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State Barrier Fence Extension

Weed Hygiene Plan

DRAFT

Prepared for
Department of Agriculture and Food Western Australia
by Strategen

April 2017

State Barrier Fence Extension

Weed Hygiene Plan

DRAFT

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April 2017

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Client: Department of Agriculture and Food Western Australia

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
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Summary

This Weed Hygiene Plan (WHP) has been submitted in accordance with the requirements of the Environmental Scoping Document (ESD) (Assessment Number 2088) Item 4 Project by Department of Agriculture and Food Western Australia (DAFWA).

Table ES 1 below presents the environmental management target/s to measure achievement of the conditioned environmental objective that must be met through implementation of this Condition EMP.

Table ES 1: Environmental management targets

Required information	Response
Title of proposal	State Barrier Fence Esperance Extension.
Proponent	Department of Agriculture and food Western Australia.
Environmental Scoping Document	Assessment Number: 2088.
Purpose of this WHP	The Weed Hygiene Plan is submitted as a mitigation strategy to meet the requirements of Item 4 of the ESD (Assessment Number: 2088).
EPA's environmental objective for the key environmental factor	Flora and Vegetation: To protect flora and vegetation so that the biological diversity and ecological integrity are maintained.
WHP environmental objective	To ensure indirect impacts on flora and vegetation from the introduction and spread of weeds from the Proposal can be managed.
Management targets	Management target 1: No new introductions or spread of Declared Pests and aggressive weeds. Management target 2: Minimise the spread of existing weeds within the maximum clearing footprint.

Corporate endorsement

I hereby certify that to the best of my knowledge, the provisions within this Weed Hygiene Plan are true and correct and address the legal requirements the Environmental Scoping Document (Assessment Number:2088).

[Signature of duly authorised proponent representative]

Name: Kevin Chennell

Signed:

Designation: Executive Director, Biosecurity and Regulation

Date:

1. Context, scope and rationale

The Weed Hygiene Plan (WHP) presents the management actions to be implemented by the Department of Agriculture and Food Western Australia (DAFWA) to ensure indirect impacts on flora and vegetation from the introduction and spread of weeds associated with the Proposal can be managed.

1.1 What is the Proposal?

DAFWA, on behalf of the agricultural industry in the Shires of Ravensthorpe and Esperance, proposes to extend the existing State Barrier Fence (SBF) from its current termination point 25 km east of Ravensthorpe, north to Salmon Gums, ending east of Esperance near Cape Arid National Park (the Proposal; Figure 1-1).

The Proposal is in response to socio-economic impacts on industry and communities in the region from periodic emu 'migrations', kangaroo damage to crops and pasture and the impact of wild dogs limiting livestock enterprises. The Proposal aims to protect agricultural enterprises by providing a physical barrier along the boundary between agricultural land and Unallocated Crown Land (UCL) in the Great Western Woodlands (GWW) to restrict the movement of kangaroos, emus and wild dogs (target fauna) from entering agricultural land.

The Proposal involves the construction of a 660 km long and 1.35 m high barrier fence that is largely impermeable to target fauna. The Proposal includes corridor gaps in the barrier fence at three major waterways that intersect the Proposal alignment, and a 3.2 km wide unfenced coastal corridor near Cape Arid National Park. These gaps in the proposed barrier fence will maintain significant ecological corridors (Figure 1-1).

1.2 Scope

A WHP was prepared in May 2015 for the Proposal in response to recommendations made following biological surveys undertaken for the Proposal alignment (Ecoscape 2015a). The Environmental Protection Authority (EPA) also issued in August 2015 Environmental Assessment Guideline (EAG) 17 for *Preparation of Management Plans* under Part IV of the *Environmental Protection Act 1986* (EP Act) (EPA 2015). The WHP was prepared prior to the release of EAG 17 and was not consistent with the format requirements outlined in EAG 17.

Since preparation of the original WHP and referral of the Proposal, the OEPA (2016) issued the Environmental Scoping Document (ESD) guiding the assessment of the Proposal. The ESD required DAFWA to prepare a WHP in accordance with EAG 17. Subsequently, this WHP has been prepared to address the ESD requirement, and is based on the original WHP (Ecoscape 2015a).

The WHP addresses the construction and ongoing maintenance activities for the proposed barrier fence and has been structured as a management-based environmental plan in accordance with EAG 17. The WHP identifies the management actions and monitoring measures that should be implemented to achieve the EPA environmental objective for Flora and Vegetation. Management targets and contingency actions have also been identified to provide an adaptive management framework to ensure the potential introduction and spread of weeds associated with the Proposal can be managed.

Since the release of the ESD, the EPA has published revised instructions on how to prepare environmental management plans. After 13 December 2016 the EAG 17 guidelines have been superseded. However, consistent with EPA advice to DAFWA for this transitional period this WHP has been prepared in accordance with the requirements set out in the ESD.

The management actions and monitoring requirements in this WHP are expected to be very similar to those required for *Phytophthora* Dieback management. A *Phytophthora* Dieback Management Plan (PDMP) is proposed to be developed following approval of the Proposal. Due to the inherent similarities in management approach, DAFWA anticipates the PDMP may be incorporated with the WHP as one document (for example, as a Weed and *Phytophthora* Dieback Hygiene Plan) to avoid unnecessary duplication and aid management efficiency.

1.3 Key environmental factor, aspects and objectives

The ESD aimed to ensure the EPA objectives for preliminary key environmental factors are met. The ESD identified Flora and Vegetation as one of the key preliminary environmental factors for the Proposal due to the potential indirect risk of the introduction and spread of weeds associated with the Proposal from construction and ongoing maintenance activities.

The environmental objective for this WHP is to ensure indirect impacts on flora and vegetation from the introduction and spread of weeds from the Proposal can be managed.

The EPA objective, as well as relevant environmental aspect of the Proposal that may impact on Flora and Vegetation are provided in Table 1-1.

Table 1-1: Key environmental factor, EPA objective and aspect of the Proposal

Environmental factor	EPA objective	Environmental aspects of the Proposal
Flora and Vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained	The introduction and/or spread of weeds through the construction and ongoing maintenance of the Proposal from: <ul style="list-style-type: none"> increased vehicular access clearing of native vegetation disturbance of topsoil and mulching from chaining/clearing activities.

