



Rosenthal Estate, Sunbury

Conservation Management Plan Implementation

Year 5 Monitoring

Prepared for
TF & A Millett
C/- Urban Design and Management P/L

April 2021
Report 15148 (10.1)



**Nature
Advisory**

(Formerly Brett Lane & Associates Pty Ltd)

5/61-63 Camberwell Road
Hawthorn East, VIC 3123
PO Box 337, Camberwell VIC 3124

(03) 9815 2111

www.natureadvisory.com.au

Contents

1. INTRODUCTION, METHODS AND SUMMARY	1
2. EASTERN RESERVE	3
2.1. Monitoring results	3
2.2. Adaptive management recommendations	15
2.2.1. Weed control	15
2.2.2. Biomass management	16
2.2.3. Revegetation	16
3. WESTERN RESERVE	17
3.1. Monitoring results	17
3.2. Adaptive management recommendations	35
3.2.1. Weed control	35
3.2.2. Biomass management	36
3.2.3. Revegetation	36
4. REFERENCES.....	37

Tables

Table 1: Eastern Reserve – Year 5 management actions	4
Table 2: Eastern Reserve – Year 4 and Year 5 photos	5
Table 3: Eastern Reserve – biomass observations since December 2015	10
Table 4: Eastern Reserve – weed cover observations since 2015	11
Table 5: Eastern Reserve – Year 5 indigenous flora species	14
Table 6: Western Reserve – Year 5 management actions	19
Table 7: Western Reserve – Year 4 and Year 5 photos	20
Table 8: Western Reserve – biomass observations since 2015.....	29
Table 9: Western Reserve – weed cover observations since 2015	30
Table 10: Western Reserve – Year 5 indigenous flora species	33

Appendices

Appendix 1: Western Reserve – weed and biomass management area	38
Appendix 2: Progress against management actions listed in Table 13 of the Offset Management Plan (EHP 2015b).....	39

1. INTRODUCTION, METHODS AND SUMMARY

T.F. & A. Millett, C/- Urban Design and Management Pty Ltd engaged Nature Advisory Pty Ltd 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 the 5th January 2021 to:

- Assess the extent to which the year five 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 present 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 particularly indigenous, and also introduced, species diversity and cover.

A summary of the current monitoring results is provided below.

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

Implementation of the CMP over the five-year monitoring period 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;
- A lengthy period of dry conditions that limited the ability to revegetate area; and
- A wet year which has favoured weed growth.

Monitoring has been impacted by the following factors:

- The mass germination of annual low threat weed species due to recent heavy rainfall events. This has the effect of increasing both weed cover and biomass.

Future management actions should focus on the following:

- Eastern Reserve

- Prioritise chemical control of noted high-threat weeds within the least weedy parts of the reserve, before progressing works into the weediest parts of the reserve.
 - If possible, burn the majority of the site in Autumn 2021. This must be followed by close monitoring of weeds and ongoing weed control. Direct seeding of indigenous grasses is recommended within the southern low-lying section of the reserve following the burn followed by at least one round of weed control.
- 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.
 - If possible, burn the majority of the northern two thirds of the site in Autumn 2021. This must be followed by close monitoring of weeds and ongoing weed control.

The actions implemented to date are in accordance with the CMP and OMP. These actions are progressing towards meeting the requirements of both the CMP and OMP for the Eastern Reserve, though currently the Western Reserve has much further improvement to gain before these requirements can be considered as met.

This investigation was undertaken by a team from Nature Advisory comprising Verity Fyfe (Senior Ecologist) 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 five 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 comparisons, Table 3 the biomass cover, Table 4 the weed cover and Table 5 the indigenous species cover.

Key findings are listed below.

