



## Environmental Scoping Document: Southern Forests Irrigation Scheme

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SF IRRIGATION CO-OPERATIVE LIMITED  
NOVEMBER 2019



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## Document Status

**Document title:** Environmental Scoping Document, Southern Forests Irrigation Scheme

**Document reference:** 191401/01v2

Version	Author	Issued	Reviewed by	Approved by	Date
Draft	JW, MB, SP, PF	15/07/2019	MB, PW	JB	14/8/2019
Draft for EPA	MB, JW, SP, PF	20/09/19	MB, PW	JB	20/9/19
Final Draft	MB, JW, SP, PF	14/11/19	MB, PW	JB	12/11/19
v0 Final for EPA	MB, JW, SP, PF	20/11/19	MB, PW	JB	20/11/19
v1 Revised final	MB, JW, SP, PF	3/12/19	MB, PW	JB	3/12/19
v2 Final	MB, JW, SP, PF	13/12/19	MB, PW	JB	16/12/19

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## ENVIRONMENTAL SCOPING DOCUMENT

<b>Proposal Name:</b>	Southern Forests Irrigation Scheme
<b>Proponent:</b>	SF Irrigation Co-operative Limited
<b>Assessment Number:</b>	Assessment 2203
<b>Location:</b>	Southern Forests Region
<b>Local Government Area:</b>	Shire of Manjimup, Shire of Bridgetown-Greenbushes.
<b>Public Review Period:</b>	Environmental Review Document – 6 weeks
<b>EPBC Reference Number:</b>	EPBC 2019/8509

## 1 Introduction

The Environmental Protection Authority (EPA) has determined that the above Proposal is to be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act).

The purpose of this Environmental Scoping Document (ESD) is to define the form, content, timing and procedure of the environmental review, required by s. 40(3) of the EP Act. The SF Irrigation Co-operative Limited (SFIC) has prepared this draft ESD according to the procedures in the Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual 2016 (EPA, 2016a).

### 1.1 Form

The EPA requires that the form of the report on the environmental review required under s. 40 (Environmental Review Document, ERD) is in accordance with the Environmental Review Document template.

### 1.2 Content

The SFIC proposes that the content outlined in Sections 2 to 6 of this ESD adequately addresses the EPA's requirements for the Proposal's environmental review.

### 1.3 Timing

Table 1 sets out the timeline for the assessment of the proposal agreed between the EPA and the SFIC.

Table 1: Assessment Timeline

Key Assessment Milestones	Completion Date
EPA approves Environmental Scoping Document	12 December 2019
SFIC submits first draft ERD	February 2020
EPA provides comment on first draft ERD ( <i>6 weeks from receipt of ERD</i> )	March 2020
SFIC submits revised draft ERD	April 2020
DoEE comment on the draft ERD	May 2020
EPA authorises release of ERD for public review ( <i>2 weeks from EPA Approval of ERD</i> )	May 2020
SFIC releases ERD for public review for 6 weeks	May 2020
Close of public review period	July 2020
EPA provides Summary of Submissions ( <i>3 weeks from close of public review period</i> )	July 2020
SFIC provides Response to Submissions	August 2020
EPA and DoEE review the Response to Submissions ( <i>4 weeks from receipt of Response to Submissions</i> )	September 2020
EPA prepares draft assessment report and completes assessment ( <i>6 weeks from EPA accepting Response to Submissions</i> )	October 2020
EPA finalises assessment report (including two weeks consultation on draft conditions) and gives report to Minister ( <i>6 weeks from completion of assessment</i> )	December 2020

### 1.4 Procedure

The EPA requires proponents to undertake the environmental review according to the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (EPA, 2016b) and the *Procedures Manual* (EPA 2016a).

This draft ESD has not been released for public review. The final ESD will be available on the EPA website [www.epa.gov.au](http://www.epa.gov.au) upon endorsement and will be appended to the ERD.

The ERD will include relevant policy and guidance including:

- Environmental Protection Authority (2018a). *Statement of Environmental Principles, Factors and Objectives*. December 2018.
- Environmental Protection Authority (2018b). *Instructions on How to Prepare an Environmental Review Document*. April 2018.

## 1.5 Assessment as Accredited Assessment

The proposal was referred on the 9 August 2019 under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and made available for comment by the Department of the Environment and Energy (DoEE) on 18 September 2019 (referral number 2019/8509). The SFIC has received a response from DoEE (29 October 2019), confirming that the proposal is considered a Controlled Action requiring assessment under the EPBC Act and that the assessment can be completed under the Bilateral Agreement between Commonwealth of Australia and the State of Western Australia under section 45 of that Act. The relevant matters of national environmental significance (MNES) for this proposal are:

- Listed threatened species and communities (s18 and 18A) including the potential for:
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*)
  - Baudin's Black Cockatoo (*Calyptorhynchus baudinii*)
  - Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)
  - Blackstriped Dwarf Galaxias (*Galaxiella nigrostriatal*)
  - Carter's Freshwater Mussel (*Westralunio carteri*)
  - Woylie (*Bettongia penicillata ogilbyi*)
  - Chuditch (*Dasyurus geoffroii*)
  - Numbat (*Myrmecobius fasciatus*)
  - Western Ringtail Possum (*Pseudocheirus occidentalis*)
  - Quokka (*Setonix brachyurus*)
  - Christine's Spider Orchid (*Caladenia christineae*)
  - Harrington's Spider Orchid (*Caladenia harringtoniae*)
  - Many-flowered Commersonia (*Commersonia apella*)
  - Dwarf Hammer-orchid (*Drakaea micrantha*).

This ESD includes work required to be carried out and reported on in the ERD in relation to MNES. The ERD will also address the matters in Schedule 4 of the *Environmental Protection and Biodiversity Conservation Regulations 2000*, which also includes social and economic matters (the persons environmental record) and information sources.

MNES that may be impacted by the proposal will be identified and the potential impacts on these matters addressed within each relevant preliminary environmental factor as identified in Table 4. The ERD will include a separate section which summarises the potential impacts on MNES and describes, to the extent practicable, any feasible alternatives to the proposed action and possible mitigation measures. Proposed offsets to address significant residual impacts on MNES are also to be discussed.

## 2 The Proposal

The subject of this ESD is the proposal by the SFIC to construct and operate the Southern Forests Irrigation Scheme (SFIS). The SFIS is a horticultural irrigation scheme designed to increase the availability and reliability of water for irrigated agriculture within the Southern Forests region of Western Australia.

The regional location and layout of the proposal is shown in Figure 1 and Figure 2.

