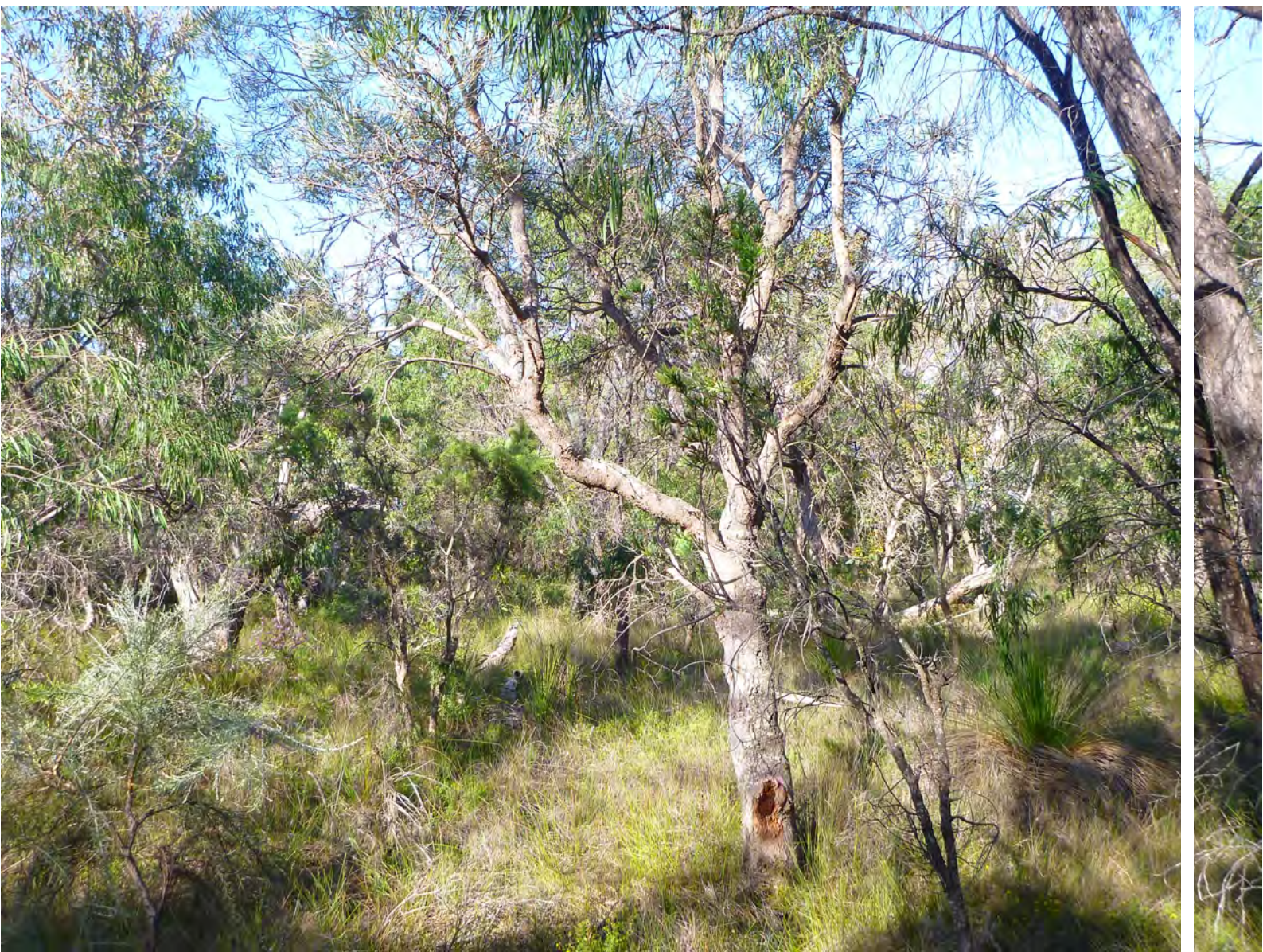





## **Armstrong Reserve Weed Management Plan**

**Prepared for Capecare  
23 April 2020**



| Document Status |                           |                               |          |                  |                                                                                       |          |
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|                 |                           |                               |          | Name             | Signature                                                                             | Date     |
| 1               | B. Menezies<br>D.Brearley | D. Brearley                   | 19/12/19 | D.Brearley       |                                                                                       | 29/01/20 |
| 2               | D.Brearley                | B.van der Wiele,<br>M.Sproule | 30/01/20 | D.Brearley       |                                                                                       | 31/01/20 |
| 3               | D.Brearley                | W.Oldfield (CoB)              | 07/02/20 | D.Brearley       |                                                                                       | 20/04/20 |
| F               | D.Brearley                | B.van der Wiele               | 22/04/20 | D.Brearley       |  | 23/04/20 |
|                 |                           |                               |          |                  |                                                                                       |          |
|                 |                           |                               |          |                  |                                                                                       |          |



Onshore Environmental Consultants Pty Ltd  
ACN 095 837 120  
PO Box 227  
YALLINGUP WA 6282  
Telephone / Fax (08) 9756 6206  
E-mail: [info@onshoreenvironmental.com.au](mailto:info@onshoreenvironmental.com.au)

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# TABLE OF CONTENTS

|                                                                                                                                                           |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Onshore Environmental Consultants Pty Ltd .....</b>                                                                                                    | <b>i</b>   |
| <b>TABLE OF CONTENTS .....</b>                                                                                                                            | <b>ii</b>  |
| <b>SUMMARY.....</b>                                                                                                                                       | <b>iii</b> |
| <b>1.0      CONTEXT, SCOPE AND RATIONALE.....</b>                                                                                                         | <b>1</b>   |
| <b>1.1      Proposal .....</b>                                                                                                                            | <b>1</b>   |
| <b>1.2      Key Environmental Factors .....</b>                                                                                                           | <b>2</b>   |
| Table 1: Environmental Factors, Impacts and Design Inclusions to Minimise Environmental Risk.....                                                         | 1          |
| <b>1.3      Condition Requirements.....</b>                                                                                                               | <b>4</b>   |
| <b>1.4      Rationale and Approach .....</b>                                                                                                              | <b>4</b>   |
| 1.4.1      Surveys and Study Findings .....                                                                                                               | 4          |
| 1.4.2      Key Assumptions and Uncertainties.....                                                                                                         | 6          |
| 1.4.3      Management Approach .....                                                                                                                      | 7          |
| 1.4.4      Rationale for Choice of Provisions .....                                                                                                       | 7          |
| 1.4.5      Completion Criteria .....                                                                                                                      | 8          |
| Table 2: Management Objectives, Completion Criteria, and Key Performance Indicators.....                                                                  | 8          |
| <b>1.5      Index of Biodiversity Surveys for Assessments (IBSA) .....</b>                                                                                | <b>8</b>   |
| <b>2.0      EMP PROVISIONS.....</b>                                                                                                                       | <b>10</b>  |
| Table 3: Flora and Vegetation Provisions .....                                                                                                            | 11         |
| Table 4: Weed Management Actions, Targets, Monitoring and Reporting Requirements.....                                                                     | 12         |
| <b>3.0      ADAPTIVE MANAGEMENT .....</b>                                                                                                                 | <b>15</b>  |
| Table 5: Triggers and Corrective Actions.....                                                                                                             | 15         |
| <b>4.0      STAKEHOLDER CONSULTATION.....</b>                                                                                                             | <b>17</b>  |
| <b>5.0      PROJECT TEAM .....</b>                                                                                                                        | <b>18</b>  |
| <b>6.0      REFERENCES.....</b>                                                                                                                           | <b>19</b>  |
| <b>FIGURE 1</b>                                                                                                                                           |            |
| Location of Armstrong Reserve .....                                                                                                                       | 20         |
| <b>FIGURE 2</b>                                                                                                                                           |            |
| Vegetation condition, weedy sites mapped as supporting introduced species, and boundary of the Dunsborough Swamp Forest PEC within Armstrong Reserve..... | 22         |
| <b>APPENDIX 1</b>                                                                                                                                         |            |
| Introduced Flora Species Recorded within Armstrong Reserve and Recommended Controls .....                                                                 | 24         |