- Vegetation biomass has increased from 75% in December 2019 to 85% currently. Biomass cover is especially high within the western half of the Eastern Reserve and the low-lying central part.
- No evidence that biomass control was conducted during year five was readily observed. *If possible, it is recommended that the entire site is burnt in Autumn 2021.* The burn should be hot enough to reduce biomass to soil level, thereby killing weeds and promoting the growth of indigenous species. Patchy burns conducted in 2018 are likely to have been too cool and small in extent to achieve the desired outcomes.
- Indigenous vegetation cover remains the same as for December 2018 and December 2019 (30%), despite observed evidence of chemical weed control.
- A total of 18 indigenous flora species were recorded (same as December 2019).
- Weed cover has increased from 50% in December 2019 to 55% currently. This change is likely partially due to high rainfall during 2020 which has favoured weed growth. Weed cover remains too high, with notable increases in the cover of high threat weeds such as Chilean Needle-grass, Prairie Grass and Spear Thistle. *Weed control efforts focussing on high threat weeds must be increased, though the priority should be to burn the site in Autumn 2021.*
- A total of 43 weed species were recorded (8 more than in December 2019).
- 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, Cocksfoot, Prairie Grass and Paspalum – should be prioritised for control. *Targeted control efforts of high-threat grasses must be conducted more frequently and with more intensity in 2021 and beyond than in previous years.*
- Evidence of past woody weed control was observed, though several Blackberry plants were observed to have re-sprouted 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.*
- No pest animal activity was observed.
- The actions being implemented are meeting the requirements of both the CMP and OMP.

Table 1: Eastern Reserve – Year 5 management actions

Action	Management action	Responsible entity	Timing of action	Implementation notes and recommendations
5.1	Conduct weed control	Landowner/Bushland Management Contractor	As per Table 2 of CMP	Evidence of weed control was observed throughout the reserve, however disappointingly high covers of high threat weeds still remain. Weed control efforts must be conducted more frequently and with more intensity in 2021. Weed management approach recommended (see Section 2.2.1).
5.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	Late summer/early autumn	Pest animals appear to be well controlled. Continue to monitor for pest animal activity during all site visits and undertake control works if activity is recorded
5.3	Maintain fences	Landowner/Fencing Contactor	As required	Fences and access gates maintained in good repair.
5.4	Monitor organic litter and biomass density and develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	Outside of the GSM active season (October – January)	Monitoring undertaken. Further biomass reduction management recommended (see Section 2.2.2).
5.5	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).
5.6	Continue 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. Direct seeding following a prescribed burn remains an option for 2021.

Table 2: Eastern Reserve – Year 4 and Year 5 photos

Photo-point #	December 2019	January 2021
1		
2		

Photo-point #	December 2019	January 2021
3		
4		

Photo-point #	December 2019	January 2021
5		
6		

Photo-point #	December 2019	January 2021
7	 A photograph showing a grassy hillside in December 2019. The grass is mostly dry and yellowish-brown, with some green patches. The sky is blue with some light clouds.	 A photograph showing a grassy hillside in January 2021. The grass is mostly dry and yellowish-brown, with some green patches. A large, dark, rectangular object is visible in the foreground.
8	 A photograph showing a grassy hillside in December 2019. The grass is mostly dry and yellowish-brown, with some green patches. The sky is overcast.	 A photograph showing a grassy hillside in January 2021. The grass is mostly dry and yellowish-brown, with some green patches. The sky is overcast.

Photo-point #	December 2019	January 2021
9		

Table 3: Eastern Reserve – biomass observations since December 2015

Estimate	Dec 2015	Dec 2016	Dec 2017	Dec 2018	Dec 2019	Jan 2021
Total native vegetation cover (%)	40	32	32	30	30	30
Total weed cover (%)	45	74	60	65	50	55
Litter (dead vegetation) cover (%)	-	27	40	35	30	40
Biomass cover (%)	-	99	95	95	75	85
Biomass – minimum average height (m)	-	0.3	0.3	0.3	0	0.2
Biomass – maximum average height (m)	-	1.2	1.2	1.2	1.2	1.5