It is expected that the development envelope (for the pipeline network) shown in Figure 2 will be further refined and the amount of clearing reduced through detailed design and assessment. The estimated clearing of native vegetation provided in the ESD has been calculated using a 20 m pipeline corridor development envelope. Particular focus in the design and assessment will be paid to environmentally sensitive areas and areas that provide habitat to species listed as MNES. As part of developing the ERD, the SFIC will accurately quantify the key proposal elements (based on the results of studies and investigations) and provide a revised development envelope that is the maximum area within which the proposed footprint will be located.

The key characteristics of the proposal are set out in Tables 2 and 3. The key proposal characteristics may change as a result of the findings of studies and investigations conducted and the application of the mitigation hierarchy by the SFIC.

## 2.1 Background

Water availability in horticultural areas in the Southern Forests region is constrained and water with a high reliability of supply is fully (or close to) allocated in twelve of the twenty-five surface water subareas in the Warren-Donnelly surface water allocation area (DoW 2017).

The Proposal has been developed to support the Manjimup SuperTowns vision of expanding the area's horticulture industry and doubling the population over the next 15 years. The Manjimup SuperTown Agriculture Strategy (Science Matters 2014) and The Value of Horticulture Production in the Manjimup-Pemberton Area report (Longson and Phillips 2014) highlighted the need to secure additional water to supply horticultural areas currently subject to water shortages. The Proposal is also consistent with the South West Development Commission's regional blueprint (2014), a strategic document to guide investment in regional development into the future. The blueprint identifies the need to ensure the Manjimup growing district has greater protection against climate change and drought through the construction of an irrigation network at Manjimup to facilitate distribution and water trading.

The SFIS will be operated by the SFIC as a water supply and trading co-operative. Water will be pumped from the Donnelly River offtake during peak river flows to the Record Brook reservoir for storage. Water will be pumped from Record Brook reservoir to balance tanks during off-peak (low tariff) periods and distributed to farms via gravity through the irrigation pipe network. The scheme will facilitate the irrigation of horticultural and agricultural crops in the Southern Forests growing region.

*Table 2: Summary of the Proposal*

<b>Proposal Title</b>	Southern Forests Irrigation Scheme (SFIS)
<b>Proponent Name</b>	SF Irrigation Co-operative Limited
<b>Short Description</b>	The proposal is to construct and operate a water offtake (pump station) adjacent to the Donnelly River, a reservoir on Record Brook (a tributary of the Donnelly River), two balance tanks, a network of approximately 250 km of distribution pipelines to supply water to agricultural properties and supporting infrastructure (powerlines and access tracks)

Table 3: Location and proposed extent of physical and operational elements.

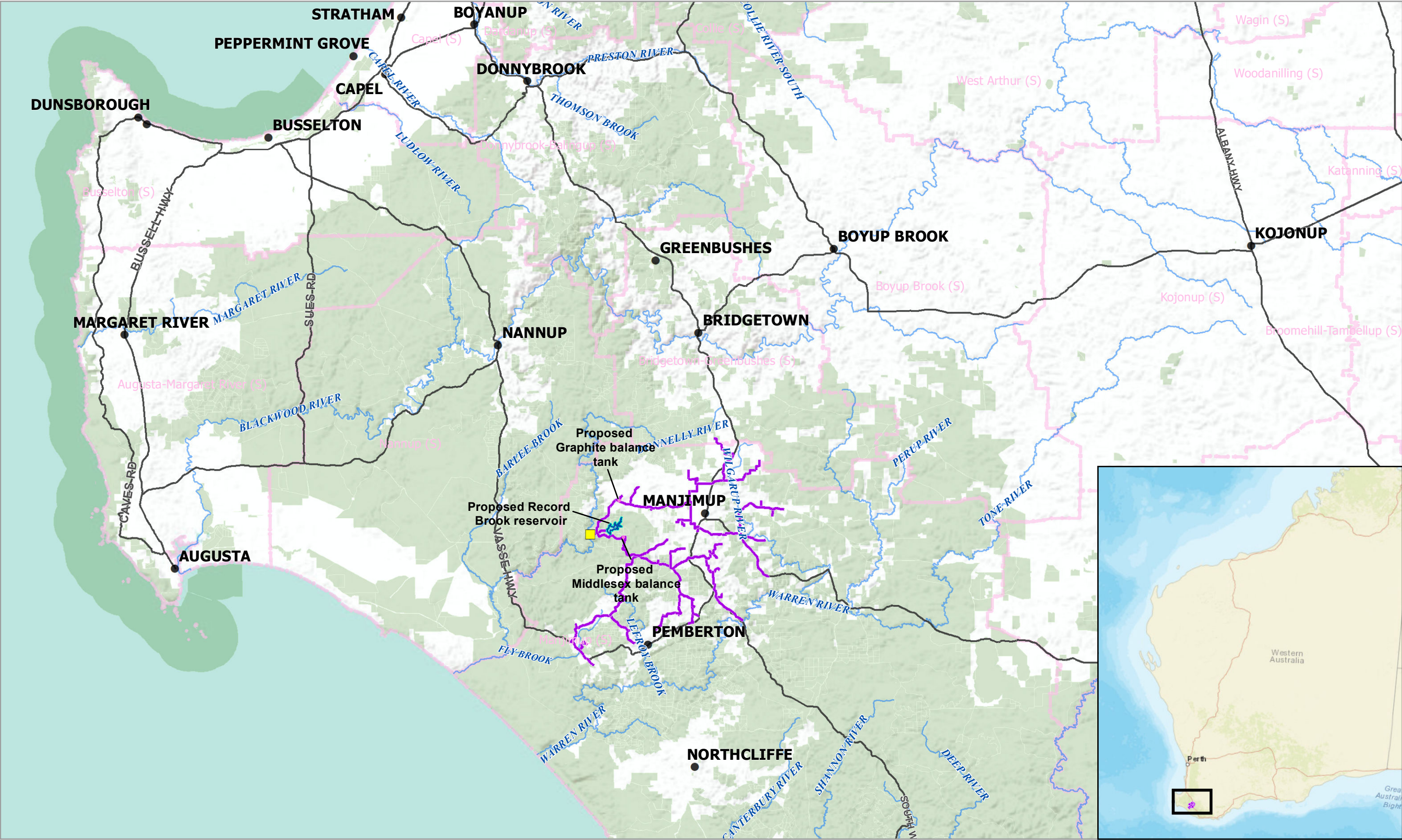
Element	Location	Proposed Extent
Physical Elements		
Construction of Donnelly River water offtake, which includes sump, submersible pumps, pump station, access road and power supply, Record Brook reservoir and balance tanks.	Refer to Figure 1 and 2	Clearing of up to 170 ha within the Donnelly River offtake and Record Brook reservoir development envelope.
Approximately <b>250 km</b> of irrigation distribution pipelines and associated infrastructure.		Clearing of approximately 142 ha of native vegetation within 481 ha pipeline corridor development envelope based on an average width of 20 m
Operational Elements		
Donnelly River water offtake and Record Brook reservoir.	Refer to Figure 1 and 2	Pump an average of approximately 9.3 GL/yr of water from the Donnelly River to the Record Brook reservoir.