# SUMMARY

| PROPOSAL TITLE: ARMSTRONG RESERVE, DUNSBOROUGH |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proponent:                                     | Ray Village Aged Services (Inc.) trading as Capecare                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Ministerial Statement No.:                     | 1094                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Purpose of the Plan:                           | To meet the requirements of the Armstrong Reserve Environmental Management Plan (EMP) which was prepared to satisfy Conditions 6-1 to 6-3 of Ministerial Statement 1094.                                                                                                                                                                                                                                                                                                |
| Key Environmental Factors:                     | Flora and Vegetation                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| EMP Requirements:                              | EMP Management Action 10:<br>Prepare a Weed Management Plan (WMP) for the Reserve. The WMP will include conducting a weed survey to identify and map the weed species present, to prioritise the species' threat to the native vegetation of the Reserve and to determine the appropriate management measures to be implemented.                                                                                                                                        |
| Key Environmental Values:                      | Native flora and vegetation protected under the Western Australian <i>Biodiversity Conservation Act 2016</i> and/or listed as Matters of National Environmental Significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> . Within the Reserve, these include the Priority 1 Ecological Community 'Dunsborough Swamp Forest', and the Threatened Flora species <i>Caladenia viridescens</i> (Dunsborough Spider Orchid). |

# 1.0 CONTEXT, SCOPE AND RATIONALE

## 1.1 Proposal

Ray Village Aged Services (Inc.) trading as Capecare (Capecare), propose to develop a 1.28 ha portion of Armstrong Reserve, Naturaliste Terrace, Dunsborough (the development envelope), for the purpose of an aged care facility. The aged care facility will consist of the following operational elements:

- An 80-bed residential care facility to cater for people with high physical needs in a dementia-enabling environment;
- Approximately 40 independent living apartments;
- Administration offices and community facilities (including meeting rooms for the Country Women's Association); and
- Internal road network and road access between the proposed development footprint, Naturaliste Terrace and Armstrong Place.

The development envelope, situated within the municipal boundary of the City of Busselton, is located approximately 500 m north of the business centre of the town of Dunsborough and is bounded by Armstrong Place to the south, Gifford Road to the east, Naturaliste Terrace to the west and the remaining vegetated portion of Armstrong Reserve (refer to Figure 1).

Previously comprising Lots 111, 115, 116, 117 Naturaliste Terrace and a 9994 m<sup>2</sup> portion of Lot 257 Naturaliste Terrace, in accordance with the Western Australian *Town Planning and Development Act 2005*, rezoning of the development envelope has resulted in the amalgamation of the Lots into a single Certificate of Title. Lot 600 is now the legal responsibility of Capecare and will be retained as one Title in perpetuity and is zoned 'Special Purpose – Aged Person Housing' under the City of Busselton's Local Planning Scheme No. 21. The remainder of Armstrong Reserve has been gazetted into three Lots with the City of Busselton retaining vesting of Reserve 25339 (Lots 3000 and 601) for the purpose of 'Landscape Protection' and Water Corporation retaining vesting of Reserve 40445 (Lot 258) for the purpose of 'Drainage'.

Bushland outside of the development envelope will be retained and managed in accordance with the *Armstrong Reserve Environmental Management Plan (EMP)* (EndPlan Environmental 2019). The EMP was prepared in consultation with the Department of Water and Environmental Regulation's EIA Planning Branch, the City of Busselton and the Department of Biodiversity Conservation and Attractions (DBCA).

This Weed Management Plan (WMP) has been prepared to satisfy the requirements of Management Action 10 of the EMP. As per the management action, this WMP includes results from a weed survey conducted to identify and map the weed species present, prioritises the species' threat to the native vegetation of the Reserve, and identifies the appropriate management measures to be implemented.

This WMP identifies management measures, monitoring actions, completion criteria and compliance reporting requirements that are to be implemented to ensure the long-term protection of the Priority 1 'Dunsborough Swamp Forest' Priority Ecological Community (PEC), and the Threatened flora species *Caladenia viridescens* through the control and management of weeds within the Reserve.

## 1.2 Key Environmental Factors

The key environmental factors of the Reserve that may be affected as a result of not implementing Management Action 10 of the EMP are summarised in Table 1. Section 2 addresses the environmental factors in detail, with specific provisions identified.

**TABLE 1: Environmental Factors, Impacts and Design Inclusions to Minimise Environmental Risk**

| Environmental Factor | Activity which would affect the key environmental factor                                                                                                                                                                                                                                              | Site-specific environmental value, existing and/or potential uses, ecosystem health condition or sensitive component of the key environmental factor which will be affected            | Summary of key design inclusions and management activities to minimise environmental risk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flora and Vegetation | <ul style="list-style-type: none"> <li>• Clearing or damage of vegetation within the Reserve.</li> <li>• Construction earthworks and temporary drainage infrastructure of the adjacent development envelope.</li> <li>• Spread or increased number of weeds due to disturbance activities.</li> </ul> | <ul style="list-style-type: none"> <li>• <i>Caladenia viridescens</i> (Dunsborough Spider Orchid)</li> <li>• 'Dunsborough Swamp Forest' Priority Ecological Community (PEC)</li> </ul> | <ul style="list-style-type: none"> <li>• Clearing of existing vegetation will be contained within the approved development envelope.</li> <li>• To ensure surrounding vegetation is not disturbed, the approved development envelope will be surveyed, pegged and temporary fencing erected to clearly demarcate the limits of clearing during construction.</li> <li>• Permanent conservation fencing to be constructed between approved development envelope and the Reserve.</li> <li>• To ensure weeds (and Dieback) are not spread, a Clean-On-Entry/Exit (COE) point will be constructed within the development envelope with educational signage for all construction personnel.</li> <li>• All construction drainage to be retained on-site.</li> </ul> |

## 1.3 Condition Requirements

This WMP has been prepared to satisfy the requirements of Management Action 10 of the EMP.

**Management Action 10** states:

*Prepare a Weed Management Plan (WMP) for the Reserve. The WMP will include conducting a weed survey to identify and map the weed species present, to prioritise the species' threat to the native vegetation of the Reserve and to determine the appropriate management measures to be implemented.*

The EMP has been prepared to fulfil the requirements of Conditions 6-1 to 6-3 of Ministerial Statement 1094. The purpose of the EMP is to mitigate for significant residual impacts of the Proposal within the Armstrong Reserve on the 'Dunsborough Swamp Forest' PEC, Threatened and significant fauna species *Pseudocheirus occidentalis* and *Ctenopus ora*, and Threatened flora species *Caladenia viridescens*.

Specifically in relation to weeds, **Condition 6-2** of Ministerial Statement 1094 states:

*The Environmental Management Plan required by Condition 6-1 shall be prepared in consultation with the City of Busselton and include:*

- (1) dieback management measures prepared in consultation with the DBCA;*
- (2) measures to ensure Banksia logs and other woody debris from the clearing in the development envelope are relocated to within the area shown as remaining portion of Armstrong Reserve in Figure 1 to enhance fauna habitat values;*
- (3) **weed control measures;***
- (4) measures to control vehicle and pedestrian access; and*
- (5) management measures to ensure impacts from the proposal are contained within the development envelope shown in Figure 1.*

In addition, **Condition 5-1** of Ministerial Statement 1094 relating to public availability of data, includes the requirement for management plans to be made publicly available for the remainder of the life of the proposal.

A copy of the approved WMP will be published on Capecare's website: <http://capecare.com.au/independent-living/new-dunsborough-aged-care-village/>.

## 1.4 Rationale and Approach

### 1.4.1 Surveys and Study Findings

Through the formal Environmental Impact Assessment (EIA) process to determine the environmental values of Armstrong Reserve (EndPlan Environmental 2012), desktop assessments and field surveys were conducted by consultants experienced in surveying on the southern Swan Coastal Plain. To ensure that the biodiversity data collected was of an appropriate standard for use in EIA, each of the surveys was conducted in accordance with the relevant technical guidance documents (at the time of the survey) for biodiversity surveys issued by the Environmental Protection Authority (EPA).