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	January 2021
Weed species								
African Box-thorn	<i>Lycium ferocissimum</i>	X	<1			1	<1	<1
Artichoke Thistle	<i>Cynara cardunculus</i>	X	<1			<1		<1
Bearded Oat	<i>Avena barbata</i>	X	1	6	2	5	5	5
Blackberry	<i>Rubus fruticosus</i> spp. agg.	X	2	<1	<1	1	1	1
Brown-top Bent	<i>Agrostis capillaris</i>		1		1	1		<1
Chilean Needle-grass	<i>Nassella neesiana</i>	X	1	1	4	10	4	6
Flatweed	<i>Hypochaeris radicata</i>		1	1	1	2	<1	2
Perennial Rye-grass	<i>Lolium perenne</i>		10	22	15	10	10	5
Prairie Grass	<i>Bromus catharticus</i>		<1	1	3	3	1	3
Ribwort	<i>Plantago lanceolata</i>		2	<1	3	5	2	3
Serrated Tussock	<i>Nassella trichotoma</i>	X	10	13	3	4	4	2
Sheep Sorrel	<i>Acetocella vulgaris</i>		2		2	2	1	1
Soft Brome	<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>		<1	2	1	1	1	1
Spear Thistle	<i>Cirsium vulgare</i>	X	1	<1		1		1
Sweet Briar	<i>Rosa rubiginosa</i>	X	1		1	1	1	<1
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>	X	1			<1		<1

Common name	Scientific name	High-threat	Projective foliage cover (%)					
			December 2015	December 2016	December 2017	December 2018	December 2019	January 2021
Tall Mallow	<i>Malva sylvestris</i>		<1	<1	<1		<1	<1
Toowoomba Canary-grass	<i>Phalaris aquatica</i>	X	10	1	1	7	1	1
Barley Grass	<i>Hordeum sp.</i>		NA	<1	<1	<1	<1	<1
Cape Weed	<i>Arctotheca calendula</i>		NA	<1				
Clustered Dock	<i>Rumex conglomeratus</i>		NA	<1	<1	<1		<1
Cocksfoot	<i>Dactylis glomerata</i>	X	NA	16	20	20	15	15
Common Peppergrass	<i>Lepidium africanum</i>		NA	<1	<1	<1	<1	<1
Common Sow-thistle	<i>Sonchus oleraceus</i>		NA	<1	3	3	<1	<1
Curled Dock	<i>Rumex crispus</i>		NA	<1	<1	<1		<1
Hogweed	<i>Polygonum aviculare</i>		NA	<1	<1	<1	<1	<1
Hop Clover	<i>Trifolium campestre</i> var. <i>campestre</i>		NA	<1	<1	<1	<1	<1
Indian Mustard	<i>Brassica X juncea</i>		NA	<1	<1	1	1	2
Medic	<i>Medicago sp.</i>		NA	<1	<1			<1
Narrow-leaf Clover	<i>Trifolium angustifolium</i> var. <i>angustifolium</i>		NA	<1	<1	<1	<1	<1
Onion Grass	<i>Romulea rosea</i>		NA	<1	<1	<1	<1	<1
Ox-tongue	<i>Helminthotheca echioides</i>		NA	<1	<1	1	<1	3
Panic Veldt-grass	<i>Ehrharta erecta</i> var. <i>erecta</i>	X	NA	<1	<1	<1		<1
Paspalum	<i>Paspalum dilatatum</i>	X	NA		1	2	1	1

Common name	Scientific name	High-threat	Projective foliage cover (%)					
			December 2015	December 2016	December 2017	December 2018	December 2019	January 2021
Paterson's Curse	<i>Echium plantagineum</i>	X	NA			<1	1	<1
Prickly lettuce	<i>Lactuca serriola</i>		NA	<1	1	1	<1	<1
Red-flower Mallow	<i>Modiola caroliniana</i>		NA	<1	2		<1	<1
Rough Dog's-tail	<i>Cynosurus echinatus</i>		NA	2	2	1	2	<1
Squirrel-tail Fescue	<i>Vulpia bromoides</i>		NA	2	2	1	1	1
Tall Fescue	<i>Festuca arundinacea</i>	X	NA	<1	<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		<1
Bathurst Burr	<i>Xanthium spinosum</i>	X					<1	<1
Yorkshire Fog	<i>Holcus lanatus</i>	X					<1	<1
Great Brome	<i>Bromus diandrus</i>						<1	<1
Total number of species			45	33	35	38	35	43

Table 5: Eastern Reserve – Year 5 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
Total Number of species		18	12	19

2.2. Adaptive management recommendations for Eastern Reserve

2.2.1. Weed control

The overall cover of weeds within the Eastern Reserve exhibited an increase from 50% in 2019 to 55% currently. While evidence of weed control (particularly of high threat grasses) was observed during the current assessment, efforts to control weeds at the site during year five have not been as successful as anticipated in reducing the cover of weeds. The observed increase in weed cover is likely partially due to the high level of rainfall received during the last twelve months which has favoured weed growth.