The Record Brook reservoir will serve to capture surface water from the Record Brook catchment. In addition to the elements detailed in Table 3, the assessment process will evaluate the capture of the surface water (from Record Brook) and the potential impacts to the downstream ecology.

### Timing and Proposal Staging


Pending receipt of all relevant approvals the SFIC plans to commence construction of the Proposal in 2021. The target date for commencement of irrigation water to farms is the summer of 2023/2024. The Proposal is not a staged development.













A3 @ 1:600000

0 5 10 20 km

 NORTH

GRID: GDA zone 50

- Proposed infrastructure**
-  Proposed pump station location
  -  Proposed balance tank
  -  Proposed Record Brook reservoir
  -  Proposed pipeline
-  Main road / Highway
-  Watercourse
-  Local government area
-  Dept of Biodiversity, Conservation and Attractions land

Source: Base map © Esri and its data suppliers. DPIRD (2019). Landgate (2019)



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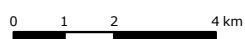
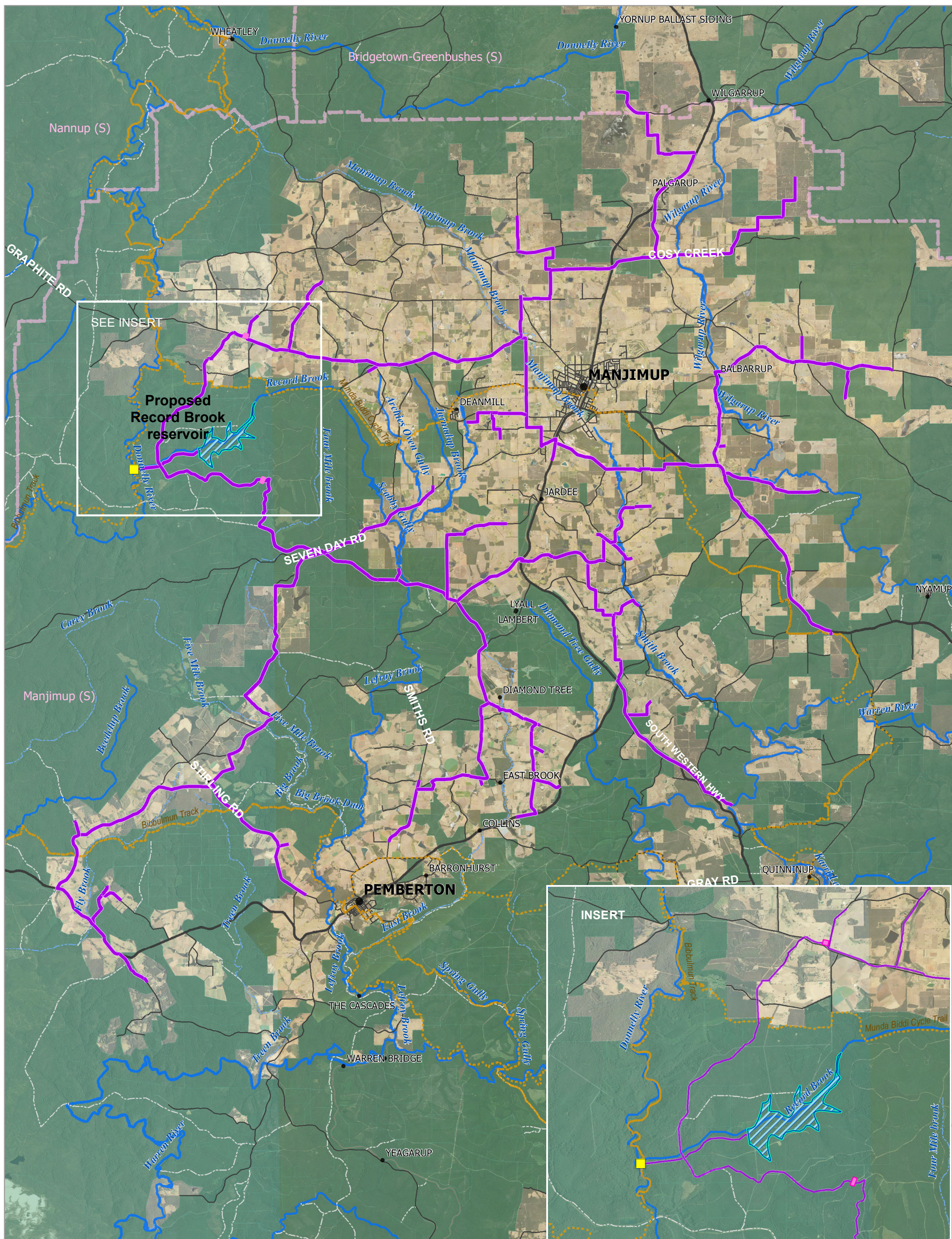
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**Figure 1: Proposal location**





Southern Forests Irrigation Scheme

Ref: SW217\_SFIS\_overview | Job 191401  
Date: 30/08/2019 Author: SP





### Proposed infrastructure

-  Proposed pump station location
-  Proposed balance tank
-  Record Brook reservoir
-  Proposed pipeline

## Existing features

- Main road
- Local road
- Vehicular track
- Walking trail
- Minor watercourse

- Watercourse  
Local Government Area



### Figure 2: Proposal layout

## Southern Forests Irrigation Scheme



### 3 Preliminary key environmental factors and required work

The preliminary key environmental factors for the environmental review document are:

1. Flora and Vegetation
2. Terrestrial Environmental Quality
3. Terrestrial Fauna
4. Inland Waters
5. Social Surroundings

Table 4 outlines the work required for each preliminary key environmental factor and contains the following element for each factor:

- **EPA factor** and **EPA objective** for that factor.
- **Relevant activities** – the Proposal activities that may have a significant impact on that factor.
- **Potential impacts and risks** to that factor.
- **Required work** for that factor.
- **Relevant policy and guidance** – EPA (and other) guidance and policy relevant to the assessment.