1.4 Requirements of the ESD

The ESD outlines the required work items to be conducted to inform the assessment of the environmental impact of the Proposal on Flora and Vegetation. This WHP has been prepared to address the requirement of work item 4 of the ESD presented in Table 1-2.

Table 1-2: Requirements of the ESD

Item	Requirement	Section in WHP
4	Describe proposed management, monitoring and mitigation methods to be implemented to ensure residual impacts (direct and indirect) are not greater than predicted.	Section 2; Table 2-2; Table 2-3; Table 2-4

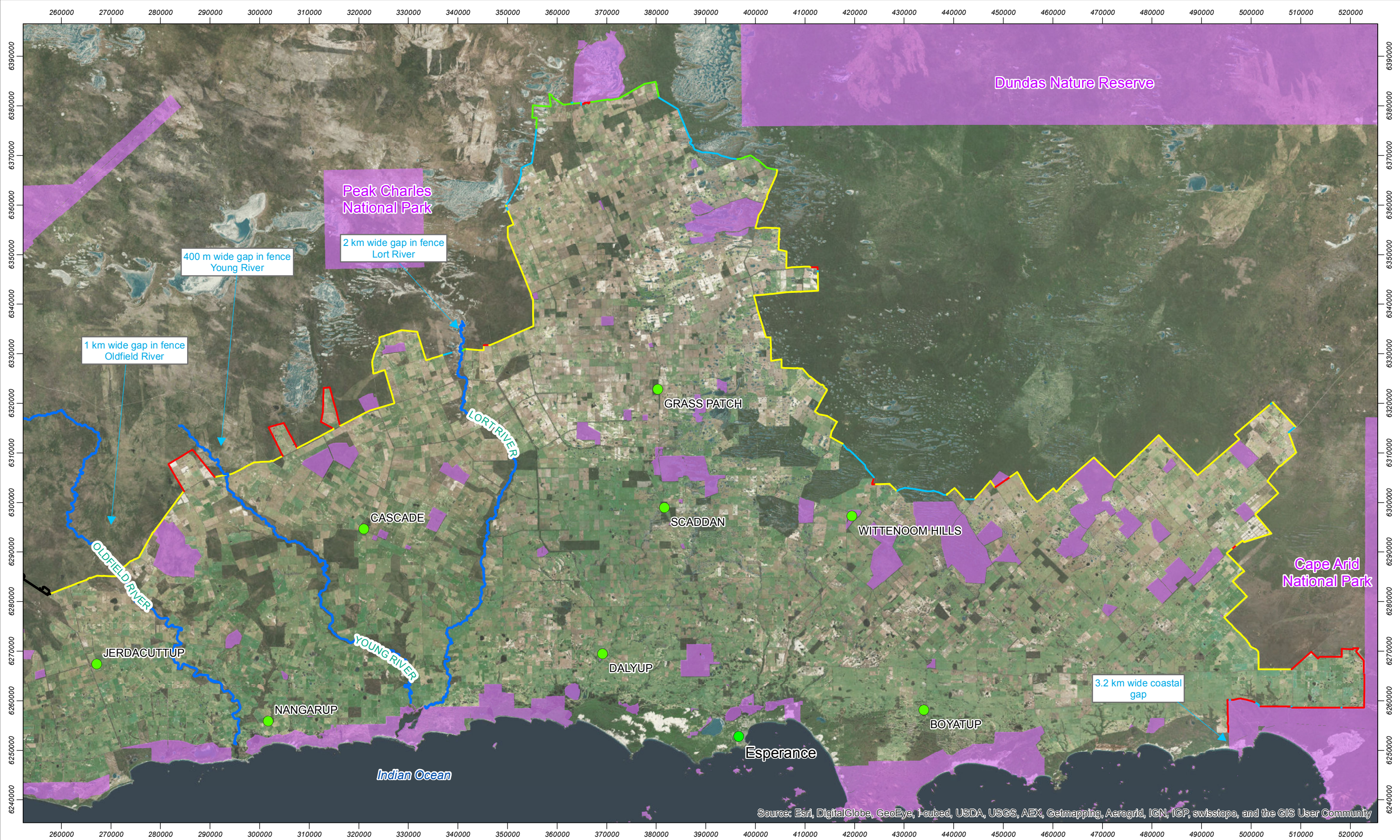


Figure 1-1: Existing environment condition along the Proposal alignment and regional location

Scale 1:708,000 at A3

0 2 4 6 8 10 km

Coordinate System: GDA 1994 MGA Zone 51
Note that positional errors may occur in some areas
Date: 12/04/2017
Author: DWhite
Source: Aerial: ESRI approx. 2010; Data: Client 2016; Reserves: DPaw. 2012.
Path: Q:\Consult\2016\DAF\DAF16515\ArcMap_documents\R003\DAF16515_01_R003_RevA_F001-1_A3.mxd

Legend

- Town
- Existing SBF
- Major watercourses
- Reserves
- Previously chained firebreak
- Existing track or graded firebreak
- Previously cleared freehold farmland
- Uncleared vegetation

Proposal alignment existing environment condition

- Previously cleared freehold farmland
- Uncleared vegetation

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1.5 Rationale and approach in meeting the environmental objective

The WHP has been developed for the following reasons to meet the EPA's objective for Flora and Vegetation and to ensure indirect impacts on flora and vegetation from the introduction and spread of weeds from the Proposal can be managed:

- prevent the introduction and/or spread of Declared Pests pursuant to the *Biosecurity and Agriculture Management Act 2007* (BAM Act) and aggressive weeds
- minimise the spread of existing weeds within the maximum clearing footprint area
- ensure that weed control measures are implemented during construction and ongoing maintenance activities to ensure there is no significant impact of weeds on flora and vegetation.

1.5.1 Environmental studies

This WHP has been informed by the following environmental investigations and the original *Weed Hygiene Plan* (Ecoscape 2015a) prepared for the Proposal:

- GHD (2012) *Report for State Barrier Fence Extension Scoping Study*
- Ecoscape (2015b) *State Barrier Fence Biological Surveys*.