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

- Serrated Tussock;
- Chilean Needle-grass;
- Tall Fescue;
- Texan Needle-grass;
- Cocksfoot;
- Paspalum;
- Toowoomba Canary-grass;
- Prairie Grass;
- Spear Thistle; and
- Blackberry.

The cover of Tall Fescue, Cocksfoot, Paspalum, Toowoomba Canary-grass and Blackberry was similar to that recorded in 2019, while the cover of the remaining above-listed weeds has increased, with the exception of Serrated Tussock (many dead tussocks were observed) which has decreased by approximately 50%. Chilean Needle-grass had increased from four to six percent, Prairie Grass from one to five percent, and Spear Thistle from zero to one percent.

Despite the reduction of some weeds (notably Serrated Tussock) a more concerted effort is required to control high threat weeds on the site. The most cost-effective means of controlling these weeds would be via more frequent and more intensive spot spraying of herbicide, though hand weeding is strongly recommended in areas supporting high covers of indigenous species to avoid off-target damage.

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 swathes of Cocksfoot and Prairie Grass occupying the western and lower parts of the 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.

A prescribed burn is recommended to be conducted in Autumn 2021 in order to kill weeds, reduce biomass levels, increase access to weeds and enable more effective weed control. It is recommended that the majority of the eastern reserve is burnt.

2.2.2. Biomass management

No observable evidence of biomass management was observed during the current assessment, despite recommendations to burn the site. The contractor (Brad Spear of EnviroVic2000 Pty Ltd) indicated that Hume City Council were keen to see Wurundjeri people involved in any burn. Unfortunately, this could not be organised in the timeframe suitable for a burn to occur.

It is recommended that the majority of the reserve is burnt in Autumn 2021 to reduce biomass (including dead weeds), kill weeds and facilitate the recruitment of indigenous species. Once biomass cover is reduced, it will be much easier to control weeds at the site as they emerge. Great care must be taken to ensure that any emerging indigenous plants are not wrongfully targeted during this time when plants can be easily mis-identified.

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 any recent attempts at revegetation was observed. Revegetation of Management Zone B is not a priority at the current time. The focus should be on the prescribed burn in Autumn 2021 followed up by timely weed control. Once this has been achieved, direct seeding of indigenous grasses throughout this burnt area is recommended.

3. WESTERN RESERVE

3.1. Monitoring results

Table 6 provides an assessment of the extent to which year five 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 comparisons, 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 increased from 85% in December 2019 to 95% currently, despite evidence of weed control and one small un-controlled (vandal) burn in the southern low-lying portion of the reserve. *If possible, it is recommended that the majority of the northern two thirds of the site is burnt in Autumn 2021.* The burn should be hot enough to reduce biomass to soil level, thereby killing weeds and promoting the growth of indigenous species.
- Indigenous vegetation cover is similar to December 2019 – approximately 25% (Note that very high grassy biomass present 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 particularly indigenous, and also introduced, species diversity and cover).
- A total of 18 indigenous flora species were recorded (same as December 2019).
- Weed cover has increased from 65% in December 2019 to 70% currently. This increase is not surprising given the overall high cover of weeds that has consistently been recorded on the site since 2015 and the excellent conditions for weed growth experienced during the last twelve months.
- A total of 41 weed species were recorded (up from 33 in December 2019).
- The following weeds increased in cover – Cocksfoot, Tall Fescue, Chilean Needle-grass, Prairie Grass, Ribwort, Ox-tongue, Flatweed, Indian Mustard, Fennel and Spear Thistle – since December 2019.
- 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 high threat weeds should be conducted more frequently and with more intensity than in previous years* (although it is noted that control of Serrated Tussock has been successful).
- Clear evidence of woody weed control was observed. However, some plants still remain in the southern portion of the reserve. *Ongoing 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.
- No pest animal activity was observed.
- There is no doubt that required management actions are being implemented. Management actions need to focus on controlling high-threat weeds within the northern two thirds of the

