Turkey Point Access Road and Bridge

Southern Ports Authority

Updated Environmental Referral Supporting Document and Additional Information
EPA Assessment Number 2275

November 2021

Executive summary

Southern Ports Authority (Southern Ports) propose to construct the Turkey Point Public Access Road and Bridge (the Proposal) at the Port of Bunbury. The Proposal would be constructed from Leschenault Drive to Estuary Drive over the Preston River at the Port.

Southern Ports has secured State Government Royalties for Regions funding for the Proposal and the Proposal has been selected by the State Government as a post COVID-19 stimulus project for the Bunbury region and as such, there is an expectation by the State Government that the Port is working hard to bring this Proposal to fruition.

Public access to Turkey Point is currently through the Port area along Leschenault Drive. Interaction between Port traffic and public recreational traffic has the potential to cause both security and safety issues. The Proposal will provide a public access road from Estuary Drive across the Preston River north of the existing rail bridges joining the existing Turkey Point access road, thus bypassing Port areas and Port related traffic. It will also provide an alternative emergency access to the Port's northern berths.

The Proposal involves construction of a bridge with a 0.6 kilometre (km) single lane dual carriage road with tie-ins to existing roads and dual use pathway. The Proposal Development Envelope (DE) required for the construction and operation covers an area of 6.52 ha.

In July 2020, Southern Ports referred the Proposal to the Environmental Protection Authority (EPA) for assessment under Section 38 (s38) of the *Environmental Protection Act 1986* (WA) (EP Act). The Proposal information submitted included a *Section 38 Environmental Referral Document* (GHD, 2020) which described the Proposal, the local environmental values present, the potential environmental impacts of the Proposal, and the management and mitigation strategies to address the identified impacts. The s38 referral assessed potential impacts to Environmental Factors within the then 11.34 ha Proposal Area.

Following referral of the Proposal to the EPA in July 2020, Southern Ports substantially revised the Proposal design and infrastructure components with the objective to reduce the potential impacts to key environmental values. This resulted in a reduction in the Proposal Area, from 11.34 ha to 6.52 ha, with reduction in impacts to Environmental Factors, as detailed in Section 2.2.3.

In December 2020, Southern Ports submitted a letter to EPA (dated 22 December 2020), regarding the Turkey Point Access Road and Bridge Project – Section 38 Outcome -RFI 3 Response. This letter outlined further refinement of the DE and clearing footprint, wetland hydrologic connectivity and proposed land use.

In January 2020, the EPA determined that the Proposal would be subject to an environmental assessment under the EP Act at the level of 'Referral Information'. The EPA provided a Notice Requiring Information for Assessment under Section 40(2)(a) of the EP Act, dated 15 January 2021, with details regarding additional information required including matters in the Southern Ports letter dated 22 December 2021 (EPA, 2021).

This document is a revision of the original s38 referral document (GHD, 2020). It provides updated information and an assessment of the environmental impact of the Proposal, as amended, against relevant Environmental Factors: Terrestrial Fauna, Flora and Vegetation, Inland Waters, Social Surroundings and Greenhouse Gas Emissions. As well as updated information the following additional information was specifically requested by the EPA in the Notice Requiring Information for Assessment:

- Issue 1 – Finalised environmental investigation and assessment

- Issue 2 – Stakeholder consultation
- Issue 3 – Consistency with Ministerial Statement 697
- Issue 4 – Greenhouse gases
- Issue 5 – IBSA data package
- Issue 6 – Spatial data
- Issue 7 – Section 43A
- Issue 8 – Preparation of a consolidated report.

Southern Ports submitted a letter to the EPA, dated 10 September 2021, detailing changes to the Proposal alignment and subsequent reduction in impact, under section 43A of the EP Act.

The Updated Environmental Referral Supporting Document and Additional Information report (this report) forms the response by Southern Ports to EPA regarding issues outlined in the EPA Notice Requiring Information for Assessment under section 40(2)(a) of the EP Act, dated 15 January 2021. The title of this document reflects the inclusion of both updated and additional information to address the additional information request.