These environmental investigation results are presented in the PER document. A summary of the results pertaining to introduced flora has been provided below.

GHD (2012) scoping study report findings

A Level 1 flora and fauna desktop and field assessment was conducted for four potential alignment options for the Proposal. The study area comprised a 100 m wide area along the entire length of all proposed alignment options.

The desktop assessment identified these four environmentally significant invasive species as having the potential to occur within the Proposal alignment:

- *Asparagus asparagoides* (Bridal Creeper)
- *Carrichtera annua* (Ward's Weed)
- *Lycium ferocissimum* (African Boxthorn)
- *Tamarix aphylla* (Athel Tree).

The field survey recorded agricultural weeds such as pasture grasses and weedy daisies that were dominant within the Proposal alignment. Weed invasion largely took place within existing disturbed tracks, roads and paddocks. Weed intrusion into the uncleared bushland and previously chained areas was minimal along the survey area. There was only one instance where a significant weed (Bridal Creeper) had intruded into uncleared bushland and this was located along the eastern-most section of the Proposal alignment along Cape Arid Nature Reserve.

The study concluded the construction of the proposed barrier fence within previously uncleared vegetation could potentially increase the risk of weed invasion in these areas, and consideration for weed control should be given in areas along the Proposal alignment with high environmental significance, such as Cape Arid National Park.

Ecoscape (2015b) State Barrier Fence biological survey findings

This survey comprised a Level 2 flora and Level 1 fauna assessment for the Proposal alignment. The study area comprised 6430 ha and was a 100 m wide corridor along the Proposal alignment.

Much of the vegetation along the Proposal alignment has been modified from clearing and chaining activities. A total of 26 invasive species (weeds) were identified as occurring along the length of the Proposal alignment, with the following two¹ species Declared Pests:

- *Asparagus asparagoides* (Bridal Creeper)
- *Onopordum acaulon* (Stemless Thistle).

The two identified Declared Pests are recognised as Category Three (C3) under the Western Australian Organism List (WAOL) developed pursuant to the BAM Act, which requires landowners and land managers to implement measures to limit the spread and potential damage to natural environments and agricultural lands. These are established plant species where it is not feasible or desirable to manage them in order to limit their damage. The biology of each species are presented in Appendix 1.

Locations for the Declared Pest species are outlined below (Figure 1-2)

- *Asparagus asparagoides* (Bridal Creeper) – adjacent to Cape Arid National Park
- *Onopordum acaulon* (Stemless Thistle) – north of Salmon Gums adjacent to Beete Road.

¹ Ecoscape (2015b) identified *Carthamus lanatus* as a Declared Pest. This species has since been delisted under the BAM Act

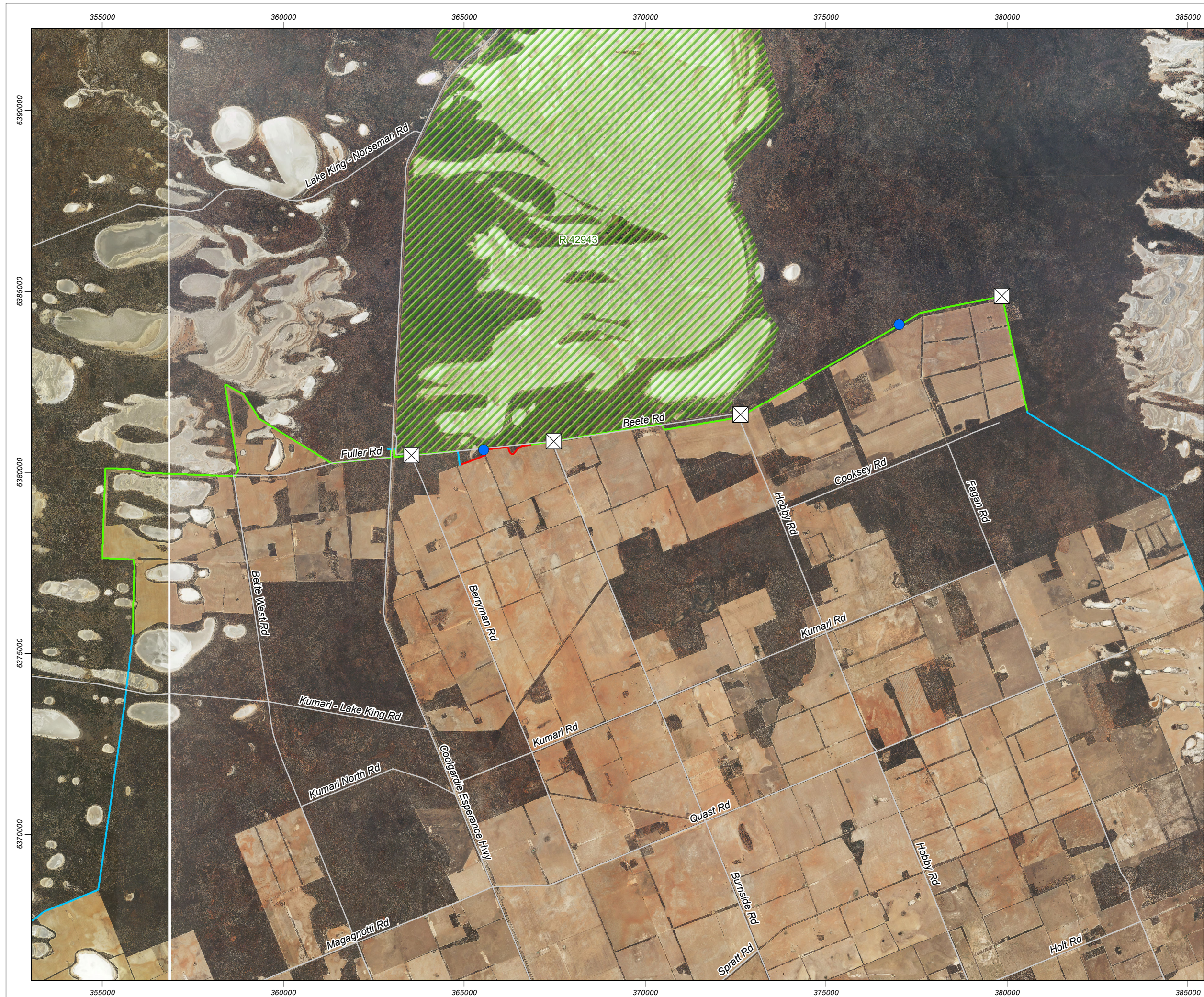
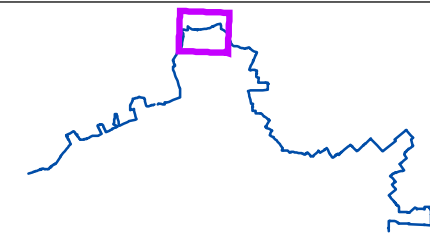