The field surveys and results relevant to this WMP are summarised below.

### Threatened Flora

Armstrong Reserve was surveyed for conservation significant flora, specifically orchid species, by Ecoscape (Australia) Pty Ltd (Ecoscape) on the 30 October 2009, over approximately seven hours (Ecoscape 2010). The survey was conducted within the flowering period of the majority of Threatened Flora species identified from the database search results, and marginally outside the normal flowering period for the Threatened Flora species *Caladenia caesarea* subsp. *maritima* and *C. excelsa* (that finish flowering in September). No Threatened Flora species were observed during the targeted survey. *Eucalyptus rudis* subsp. *cratyantha* (Priority 4) was the only conservation significant flora taxon that was found on-site, with 23 individuals recorded from 20 locations.

In 2012, two targeted Threatened Flora surveys were undertaken by officers from the former Department of Parks and Wildlife, now the Department of Biodiversity, Conservation and Attractions (DBCA), and Dr Paul van der Moezel from PGV Environmental. The surveys identified that up to three individuals of the Threatened Flora species *Caladenia viridescens* (Dunsborough Spider Orchid) occurred in Armstrong Reserve, one of which was likely to be impacted by the proposed development.

In October 2013, Dr van der Moezel conducted a re-survey of Armstrong Reserve to confirm the number and accurately identify the location of any Dunsborough Spider Orchids present. Four orchid plants were found in three locations, one of which was located just within the boundary of the development envelope (PGV Environmental 2014).

### Priority Ecological Community (PEC)

In 2008, Mr Andrew Webb, an officer at the then Department of Environment and Conservation's (now DBCA) South West Regional Office, mapped a portion of the development envelope as a wetland describing the vegetation as consisting entirely of *Melaleuca raphiophylla* – *M. preissiana* – *Banksia littoralis* low forest on seasonally waterlogged soils of the Dunsborough-Eagle Bay area, which subsequently has been listed as a Priority 1 PEC (Webb 2008). The total area of the PEC occurring with Armstrong Reserve is approximately 3.21 ha while the area within the development envelope is approximately 4,352 m<sup>2</sup>.

In November 2009, a Level 2 Flora and Vegetation Survey was conducted at Armstrong Reserve by botanists from Ecoscape (Ecoscape 2010). The survey found that Armstrong Reserve supported three distinct vegetation types correlating with landscape position. They included a low-lying dampland vegetation community *Melaleuca raphiophylla*, *Eucalyptus rudis* and *Agonis flexuosa* Low Open Forest or Woodland, a mid-slope vegetation community *A. flexuosa*, *Corymbia calophylla*, *E. rudis* and *Banksia littoralis* Low Open Forest to Open Woodland, and an upland vegetation community *C. calophylla*, *A. flexuosa* and mixed species Open Forest to Low Woodland. All three vegetation types contain an *A. flexuosa* (Peppermint tree) component, which is known habitat for the Threatened fauna species *Pseudocheirus occidentalis* (Western Ringtail Possum).

The 2009 survey determined that the low-lying dampland and mid-slope vegetation belonged to the Priority 1 PEC '*Corymbia calophylla*, *Melaleuca raphiophylla*, *Banksia littoralis*, *Eucalyptus rudis*, *Agonis flexuosa* low open forest with seasonal subsoil moisture of the Dunsborough area' (referred to as 'Dunsborough Swamp Forest' PEC).

## Introduced Flora

A Level 2 Flora and Vegetation Survey was conducted by botanists from Ecoscape at Armstrong Reserve in November 2009 (Ecoscape 2010). The survey recorded a total of 24 introduced flora (weed) species across the three reserves sampled, with 13 weeds recorded from Armstrong Reserve. One species listed as a Weed of National Significance (WONS), *\*Asparagus asparagoides* (Bridal Creeper), was recorded from two sites located within Peron Reserve, located approximately 1.3 km south-east of Armstrong Reserve. The condition of the vegetation at the reserves was also recorded during the 2009 survey. All quadrats within Armstrong Reserve were recorded as being in Very Good or Excellent condition (as per Keighery 1994).

In October 2019, Principal Botanist Dr Jerome Bull from Onshore Environmental Consultants Pty Ltd conducted a one-day targeted weed survey at Armstrong Reserve. This survey identified a total of 75 introduced species which were classified as 'High', 'Medium' or 'Low' management priority on the basis of being a WONS, listing as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007* (BAM Act), and ecological impact and invasiveness ratings from the Department of Parks and Wildlife South West Region Species Prioritisation Process (DPaW 2014) (Appendix 1, Figure 2).

One introduced species recorded from a single location (Site 14, Figure 2) was listed as a WONS, *\*Asparagus asparagoides* (Bridal Creeper), and two other weeds were listed as Declared Pests under the BAM Act (Appendix 1). These three taxa were classified as *high* management priority. There were 35 other weeds classified as *moderate* management priority, and the remaining 37 weeds were determined to be of *low* management priority (Appendix 1).

In addition to recording weed species within the Reserve, vegetation condition was rated and mapped (Figure 2). Vegetation within the majority of the reserve was rated as being in *excellent* condition (as per EPA 2016) due primarily to the dense native understorey structure and waterlogged nature of soils restricting access and hence disturbance. A reduced vegetation condition rating to *very good*, *good* or *degraded* was recorded along the northern boundary of Armstrong Reserve where the reserve abuts the back yards of private residential lots fronting Cygnet Cove (Figure 2). Smaller localised pockets of reduced vegetation condition were also mapped along Gifford Road, Armstrong Place and the northern boundary of the existing shire depot within the development envelope (Figure 2). The decline in vegetation condition at all mapped locations resulted from physical disturbance to the native vegetation ground cover and subsequent colonisation by introduced weed species. Fortunately, the impacted areas occur around the perimeter of the reserve fringing neighbouring development including roads or private residences, are relatively small in area and localised, and generally support scattered (or low coverage) weed populations that can be relatively easily managed.

### 1.4.2 Key Assumptions and Uncertainties

The findings of the flora and vegetation surveys completed within Armstrong Reserve have formed the basis for the rationale and management approach adopted for this WMP. It is assumed that the surveys undertaken have accurately identified and mapped vegetation associations, significant flora and weed species/populations within the Reserve. It is also assumed that the previous assessment of impacts on flora and vegetation associated with the formal EIA process undertaken to determine the environmental values of Armstrong Reserve are correct.

The provisions developed for this WMP identify proposed environmental targets and corresponding adaptive management actions based on the current knowledge of Armstrong Reserve.

#### 1.4.3 Management Approach

Through the formal EIA process undertaken for Armstrong Reserve, Ministerial Statement 1094 conditioned that the bushland outside of the development envelope will be retained and managed in accordance with the EMP. The EMP has been prepared to fulfil the requirements of Conditions 6-1 to 6-3 of Ministerial Statement 1094.

The purpose of the EMP is to mitigate for significant residual impacts of the Proposal within the Armstrong Reserve on the 'Dunsborough Swamp Forest' PEC, Threatened and significant fauna species *Pseudocheirus occidentalis* and *Ctenopus ora*, and Threatened Flora species *Caladenia viridescens*.

This WMP has been prepared to satisfy the requirements of Management Action 10 of the EMP. The purpose of this WMP is to ensure the long-term protection of the Priority 1 'Dunsborough Swamp Forest' PEC, and the Threatened Flora species *Caladenia viridescens* through the control and management of weeds within the Reserve.

The objectives of this WMP are to:

- Identify and map the weed species present within the Reserve;
- To prioritise the weed species based on their threat to the native vegetation of the Reserve; and
- To determine the appropriate management measures to be implemented, including a weed control program targeting high priority weeds (i.e. WONS and Declared Pests) and revegetation of areas mapped as Degraded.

