforts within Management Zone B of each reserve	Landowner/Bushland Contractor	Management	End of Year 4	Section 3.2.5	DECEMBER 2019
5	5.1	Conduct weed control and continue revegetation plan	Landowner/Bushland Contractor	Management	Refer to Table 2	Section 3.2.4	—
5	5.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	Management	After peak breeding season - late summer/early autumn	Section 3.2.6	—
5	5.3	Conduct monitoring for vegetation	Suitably qualified ecological specialist	Management	Five years after commencement of works	Section 3.3.1	—
5	5.4	Maintain fences	Landowner/Fencing Contractor	Management	As required	Section 3.2.2	—
5	5.5	Monitor organic litter and grass density and enact ecological burn or other biomass	Landowner/Bushland Contractor/CFA	Management	Outside of the GSM active season	Section 3.2.3	—