Figure 1-2a:
Identified locations of
Declared Pest species
and potential high risk
areas

- Legend**
- Indicative location for Declared Pest entry/exit signage
 - Onopordum acaulon* (Stemless Onopordon)
 - Roads
 - Parks and Wildlife Managed Lands and Waters
- Proposal alignment existing environment condition**
- Existing track or graded firebreak
 - Previously cleared freehold farmland
 - Uncleared vegetation



Scale 1:100,000 at A3

0 0.5 1 1.5 2 km

Coordinate System: GDA 1994 MGA Zone 51
Note that positional errors may occur in some areas
Date: 12/04/2017
Author: DWhite
Source: Aerial: ESRI approx. 2010; Inland waters: SLIP database, Landgate 2017





Figure 1-2b:
**Identified locations of
Declared Pest species a
nd potential high risk
areas**

Legend

- Indicative location for Declared Pest entry/exit signage
- Asparagus asparagoides* (Bridal Creeper)
- Roads
- Parks and Wildlife Managed Lands and Waters

Proposal alignment existing environment condition

- Previously chained firebreak
- Previously cleared freehold farmland
- Uncleared vegetation

Scale 1:100,000 at A3

0 0.5 1 1.5 2 km

Coordinate System: GDA 1994 MGA Zone 51
Note that positional errors may occur in some areas
Date: 12/04/2017
Author: DWhite
Source: Aerial: ESRI approx. 2010; Inland waters: SLIP database, Landgate 2017

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1.5.2 Assumptions and uncertainties

The list of identified weed species (Ecoscape 2015b) is not considered comprehensive for the study area as they were not specifically targeted during the flora field surveys. The eastern most portion of the Proposal alignment was not included in the Level 2 survey conducted in 2015; furthermore the Proposal alignment has since been slightly modified since the Level 2 vegetation survey was conducted (Ecoscape 2015); therefore, no data on Declared Pest species is available for these locations. To address this limitation this WHP includes reference to 'significant' weeds which may exist along the Proposal alignment and, if identified within the Proposal Development Envelope, are subject to the requirements of the plan. Significant weeds are defined as:

- Declared Pests under the BAM Act
- Weeds of National Significance (WoNS)
- Priority weeds identified in the *Great Western Woodlands Draft Strategic Weed and Feral Animal Management Plan* (Draft GWW WFAMP; DEC 2013) (Appendix 2).

WoNS are species which have been agreed by Australian governments as priority weeds based on their invasiveness, potential for spread and environmental, social and economic impacts (DEE 2017). In Western Australia many WoNS are also Declared Pests under the BAM Act (DAFWA 2017).

The Draft GWW WFAMP (DEC 2013) has been developed to provide cross-tenure strategic direction in weed (and feral animal) management for all land managers in the GWW. The Draft WFAMP includes a list of priority weeds identified in the development of the plan, being species that pose the greatest threat to biodiversity and cultural values of the GWW, but for which there is a strong likelihood of control. .

1.5.3 Management approach

The general approach for managing any potential construction and ongoing maintenance impacts on flora and vegetation from the Proposal is to develop a comprehensive management-based program that identifies:

- management risks
- key management-based targets
- management actions
- monitoring measures
- review and revision requirements.

The Proposal alignment will largely be located within existing tracks and graded firebreaks, and previously chained areas where possible, to avoid the spread of weeds into uncleared vegetation. The locations for the identified Declared Pests are located adjacent to environmentally significant reserves (Cape Arid National Park and Lake Gilmore Nature Reserve). However, these areas are associated with previous disturbance from chaining events, existing tracks and farm boundary fences.

An adaptive risk based management approach has been developed in order to create a robust management system, that prioritises and manages significant risks using the mitigation hierarchy (i.e. avoid, minimise, manage, rehabilitate and offset). The proposed monitoring and adaptive management approach was informed on risks identified and mitigation proposed in the original WHP (Ecoscape 2015a).

This management approach allows for flexibility, to enable the management program to adapt to any changes in the Proposal conditions, as well as to respond to the dynamic nature of the surrounding environment.

Identified locations of Declared Pest species (Ecoscape 2015b) are referred to as high risk areas in this WHP (Figure 1-2).

1.5.4 Rationale for choice of management targets

Management targets were selected to manage the potential risk of introduced and/or spread of weeds along the Proposal alignment and are based on:

- review of available data for the region and Proposal alignment
- the relationship between the Proposal aspects and the EPA environmental factors
- industry standards, legislative requirements and best practice procedures
- the requirements of the ESD.

2. WHP provisions

This section of the WHP identifies the legal provisions that DAFWA proposes to implement to satisfy work item 4 for Flora and Vegetation in the ESD. It identifies the management targets that DAFWA will use to measure performance and monitoring that will be undertaken in relation to the management targets. Finally, it identifies how DAFWA will review and revise management actions if the management targets are exceeded.

2.1 Environmental objective

The WHP environmental objective is to ensure indirect impacts on flora and vegetation from the introduction and spread of weeds from the Proposal can be managed.

2.2 Management actions

Risk-based management actions have been identified and prioritised to achieve the WHP environmental objective (Table 2-1).

These management actions focus on the construction and ongoing maintenance activities associated with the proposed barrier fence that have the highest likelihood of causing environmental impact, and were specifically developed to reduce potential indirect impacts on Flora and Vegetation. Management and monitoring actions will be implemented by DAFWA or its contractors.