Updated Proposal design

Since the submission of the s38 application in July 2021 the design has been updated to realign the road adjacent to the existing rail line to further reduce the size of the Proposal DE from 11.34 ha to 6.52 ha.

The Proposal footprint has been minimised as far as practicable through engineering design and location selection (i.e. most direct route with the smallest footprint) thereby reducing the extent of clearing and avoiding fragmentation of the Subtropical and Temperate Coastal Saltmarsh TEC/PEC.

Flora and vegetation

The Proposal DE has been extensively disturbed over time and the majority (5.85 ha (90%)) of the vegetation in the Proposal DE is in Degraded to Completely Degraded condition and 0.67 ha (10%) is in Excellent condition.

The residual impact of the Proposal will be clearing of 0.67 ha of Subtropical Temperate Coastal Saltmarsh TEC/PEC in Excellent condition, listed as ‘Vulnerable’ under the EPBC Act and ‘Priority 3’ by the DBCA.

Clearing of 0.67 ha of Subtropical and Temperate Coastal Saltmarsh TEC/PEC represents 0.2 % of the remaining extent within the Leschenault Estuary. It is considered that clearing 0.67 ha of this ecological community is not likely to have a significant impact on the remaining vegetation within the Leschenault Estuary.

It is proposed to offset the clearing of 0.67 ha of Subtropical Temperate Coastal Saltmarsh as a precautionary measure (refer to Section 13 Offsets). The residual impact of development of the Proposal will not significantly impact the biological diversity and ecological integrity at a local or regional level.

Terrestrial fauna

The development of the Proposal will result in loss of native and non-native vegetation, including 0.67 ha low quality potential foraging habitat for the conservation significant Black Cockatoos.

Potential secondary impacts associated with noise, dust, vibration and light emissions are unlikely to be significant as the areas has been previously disturbed and has existing infrastructure and industry present in the surrounding areas.

Given the degraded condition of the fauna habitat within the Proposal DE, the avoidance of habitat fragmentation, offsets being applied for the clearing of the Subtropical and Temperate Coastal Saltmarsh TEC/PEC, the clearing is unlikely to result in significant impacts to fauna species.

It is considered the Proposal will meet the EPA's objective to protect terrestrial fauna so that biological diversity and ecological integrity are maintained through offsets and adequate management practices.

Inland waters

There are no Ramsar listed, Nationally Important wetlands or PDWSAs occurring within 3 km of the Proposal DE.

The Proposal has been designed to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal.

Temporary impacts on groundwater and surface water during construction will be managed via implementation of a Proposal specific CEMP.

Operation of the Proposal, once built, is considered unlikely to significantly impact surface water and groundwater quality due to Water Sensitive Urban Design (WSUD) principles integrated during the design process.

With the adoption and implementation of the mitigation measures, and adherence to the permit conditions obtained under the RIWI Act and WC Act, it is considered the Proposal meets the EPA objective to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected. The EPA objective for Inland Waters will therefore be met for the Proposal.

Social surroundings

Dust and noise are expected to be generated during construction. This impact will be controlled using standard mitigation measures implemented under the Proposal CEMP. Appropriate measures will be implemented to ensure that short term construction related air quality impacts are effectively managed.

Potential impacts to Aboriginal heritage sites associated with the Proposal will be managed through consultation with all relevant groups and works will be undertaken in accordance with the AH Act. Potential impacts to Aboriginal heritage will be managed under the s18 approval this project has received under the AH Act. The Port has undertaken to consult with the Traditional Owners once the Project is at the 85% detailed design stage.

Community access to the birdwatching area at Point Mornington will be maintained, via a new access road to the existing carpark at Point Mornington.

Management and mitigation actions will be implemented to control both the direct and indirect impacts of the Proposal on social surroundings values. Based on the above assessment, it is considered unlikely that the Proposal will have a significant impact on Social Surroundings values. The EPA objective for Social Surroundings will therefore be met for the Proposal.

Greenhouse Gas Emissions

The combined construction and annual maintenance Scope 1 emissions for the Proposal are 1,726 t CO_2-e, below the threshold of the Factor Guideline at approximately 2% of the 100,000 t CO_2-e (Scope 1) limit.