Western Reserve via chemical means. These efforts need to be conducted more frequently and with more intensity. A prescribed burn within the northern two thirds of the site in Autumn 2021 followed by close monitoring of weeds and ongoing weed control would greatly assist with effectively controlling weeds at the site.

Table 6: Western Reserve – Year 5 management actions

Action	Management action	Responsible entity	Timing of action	Implementation notes and recommendations
5.1	Conduct weed control	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 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).
5.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	Late summer/early autumn	Continue to monitor for pest animal activity during all site visits. undertake control works, if needed.
5.4	Maintain fences	Landowner/Fencing Contactor	As required	Fences and access gates are in good repair.
5.5	Monitor organic litter and biomass density and develop ecological burn or fuel reduction plan if appropriate	Landowner/Bushland Management Contractor/CFA	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).
5.6	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).
5.7	Continue 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 2021 (see Section 3.2.3).

Table 7: Western Reserve – Year 4 and Year 5 photos

Photopoint #	December 2019	January 2021
17		
18		<p data-bbox="1563 1034 1715 1061">Not available</p>

Photopoint #	December 2019	January 2021
19		
20		

Photopoint #	December 2019	January 2021
21		
23		

Photopoint #	December 2019	January 2021
24		
25		

Photopoint #	December 2019	January 2021
26		
29		

Photopoint #	December 2019	January 2021
32		
33		

Photopoint #	December 2019	January 2021
34		
35		

Photopoint #	December 2019	January 2021
36		
37		

Photopoint #	December 2019	January 2021
38		
39		

Table 8: Western Reserve – biomass observations since 2015

Observation	Dec 2015	Dec 2016	Dec 2017	Dec 2018	Dec 2019	Jan 2021
Total native vegetation cover (%)	35	50	40	35	25	25
Total weed cover (%)	50	59	50	60	65	70
Litter (dead vegetation) cover (%)	-	12	20	15	30	40
Biomass cover (%)	-	96	94	96	85	95
Biomass – minimum average height (m)	-	0.4	0.4	0.4	0.2	0.1
Biomass – maximum average height (m)	-	1.1	1.1	1.3	2.0	2.0

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	January 2021
Weed species								
African Box-thorn	<i>Lycium ferocissimum</i>	X	<1	<1	<1	<1		<1
Artichoke Thistle	<i>Cynara cardunculus subsp. flavescens</i>	X	<1	<1	<1	<1	<1	<1
Bearded Oat	<i>Avena barbata</i>	X	1	4	3	3	3	3
Brown-top Bent	<i>Agrostis capillaris</i>		<1		1	2	<1	<1
Chilean Needle-grass	<i>Nassella neesiana</i>	X	5	1	3	3	2	5
Drain Flat-sedge	<i>Cyperus eragrostis</i>		1	<1	<1	<1		<1
Flatweed	<i>Hypochaeris radicata</i>		<1	2	1	2	1	2
Galenia	<i>Galenia pubescens var. pubescens</i>	X	2	<1	1	1	2	2
Narrow-leaf Clover	<i>Trifolium angustifolium var. angustifolium</i>		1	<1	1	1	<1	<1
Perennial Rye-grass	<i>Lolium perenne</i>	X	5	21	10	8	10	8
Prairie Grass	<i>Bromus catharticus</i>		<1	2	2	2	2	3
Prunus	<i>Prunus sp.</i>		<1	<1	<1	<1	<1	<1
Red-flower Mallow	<i>Modiola caroliniana</i>			<1	<1	<1	<1	<1
Ribwort	<i>Plantago lanceolata</i>		<1	1	1	2	1	2
Serrated Tussock	<i>Nassella trichotoma</i>	X	10	8	5	4	4	2
Sheep Sorrel	<i>Acetosella vulgaris</i>		2	<1	1	1	<1	<1
Soft Brome	<i>Bromus hordeaceus subsp. hordeaceus</i>		<1	4	3	3	3	2
Spear Thistle	<i>Cirsium vulgare</i>	X	3	<1	1	1	<1	1