Table 2-1: Risk-based management actions that will be implemented to meet the WHP and EPA environmental objectives

Risk and key impacts	Management actions	Risk-based priority	Timeframe
Introduction and/or spread of weeds via clearing activities and equipment	<ol style="list-style-type: none"> 1. Conduct environmental inductions that discuss: <ul style="list-style-type: none"> • significant weeds (Declared Pests, WoNS and Draft GWW WFAMP priority weeds) recorded and potentially occurring within the Proposal alignment • high risk areas (including mapping of known locations of significant weeds within Development Envelope) • clean-on-entry requirements and wash-down/brush down procedures. 2. Compile maps of known occurrences of significant weeds and amend as required. 3. Develop and maintain a significant weed register for weeds identified within Proposal Development Envelope. Register to include for each species: <ul style="list-style-type: none"> • location within Development Envelope • details of distribution • abundance • relevant biological information • history of control methods and relative success of control methods • importance of following weed hygiene procedures. 4. Conduct inspections of the proposed barrier fence to identify new weed outbreaks. 5. Review the list of Declared Pests annually and update this WHP and weed register with any relevant changes. 6. Clearly demarcate high risk areas and previously uncleared areas using distinctive markers (flagging tape, signage etc.) 7. Install traffic control methods such as gates (or suitable equivalent to clearly signal to vehicles to stop for inspection) and significant weed signage at entry/exit locations identified high risk areas and previously uncleared areas. 8. Inspect vehicles and machinery exiting restricted areas, including the following measures: <ul style="list-style-type: none"> • check tyres and the underside of vehicles for plant and organic material – clean on exit if required • check tools and machinery involved in clearing for plant and organic material – clean on exit if required. 9. Undertake direction of clearing in low risk areas from that area towards high risk areas. 10. Ensure potentially weed contaminated windrows or stockpiles of cleared vegetation from within high risk areas is kept within that area, separate from low risk areas, and signposted. 	High	During construction
	<ol style="list-style-type: none"> 1. Conduct environmental inductions that discuss: <ul style="list-style-type: none"> • significant weeds • high risk areas, including mapping • clean-on-entry requirements and wash-down/brush down procedures. 2. Maintain the significant weed register developed during construction. 3. Ensure all plant and equipment, including vehicles cleaned and inspected prior to entry to the Proposal alignment. 4. Inspect vehicles and machinery exiting high risk areas including the following measures: <ul style="list-style-type: none"> • check tyres and the underside of vehicles for plant and organic material – clean on exit if required • check tools and machinery involved in clearing for plant and organic material – clean on exit if required. 	Moderate	During ongoing maintenance

Risk and key impacts	Management actions	Risk-based priority	Timeframe
Importation of material containing weed seeds may cause introduction of new weeds	1. No soil or vegetation matter will be brought onto the site.	Moderate	During ongoing maintenance
Increased vehicular access in previously uncleared vegetation and identified high risk areas	1. All vehicles and machinery will be clean-on-entry to site. 2. Maintain records of all vehicle and machinery inspections, including the following information: <ul style="list-style-type: none"> • date of inspection • vehicle and machinery inspected • location of inspection, including work proposed for the vehicle or machinery • person conducting inspection and their job role/employer. 3. All records (hard copy and/or electronic) will be available on site and stored at the DAFWA main office. 4. Restrict access to high risk sites through the installation of perimeter demarcation, clear entry/exit points and signage. 5. Movement of vehicles to be restricted to access roads.	Moderate	During construction
	1. All vehicles and machinery will be clean-on-entry to site. 2. Maintain records of all vehicle and machinery inspections, including the following information: <ul style="list-style-type: none"> • date of inspection • vehicle and machinery inspected • location of inspection, including work proposed for the vehicle or machinery • person conducting inspection and their job role/employer. 3. All records (hard copy and/or electronic) will be stored with the DAFWA SBF Manager. 4. Map location of high risk sites and provide maps, coordinates, weed register and clean on exit instructions for these sites to staff and contractors prior to conducting maintenance activities on Proposal.	Moderate	During ongoing maintenance

2.3 Management target

A management target will be employed to measure and report against achievement of the WHP and EPA environmental objectives.

Table 2-2: Management targets to measure the efficacy of management actions relative to the WHP and EPA environmental objectives

Proponent environmental objective	Response
Management target 1	No new introductions or spread of Declared Pests and other significant* weeds attributable to the Proposal.
Management target 2	Minimise the spread of existing significant* weeds within the maximum clearing footprint.

*Significant weeds are defined as Declared Pests under the BAM Act, WoNS and priority weeds identified in the Draft GWW WFAMP (DEC 2013).

2.4 Monitoring

The purpose of monitoring is to inform, through the management targets, if the WHP and EPA environmental objectives are being achieved and when management actions will be have to be reviewed and revised.

Table 2-3 describes the monitoring program for weeds along the Proposal alignment.

Table 2-3: Monitoring to measure the efficacy of management actions against the management targets

Indicator	Method	Location	Parameters	Frequency
Management target 1: No new introductions or spread of Declared Pests and aggressive weeds				
No incidents relating to non-compliance with hygiene procedures on site	Check the integrity of the demarcation of high risk areas, and previously uncleared areas.	High risk areas and previously uncleared areas.	<ul style="list-style-type: none"> Demarcation (e.g. flagging, signage) Vehicle/plant inspection records Incident reports. 	Weekly during construction until completion of clearing works.
No new outbreaks of significant weed species attributable to Proposal	Conduct inspections to identify new weed outbreaks.	Proposal alignment – edge of disturbance.	<ul style="list-style-type: none"> Up to date weed register and mapping Incident and assessment reports. 	Annually in winter to spring (during maintenance). Opportunistically (during construction and maintenance).
Management target 2: Minimise the spread of existing weeds within the maximum clearing footprint				
No spread of significant weed species attributable to Proposal	Assess high risk areas and adjacent areas for growth of new significant weed species.	High risk areas and areas adjacent to mapped area boundary.	<ul style="list-style-type: none"> Up to date weed register and mapping Incident and assessment reports. 	Annually in winter to spring. Opportunistically.
	Monitor potentially weed contaminated windrows or stockpiles.	High risk areas.	<ul style="list-style-type: none"> Up to date weed register and mapping Incident reports. 	Monthly during construction. Opportunistically.
	Conduct inspections to identify spread of existing significant weeds.	Proposal alignment – edge of disturbance.	<ul style="list-style-type: none"> Up to date weed register and mapping Incident and assessment reports. 	Annually in winter to spring. Opportunistically.
Vehicle inspection logs completed and up to date	Review vehicle inspection logs to ensure hygiene procedure is being followed.	Proposal alignment.	<ul style="list-style-type: none"> Vehicle inspection records. 	Monthly during construction. Quarterly during maintenance.