In response to the preliminary stage of design, a 50% up lift to the construction footprint would still put the modelled Scope 1 emissions at 2,938 t CO_2-e, several orders of magnitude below the threshold.

Scope 1 Emissions estimates are negligible compared to the annual emissions from Western Australia and do not trigger the threshold of 100,000 t CO_2-e for the EPA Factor Guideline: GHG Emissions for further assessment (EPA, 2021).

The results of the GHG assessment for construction and operation of the Proposal indicate that the constructed Proposal is unlikely to produce significant GHG emissions. The EPA's objective for the factor GHG is to reduce net greenhouse gas emissions to minimise the risk of environmental harm associated with climate change. Given the above assessment, no residual impacts are expected for this aspect and the Proposal meets the EPA objective for GHG.

Impact summary

The Proposal will provide a public access road from Estuary Drive across the Preston River north of the existing rail bridges joining the existing Turkey Point access road, thus bypassing Port areas and Port related traffic. It will also provide alternative emergency access to the Port's northern berths.

There has been significant attention to locating the Turkey Point access road and bridge to minimise its impacts on Key Environmental Factors. Some residual impacts to key environmental factors vegetation and flora are expected which will require offsetting. It is considered that potential residual impacts to other key environmental factors will not be significant and will be manageable through implementation of a CEMP to ensure the EPA's objective for each Key Environmental Factor is met.

Acronyms

Term	Definition
%	Percentage
<	Less than
°C	Degrees Celsius
ACMC	Aboriginal Cultural Materials Committee
AH Act	*Aboriginal Heritage Act 1972*
ARI	Average Recurrence Interval
AS	Australian Standards
ASS	Acid Sulphate Soils
BC Act	*Biodiversity Conservation Act 2016 (WA)*
BoM	Bureau of Meteorology
CCW	Conservation Category Wetland
CFM	Carter's Freshwater Mussel
CO	Carbon Monoxide
CoB	City of Bunbury
DA	Development Application
DAWE	Department of Agriculture, Water and Environment (Commonwealth)
DBCA	Department of Biodiversity, Conservation and Attractions
DE	Development Envelope
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water, Environment and Regulation (WA)
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Act 1999* (Commonwealth)
ESA	Environmentally Sensitive Area
GBR	Greater Bunbury Region
GBRS	Greater Bunbury Regional Scheme
GoWA	Government of Western Australia
ha	Hectare
HSE	Health, Safety and Environmental
IBRA	Interim Biogeographic Regionalisation for Australia
JDAP	Joint Development Assessment Panel
km	Kilometre
km/hr	Kilometre per hour
L	Litres
L/day	Litres per day
LGA	Local Government Area
m	Metres
m AHD	Metres in Australian Height Datum
m^3	Cubic metres
mm/year	Millimetres per year
MNES	Matters of National Environmental Significance
MS	Ministerial Statement
n/a	Not applicable
PDWSA	Public Drinking Water Source Area
PEC	Priority Ecological Community

Term	Definition
PM	Particular Matter
PM_{10}	Total suspended particulates with an aerodynamic diameter of 10 microns
PMST	Protected Matters Search Tool
RIWI Act	*Rights in Water and Irrigation Act 1914 (WA)*
ROS	Regional Open Space
s18	Section 18 under the *Aboriginal Heritage Act 1972*
s38	Section 38 under the *Environmental Protection Act 1986*
s40(2)(a)	Section 40(2)(a) under the *Environmental Protection Act 1986*
s43A	Section 43A under the *Environmental Protection Act 1986*
s51	Section 51 under the *Environmental Protection Act 1986*
SLR	Sea level rise
Southern Ports	Southern Ports Authority – Port of Bunbury
SPP	State Planning Policy
TEC	Threatened Ecological Communities
The Port	Port of Bunbury
TSP	Total suspended particulates
UCL	Unallocated Crown Land
VT	Vegetation type
WA	Western Australia
WC Act	*Waterways Conservation Act 1976*