#### 1.4.4 Rationale for Choice of Provisions

Weed management will aim to remove and control established weed populations to enable regeneration of native plant species, and increase the protection and resilience of the 'Dunsborough Swamp Forest' PEC and Threatened Flora species within the Reserve. This will be accomplished by undertaking the following:

- Recording the location of weed species listed WONS or Declared Pests and weeds identified as high priority (i.e. rhizomatous grasses, bulbous, woody and noxious weeds);
- Recording areas of high weed infestation;
- Identifying the known locations of the Threatened Flora species *Caladenia viridescens* (Dunsborough Spider Orchid); and
- Highlighting areas that require native revegetation.

Based on the above criteria, data from the most recent targeted survey undertaken within Armstrong Reserve by Onshore Environmental in 2019 has identified targeted sites for weed management. Three weed species have been identified as high priority as they are listed as WONS or Declared Pests (Appendix 1). These weed species occur at Sites 2, 3, 4, 10 and 14 (Figure 2). In addition to Sites 2 and 3, Sites 1 and 12 have been identified as areas of high weed infestation due to the high diversity of weed species present; 27 and 14 introduced taxa respectively (Figure 2). The Threatened

Flora species *Caladenia viridescens* is known to occur from two locations within the Reserve (locations not to be made publicly available). Vegetation condition in these areas was rated as *excellent* by Onshore Environmental in late 2019 and there were no introduced species recorded in close proximity to either of the known locations. Both locations will not be impacted by proposed management actions.

In addition to the above target sites, areas to be revegetated have been identified. These areas correspond to vegetation mapped in *degraded* condition, based on the recent targeted survey undertaken within Armstrong Reserve in 2019 by Onshore Environmental. Areas occurring along the northern boundary of Armstrong Reserve, as well as pockets along Gifford Road, Armstrong Place and the northwest boundary of the development envelope were rated as being *degraded* (Figure 2).

#### 1.4.5 Completion Criteria

Completion criteria, targets and key performance indicators have been set to meet the objectives of the WMP (Table 2).

**TABLE 2: Management Objectives, Completion Criteria, and Key Performance Indicators.**

| Management Objective                                                     | Completion Criteria                                                                                                             | Key Performance Indicator                                                                       |
|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| To minimise the spread of weed species within Armstrong Reserve          | No significant <sup>1</sup> increase in weeds (weed density and/or cover depending on weed species) in Armstrong Reserve.       | Weed density or weed cover (depending on weed species) in monitoring transects.                 |
|                                                                          | No significant change in the distribution and extent of identified weed species in Armstrong Reserve.                           | Weed distribution or extent in monitoring transects.                                            |
| To prevent the introduction of new weeds into Armstrong Reserve          | No new weed species observed or recorded in Armstrong Reserve.                                                                  | Absence of weed species other than those previously identified in Armstrong Reserve.            |
| Control &/or eradicate both WONS and Declared Pests in Armstrong Reserve | WONS and Declared Pests are eradicated where possible, or controlled within Armstrong Reserve.                                  | Absence or reduced distribution and extent of WONS and Declared Pests within Armstrong Reserve. |
|                                                                          | No significant increase in the density and/or cover (depending on species) of WONS and Declared Pests within Armstrong Reserve. | Density or cover (depending on species) of weeds in monitoring transects.                       |

## 1.5 Index of Biodiversity Surveys for Assessments (IBSA)

The Index of Biodiversity Surveys for Assessments (IBSA) data packages relating to all surveys, with the exception of the targeted weed survey, have been provided as part of the EMP for Armstrong Reserve (EndPlan Environmental 2019) and therefore will not be provided within this WMP.

<sup>1</sup> Significant – for the purposes of this table, ‘significant’ refers to a statistical measure of significance using data obtained from the monitoring transects

The IBSA data package associated with the information contained in Section 2 for the targeted weed survey undertaken in October 2019 has been prepared by Onshore Environmental, and will be submitted through the IBSA online portal.

## 2.0 EMP PROVISIONS

This section presents the key environmental factor of Flora and Vegetation, with referral to baseline studies undertaken with respect to the relevant provision, the approach to be applied to managing the Reserve, and any other relevant information including assumptions and uncertainties.

The Level 2 flora and vegetation survey conducted at Armstrong Reserve in 2009, and targeted surveys conducted in October 2012 and October 2019 form the baseline for future comparison and assessment. As discussed in Section 1.4.4, specific weed species and sites have been identified for targeted management and control.

The EPA objective for Flora and Vegetation, the purpose and outcomes for this WMP, and the key environmental values, impacts and risks are identified in Table 3.

Management actions and targets, monitoring and reporting requirements for this environmental factor are identified in Table 4.

Weed control methods for individual weed species recorded at Armstrong Park are provided in Appendix 1. Control will include a preference to undertake hand weeding of individual plants or small populations where feasible. The use of herbicides will involve the selective grass herbicides Verdict® and Fusilade® which will have no impact on woody native vegetation. The grass selectives will be used broadscale inside the northern boundary of the reserve, where native understorey structure has been replaced by introduced grass species. Other herbicides that will be used on target weed species (not broadscale) include Lontrel® (for members of the Fabaceae), metsulfuron and chlorsulfuron (bulbous weed species) and glyphosate (woody weeds).

**TABLE 3: Flora and Vegetation Provisions**

| EPA FACTOR                       | FLORA AND VEGETATION                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EPA Objective:</b>            | To protect flora and vegetation so that biological diversity and ecological integrity are maintained.                                                                                                                                                                                                                                                                                                                                                            |
| <b>Purpose:</b>                  | To meet the requirements of the <i>Armstrong Reserve Environmental Management Plan</i> which was prepared to satisfy Conditions 6-1 to 6-3 of Ministerial Statement 1094.                                                                                                                                                                                                                                                                                        |
| <b>Outcomes:</b>                 | EMP Management Action 10:<br>Prepare a Weed Management Plan (WMP) for the Reserve. The WMP will include conducting a weed survey to identify and map the weed species present, to prioritise the species' threat to the native vegetation of the Reserve and to determine the appropriate management measures to be implemented.                                                                                                                                 |
| <b>Key Environmental Values:</b> | Native flora and vegetation are protected under the Western Australian <i>Biodiversity Conservation Act 2016</i> and/or listed as Matters of National Environmental Significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> . Within Armstrong Reserve, these include the Priority 1 'Dunsborough Swamp Forest' PEC, and the Threatened Flora species <i>Caladenia viridescens</i> (Dunsborough Spider Orchid). |
| <b>Key Impacts and Risks:</b>    | Spread or increase of weeds within the Reserve.                                                                                                                                                                                                                                                                                                                                                                                                                  |

**TABLE 4: Weed Management Actions, Targets, Monitoring and Reporting Requirements**

| MANAGEMENT ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | MONITORING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | REPORTING                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Management Target:</b> To maintain the diversity of the reserve's flora and vegetation (including the Priority 1 PEC), ensure that <u>high and medium priority weeds</u> are controlled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                        |
| <p>Implement a Weed Control Program targeting the eradication of weeds species identified as:</p> <ul style="list-style-type: none"> <li>• Weeds of National Significance (WONS);</li> <li>• Declared Pests; or</li> <li>• Weeds identified as medium priority (Appendix 1).</li> </ul> <p>Management will follow species specific treatments recommended in 'Southern Weeds and their Control' (Moore and Wheeler 2002).</p> <p>As False Cleaver has shown resistance to herbicides, individuals of False Cleavers (<i>Galium spurium</i>) are to be hand-pulled before seed set, and disposed of via burning all plant material.</p> <p>Weed control should be undertaken by suitably qualified and licensed contractors.</p> | <p>Implement a Weed Monitoring Program that quantitatively records plant biodiversity parameters including species richness, plant density, and plant cover within permanent sampling quadrats.</p> <p>The Weed Monitoring Program shall:</p> <ul style="list-style-type: none"> <li>• Conduct quarterly weed monitoring to check for evidence of herbivoring and signs (scats, markings) of feral animals;</li> <li>• Establish permanent quadrats in relevant areas to monitor the success of weed control measures;</li> <li>• Conduct six-monthly monitoring (endemic and introduced flora species) of the quadrats for 3-years following implementation of the Weed Control Program; and</li> <li>• Record all weed species present and their cover, and is to include photographic evidence of the quadrat with the date and quadrat identification number clearly shown.</li> </ul> | <p>Six-monthly monitoring reports will be prepared and submitted to the City of Busselton within six weeks of undertaking the monitoring.</p> <p>The monitoring reports will be included in the annual Compliance Assessment Report (CAR) to be prepared by Capecare, submitted to the DEWR and published on the Capecare website.</p> |