2.5 Review and revision of management actions

In the event that management targets are not met, the Proponent will investigate the potential cause and determine the likely impact on terrestrial flora and vegetation. This includes risks and key impacts with associated management actions and priorities in Table 2-1. If the management targets were not met as a result of the Proposal the risk assessment will be reviewed and management actions revised as per Table 2-4 to ensure environmental objectives are met.

Reviewed and revised management actions will be implemented by the Proponent to mitigate and manage impacts so they once again will meet the management targets and the environmental objective.

Table 2-4: Monitoring and corrective actions for management targets

Trigger	Corrective actions
Weed infested material handled inappropriately	<ol style="list-style-type: none"> 1. Investigate the cause. 2. Implement remedy, which may include intensive weed control in the affected area. 3. Monitor the success of the control. 4. Review weed management measures if the source of the introduction was operational. 5. Communicate the outcome of the investigation and control program to the work force in a tool box meeting.
Non-compliance with hygiene procedures onsite	<ol style="list-style-type: none"> 1. DAFWA will notify Department of Parks and Wildlife and/or private landholder of the location and (if relevant) species identified within the Proposal alignment. 2. Investigate cause. 3. Implement remedy, which could include: <ul style="list-style-type: none"> • review of hygiene measures • improve induction for staff/contractors • increase educational signage • improve wash down/ brush down facilities available on site. 4. Monitor success of remedy.
Demarcation/control points at site entry and exit points (human or environmental) subject to damage	<ol style="list-style-type: none"> 1. Investigate cause of damage. 2. Arrange for repairs to be undertaken. 3. Assess the need for additional measures to be implemented (e.g. use of temporary fencing, gates).
New introductions/spread of significant weed species areas attributable to Proposal	<ol style="list-style-type: none"> 1. Review the list of Declared Pests annually and update this WHP, weed register and weed maps with any relevant changes. 2. Inspect vehicle cleaning logs to ensure compliance with procedure. 3. Inspect and review vehicle access prevention measures along Proposal alignment. 4. Report the following information to the DAFWA Pest and Disease Information Service (PaDIS): <ul style="list-style-type: none"> • date of observation • person and company who observed the new population • weed species • location of population (position along the Proposal alignment and GPS co-ordinates) • approximate size of infestation (number of weed individuals/populations) • photos (if possible). PaDIS can be contacted by phone (1800 084 881) or email (info@agric.wa.gov.au). 5. Mark locations of new significant weed populations using flagging tape and update weed register and mapping as required. 6. Consult DAFWA regarding potential controls and implement controls (e.g. herbicide application).

Trigger	Corrective actions
Growth of significant weeds in windrows or stockpiles of potentially contaminated windrows or stockpiles	<ol style="list-style-type: none"> 1. Report the following information to the DAFWA Pest and Disease Information Service (PaDIS): <ul style="list-style-type: none"> • date of observation • person and company who observed the new population • weed species • location of population (position along the Proposal alignment and GPS co-ordinates) • approximate size of infestation (number of weed individuals/populations) • photos (if possible). PaDIS can be contacted by phone (1800 084 881) or email (info@agric.wa.gov.au). 2. Update weed register and mapping as required. 3. Consult DAFWA regarding potential controls and implement controls (e.g. herbicide application)

2.6 Reporting provisions

2.6.1 Annual reporting

A summary will be produced annually during construction and ongoing maintenance of the Proposal that details weed hygiene performance.

The annual summary will include:

- summary of hygiene measures undertaken
- comparison of monitoring results to management targets
- documentation of any contingency actions undertaken.

The annual summary will also include the achievement of management targets and the environmental objective. The WHP summary template is presented in Table 2-5.

The annual summary will be submitted to the CEO of the OEPA as part of the performance review section of annual compliance reports expected to be required under EP Act approval of the Proposal.

2.6.2 Reporting on exceedance of the management target

In the event that the management targets are exceeded (or not met), DAFWA will notify the CEO of the OEPA within seven days of identification of the exceedance.

Table 2-5: Environmental management plan reporting table

WHP environmental objective and management target set in the Condition EMP	Reporting on the management objective and management target	Status of achievement
Key environmental factor: Flora and Vegetation (ESD Assessment Number: 2088)		
EPA environmental objective: <i>To protect flora and vegetation so that biological diversity and ecological integrity are maintained</i>		
Management target 1: No new introductions or spread of Declared Pests and other significant* weeds attributable to the Proposal.	There [has/ has not] been introductions or spread of Declared Pests and other significant* weeds attributable to the Proposal.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Management target 2: Minimise the spread of existing significant* weeds within the maximum clearing footprint.	The spread of existing significant weeds within the maximum clearing footprint [was/ was not] minimised.	<input type="checkbox"/> Yes <input type="checkbox"/> No

3. Adaptive management and review

DAFWA will implement adaptive management systems to provide a robust management plan to learn from the implementation of mitigation measures, monitoring and evaluation against management targets in order to meet the WHP environmental objective. The following approach will be taken:

- review management and monitoring requirements (including frequency) after one year
- address evaluation of assumptions and uncertainties in Section 1.5.2
- re-evaluate the risk assessment and revision of risk-based priorities on the basis of monitored information
- revision when management actions are not as effective as predicted
- revision due to external changes during ongoing maintenance of the Proposal, for example:
 - * continuous improvement and changes in regulatory and corporate requirements
 - * changes to the sensitivity of the key environmental factors
 - * implementation of other activities in the area etc.