Defined Terms

Term	Definition
Acid sulfate soils	Acid sulfate soils (ASS) are naturally occurring soils and sediments whose sulfide minerals, predominantly pyrite, have been exposed to oxygen and have formed sulfuric acid.
Geomorphic wetlands	Wetlands classified according to landform and water permanence, e.g. lake, sumpland, dampland and palusplain. Swan Coastal Plain wetlands management categories are based on their assessed level of management and protection requirements, i.e. Conservation, Resource Enhancement or Multiple Use.
Conservation Category Wetland (CCW)	A wetland with a high level of attributes and functions.
Matters of National Environmental Significance (MNES)	Matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), i.e.: • World heritage properties. • National heritage places. • Wetlands of international importance (listed under the Ramsar Convention). • Listed threatened species and ecological communities. • Migratory species protected under international agreements. • Commonwealth marine areas. • The Great Barrier Reef Marine Park • Nuclear actions (including uranium mines). • A water resource, in relation to coal seam gas development and large coal mining development. Under the EPBC Act, actions that have, or are likely to have, a significant impact on a MNES require approval from the Australian Government Minister for the Environment who will decide whether assessment and approval is required.
Multiple Use Wetland	A wetland with few important ecological attributes and functions remaining.
Proposal Development Envelope (DE)	The area shown in Figure 1-1, covering approximately 6.52 hectares (ha), within the City of Bunbury.
Ramsar, Ramsar Convention, Ramsar wetland	An international, intergovernmental treaty for the conservation and sustainable use of wetlands especially as waterfowl habitat. Treaty was established in 1971 in the city of Ramsar, Iran.
Resource Enhancement Wetland	A wetland which may have been partially modified but still supports substantial ecological attributes and functions.

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1. Introduction

Southern Ports Authority (Southern Ports) propose to construct the Turkey Point Public Access Road and Bridge (the Proposal) at the Port of Bunbury. The Proposal will be constructed from Leschenault Drive to Estuary Drive over the Preston River at the Port (Figure 1-1 and Appendix A).

Southern Ports has secured State Government Royalties for Regions funding for the Proposal and the Proposal has been selected by the State Government as a post COVID-19 stimulus project for the Bunbury region and as such, there is an expectation by the State Government that the Port is working hard to bring this Proposal to fruition.

Public access to Turkey Point is currently through the Port along Leschenault Drive. Interaction between Port traffic and public recreational traffic has the potential to cause both security and safety issues. The Proposal will provide a public access road from Estuary Drive across the Preston River north of the existing rail bridges and power lines joining the existing Turkey Point access road, thus bypassing Port areas and Port related traffic. It will also provide alternative emergency access to the Port's northern berths.

The Proposal involves construction of a bridge with a 0.6 kilometre (km) single lane dual carriage road with tie-ins to existing roads. The bridge will also include a dual use pathway. The construction of the Proposal will include clearing of native vegetation within a Proposal Development Envelope (DE) of up to 6.52 ha.

In July 2020, Southern Ports referred the Proposal to the Environmental Protection Authority (EPA) for assessment under Section 38 (s38) of the *Environmental Protection Act 1986* (WA) (EP Act). The Proposal information submitted included a *Section 38 Environmental Referral Document* (GHD, 2020) which described the Proposal, the local environmental values present, the potential environmental impacts of the Proposal, and the management and mitigation strategies to address the identified impacts. The s38 referral assessed potential impacts to Environmental Factors within the then 11.34 ha Proposal Area.

Following referral of the Proposal to the EPA in July 2020, Southern Ports substantially revised the Proposal design and infrastructure components with the objective to reduce the potential impacts to key environmental values. This resulted in a reduction in the Proposal Area, from 11.34 ha to 6.52 ha, with a reduction in impacts to Environmental Factors, as detailed in Section 2.2.3, Proposal design and alternatives considered

In December 2020, Southern Ports submitted a letter to EPA (dated 22 December 2020), regarding the Turkey Point Access Road and Bridge Project – Section 38 Outcome -RF 3 Response. This letter outlined further refinement of the DE and clearing footprint, wetland hydrologic connectivity and proposed land use.