| MANAGEMENT ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MONITORING                                                                                                                                                                                                                                                                                                                                                                                           | REPORTING                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Management Target:</b> To maintain the diversity of the reserve's flora, ensure the protection of known <u>locations of the Dunsborough Spider Orchid</u> ( <i>Caladenia viridescens</i> ) from weed infestation.                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                          |
| There are currently no weed species identified in close proximity to the two known <i>Caladenia viridescens</i> (Dunsborough Spider Orchid) locations. Management will ensure monitoring is undertaken to ensure no new weed populations are introduced within a 30 metre buffer around known orchid locations, and appropriate management is implemented where weeds are identified. Any weed control within a 30 metre radius of known <i>Caladenia viridescens</i> locations will be undertaken by hand pulling (no herbicide use will be permitted). | <p>The biannual Weed Monitoring Program will include a qualitative assessment of weed presence within a 30 metre radius of known <i>Caladenia viridescens</i> locations within Armstrong Reserve.</p> <p>Any weed species present will have the species name, location, and cover recorded, and is to include photographic evidence of the date and quadrat identification number clearly shown.</p> | <p>Biannual monitoring reports will be prepared by the weed control contractor and submitted to the City of Busselton within six weeks of the completion of the monitoring.</p> <p>The monitoring reports will be included in the annual Compliance Assessment Report (CAR) to be prepared by Capecare, submitted to the DEWR and published on the Capecare website.</p> |

| MANAGEMENT ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | MONITORING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | REPORTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Management Target:</b> To maintain the diversity of the reserve's flora and vegetation (including the Priority 1 PEC), undertake the <u>revegetation of degraded areas</u> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>Implement a Revegetation Program of areas where vegetation has been mapped in a <i>degraded</i> condition (identified in Figure 2).</p> <p>The aim of the Revegetation Program is to meet the agreed Completion Criteria (as outlined in Table 2) during the 3-year management period.</p> <p>The Revegetation Program shall:</p> <ul style="list-style-type: none"> <li>• Implement a Weed Control Program aimed at eradicating or reducing the prominence of the introduced weed species component;</li> <li>• Use local provenance seed stock where feasible to maintain the genetic integrity and diversity of the reserve's flora; and</li> <li>• Conduct infill planting with nursery propagated seedlings and direct sowing with provenance native seed where feasible in <i>degraded</i> areas.</li> </ul> <p>Revegetation should be undertaken by suitably qualified and licensed contractors.</p> | <p>Implement a Weed Monitoring Program that quantitatively records plant biodiversity parameters including species richness, plant density, and plant cover within permanent sampling quadrats.</p> <p>The Weed Monitoring Program shall:</p> <ul style="list-style-type: none"> <li>• Undertake quarterly weed monitoring to check for evidence of herbivoring and signs (scats, markings) of feral animals;</li> <li>• Establish permanent quadrats in relevant areas to monitor the success of weed control measures;</li> <li>• Conduct six-monthly monitoring of the quadrats for 3-years following implementation of the Weed Control Program; and</li> <li>• Record all weed species present and their cover, and include photographic evidence of the quadrat with the date and quadrat identification number clearly shown.</li> </ul> | <p>Following completion of initial planting, the plant species and the numbers of each species planted or sown in each of the revegetation areas will be provided to the City of Busselton by the rehabilitation contractor within six weeks of the completion of revegetation.</p> <p>Six-monthly monitoring reports will be prepared by the rehabilitation contractor and submitted to the City of Busselton within six weeks of the completion of the monitoring. Results are to be presented in relation to the agreed completion criteria (as outlined in Table 2).</p> <p>The monitoring reports will be included in the annual Compliance Assessment Report (CAR) to be prepared by CapeCare, submitted to the DEWR and published on the CapeCare website.</p> |

## 3.0 ADAPTIVE MANAGEMENT

Weeds represent a major issue contributing to degradation of native bushland areas and require control to maintain natural areas to preserve their ecological integrity. For Armstrong Reserve, the condition of the 'Dunsborough Swamp Forest' PEC and the occurrence of the Threatened Flora species *Caladenia viridescens* (Dunsborough Spider Orchid) are specific considerations.

The weed management presented in this WMP aims to eradicate weed species identified as WONS or Declared Pests under the BAM Act, and control other weeds identified as high priority.

In the event that the Weed Monitoring Program indicates that weed occurrence has spread or new weed species have been identified, or if the Revegetation Monitoring Program indicates revegetation is not developing in line with completion criteria, contingency actions identified in Table 5 will be implemented.

**TABLE 5: Triggers and Corrective Actions**

| TRIGGER                                                                                                                                      | CORRECTIVE ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| New weed species has been identified.                                                                                                        | <p>Identify the probable cause of the introduction of the new weed species.</p> <p>Identify the priority status of the new weed species to inform management (i.e. is the weed a WONS, Declared Pest or other high priority weed).</p> <p>Implement one or more corrective actions:</p> <ul style="list-style-type: none"> <li>• Undertaking additional weed control as relevant for the species (i.e. spraying or hand-pulling); and/or</li> <li>• Restrict access by pedestrians and vehicles to the area by implementing temporary fencing and/or signage.</li> </ul> <p>Monitor the success of the corrective action.</p> |
| Weed coverage has increased or weeds have spread to previously uninfested area, and is impacting on development of the native species cover. | <p>Identify the cause of the increase and/or spread of weed species.</p> <p>Implement one or more corrective actions:</p> <ul style="list-style-type: none"> <li>• Using a different chemical for eradicating the species identified;</li> <li>• Utilising hand weeding/digging;</li> <li>• Undertaking additional weed control as relevant for the species; and/or</li> <li>• Restrict access by pedestrians and vehicles to the area by implementing temporary fencing and/or signage.</li> </ul> <p>Monitor the success of the corrective action.</p>                                                                      |

| TRIGGER                                                        | CORRECTIVE ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Revegetation completion criteria are not met at Years 2 and 3. | <p>Identify the cause of the completion criteria not being met (i.e. low survival rate, increased weed cover).</p> <p>Implement one or more corrective actions:</p> <ul style="list-style-type: none"> <li>• Undertaking additional infill planting or remedial sowing;</li> <li>• Implementing supplementary watering, fertilising, wetting agents, mulching if required;</li> <li>• Undertaking additional weed control as relevant for the species; and/or</li> <li>• Restrict access by pedestrians and vehicles to the area by implementing temporary fencing and/or signage.</li> </ul> <p>Monitor the success of the corrective action.</p> |

## 4.0 STAKEHOLDER CONSULTATION

Condition 6-2 of Ministerial Statement 1041 states that “the Environmental Management Plan required by condition 6-1 shall be prepared in consultation with the City of Busselton.” Condition 6-3 states that “the proponent shall implement the revised Environmental Management Plan in consultation with the City of Busselton for a period of three (3) years from the commencement of construction.”

Throughout the preparation of the EMP, Capecare has liaised with the City of Busselton’s environmental planning officers to ensure that the environmental objectives, management measures and completion criteria meet the City’s environmental requirements for the management of their Reserve.

Bushland occurring outside of the development envelope within Armstrong Reserve is to be managed in accordance with the EMP; this WMP has been prepared in accordance with the EMP and will be reviewed by the City of Busselton prior to being implemented.