Table 4: Preliminary key Environmental Factors and required work

Flora and Vegetation	
EPA objective	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.
Relevant activities	<ul style="list-style-type: none"> <li>- Clearing of native vegetation during construction.</li> <li>- Construction activities such as disturbance of soils, consequential erosion and mobilisation of sediment and the use of chemicals and fuels.</li> <li>- Alteration of surface water regimes in the Donnelly River and Record Brook.</li> <li>- Ongoing use of tracks for pipeline maintenance.</li> </ul>
Potential impacts and risks	<p>Construction of the Proposal:</p> <ul style="list-style-type: none"> <li>- Clearing of approximately 312 ha of native vegetation comprising predominantly Karri forest and Jarrah/Marri forest/woodland. Of this 312 ha, approximately 100 ha will be revegetated.</li> <li>- Potential presence of priority ecological community (P3): 'Epiphytic Cryptograms of the Karri forest'.</li> <li>- Potential impact to informal reserves as identified in the Forest Management Plan 2014-2023 (Conservation Commission of WA 2013).</li> <li>- Potential impact to federally listed threatened flora species including: <ul style="list-style-type: none"> <li>o Christine's Spider Orchid (<i>Caladenia christineae</i>) – Vulnerable;</li> <li>o Harrington's Spider Orchid (<i>Caladenia harringtoniae</i>) – Vulnerable;</li> <li>o Dwarf Hammer-orchid (<i>Drakaea micrantha</i>) – Vulnerable; and</li> <li>o Many-flowered Commersonia (<i>Commersonia apella</i>) – Critically endangered.</li> </ul> </li> <li>- Potential indirect impacts on flora and vegetation through: <ul style="list-style-type: none"> <li>o Erosion;</li> <li>o Fragmentation;</li> <li>o uncontrolled access;</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ dust deposition; and</li> <li>○ spread of weeds and plant pathogens (particularly phytophthora dieback).</li> </ul> <p>Operation of the proposal:</p> <ul style="list-style-type: none"> <li>- Potential impacts to riparian vegetation associated with changes in hydrological regime of the Donnelly River and Record Brook.</li> <li>- Potential introduction and/or spread of weeds and plant pathogens (particularly phytophthora dieback).</li> <li>- Potential indirect impact to informal reserves as identified in the Forest Management Plan 2014-2023 (Conservation Commission of WA 2013).</li> </ul>
Required work	<ol style="list-style-type: none"> <li>1. A review of the flora and vegetation survey work undertaken in the footprint area with consideration to Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016c), Environmental Factor Guideline –Flora and Vegetation (EPA 2016d) and Survey Guidelines for Australia’s threatened orchids (Commonwealth of Australia 2013).</li> <li>2. Supplementary vegetation flora and vegetation survey effort will be undertaken to inform the ERD. Survey work will focus on unsurveyed areas generated by changes in the development footprint and complement previous survey work in accordance with EPA technical guidance. This will include work to confirm the presence or absence of previous records of significant flora and threatened or priority ecological communities, including federally listed threatened flora species (as listed under potential impacts and risks above). Where encountered the occurrence of introduced species and weeds of national significance will be recorded.</li> <li>3. Existing Department of Biodiversity Conservation and Attractions (DBCA) dieback mapping will be used to undertake a risk assessment and inform the impact assessment. To ensure the most recent mapping possible, additional surveys will be conducted in the pre-construction phase and used to inform dieback management during construction and operation.</li> <li>4. Existing and additional survey information will be used to complete an analysis of vegetation types and vegetation mapping.</li> <li>5. Provide a summary of the surveys completed to demonstrate that surveys have been undertaken in accordance with Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016c), Environmental Factor Guideline – Flora and Vegetation (EPA 2016d) and Survey Guidelines for Australia’s threatened orchids (Commonwealth of Australia 2013). Confirm surveys undertaken by suitably qualified and experienced environmental practitioners and demonstrate survey effort for threatened species and communities.</li> <li>6. Describe the flora and vegetation values recorded by the surveys within the impact area and surrounds with supporting maps.</li> </ol>

	<ol style="list-style-type: none"> <li>7. Provide a detailed assessment of the potential direct, indirect and cumulative impacts on flora and vegetation within the development footprint. This will include: <ul style="list-style-type: none"> <li>- The total area of each vegetation unit to be impacted noting whether these impacts are unknown, unpredictable or irreversible. Tables will be provided quantifying impacts.</li> <li>- Identification of any significant flora species or communities directly or indirectly impacted by the proposal.</li> <li>- Where impacts to threatened flora or communities of conservation significance are identified, provide baseline information on their distribution, ecology and habitat at a site level and quantify the significance of the flora/communities in a local and regional context.</li> <li>- Identify and discuss potential indirect impacts including spread of dieback and weeds and include mapping as appropriate.</li> <li>- Consideration of potential indirect and direct impacts to formal and informal reserves (including areas of old growth forest).</li> </ul> </li> <li>8. Demonstrate that all practicable measures have been taken to reduce both the area of the proposed disturbance footprint through the proposal design and understanding of the environmental impacts. This will include consideration of potential impacts to formal and informal reserves (including areas of old-growth forest) in the detailed design.</li> <li>9. Discuss proposed management, monitoring, mitigation and rehabilitation methods to be undertaken and demonstrate that the design of the Proposal has addressed the mitigation hierarchy in relation to impacts on flora and vegetation.</li> <li>10. Demonstrate and document in the ERD how the EPA's objective for this factor will be met.</li> <li>11. Determine and quantify any significant residual impacts by applying the: Residual Impact Significance Model (WA Environmental Offsets Guidelines) for all direct and indirect impacts and with consideration of relevant Commonwealth policy and guidance documents, including the EPBC Act Offsets Policy.</li> <li>12. Where significant residual impacts remain, propose an appropriate offsets strategy with supporting information to demonstrate consistency with the WA Environmental Offsets Policy and Guidelines and the EPBC Act Offsets Policy.</li> <li>13. Submit an IBSA package for flora and vegetation.</li> </ol>
Relevant policy and guidance	<p><u>EPA Policy and Guidance</u></p> <ul style="list-style-type: none"> <li>- Environmental Factor Guideline – Flora and Vegetation (EPA 2016d).</li> <li>- Instructions on how to Prepare <i>Environmental Protection Act 1986</i> Part IV Environmental Management Plans (EPA 2016f)</li> <li>- Environmental Offsets Guidelines, Perth, Western Australia (Government of Western Australia 2014).</li> <li>- Environmental Offsets Policy, Perth, Western Australia (Government of Western Australia 2011).</li> </ul>