In January 2020, the EPA determined that the Proposal would be subject to an environmental assessment under the EP Act at the level of 'Referral Information'. The EPA provided a Notice Requiring Information for Assessment under Section 40(2)(a) of the EP Act, dated 15 January 2021, with details regarding additional information required including matters in the Southern Ports letter dated 22 December 2021.

1.1 Purpose and scope of this report

This document updates the information provided at referral with respect to the current Proposal changed under section 43A of the EP Act, and provides the additional information requested by the EPA under section 40(2)(a) of the EP Act. This information, presented with the information provided in the s38 referral, will be used by the EPA in their assessment of the Proposal.

The title of this document reflects the inclusion of both updated and additional information to address the additional information request.

This document provides updated information and an assessment of the environmental impact of the Proposal, as amended, against relevant Environmental Factors: Terrestrial Fauna, Flora and Vegetation, Inland Waters and Social Surroundings. As well as updated information for the following additional information was specifically requested by the EPA in the Notice Requiring Information for Assessment:

- Issue 1 – Finalised environmental investigation and assessment
- Issue 2 – Stakeholder consultation
- Issue 3 – Consistency with Ministerial Statement 697
- Issue 4 – Greenhouse gases
- Issue 5 – IBSA data package
- Issue 6 – Spatial data
- Issue 7 – Section 43A
- Issue 8 – Preparation of a consolidated report.

This document has been prepared in accordance with *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures* (EPA, 2016g) and *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA, 2018b).

1.2 The proponent

The Proponent for this Proposal is:

- Southern Ports Authority

  ABN: 30 044 341 250

  Address: 54 Casuarina Drive, Bunbury, WA 6230

The contact for Southern Ports in relation to the Proposal is:

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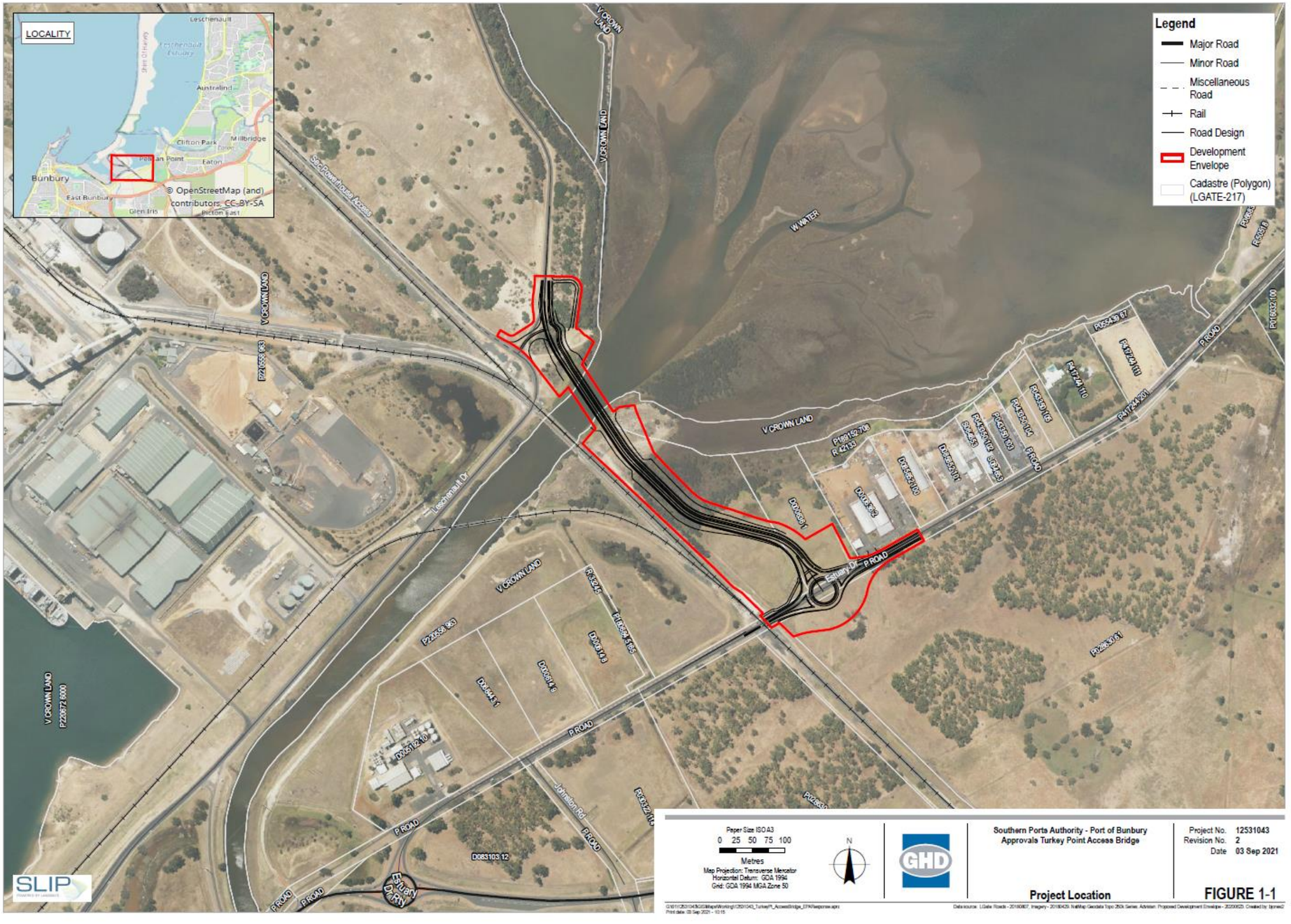