Common name	Scientific name	High-threat	Projective foliage cover (%)					
			December 2015	December 2016	December 2017	December 2018	December 2019	January 2021
Sweet Briar	<i>Rosa rubiginosa</i>	X	5	<1	1	1	1	<1
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>	X	1		<1	1	<1	<1
Toowoomba Canary-grass	<i>Phalaris aquatica</i>	X	10		6	7	8	8
Yorkshire Fog	<i>Holcus lanatus</i>	X	4	3	4	3		1
Big Heron's-bill	<i>Erodium botrys</i>		NA	<1	<1	<1		
Cocksfoot	<i>Dactylis glomerata</i>	X	NA	10	10	20	24	26
Common Peppercross	<i>Lepidium africanum</i>		NA	<1	<1	1	<1	<1
Curled Dock	<i>Rumex crispus</i>		NA	<1	<1	<1		<1
Fiddle Dock	<i>Rumex pulcher subsp. pulcher</i>		NA		<1	<1		<1
Garden Dandelion	<i>Taraxacum officinale spp. agg.</i>		NA	<1	<1	<1	<1	<1
Indian Mustard	<i>Brassica X juncea</i>		NA	<1	<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	2
Paterson's Curse	<i>Echium plantagineum</i>	X	NA	<1	<1	<1		<1
Rough Dog's-tail	<i>Cynosurus echinatus</i>		NA	<1	<1	<1		<1
Rough Sow-thistle	<i>Sonchus asper</i>		NA	<1	1	1	<1	<1
Squirrel-tail Fescue	<i>Vulpia bromoides</i>		NA	9	4	4	4	3
Tall Fescue	<i>Festuca arundinacea</i>	X	NA	1	1	1	3	4

Common name	Scientific name	High-threat	Projective foliage cover (%)					
			December 2015	December 2016	December 2017	December 2018	December 2019	January 2021
Texas Needle-grass	<i>Nassella leucotricha</i>	X	NA	1	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	<1
Fennel	<i>Foeniculum vulgare</i>		NA			<1	<1	1
Great Brome	<i>Bromus diandrus</i>						<1	1
Hawthorn	<i>Crataegus monogyna</i>	X					<1	<1
Couch	<i>Cynodon dactylon</i>						<1	<1
Total number of species				35	39	40	33	41

Table 10: Western Reserve – Year 5 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
Kneed 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
Slender Bindweed	<i>Convolvulus angustissimus</i> subsp. <i>omnigracilis</i>	X		X

Common name	Scientific name	Management Zone		Total
		A	B	
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
Total number of species		28	12	30

3.2. Adaptive management recommendations

3.2.1. Weed control

The overall cover of weeds within the Western Reserve exhibited an increase from 65% in December 2019 to 70% currently. The increase in cover occurred despite evidence of a small un-controlled (vandal) burn in the southern low-lying portion of the reserve and chemical weed control.

The increase in weed cover was observed throughout the reserve but was most obvious within the northern two thirds of the reserve which supports the most intact area of 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. Urgent action is required to reduce the cover of high-threat weeds within the northern two thirds of the reserve if native vegetation is going to be maintained and improved on the site.

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.

Chilean Needle-grass cover increased from two to five percent, Cocksfoot cover increased from 24% to 26%, and Tall Fescue cover increased from three to four percent. The cover of Serrated Tussock decreased from four to two percent, while no notable change in the cover of Texas Needle-grass was observed.

It is recommended that these high-threat weeds are prioritised for control within the northern two-thirds of the reserve and at the interface of this area and the southern weed-dominated portion of the reserve. A more concerted effort is required 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 additional high-threat weeds listed below should also 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 low levels of woody weeds (concentrated within the southern portion of the reserve) should be prioritised for control and elimination.