## 5.0 PROJECT TEAM

This WMP for Armstrong Reserve was developed by the following personnel:

Onshore Environmental Consultants Pty Ltd

ABN 41 095 837 120

PO Box 227

YALLINGUP WA 6282

P: 08 9756 6206 M: 0427 339 842

Email: [info@onshoreenvironmental.com.au](mailto:info@onshoreenvironmental.com.au)

### **Project Staff**

Dr Darren Brearley

PhD

Direction / Principal Botanist

Dr Jerome Bull

PhD

Principal Botanist

Ms Breanne Menezies

BSc Hons

Senior Environmental Advisor

Mr Todd Griffin

BSc

GIS Specialist / Mapping

## 6.0 REFERENCES

- Department of Parks and Wildlife (2014) Ecological Impact and Invasiveness Ratings from the Department of Parks and Wildlife, South West Region Species Prioritisation Process 2014, available: <https://www.dpaw.wa.gov.au/plants-and-animals/plants/weeds/156-how-does-dpaw-manage-weeds>.
- Ecoscape (2010) Armstrong Reserve, Dunsborough Flora and Vegetation Assessment, unpublished report prepared for Ray Village Aged Services (Inc.).
- EndPlan Environmental (2012) Public Environmental Review – Armstrong Reserve, Dunsborough, Aged Care Facility Development, EPA Assessment No. 1808, September 2012.
- EndPlan Environmental (2019) Environmental Management Plan Armstrong Reserve, Dunsborough, Urban and Commercial Development (Ministerial Statement 1094), May 2019.
- Environmental Protection Authority (EPA) (2016) Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment, EPA, Western Australia, December 2016.
- Keighery, B.J. (1994) Bushland Plant Survey: a Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc.), Nedlands, Western Australia.
- PGV Environmental (2014) Dunsborough Spider Orchid Survey and Documentation, unpublished report prepared for Ray Village Aged Services (Inc.).
- Webb, A. (2008) Comments on the Conservation Values of Armstrong Reserve, Dunsborough, unpublished report for the Department of Environment and Conservation, Perth, Western Australia.

# FIGURE 1

Location of Armstrong Reserve



PINPOINT CARTOGRAPHICS (08) 9562 7136 RVA292\_78-402.dgn

|                                         |                                                                                                                                                                                                                        |                                                                                                      |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| <p><b>EndPlan</b><br/>Environmental</p> | <p>Ray Village Aged Care Services Inc t/a CapeCare<br/>ENVIRONMENTAL MANAGEMENT PLAN<br/>ARMSTRONG RESERVE, DUNSBOROUGH - URBAN AND COMMERCIAL DEVELOPMENT</p> <p><b>EXISTING ENVIRONMENT WITH CADASTRE (2015)</b></p> | <p>Date: 17 May 2019<br/>Drawn: B. Van der Wiele</p> <p><b>Figure 1</b><br/>Report No. RVA292_78</p> |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|

## FIGURE 2

Vegetation condition, weedy sites mapped as supporting introduced species, and boundary of the Dunsborough Swamp Forest PEC within Armstrong Reserve



**FIGURE 2**

Vegetation condition, weedy sites mapped as supporting introduced species, and boundary of the Dunsborough Swamp Forest PEC within Armstrong Reserve

**Legend**

- Weedy Sites
- Armstrong Reserve
- Development Envelope
- Dunsborough Swamp Forest PEC
- Vegetation Condition**
  - Degraded
  - Good
  - Very Good
  - Excellent

N

0 10 20 30

Meters  
1:1,000

Datum: GDA94  
Projection: MGA Zone 50

Date: 29/01/2020  
Status: Final  
Figure: 2  
Sheet Size: A3  
Internal Reference: AR\_Weed\_Ovr  
Drawn by: GSM  
Requested by: DB



# APPENDIX 1

## Introduced Flora Species Recorded within Armstrong Reserve and Recommended Controls

| Family          | Species Name                   | Common Name              | Status              | Impact <sup>1</sup> | Invasiveness <sup>1</sup> | Priority    | Area (Figure 2)   | Recommended Treatment                                                                                                                                                                                                      |
|-----------------|--------------------------------|--------------------------|---------------------|---------------------|---------------------------|-------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Agapanthaceae   | <i>Agapanthus praecox</i>      | Agapanthus               |                     | High                | Rapid                     | Medium      | 10, 20            | Hand pull and remove scattered plants or spray with 10g metsulfuron plus wetting agent / 1 L water                                                                                                                         |
| Alliaceae       | <i>Allium triquetrum</i>       | Three-cornered Garlic    |                     | Low                 | Slow                      | Low         | 4                 | Hand pull scattered plants and crush or burn the bulbs, or spray in late winter with 0.5g metsulfuron (600g/kg) plus wetting agent / 10 L water                                                                            |
| Apocynaceae     | <i>Vinca major</i>             | Blue Periwinkle          |                     | High                | Slow                      | Low         | 10                | Mow or cut the vine in early spring, then follow-up spray of regrowth with 100 mL glyphosate (450g/L) plus wetting agent in 10 L water                                                                                     |
| Araceae         | <i>Zantedeschia aethiopica</i> | Arum Lily                | Declared Pest       | High                | Moderate                  | <b>High</b> | 2, 3, 10          | Spray in late winter with 1.0g chlorsulfuron (750g/kg) or 1.0g metsulfuron (600g/kg) plus wetting agent in 10 L water                                                                                                      |
| Arecaceae       | <i>Washingtonia filifera</i>   | California Fan Palm      |                     | Not Listed          | Not Listed                | Medium      | 2                 | Hand pull or dig out and remove entire plant                                                                                                                                                                               |
| Asparagaceae    | <i>Asparagus asparagoides</i>  | Bridal Creeper           | WONS, Declared Pest | High                | Rapid                     | <b>High</b> | 14                | Encourage biocontrol agents such as the rust fungus. Alternatively, spot spray with 0.02g metsulfuron plus wetting agent in 10 L water                                                                                     |
| Asparagaceae    | <i>Chlorophytum comosum</i>    | Spider Plant             |                     | Not Listed          | Not Listed                | Low         | 10                | Hand pull scattered plants or spot spray with 100 mL glyphosate (450g/L) plus wetting agent in 10 L water                                                                                                                  |
| Asparagaceae    | <i>Yucca filamentosa</i>       | Adam's Needle            |                     | Medium              | Slow                      | Medium      | 20                | Hand pull or dig out and remove entire plant                                                                                                                                                                               |
| Asteraceae      | <i>Arctotheca calendula</i>    | Cape Weed                |                     | Medium              | Moderate                  | Low         | 12                | Spray in winter prior to flowering with 300 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                      |
| Asteraceae      | <i>Conyza bonariensis</i>      | Flaxleaf Fleabane        |                     | Unknown             | Rapid                     | Medium      | 1                 | Spray in winter prior to flowering with 500 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                      |
| Asteraceae      | <i>Cotula turbinata</i>        | Funnel Weed              |                     | Unknown             | Rapid                     | Low         | 2, 12             | Manually remove isolated plants. Spray with hormone herbicides in winter before flowering                                                                                                                                  |
| Asteraceae      | <i>Hypochaeris glabra</i>      | Smooth Cats-ear          |                     | Medium              | Rapid                     | Low         | 1, 3, 5, 8, 9, 14 | Spray in winter prior to flowering with 500 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                      |
| Asteraceae      | <i>Sonchus oleraceus</i>       | Common Sowthistle        |                     | Moderate            | Rapid                     | Low         | 1, 13             | Hand pull scattered plants, or spray in late winter with 50 mL glyphosate (450g/L) plus wetting agent / 10 L water                                                                                                         |
| Bignoniaceae    | <i>Pandorea jasminoides</i>    | Bower Vine               |                     | Not Listed          | Not Listed                | Low         | 1, 3, 14          |                                                                                                                                                                                                                            |
| Bignoniaceae    | <i>Pandorea pandorana</i>      | Wonga Wonga Vive         |                     | Not Listed          | Not Listed                | Low         | 3                 |                                                                                                                                                                                                                            |
| Caryophyllaceae | <i>Cerastium glomeratum</i>    | Mouse Ear Chickweed      |                     | Low                 | Moderate                  | Medium      | 12                | Hand pull scattered plants or spot spray larger areas with 100 mL glyphosate (450g/L) plus wetting agent in 10 L water                                                                                                     |
| Caryophyllaceae | <i>Petrorhagia dubia</i>       | Velvet Pink              |                     | Unknown             | Rapid                     | Medium      | 2                 | Remove small and/or isolated plants manually before seed set                                                                                                                                                               |
| Caryophyllaceae | <i>Spergula arvensis</i>       | Corn Spurry              |                     | Unknown             | Unknown                   | Low         | 2, 4              | Apply chlorsulfuron + 2,4-D herbicide                                                                                                                                                                                      |
| Cyperaceae      | <i>Cyperus tenellus</i>        | Tiny Flatsedge           |                     | Unknown             | Rapid                     | Low         | 12                | Glyphosate, amitrole, hormone and urea herbicides have action on this weed                                                                                                                                                 |
| Euphorbiaceae   | <i>Euphorbia terracina</i>     | Geraldton Carnation Weed |                     | High                | Rapid                     | Medium      | 1, 3, 15          | Spot spray large infestations with metsulfuron methyl 0.1 g/15 L or metsulfuron methyl + 1% glyphosate before flowering                                                                                                    |
| Fabaceae        | <i>Acacia iteaphylla</i>       | Flinders Range Wattle    |                     | Unknown             | Rapid                     | Medium      | 2, 12, 15         | Seedlings: hand pull and remove individuals; Mature Woody Plants: Fell and remove entire bush/tree, paint cut stump with Garlon®600. Follow-up spray of germinants using 4 L/ha of glyphosate (450g/L) with wetting agent. |
| Fabaceae        | <i>Acacia longifolia</i>       | Sydney Golden Wattle     |                     | Unknown             | Moderate                  | Medium      | 1, 5, 16, 17      | Seedlings: hand pull and remove individuals; Mature Woody Plants: Fell and remove entire bush/tree, paint cut stump with Garlon®600. Follow-up spray of germinants using 4 L/ha of glyphosate (450g/L) with wetting agent. |
| Fabaceae        | <i>Acacia pycnantha</i>        | Golden Wattle            |                     | Low                 | Slow                      | Medium      | 13                | Seedlings: hand pull and remove individuals; Mature Woody Plants: Fell and remove entire bush/tree, paint cut stump with Garlon®600. Follow-up spray of germinants using 4 L/ha of glyphosate (450g/L) with wetting agent. |
| Fabaceae        | <i>Dipogon lignosus</i>        | Dolichos Pea             |                     | High                | Moderate                  | Medium      | 10                | Spray in winter prior to flowering with 500 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                      |
| Fabaceae        | <i>Lotus subbiflorus</i>       | Hairy Birdsfoot Trefoil  |                     | Unknown             | Rapid                     | Low         | 1                 | Spray in winter prior to flowering with 500 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                      |
| Fabaceae        | <i>Medicago polymorpha</i>     | Burr Medic               |                     | Unknown             | Moderate                  | Low         | 1, 3              | Spray in winter prior to flowering with 10 mL Lontrel® plus wetting agent in 10 L water to provide reasonably selective control                                                                                            |
| Fabaceae        | <i>Medicago truncatula</i>     | Barrel Medic             |                     | Unknown             | Moderate                  | Low         | 1                 | Spray in winter prior to flowering with 10 mL Lontrel® plus wetting agent in 10 L water to provide reasonably selective control                                                                                            |
| Fabaceae        | <i>Melilotus indicus</i>       | Melilot                  |                     | Unknown             | Moderate                  | Low         | 1                 | Spray in winter prior to flowering with 10 mL Lontrel® plus wetting agent in 10 L water to provide reasonably selective control                                                                                            |
| Fabaceae        | <i>Stylosanthes</i> sp. indet  | Stylo                    |                     | Not Listed          | Not Listed                | Medium      | 3, 4              | Spray in winter prior to flowering with 10 mL Lontrel® plus wetting agent in 10 L water to provide reasonably selective control                                                                                            |
| Fabaceae        | <i>Trifolium campestre</i>     | Hop Clover               |                     | Unknown             | Unknown                   | Low         | 1                 | Spray in winter prior to flowering with 500 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                      |
| Fabaceae        | <i>Trifolium subterraneum</i>  | Subterranean Clover      |                     | Unknown             | Unknown                   | Low         | 3, 4              | Spray in winter prior to flowering with 500 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                      |