4. Stakeholder consultation

As part of the preparation of the WHP, consultation with various stakeholders was undertaken and is detailed in the PER document.

5. References

- Environmental Protection Authority (EPA) 2015, *Environmental Assessment Guideline 17: Preparation of management plans under Part IV of the Environmental Protection Act 1986*, Environmental Protection Authority, Western Australia.
- Ecoscope 2015a, *State Barrier Fence Weed Hygiene Plan*, report prepared for Department of Agriculture and Food Western Australia, May 2015.
- Ecoscope 2015b, *State Barrier Fence Biological Surveys*, 9309-3087-13R Rev 1 report prepared for Department of Agriculture and Food Western Australia, July 2015.
- Department of Environment and Conservation (DEC) 2013, *Great Western Woodlands Draft Strategic Weed and Feral Animal Management Plan*, Department of Environment and Conservation, Perth, April 2013.
- Department of Agriculture and Food (DAFWA) 2017, *Weeds of National Significance*, Government of Western Australia, Available from: <https://www.agric.wa.gov.au/pests-weeds-diseases/weeds/weeds-national-significance> [31 March 2017].
- GHD 2012, *Report for State Barrier Fence Esperance Extension Scoping Study*, report prepared by GHD Pty Ltd for Department of Agriculture and Food Western Australia, September 2012.
- Office of the Environmental Protection Authority (OEPA) 2016, *Environmental Scoping Document, Proposal Name: State Barrier Fence Esperance Extension, Assessment Number: 2088*, Environmental Protection Authority, Perth, Western Australia, 27 October 2016.

Appendix 1

Declared Pests biology information

STEMLESS THISTLE (*ONOPORDUM ACAULON*)

Appearance

Stemless Thistle is a woolly annual to biennial herb that is usually prostrate. The leaves are a rosette of grey prickly woolly leaves that can grow over 60 cm in diameter. As its name suggests, the Pest does not produce any stems. It has white or purple flowers of 4–6 cm diameter surrounded by sharp spines, between October and December, sometimes in July.



Image sourced from Ecoscape (2015a)

Preferred Habitat

Stemless Thistle occurs in pastures, roadsides, disturbed areas and cultivated lands. It grows in a variety of soils, including sand, heavy clay and calcareous loams and stony slopes. It tolerates a range of soil moisture conditions, from mostly dry to moderately wet. This species is found mainly in the southern cereal growing areas near Esperance.

Reason for Declaration

Stemless Thistle is listed as a C3 organism (Declared Pest) for a number of south-western local government areas, including the Shires of Ravensthorpe and Esperance within which the study area occurs. This weed species can greatly reduce the carrying capacity of pastures, reducing crop yields. It is also generally unpalatable to stock and can cause stomach ailments and occasionally liver and kidney damage.

The distribution, ecological impact and rate of dispersal of this species in the South Coastal Region is currently unknown. Seeds are known to lay dormant in the soil for up to several years, making it difficult to eradicate in areas once a population is established.

Method of propagation and potential dispersion

Stemless Thistles disperse their barbed seeds mostly by wind, although they can also get lodged in animal fur and feet and may be dispersed along water channels. They can also get lodged on clothing, shoes and in car wheels, tyres and undersides.

More information on Stemless Thistle (and how to control populations) can be found at the following website:

- <http://florabase.dpaw.wa.gov.au/browse/profile/8154>

BRIDAL CREEPER (ASPARAGUS ASPARAGOIDES)

Appearance

Bridal Creeper is perennial herb and climber, growing between 1 m and 5 m in height. Leaves are fleshy, green and up to 2 cm long. Bridal Creeper has small cream-white flowers in spring and produces red fleshy berries to about 1 cm in diameter before dying back in summer and surviving underground until the following autumn.



Source: Ecoscape (2015a)

Preferred Habitat

Bridal Creeper grows in a wide variety of habitats, including coastal areas, woodlands, shrublands, riparian areas and Pestations. It is extremely invasive and can penetrate and dominate undisturbed bushlands.

Method of propagation and potential dispersion

Bridal Creeper mostly spreads by seed and is readily spread by birds and potentially foxes eating the fruit. Seeds can also be spread by animals and water movement. The species may also propagate from fragments of its modified roots (rhizomes), which can growth into think mats under the soil. Any soil disturbance, such as digging or grading the soil, can cause rhizome fragments to be spread.

Reason for Declaration

Bridal Creeper is listed as a C3 organism (Declared Pest) for the whole of Western Australia and also as a Weed of National Significance (WONS) listed species. The species is one of the State's most urgent environmental weed problems. It is extremely invasive, spreading rapidly over other vegetation, eventually smothering and possibly killing the Pests. It can grow a thick tuberous root mat which inhibits growth of other Pests and prevent overstorey Pests from regenerating.

Implementation of control methods

Determining the extent of *Onopordum acaulon* infestations should include a detailed map with the following recorded information

- the total area invaded
- areas of vegetation that are under threat from invasion
- which areas are eradicable
- infestations that are most likely to be major seed sources
- locations for buffer zones.

Bridal creeper infestations are often found under tall trees, power lines and fence lines, or anywhere birds are likely to perch. Given this knowledge, each time a field area is visited the following checks should occur:

- check tree corridors, roadside vegetation and taller trees on the verge of native vegetation areas.
- always investigate for populations several hundred metres further from where the last Pest was found to ensure that all bird dispersed seedlings are located.

Accurate field observations mean that a successful containment and control program can occur around pre-existing infestations. Where bridal creeper is found, a buffer zone needs to be established. Allow at least a 500 m wide buffer zone around the edge of the infestation. It is imperative that this buffer zone be kept free of any seedlings to limit further spread. Work back from the buffer zone towards the centre of the infestation.