The amount of weed control works undertaken in the northern two-thirds of the Western Reserve and its effectiveness needs to increase in 2021.

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, and now it sits higher still at 70%. 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 another prescribed burn is conducted within the northern two-thirds of the reserve in Autumn 2021. The burn should cover the majority of this area and be closely monitored for the need to control weeds and weeds treated accordingly.

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 following the planting events.

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.

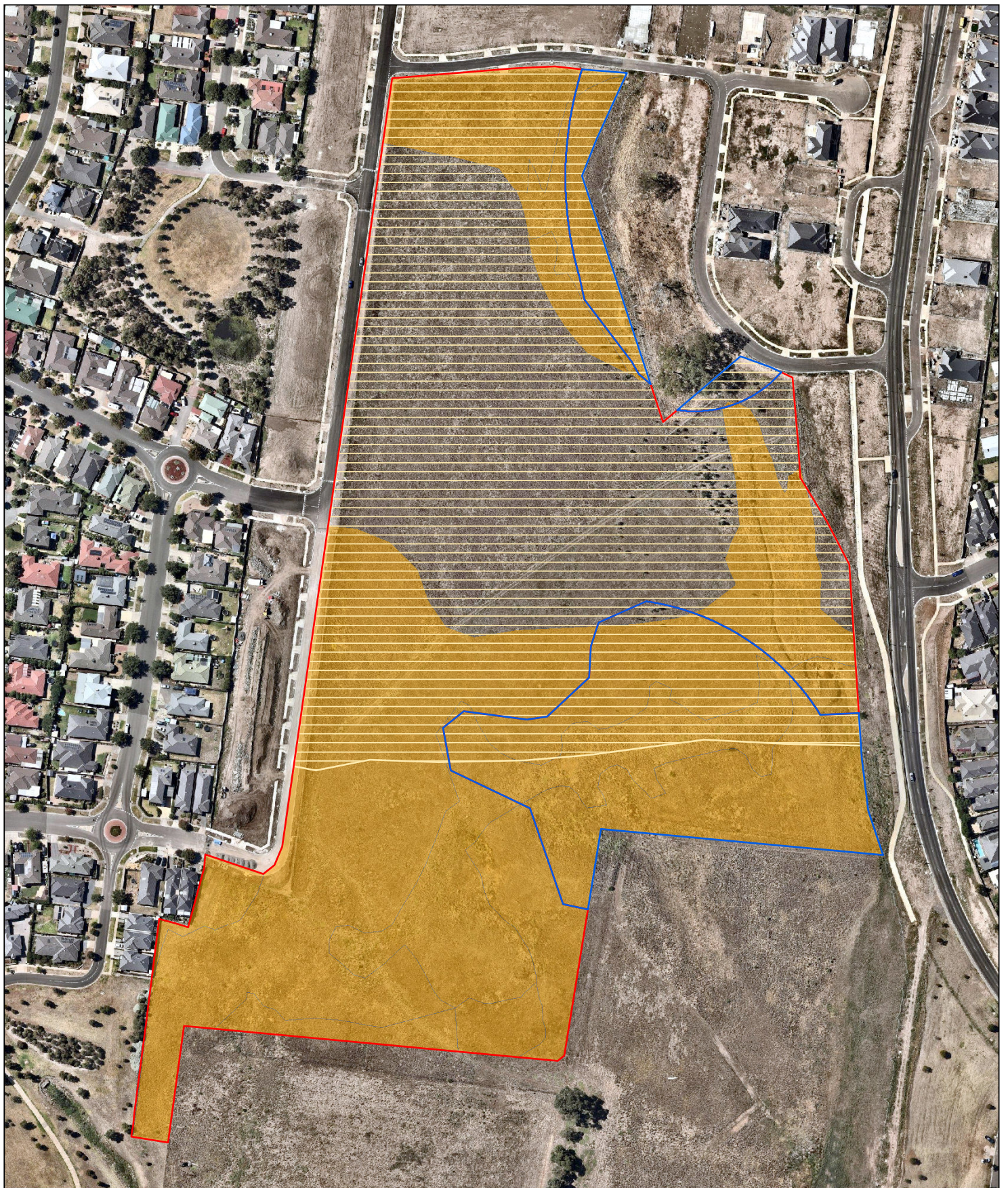
Revegetation within the northern two thirds of the reserve is also not recommended, as the focus should be on drastically reducing the presence of high-threat grass weeds in this area.