Figure 1-1 Location of the Proposal

1.3 Environmental impact assessment process

1.3.1 *Environmental Protection Act 1986*, Part IV Environmental impact assessment

The EP Act is the primary legislation governing environmental impact assessment in WA and Part IV of the EP Act relates to Environmental Impact Assessment, which is carried out in accordance with the EPA Administrative Procedures (2016g).

In July 2020, Southern Ports referred the Proposal to the Environmental Protection Authority (EPA) for assessment under section 38 (s38) of the *Environmental Protection Act 1986* (WA) (EP Act). The Proposal information submitted included a *Section 38 Environmental Referral Document* (GHD, 2020) which described the Proposal, the local environmental values present, the potential environmental impacts of the Proposal, and the management and mitigation strategies to address the identified impacts. The s38 referral assessed potential impacts to Environmental Factors within the then 11.34 ha Proposal Area.

In December 2020, Southern Ports submitted a letter to EPA (dated 22 December 2020), regarding the Turkey Point Access Road and Bridge Project – Section 38 Outcome –RFI 3 Response. This letter outlined further refinement of the DE and clearing footprint, wetland hydrologic connectivity and proposed land use.

In January 2020, the EPA determined that the Proposal would be subject to an environmental assessment under the EP Act at the level of 'Referral Information'. The EPA provided a Notice Requiring Information for Assessment under section 40(2)(a) of the EP Act, dated 15 January 2021, with details regarding additional information required including matters in the Southern Ports letter dated 22 December 2021.

Additional information required by EPA and the response by Southern Ports has been summarised in Table 1-1.

Southern Ports submitted a letter to the EPA, dated 10 September 2021, detailing changes to the Proposal alignment and subsequent reduction in impact, under Section 43A of the EP Act.

The Updated Environmental Referral Supporting Document and Additional Information report (this report) forms the response by Southern Ports to the EPA regarding issues outlined in the EPA Notice Requiring Information for Assessment under section 40(2)(a) of the EP Act, dated 15 January 2021.

Table 1-1 Notice Requiring Information for Assessment under Section 40(2)(a) – summary of response

Additional information required	Response/section addressing
Issue 1 – Finalised Environmental Investigations and Assessment	
• For the Preliminary Key Environmental Factor of Inland Waters, complete hydrological investigations to determine the site-specific tidal flows to be maintained, which is important to the survival of the *Subtropical and Temperate Coastal Saltmarsh* Priority Ecological Community (P3).	Hydrological investigations were undertaken by GHD (2021a) to determine site-specific tidal flows and the impact of the design referred in July 2020. This investigation (Appendix B) determined that modelling of the existing and proposed design would not significantly impact on the spatial extent, depth, duration and frequency of inundation patterns at the TEC/PEC site. The culverts were predicted to be