| Family         | Species Name                      | Common Name             | Status | Impact <sup>1</sup> | Invasiveness <sup>1</sup> | Priority | Area (Figure 2)                | Recommended Treatment                                                                                                                                                                                                                     |
|----------------|-----------------------------------|-------------------------|--------|---------------------|---------------------------|----------|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fabaceae       | <i>Vicia sativa</i>               | Common Vetch            |        | Unknown             | Slow                      | Low      | 1                              | Spray in winter prior to flowering with 500 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                                     |
| Geraniaceae    | <i>Geranium molle</i>             | Dove's Foot Cranesbill  |        | Unknown             | Unknown                   | Low      | 18                             | Spray in winter prior to flowering with 300 mL/ha Lontrel® plus wetting agent to provide reasonably selective control                                                                                                                     |
| Hypericaceae   | <i>Hypericum perforatum</i>       | St John's Wort          |        | Unknown             | Moderate                  | Medium   | 6                              | Hand pull scattered plants or spot spray larger areas with 100 mL glyphosate (450g/L) plus wetting agent in 10 L water                                                                                                                    |
| Iridaceae      | <i>Freesia alba x leichtlinii</i> | Freesia                 |        | High                | Rapid                     | Medium   | 14                             | Spray in late winter with 0.5g metsulfuron (600g/kg) plus wetting agent / 10 L water (2-3 years of treatment required)                                                                                                                    |
| Iridaceae      | <i>Gladiolus undulatus</i>        | Wild Gladiolus          |        | High                | Moderate                  | Medium   | 1, 2, 7, 12, 17, 18, 21        | Spray in late winter with 0.5g metsulfuron (600g/kg) plus wetting agent / 10 L water (2-3 years of treatment required)                                                                                                                    |
| Iridaceae      | <i>Romulea rosea</i>              | Guildford Grass         |        | High                | Unknown                   | Medium   | 3                              | Spray in late winter with 0.5g metsulfuron (600g/kg) plus wetting agent / 10 L water (2-3 years of treatment required)                                                                                                                    |
| Iridaceae      | <i>Sisyrinchium rosulatum</i>     |                         |        | Not Listed          | Not Listed                | Low      | 10, 11                         | Spray in late winter with 0.5g metsulfuron (600g/kg) plus wetting agent / 10 L water (2-3 years of treatment required)                                                                                                                    |
| Iridaceae      | <i>Watsonia versfeldii</i>        | Watsonia                |        | High                | Moderate                  | Medium   | 9                              | Hand pull and remove scattered plants, or spray with 100g 2,2-DPA(740g/kg) plus wetting agent in 10 L water                                                                                                                               |
| Juncaceae      | <i>Juncus bufonius</i>            | Toad Rush               |        | Low                 | Rapid                     | Low      | 12                             |                                                                                                                                                                                                                                           |
| Juncaceae      | <i>Juncus capitatus</i>           | Capitate Rush           |        | Low                 | Rapid                     | Low      | 12                             |                                                                                                                                                                                                                                           |
| Juncaceae      | <i>Juncus microcephalus</i>       | Weedy Rush              |        | Low                 | Rapid                     | Low      | 15                             | Dig out isolated plants. Try treatment as for Juncus acutus - spray 2% glyphosate + wetting agent in late summer/autumn if there is surface water present throughout the rest of the year. In dry conditions apply in spring/early summer |
| Lamiaceae      | <i>Lavandula stoechas</i>         | Italian Lavendar        |        | Low                 | Moderate                  | Low      | 15                             |                                                                                                                                                                                                                                           |
| Myrtaceae      | <i>Callistemon citrinus</i>       |                         |        | Not Listed          | Not Listed                | Medium   | 15                             | Hand pull and remove scattered plants                                                                                                                                                                                                     |
| Oleaceae       | <i>Olea europaea</i>              | Olive                   |        | High                | Moderate                  | Medium   | 4                              | Hand pull and remove scattered plants                                                                                                                                                                                                     |
| Orchidaceae    | <i>Disa bracteata</i>             | South African Orchid    |        | Unknown             | Rapid                     | Low      | 3, 9                           | Spot spray glyphosate 1% + Pulse®. Just on flowering                                                                                                                                                                                      |
| Orobanchaceae  | <i>Parentucellia latifolia</i>    | Common Bartsia          |        | Unknown             | Rapid                     | Low      | 4                              |                                                                                                                                                                                                                                           |
| Oxalidaceae    | <i>Oxalis compressa</i>           |                         |        | Not Listed          | Not Listed                | Medium   | 1, 2, 12, 14                   | Spray in late winter with 0.1g metsulfuron (600g/kg) plus wetting agent / 10 L water                                                                                                                                                      |
| Oxalidaceae    | <i>Oxalis pes-caprae</i>          | Soursob                 |        | High                | Slow                      | Medium   | 12                             | Spray in late winter with 0.1g metsulfuron (600g/kg) plus wetting agent / 10 L water                                                                                                                                                      |
| Oxalidaceae    | <i>Oxalis purpurea</i>            | Largeflower Wood Sorrel |        | High                | Slow                      | Medium   | 3                              | Spray in late winter with 0.1g metsulfuron (600g/kg) plus wetting agent / 10 L water                                                                                                                                                      |
| Papaveraceae   | <i>Fumaria capreolata</i>         | Whiteflower Fumitory    |        | Medium              | Unknown                   | Medium   | 1, 3                           | Hand pull scattered plants and remove, or spot spray with 0.1g metsulfuron (600g/kg) plus wetting agent in 10 L water                                                                                                                     |
| Pittosporaceae | <i>Pittosporum undulatum</i>      | Sweet Pittosporum       |        | High                | Rapid                     | Medium   | 1, 10, 18, 19, 21              | Hand pull scattered plants and remove, or spot spray with 200 mL glyphosate (450g/kg) plus wetting agent in 10 L water                                                                                                                    |
| Plantaginaceae | <i>Maurandya barclayana</i>       | Mexican Viper           |        | Unknown             | Slow                      | Low      | 1                              |                                                                                                                                                                                                                                           |
| Plantaginaceae | <i>Plantago lanceolata</i>        | Ribwort Plantain        |        | High                | Unknown                   | Medium   | 1, 3, 12                       | Hand pull scattered plants and remove, or spot spray with 200 mL glyphosate (450g/kg) plus wetting agent in 10 L water                                                                                                                    |
| Poaceae        | <i>Aira caryophyllea</i>          | Silvery Hairgrass       |        | Unknown             | Rapid                     | Low      | 2                              |                                                                                                                                                                                                                                           |
| Poaceae        | <i>Avena barbata</i>              | Bearded Oat             |        | High                | Rapid                     | Medium   | 1, 3, 9, 17                    | Selective control by spraying with 100 mL/ha Verdict®520 with wetting agent in winter prior to flowering                                                                                                                                  |
| Poaceae        | <i>Briza maxima</i>               | Blowfly Grass           |        | Unknown             | Rapid                     | Low      | 1, 3, 8, 9, 11, 12, 13, 17, 21 | Selective control by spraying with 800 mL/ha Verdict®520 with wetting agent in winter prior to flowering                                                                                                                                  |
| Poaceae        | <i>Briza minor</i>                | Shivery Grass           |        | Unknown             | Rapid                     | Low      | 2, 9                           | Selective control by spraying with 800 mL/ha Verdict®520 with wetting agent in winter prior to flowering                                                                                                                                  |
| Poaceae        | <i>Bromus diandrus</i>            | Great Brome             |        | High                | Rapid                     | Medium   | 1, 3                           | Selective control by spraying with 100 mL/ha Verdict®520 with wetting agent in winter prior to flowering                                                                                                                                  |
| Poaceae        | <i>Bromus hordeaceus</i>          | Soft Brome              |        | High                | Rapid                     | Medium   | 2                              | Selective control by spraying with 100 mL/ha Verdict®520 with wetting agent in winter prior to flowering                                                                                                                                  |
| Poaceae        | <i>Cenchrus clandestinus</i>      | Kikuyu Grass            |        | High                | Rapid                     | Medium   | 11                             | Selective control by spraying with 800 mL/ha Verdict®520 with wetting agent in winter prior to flowering                                                                                                                                  |
| Poaceae        | <i>Cynodon dactylon</i>           | Couch                   |        | High                | Rapid                     | Medium   | 1, 2, 3, 10, 19                | Selective control by spraying with 1 L/ha Fusilade®212 with wetting agent in winter prior to flowering                                                                                                                                    |
| Poaceae        | <i>Ehrharta calycina</i>          | Perennial Veldt Grass   |        | Unknown             | Moderate                  | Medium   | 17                             | Selective control by spraying with 1 L/ha Fusilade®212 with wetting agent in winter prior to flowering                                                                                                                                    |
| Poaceae        | <i>Ehrharta longiflora</i>        | Annual Veldt Grass      |        | Unknown             | Rapid                     | Medium   | 1, 12, 13, 18                  | Selective control by spraying with 1 L/ha Fusilade®212 with wetting agent in winter prior to flowering                                                                                                                                    |
| Poaceae        | <i>Eragrostis curvula</i>         | African Lovegrass       |        | High                | Rapid                     | Medium   | 3, 9, 12, 13                   | Hand pull and remove scattered plants, or spray in winter with 4 L glyphosate (450g/L) plus wetting agent                                                                                                                                 |
| Poaceae        | <i>Lagurus ovatus</i>             | Hare's Tail Grass       |        | Unknown             | Moderate                  | Low      | 1                              | Selective control by spraying in winter prior to flowering with 20 mL Fusilade®212 with wetting agent per 10 L water                                                                                                                      |
| Poaceae        | <i>Lolium rigidum</i>             | Wimmera Ryegrass        |        | Moderate            | Rapid                     | Low      | 1                              | Selective control by spraying in winter prior to flowering with 5 mL Fusilade®212 with wetting agent per 10 L water                                                                                                                       |
| Poaceae        | <i>Paspalum dilatatum</i>         | Paspalum                |        | High                | Rapid                     | Medium   | 1, 2                           | Selective control by spraying with 800 mL/ha Verdict®520 with wetting agent in winter prior to flowering                                                                                                                                  |