- Guidance Statement 6 – Rehabilitation of Terrestrial Ecosystems (EPA 2006).
- Statement of Environmental Principles, Factors and Objectives (EPA 2016e).
- Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016c)

Other Policy and Guidance

- Conservation Advice for *Caladenia christineae* (Christine's Spider Orchid) (DEWHA 2008a).
- Conservation Advice for *Caladenia harringtoniae* (Harrington's Spider-orchid) (DEWHA 2008b).
- Conservation Advice *Commersonia apella* many flowered commersonia (TSSC 2018a).
- Conservation Advice for *Drakaea micrantha* (Dwarf Hammer-orchid) (DEWHA 2008c).
- EPBC Act 1999 Environmental Offsets Policy (DSEWPaC 2012a).
- Matters of National Environmental Significance. Significant Impact Guidelines 1.1. *Environmental Protection and Biodiversity Conservation Act 1999* (DoE 2013).
- Survey Guidelines for Australia's threatened orchids (Commonwealth of Australia 2013).
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (DoEE 2017a).
- Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*. Canberra, ACT: Commonwealth of Australia (DoE 2014).

Terrestrial Environmental Quality	
EPA objective	To maintain the quality of land and soils so that environmental values are protected.
Relevant activities	<ul style="list-style-type: none"> <li>- Construction activities such as clearing of native vegetation, disturbance of soils, consequential erosion and mobilisation of sediment.</li> <li>- Waste disposal.</li> <li>- Storage and handling of chemicals and fuels.</li> <li>- Distribution of water to farms participating in the scheme for irrigated horticulture and agriculture.</li> </ul>
Potential impacts and risks	<p>Construction of the Proposal:</p> <ul style="list-style-type: none"> <li>- Soil erosion as a result of clearing of vegetation.</li> <li>- Contamination through wastes and spills.</li> </ul> <p>Operation of the Proposal:</p> <ul style="list-style-type: none"> <li>- Increases in soil salinity and sodicity as a result of salt accumulation in soil and/or increases in groundwater levels due to over irrigation or irrigation of unsuitable areas.</li> </ul>
Required work	<ol style="list-style-type: none"> <li>14. Describe the land capabilities and soils recorded by the surveys within the irrigation area with supporting maps.</li> <li>15. Discuss the suitability of the land potentially supplied by water from the scheme for irrigation.</li> <li>16. Discuss proposed monitoring and management methods to be implemented and demonstrate that the operation of the Proposal can address the mitigation hierarchy in relation to impacts on terrestrial environmental quality. This will include: <ul style="list-style-type: none"> <li>- A construction environmental management plan that will include chemical and fuel storage, and power generation and management measures, including contingencies in the event of a spill, to ensure that contamination of land does not occur.</li> <li>- An operational management plan to provide an overarching framework for the management of impacts from operation of the scheme and provide details of how proposed farm water access plans will be applied within this framework.</li> </ul> </li> <li>17. Provide details of additional regulatory mechanisms that the scheme will operate within and how the proposed operational management plan will align with existing regulatory framework.</li> <li>18. Demonstrate and document in the ERD how the EPA's objective for this factor will be met.</li> </ol>
Relevant policy and guidance	<p><u>EPA Policy and Guidance</u></p> <ul style="list-style-type: none"> <li>- Environmental Factor Guideline – Terrestrial Environmental Quality (EPA 2016g).</li> <li>- Statement of Environmental Principles, Factors and Objectives (EPA 2016e).</li> <li>- Guidance Statement 6 – Rehabilitation of Terrestrial Ecosystems (EPA 2006).</li> </ul>

Terrestrial Fauna	
EPA objective	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
Relevant activities	<ul style="list-style-type: none"> <li>- Clearing of habitat for terrestrial fauna during construction.</li> <li>- Construction impacts such as noise vibration and light impacts, the use of chemicals and fuels and collisions and emissions.</li> <li>- Construction of a sump and installation of submersible pumps on the Donnelly River, pump station adjacent to Donnelly River and reservoir on the Record Brook.</li> <li>- Alteration of surface water regimes in the Donnelly River and Record Brook.</li> </ul>
Potential impacts and risks	<p>Construction of the Proposal:</p> <ul style="list-style-type: none"> <li>- Clearing of approximately 312 ha of potential fauna habitat, comprising predominantly Karri forest and Jarrah/Marri forest/woodland, which is common in the region. Of the 312 ha of vegetation to be cleared approximately 100 ha will be revegetated.</li> <li>- Potential impact to federally listed threatened fauna species including: <ul style="list-style-type: none"> <li>o Forest Red-tailed Black Cockatoo;</li> <li>o Baudin's Black Cockatoo;</li> <li>o Carnaby's Black Cockatoo;</li> <li>o Blackstriped Dwarf Galaxias;</li> <li>o Carter's Freshwater Mussel;</li> <li>o Woylie;</li> <li>o Chuditch;</li> <li>o Numbat;</li> <li>o Western Ringtail Possum; and</li> <li>o Quokka.</li> </ul> </li> <li>- Potential for indirect impacts to fauna through erosion, uncontrolled access, fragmentation, dust deposition and through spread of weeds and dieback.</li> <li>- Sedimentation and water quality impacts affecting benthic habitat including habitat for significant aquatic species such as Balston's Pygmy Perch, Carter's Freshwater Mussel, Pouched Lamprey and Blackstriped Dwarf Galaxias.</li> </ul> <p>Operation of the Proposal:</p> <ul style="list-style-type: none"> <li>- Alteration of surface water flows in the Donnelly River and Record Brook and associated potential impacts to aquatic fauna (including Balston's Pygmy Perch, Carter's Freshwater Mussel, Pouched Lamprey and Blackstriped Dwarf Galaxias) and riparian ecosystems.</li> <li>- Potential impact of the Record Brook reservoir to movement of aquatic fauna.</li> </ul>
Required work	<p>19. A review of the fauna survey (including for aquatic fauna) work completed in the footprint area will be undertaken with consideration to EPA Technical Guidance - Terrestrial Fauna Surveys, EPA (2016h), Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna EPA (2016i) and other relevant guidelines listed below. The review will include:</p> <ul style="list-style-type: none"> <li>- A summary of the surveys undertaken, including the survey effort, timing and personnel with particular consideration to threatened fauna listed under state and federal legislation (and as listed in potential impacts and risks above).</li> </ul>