Additional information required	Response/section addressing
	effective mitigative structures that allow the flows between the tidal flats and the TEC/PEC site to be maintained following construction of the Proposed. However, subsequent to referral of the Proposal in July 2020, the Proposal DE has been reduced and the design realigned so that the proposed road lies adjacent to the existing rail line. This has resulted in a reduction of impact on the TEC/PEC. Clearing of this TEC/PEC is reduced to 0.67 ha and there is no longer fragmentation of the vegetation community and therefore no impact on tidal flows and hydrological connection.
• The EPA requires these investigations to be undertaken in accordance with the EPA's Framework for Environmental Considerations in EIA, the EPA's Framework for Advice and Reference Material and other appropriate technical guidance documents where relevant to this proposal. The framework is available here https://www.epa.wa.gov.au/pages/framework-environmental-considerations-eia.	Investigations have been undertaken in accordance with the EPA's Framework for Environmental Considerations in EIA.
• The above information and assessment is required to better define the extent and severity of the proposal's indirect impacts and include specific outcome based management and mitigation measures to ensure hydrological connection is maintained between the two wetlands that will be fragmented by the proposal.	The Proposal DE has been designed to avoid fragmentation of Subtropical and Temperate Coastal Saltmarsh TEC/PEC.
• The EPA notes that Southern Ports Authority has provided some information on the application of the mitigation hierarchy. However, the EPA requests that the further work is required to show the application of the mitigation hierarchy for each Preliminary Key Environmental Factor in the proposal design, construction and operation phases. Detail actions to be undertaken to avoid, minimise and mitigate proposal impacts including details on the proposed revegetation. Determine and quantify any significant residual impacts by applying the residual impact significance model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (2014).	Further information has been provided for application of the mitigation hierarchy for each Preliminary Key Environmental Factor (refer to Sections 5 to 10).

Additional information required	Response/section addressing
• If offsets are appropriate, provide an Offsets Strategy in accordance with the Western Australian State Government Environmental Offsets Policy (2011) and Guidelines. This should include providing an assessment of whether the proposed offset is likely to counter-balance any significant residual impact, and whether the EPA's environmental factor objective will be met, over all relevant timeframes.	An Offsets Strategy has been provided in Section 13 in accordance with the WA Environmental Offsets Policy (2011) and Guidelines.
• For each Preliminary Key Environmental Factor, identify, describe and quantify the cumulative impacts of the proposal in relation to other current and foreseeable future developments.	Information has been provided for cumulative impacts for each Preliminary Key Environmental Factor (refer to Sections 5 to 10).
• For Terrestrial Fauna assess the indirect impacts to fauna movement from fragmentation of the wetland and native vegetation from the embanked road and if appropriate, provide management and mitigation measures to reduce impacts from the proposal.	The Proposal DE has been designed to avoid fragmentation of Subtropical and Temperate Coastal Saltmarsh TEC/PEC and thereby does not impact on fauna movement.
• A holistic environmental assessment.	A holistic environmental assessment is provided in Section 14.
Issue 2 – Stakeholder consultation	
• Undertake consultation with the South West Aboriginal Land and Sea Council in relation to the proposal and the potential impacts to Aboriginal Heritage sites.	Consultation has been undertaken with the South West Aboriginal Land and Sea Council (refer to Section 3.1).
• Undertake targeted consultation with local interest groups, stakeholder groups for the proponent, and the State-wide groups who made submissions in the public comment period. A list of groups consulted should be provided to the EPA Services. • Provide evidence and information on the outcome of the consultation and how any comments were considered and incorporated into the proposal, where relevant and appropriate.	Targeted consultation has been undertaken with the various groups as requested with records of the discussions included in Section 3.2
Issue 3 – Consistency with Ministerial Statement 697	
• Demonstrate how the proposal has had regard to and is not inconsistent with the requirements and intent of the relevant conditions outlined in Ministerial Statement 697 (e.g. item 5-3 of Attachment 1).	The Proposal DE has been designed to reduce impact of clearing native vegetation, avoid fragmentation of Subtropical and Temperate Coastal Saltmarsh TEC/PEC and maintain environmental integrity and function of the