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 (2.1), Brett Lane & Associates Pty Ltd, Hawthorn East, consultant report prepared for Urban Design & Management Pty Ltd.
- Brett Lane & Associates (BL&A) 2018, Rosenthal Estate Conservation Management Plan Year 2 Monitoring - Report No. 15148 (4.1), Brett Lane & Associates Pty Ltd, Hawthorn East, consultant report prepared for Urban Design & Management Pty Ltd.
- Brett Lane & Associates (BL&A) 2019, Rosenthal Estate Conservation Management Plan Year 3 Monitoring - Report No. 15148 (7.2), Brett Lane & Associates Pty Ltd, Hawthorn East, consultant report prepared for Urban Design & Management Pty Ltd.
- Nature Advisory 2020, Rosenthal Estate Conservation Management Plan Year 4 Monitoring - Report No. 15148 (9.0), Nature Advisory Pty Ltd, Hawthorn East, consultant report prepared for Urban Design & Management Pty Ltd.
- 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.
- Muyt, A 2001, Bush invaders of south-east Australia: a guide to the identification and control of environmental weeds found in south-east Australia, RG & FJ Richardson, Meredith.

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

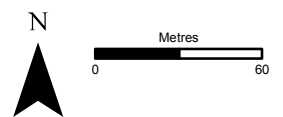
Light yellow box: Prioritise for weed control and biomass management

Yellow box: Weedy areas

Management zones

Red box: A

Blue box: B



PO Box 337, Camberwell, VIC 3124, Australia
www.natureadvisory.com.au
 03 9815 2111 - info@natureadvisory.com.au

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

YEAR 5 2020

Year	Action	Management action	Responsible authority / personnel	Timing of action	Date completed
4	4.5	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Contractor/CFA	Management Summer/Autumn	—
4	4.6	Assess success of supplementary planting efforts within Management Zone B of in-situ reserves	Landowner/Bushland Contractor	Management End of year 4	—
4	4.7	Monitor and assess works, and prepare progress report for ex-situ Warrambeen offset	Suitably qualified ecological specialist	Four years after commencement of OMP for ex-situ Warrambeen offset	—
5	5.1	Conduct weed control	Landowner/Bushland Contractor	Species dependent	DEC 2020
5	5.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	DEC 2020
5	5.3	Maintain fences	Landowner/Fencing Contractor	As required	NOT REQUIRED
5	5.4	Monitor biomass density and implement stock grazing regime or develop ecological burn/ fuel reduction plan if appropriate	Landowner/Bushland Contractor/CFA	Management Summer/Autumn	SOME SLIGHTLY UNDERWAY
5	5.5	Monitor and assess works, and prepare progress report for in-situ Rosenthal offsets	Suitably qualified ecological specialist	Five years after commencement of OMP for in-situ Rosenthal offset sites	FEB 2021
5	5.6	Continue supplementary planting within Management Zone B of in-situ reserves	Landowner/Bushland Contractor	Early Spring Year 5 - subject to availability of plants and environmental conditions	HELP OVER
6	6.1	Conduct weed control	Landowner/Bushland Contractor	Species dependent	CONDITIONS NOT RIGHT
6	6.2	Monitor populations of pest animals and conduct control works if required	Landowner/Pest Animal Contractor	After peak breeding season - late summer/early autumn	—
6	6.3	Conduct monitoring for vegetation and Golden Sun Moth	Suitably qualified ecological specialist	Six years after commencement of OMP	—
6	6.4	Maintain fences	Landowner/Fencing Contractor	As required	—

PLANNING AND ENVIRONMENT ACT 1987

This Plan/Document is endorsed in accordance with condition _____ of Planning Permit No. A8881

27 JAN 2016

39/51
Sheet No

Signature of Responsible Authority