- Assessment of habitat suitability for threatened fauna and consideration of likelihood of occurrence of threatened fauna species (including federally listed species identified in potential impacts and risks above).
  - Demonstration that surveys have been undertaken in accordance with relevant guidelines and confirm surveys undertaken by suitably qualified and experienced environmental practitioners.
20. A review of aquatic ecosystem studies will be undertaken for Record Brook reservoir and the Donnelly River including (but not limited to) Storer *et al.* (a, b, in prep.), Beatty *et al.* (2016), Morgan and Beatty (2006) and Pennifold (2018).
21. Supplementary fauna survey effort will be undertaken to inform the ERD. Surveys will focus on unsurveyed areas generated by changes in the development footprint and to compliment previous survey work in accordance with EPA technical guidance. This will include:
- Follow-up targeted surveys for terrestrial fauna of conservation significance (focusing on Western Ringtail Possums and Quokkas and with consideration of outcomes of habitat assessment for other threatened species).
  - Further assessment of Black Cockatoo habitat.
  - A supplementary survey for short-range endemic fauna during seasonally wetter periods between May and October to meet the EPA Technical guidance of sampling Short Range Endemic (SRE) invertebrate fauna (EPA 2016j).
  - Supplementary targeted surveys for aquatic fauna of conservation significance (Carter's Freshwater Mussel, Balston's Pygmy Perch, Black-stripe Minnow and Pouched Lamprey).
22. Extend fauna habitat mapping with consideration to the vegetation mapping undertaken in supplementary flora and vegetation surveys.
23. Existing and additional information (from survey of gaps and additional targeted studies) will be used to calculate direct loss of habitat for species of conservation significance.
24. Describe the fauna habitat values recorded by the surveys within the impact area including locations (mapping) and quantification of the extent of these habitat features.
25. Provide a detailed description of the potential direct, indirect and cumulative impacts to conservation significant fauna species and SRE invertebrates within the development footprint. This will include:
- Calculating the total area of impact to each fauna habitat type.
  - Consideration of the risk to aquatic fauna from changes to the flow regime in the Donnelly River and potential for impacts to the movement of aquatic fauna.
  - For each significant fauna species and/or SRE invertebrates likely to be impacted by the proposal provide information on their abundance (including known occurrences), distribution, ecology, and habitat preferences at both the site and regional levels.

	<p>26. Demonstrate that all practicable measures have been taken to reduce both the area of the proposed disturbance footprint through the proposal design and understanding of the environmental impacts.</p> <p>27. Discuss proposed management, monitoring, mitigation and rehabilitation methods to be undertaken and demonstrate that the design of the Proposal has addressed the mitigation hierarchy in relation to impacts on fauna during construction and operation.</p> <p>28. Demonstrate and document in the ERD how the EPA's objective for this factor will be met.</p> <p>29. Determine and quantify any significant residual impacts by applying the: Residual Impact Significance Model (WA Environmental Offsets Guidelines) for all direct and indirect impacts and by applying the <i>Environment Protection and Biodiversity Conservation Act 1999</i> Environmental Offsets Policy (DSEWPac 2012a) for all matters of National Environmental Significance.</p> <p>30. Where significant residual impacts remain, propose an appropriate offsets strategy with supporting information to demonstrate consistency with the WA Environmental Offsets Policy and Guidelines and (for matters of NES) the Matters of National Environmental Significance Significant Impact Guidelines 1.1. <i>Environment Protection and Biodiversity Conservation Act 1999</i> (DoE 2013).</p> <p>31. Submit an IBSA package for terrestrial fauna.</p>
Relevant policy and guidance	<p><u><i>EPA Policy and Guidance</i></u></p> <ul style="list-style-type: none"> <li>– Technical Guidance - Terrestrial Fauna Surveys (EPA 2016h).</li> <li>– Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna (EPA 2016i).</li> <li>– Technical Guidance Sampling of short range endemic invertebrate fauna (EPA 2016j).</li> <li>– Environmental Factor Guideline - Terrestrial Fauna (EPA 2016k).</li> <li>– Instructions on how to Prepare <i>Environmental Protection Act 1986</i> Part IV Environmental Management Plans (EPA 2016f).</li> <li>– Western Australian Environmental Offsets Policy (Government of Western Australia 2011).</li> <li>– Western Australian Environmental Offsets Guidelines (Government of Western Australia 2014).</li> </ul> <p><u><i>Other Policy and Guidance</i></u></p> <ul style="list-style-type: none"> <li>– Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>) Recovery Plan (DPaW 2013).</li> <li>– Chuditch (<i>Dasyurus geoffroii</i>) Recovery Plan. Wildlife Management Program No. 54. Department of Environment and Conservation (2012).</li> <li>– Conservation Advice <i>Bettongia penicillata</i> woylie. Threatened Species Scientific Committee (2018b).</li> <li>– Conservation Advice for <i>Calyptorhynchus banksii naso</i> (<i>Forest Red-tailed Black Cockatoo</i>) (Threatened Species Scientific Committee 2009).</li> </ul>

- Conservation Advice *Calyptorhynchus baudinii* Baudin's Cockatoo (Threatened Species Scientific Committee 2018c).
- Conservation Advice *Galaxiella nigrostriata* black-stripe minnow (Threatened Species Scientific Committee 2018d).
- Conservation Advice *Myrmecobius fasciatus* numbat. Threatened Species Scientific Committee (2018e).
- Conservation Advice *Nannatherina balstoni* (Balston's Pygmy Perch) (Threatened Species Scientific Committee 2018f).
- Conservation Advice *Pseudocheirus occidentalis* Western ringtail possum (Threatened Species Scientific Committee 2018g).
- Conservation Advice *Westralunio carteri* Carter's Freshwater Mussel (Threatened Species Scientific Committee 2018h).
- *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy October 2012. (DSEWPac 2012a).
- EPBC Act Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii*, Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso* (DSEWPac 2012b).
- Forest Black Cockatoo (Baudin's Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan (DEC 2008).
- Matters of National Environmental Significance. Significant Impact Guidelines 1.1. *Environmental Protection and Biodiversity Conservation Act 1999* (DoE 2013).
- National Recovery Plan for the woylie *Bettongia penicillate* (Yeatman and Groom 2012).
- Numbat (*Myrmecobius fasciatus*) Recovery Plan. Department of Parks and Wildlife (2017).
- Revised draft referral guideline for three threatened Black Cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo, Forest Red-tailed Black Cockatoo (DoEE 2017b).
- Survey guidelines for Australia's threatened mammals. EPBC Act survey guidelines 6.5. (DSEWPac 2011).
- Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the EPBC Act. (DEWHA 2010).
- Western Ringtail Possum (*Pseudocheirus occidentalis*) Recovery Plan (DPaW 2017).
- Threat abatement plan for predation by feral cats. (Department of the Environment 2015).
- Threat abatement plan for competition and land degradation by rabbits. (Department of the Environment and Energy 2016).
- Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (Department of the Environment and Energy 2017).
- Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomic* (Department of the Environment and Energy 2018).
- Threat abatement plan for predation by the European red fox (Department of the Environment, Water, Heritage and the Arts 2008)