More information on Bridal Creeper can be found at the following websites:

- http://www.weeds.org.au/WoNS/bridalcreeper/docs/Asparagus_Weeds_BPMM-2.pdf
- http://weeds.ala.org.au/WoNS/bridalcreeper/docs/Asparagus_Weeds_BPMM-2.pdf
- <http://florabase.dpaw.wa.gov.au/browse/profile/8779>

Appendix 2
Great Western Woodlands Draft
Strategic Weed and Feral Animal
Management Plan – Priority weed list

Table 1. Priority weed species and priority index scoring

Scientific name		Common name	ARRP Act	WoNS	Invasiveness		Impacts on assets		Feasibility of control		Priority index
Environmental weeds	<i>Cylindropuntia</i> spp.	e.g. Coral Cactus, Devils Rope, Hudson Pear, Jumping Cholla	–	WoNS	Species present in the GWW for possibly up to 100 years, but extent and density of populations is still low. Spread is relatively slow compared with other parts of Australia.	3	Not impacting on assets; occurring predominantly on disturbed land within town sites. Reportedly occurring on pastoral land.	1	High feasibility of control; limited distribution, small isolated populations, low densities and relatively slow rate of spread.	5	9
	<i>Opuntia</i> spp.	e.g. Common Prickly Pear, Drooping Prickly Pear, Wheel Cactus	–	WoNS	Species present in the GWW for possibly up to 100 years, but extent and density of populations is still low. Spread is relatively slow compared with other parts of Australia.	3	Not impacting on assets; occurring predominantly on disturbed land within town sites. Reportedly occurring on pastoral land.	1	High feasibility of control; limited distribution, small isolated populations, low densities and slow rate of spread.	5	9
	<i>Tamarix</i> spp.	Athel Pine, Tamarisk	P1	WoNS	Most historical plantings (up to ≈100 years old) have not spread. Two cases known where it has spread into a waterbody (Lake Boonderoo and Cowarna Downs); both populations probably established after 1995.	3	Historical plantings not impacting on assets. Lake Boonderoo population is large and impacting the waterbody. Cowarna Downs population is smaller is not yet impacting on the waterbody.	3	Feasibility of control is site-dependant. Removal of individual historical plantings is achievable. Control is feasible at Cowarna Downs. Control at Lake Boonderoo would be a major undertaking.	3	9
	<i>Bryophyllum</i> spp.	Mother-of-Millions	–	–	Planted in most townships as a garden species, but has spread at only a handful of locations. Largest population is along a drainage line in Kambalda.	3	Not impacting on assets; occurring only on disturbed land within town sites.	1	High feasibility of control; limited distribution, small isolated populations and relatively slow rate of spread. Control of Kambalda population will be more difficult and will require committed follow-up.	4	8
	<i>Lycium ferocissimum</i>	African Boxthorn	–	WoNS	Common on disturbed land within town sites, but not occurring at high densities. Not behaving as aggressively as in other parts of Australia.	2	Not impacting on assets; occurring only on disturbed land within town sites.	1	High feasibility of control; limited distribution, small isolated populations, low densities and relatively slow rate of spread.	4	7
	<i>Asparagus asparagoides</i>	Bridal Creeper	P1	WoNS	Only limited spread from historical plantings. Not behaving as aggressively in the GWW as in southern and southwestern WA.	2	Not impacting on assets; occurring only on disturbed land. Southern populations are immediately adjacent to intact native vegetation and could potentially invade these areas.	2	Feasibility of control is site-dependant. Species is being contained at southern sites through biocontrol. High feasibility of control at northern sites.	3	7
	<i>Schinus molle</i>	Pepper Tree	–	–	Many historical plantings are spreading, especially in disturbed areas and along drainage lines.	2	Not impacting on assets, although the Boanya population is immediately adjacent to intact native vegetation and could potentially	2	Feasibility of control is site-dependant. Removal of individual historical plantings is achievable. Control of larger populations is feasible with	3	7

Scientific name	Common name	ARRP Act	WoNS	Invasiveness		Impacts on assets	Feasibility of control	Priority index
						invade this area.	committed follow-up.	
<i>Acetosa vesicaria</i>	Ruby Dock	–	–	Occurs along the length of the Transline from Kalgoorlie to WA-SA border demonstrating invasion potential, but has otherwise has only limited spread.	4	Not impacting on assets; occurring only on disturbed land.	1 Feasibility of control is site-dependant. Low feasibility of control for linear populations, e.g. Transline. High feasibility of control for isolated outliers, e.g. mine sites.	1 6
<i>Gazania</i> spp.	Gazania	–	–	Not behaving as aggressively in the GWW as elsewhere in WA. Not spreading beyond disturbed areas in townships.	2	Not impacting on assets; occurring only on disturbed land within town sites.	1 Low feasibility of control. Occurring in isolated populations, but at high densities. Containment unlikely for town site populations.	2 5
<i>Cenchrus ciliaris</i>	Buffel Grass	–	–	Not behaving as aggressively as in other parts of Australia.	2	Not impacting on assets; occurring only along the road verge.	1 Low feasibility of control for road verge populations; reinvasion from the north via the Goldfields Hwy is inevitable.	1 4
Pastoral weeds	<i>Carthamus lanatus</i>	P1, P2–P3	–	Restricted mostly to pastoral and ex-pastoral land.	2	Impacting on pastoral and ex-pastoral land.	1 Low feasibility of control on pastoral land. Species is associated with disturbance caused by pastoral activity.	1 4
	<i>Marrubium vulgare</i>	P1, P2–P4	–	Restricted mostly to pastoral and ex-pastoral land.	2	Impacting on pastoral and ex-pastoral land.	1 Low feasibility of control on pastoral land. Species is associated with disturbance caused by pastoral activity.	1 4
	<i>Echium plantagineum</i>	P1, P3–P4	–	Restricted mostly to pastoral and ex-pastoral land.	2	Impacting on pastoral land.	1 Low feasibility of control on pastoral land. Species is associated with disturbance caused by pastoral activity.	1 4
	<i>Xanthium spinosum</i>	P1, P3–P4	–	Restricted mostly to pastoral and ex-pastoral land.	2	Impacting on pastoral and ex-pastoral land.	1 Low feasibility of control on pastoral land. Species is associated with disturbance caused by pastoral activity.	1 4
Invasiveness: 1= less invasive, 5= more invasive; impact on assets: 1= not impacting assets, 5= impacting assets; feasibility of control: 1= widespread distribution, 5= small, isolated pops.								