| Family      | Species Name                   | Common Name       | Status        | Impact <sup>1</sup> | Invasiveness <sup>1</sup> | Priority    | Area (Figure 2)  | Recommended Treatment                                                                                                            |
|-------------|--------------------------------|-------------------|---------------|---------------------|---------------------------|-------------|------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Poaceae     | <i>Stenotaphrum secundatum</i> | Buffalo Grass     |               | High                | Moderate                  | Medium      | 1, 2, 13, 14, 20 | Selective control by spraying with 800 mL/ha Verdict®520 with wetting agent in winter prior to flowering                         |
| Poaceae     | <i>Vulpia myuros</i>           | Rat's Tail Fescue |               | Unknown             | Rapid                     | Low         | 3                | Spray in winter prior to flowering with 5 mL glyphosate (450g/L) plus wetting agent / 10L water for reasonably selective control |
| Primulaceae | <i>Lysimachia arvensis</i>     | Pimpernel         |               | Unknown             | Rapid                     | Low         | 2                |                                                                                                                                  |
| Rubiaceae   | <i>Galium murale</i>           | Small Goosegrass  |               | Low                 | Unknown                   | Low         | 2                |                                                                                                                                  |
| Rubiaceae   | <i>Galium spurium</i>          | False Cleavers    | Declared Pest | Not Listed          | Not Listed                | <b>High</b> | 4                | Spray in late winter with 1.0g chlorsulfuron (750g/kg) plus wetting agent in 10 L water                                          |
| Solanaceae  | <i>Physalis peruviana</i>      | Cape Gooseberry   |               | Low                 | Moderate                  | Low         | 3                |                                                                                                                                  |
| Violaceae   | <i>Viola odorata</i>           | Common Violet     |               | Low                 | Slow                      | Low         | 3                |                                                                                                                                  |

<sup>1</sup> Department of Parks and Wildlife 2014