Inland Waters	
EPA objective	To maintain the quality of groundwater and surface water so that environmental values are protected.
Relevant activities	<ul style="list-style-type: none"> <li>- Construction of a sump and installation of submersible pumps on the Donnelly River, pump station adjacent to Donnelly River and reservoir on the Record Brook.</li> <li>- Abstraction of on average 9.3 GL/year water from the Donnelly River.</li> <li>- Alteration of the hydrological regime of the Donnelly River and Record Brook.</li> </ul>
Potential impacts and risks	<p>Construction of the Proposal:</p> <ul style="list-style-type: none"> <li>- Sedimentation and water quality impacts.</li> <li>- Impacts on downstream water quality including erosion, sediment and accidental spills.</li> </ul> <p>Operation of the Proposal:</p> <ul style="list-style-type: none"> <li>- Alteration of surface water flows in the Donnelly River and Record Brook and associated potential impacts to aquatic fauna (see Terrestrial Fauna) and riparian ecosystems.</li> <li>- Potential impact of the Record Brook reservoir to movement of aquatic fauna (see Terrestrial Fauna).</li> <li>- Potential water quality risks in the Record Brook reservoir and impact on downstream systems.</li> </ul>
Required work	<p>32. Describe the hydrological regime of the Donnelly River and Record Brook using outputs of hydrological model and existing surface water gauging data as available.</p> <p>33. Assess risk of in stream values being potentially impacted by alteration of the flow regime using the environmental flow study currently under preparation (see also Terrestrial Fauna) and including a discussion of the potential risk of impacts to the Donnelly River estuary.</p> <p>34. Current water quality of the Donnelly River and Record Brook will be reviewed using existing monitoring data from DWER monitoring programs and supplemented by additional data including water quality sites upstream and downstream of the offtake area and on Record Brook. This data will form a baseline for ongoing monitoring and management (refer to point 36.).</p> <p>35. Describe and assess the risk of temporary and localised impacts associated with the construction of the Donnelly River offtake.</p> <p>36. Demonstrate that all practicable measures have been taken to reduce both the area of the proposed disturbance footprint through the proposal design and understanding of the environmental impacts including consideration of impacts of altered surface water regime and construction impacts associated with the Donnelly River water offtake.</p> <p>37. Discuss proposed management, monitoring and methods to be implemented and demonstrate that the design and operation of the Proposal has addressed the mitigation hierarchy in relation to impacts on inland waters. This will include a monitoring plan for the Donnelly River and Record Brook reservoir. Parameters for the program will be based on a risk assessment and may include monitoring of flow, water quality (including phytoplankton) and biological sampling (including macroinvertebrates).</p>

	<p>38. Demonstrate and document in the ERD how the EPA's objective for this factor will be met.</p> <p>39. Submit an IBSA package for Inland waters (if required).</p>
Relevant policy and guidance	<p><u>EPA Policy and Guidance</u></p> <ul style="list-style-type: none"> <li>- Environmental Factor Guideline – Inland Waters (EPA 2018c).</li> <li>- Statement of Environmental Principles, Factors and Objectives (EPA 2018a).</li> </ul> <p><u>Other Policy and Guidance</u></p> <ul style="list-style-type: none"> <li>- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000).</li> <li>- Conservation Advice <i>Galaxiella nigrostriata</i> black-stripe minnow (Threatened Species Scientific Committee 2018d).</li> <li>- Conservation Advice <i>Nannatherina balstoni</i> (Balston's Pygmy Perch) (Threatened Species Scientific Committee 2018f).</li> <li>- Conservation Advice <i>Westralunio carteri</i> Carter's Freshwater Mussel (Threatened Species Scientific Committee 2018h).</li> <li>- Environmental Water Provisions Policy for Western Australia (Water and Rivers Commission 2000).</li> <li>- Guidelines for Managing Risks in Recreational Water (National Health and Medical Research Council 2008).</li> <li>- Warren – Donnelly surface water allocation plan (Department of Water 2012).</li> </ul>

<b>Social Surroundings</b>	
EPA objective	To protect social surroundings from significant harm
Relevant activities	<ul style="list-style-type: none"> <li>- Clearing and ground disturbance.</li> <li>- Construction of reservoir, offtake infrastructure (sump and submersible pumps) and changes to hydrological regime.</li> <li>- Construction of pipeline network.</li> <li>- Operation of the offtake pump station.</li> </ul>
Potential impacts and risks	<p>Construction of the proposal:</p> <ul style="list-style-type: none"> <li>- Disturbance to recorded and unrecorded Aboriginal heritage sites.</li> <li>- Disturbance to European heritage sites listed in the Manjimup Municipal Inventory and/or Bridgetown-Greenbushes Municipal Heritage Inventory.</li> <li>- Temporary visual impact during construction of pipeline clearing corridors, offtake infrastructure and reservoir wall.</li> <li>- Noise, dust, traffic and visual amenity.</li> </ul> <p>Operation of the proposal:</p> <ul style="list-style-type: none"> <li>- Visual impact of offtake infrastructure, reservoir wall and inundation area on the Record Brook.</li> <li>- Noise impacts from operation of the Donnelly River water offtake including to nearby Bibbulmun Track and Munda Biddi Trail users.</li> </ul>
Required work	<p><b>Aboriginal Heritage</b></p> <ol style="list-style-type: none"> <li>40. Conduct additional archaeological and ethnographic surveys on any new areas of impact and on private land not surveyed.</li> <li>41. Conduct additional archaeological and ethnographic surveys on unsurveyed pipeline distribution network within the Wagyl Kaip and the Southern Noongar Native Title (NTC) Claim areas.</li> <li>42. Describe survey work undertaken for Aboriginal Heritage within the impact area and surrounds in accordance with relevant policy/guidelines. Confirm surveys undertaken by suitably qualified and experienced heritage practitioners.</li> <li>43. Provide a summary of the surveys taken, including the survey effort, timing and personnel.</li> <li>44. Describe the Aboriginal Heritage values recorded by the surveys within the impact area and surrounds with supporting maps.</li> <li>45. Describe the expected impacts of the proposal to known ethnographic and archaeological values.</li> <li>46. Describe how impacts to these known values will be avoided through detailed design or otherwise mitigated.</li> <li>47. Describe the management actions that will be undertaken in the construction phase of the project to manage the potential for disturbance to unknown sites of heritage significance.</li> </ol> <p><b>Natural and Historic Heritage</b></p> <ol style="list-style-type: none"> <li>48. Describe the Natural and Historic Heritage values recorded in the Manjimup Municipal Heritage Inventory, Bridgetown-Greenbushes Municipal Heritage Inventory, State Register of Heritage Places, National or World Heritage list within the impact area and surrounds with supporting maps.</li> <li>49. Describe the expected impacts of the proposal to European Heritage sites.</li> <li>50. Describe how impacts to these sites will be avoided through detailed design or mitigated.</li> </ol>

	<p><b>Amenity</b></p> <ol style="list-style-type: none"> <li>51. Conduct a visual impact assessment that will: <ul style="list-style-type: none"> <li>- Characterise the existing landscape and aesthetic/recreational values in the area.</li> <li>- Identify potentially affected receptors and viewpoints which are accessible to the public. This will include the Bibbulmun Track and Munda Biddi Trail users.</li> <li>- Conduct a risk evaluation of the impact of the proposed development to sensitive receptors and viewpoints.</li> </ul> </li> <li>52. Describe the impacts to both the landscape, visual receptors and nearby recreational areas with consideration to both short term construction impacts and permanent changes to the existing landscape.</li> <li>53. Where required, outline mitigation measures to protect the visual character and scenic quality of the Donnelly River riparian landscape and sensitive visual and recreational receptors.</li> <li>54. Describe potential impacts to social amenity for recreational users of the area including users of the Bibbulmun Track and Munda Biddi Trail, and where required, outline mitigation measures to manage potential impacts (including noise and disruption of access) during construction and operation.</li> </ol> <p><b>Noise and Dust</b></p> <ol style="list-style-type: none"> <li>55. Conduct a noise impact assessment to identify potential impacts of the offtake pump to sensitive noise receptors associated with the proposal.</li> <li>56. Identify all noise sensitive premises adjacent to the Proposal or are likely to be affected by the Proposal, including recreational users of the area (such as Bibbulmun Track and Munda Biddi Trail users).</li> <li>57. Outline potential noise impacts.</li> <li>58. If sensitive noise receptors are identified, outline noise and mitigation measures to avoid/minimise impacts to these receptors.</li> <li>59. Identify construction impacts to social surrounds such as noise, dust and traffic.</li> <li>60. Mitigation of construction impacts will be outlined in the Construction Environmental management Plan to be prepared in accordance with relevant guidance including the Environmental Management Plan Guidelines (Commonwealth of Australia 2014) and the EPA instructions and template on preparation of management plans (EPA 2018).</li> </ol>
Relevant policy and guidance	<p><u><b>EPA Policy and Guidance</b></u></p> <ul style="list-style-type: none"> <li>- Environmental Factor Guideline – Social Surroundings (EPA 2016).</li> <li>- Instructions on how to prepare <i>Environmental Protection Act 1986</i> Part IV Environmental Management Plans (EPA 2018d).</li> </ul> <p><u><b>Other Policy and Guidance</b></u></p> <ul style="list-style-type: none"> <li>- Aboriginal Heritage Due Diligence Guidelines (DAA 2013).</li> <li>- Environmental Protection (Noise) Regulations 1997.</li> <li>- Environmental Management Plan Guidelines (Commonwealth of Australia 2014).</li> </ul>

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|  | - Implementation guidelines for State Planning Policy 5.4<br>(Government of Western Australia 2014). |
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### 3.1 Index of Biodiversity Surveys for Assessments

During the assessment process, the biodiversity survey reports submitted for the SFIS will be accompanied by an IBSA data package (in accordance with *EPA instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessment* (EPA 2018e)).



## 4 Other Environmental Factors or matters

It is noted that other factors or matters may be identified by the EPA during the course of the environmental review that were not apparent at the time that this ESD was prepared. If this situation arises, the SFIC will consult with the EPA to determine whether these factors and/or matters are to be addressed in the ERD, and if so, to what extent.

## 5 Stakeholder consultation

The SFIC has undertaken extensive consultation with stakeholders who are affected by or are interested in the Proposal. This includes the decision-making authorities (see section 6), other relevant state and Commonwealth government agencies and local government authorities, the local community and environmental non-government organisations. The SFIC will document the following in the ERD:

- Identified stakeholders.
- The stakeholder consultation undertaken and the outcomes, including decision-making authorities' specific regulatory approvals and any adjustments to the Proposal as a result of consultation.
- Any future plans for consultation.

## 6 Decision-making Authorities

At this stage, the EPA has identified the authorities listed in Table 5 as decision-making authorities (DMAs) for the Proposal. Additional DMAs may be identified during the course of the assessment.

Table 5: Decision-making authorities for the Proposal

Decision-making authority	Relevant legislation
Minister for Lands	<i>Land Administration Act 1997</i>
Minister for Environment	<i>Environmental Protection Act 1986</i> <i>Biodiversity Conservation Act 2016</i>
Minister for Water	<i>Rights in Water and Irrigation Act 1914</i>
Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i>
Director General, Department of Biodiversity Conservation and Attractions (DBCA)	<i>Land Administration Act 1997</i> <i>Conservation and Land Management Act 1984</i>
Director General, Department of Water and Environmental Regulation	<i>Environmental Protection Act 1986</i> <i>Environmental Protection Regulations 1987</i> <i>Rights in Water and Irrigation Act 1914</i>
Shire of Manjimup	<i>Planning and Development Act 2005</i>
Shire of Bridgetown-Greenbushes	<i>Planning and Development Act 2005</i>
Commonwealth Minister for Environment	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
Economic Regulation Authority (ERA)	<i>Water Services Act 2012</i>

## 7 Regulation

A consolidated summary of potential regulation will be provided in a separate chapter with a view to optimising regulatory efficiency for environmental protection, along with a set of draft conditions for the consideration of stakeholders, DMAs, the public and the EPA.

## 8 References

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DEC (2013). Quokka *Setonix brachyurus* Recovery Plan. Wildlife Management Program No. 56. Department of Environment and Conservation, Perth, WA.

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