Additional information required	Response/section addressing
	foreshore adjoining Port Installation Reserve (refer to Section 12).
Issue 4 – Greenhouse gases	
• In accordance with the EPA's Environmental Factor Guideline Greenhouse Gas Emissions please provide estimates of scope 1 Greenhouse Gas emissions (annual and total) over the life of a proposal including a breakdown of Greenhouse Gas emissions by source. If the proposal is likely to exceed 1000,000 tonnes of scope 1 emissions each year measured in CO_2-e, show the application of the mitigation hierarchy to avoid, reduce, and offset emissions.	A Greenhouse Gas Emissions assessment has been completed for the Proposal (refer to Section 9).
Issue 5 – IBSA Data Package	
• Please provide an Index of Biodiversity Surveys for Assessments (IBSA) data package for each biodiversity survey report undertaken in accordance with the Instructions and Form: IBSA Data Packages. These instructions and forms are available on the EPA's website https://www.epa.wa.gov.au/forms-templates/instructions-preparing-data-packages-index-biodiversity-surveys-assessments-ibsa.	An IBSA data package, for each biodiversity survey report, will be provided with this submission.
Issue 6 – Spatial Data	
• The EPA notes the Referral Documentation included spatial data for the Development Envelope but spatial data for the disturbance footprint has not been provided at the time due to detailed design not being completed. The EPA requires footprint/s spatial data to identify and verify where any disturbance and the location of physical proposal elements occur.	Spatial data for the Proposal DE will be provided with this submission
• Please provide disturbance footprint figures and spatial data in accordance with the EPA's spatial data requirements, this requirement is geo-referenced data and conforms to the following parameters: o Data type: closed polygons that represent the proposal boundary (development envelope) and the activity areas for all physical elements of the proposal (footprint). - Attribution: Name the development envelope and each activity area in the attribute table of the spatial data. - Format: ESRI geodatabase or shapefile.	

Additional information required	Response/section addressing
- Coordinate System: GDA94 (datum) and projected into the appropriate Map Grid of Australia (MGA) zone.	
Issue 7 – s43A	
• Please submit an application under section 43A of the EP Act in order to seek EPA consent to change the proposal from the referral dated 31 July 2020 and to incorporate the matters in your letter of 22 December 2020, and any other changes to the proposal elements to further reduce impacts.	Southern Ports submitted a letter to the EPA, dated 10 September 2021, detailing changes to the Proposal alignment and subsequent reduction in impact, under Section 43A of the EP Act.
Issue 8 – Preparation of a consolidated report	
• The Referral Information documentation must be updated to take into account any section 43A EP Act consent to proposal changes. The updated Referral Information and the Additional Information requested in this notice should where appropriate be consolidated into a single report package, as both the amended referral information and additional information will be required to be published for targeted review.	The Updated Environmental Referral Supporting Document and Additional Information report (this report) forms the response by Southern Ports to EPA regarding issues outlined in the EPA Notice Requiring Information for Assessment under section 40(2)(a) of the EP Act, dated 15 January 2021.

1.4 Other approvals and regulation

The Proposal is subject to compliance with other relevant state legislation and regulations and guided by relevant key over-arching state policies and strategies. Table 1-2 provides a summary of the regulatory approvals required for the Proposal and the associated decision-making authorities.

Table 1-2 Summary of Proposal regulatory approvals

Proposal activities	Type of approval	Regulatory Agency	Legislation regulating the activity
Commonwealth legislation			
Clearing of federally listed Threatened Ecological Community	EPBC	Department of Agriculture, Water and the Environment	*Environment Protection and Biodiversity Conservation Act 1999*
State legislation			
Construction and operation of the bridge and access road	Part IV	Environmental Protection Authority Department of Water and Environmental Regulation	*Environmental Protection Act 1986*
Clearing of native vegetation	Part V	Department of Water and	*Environmental Protection Act 1986*

Proposal activities	Type of approval	Regulatory Agency	Legislation regulating the activity
		Environmental Regulation	Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).
Disturbance to the Bed and Bank of Preston River	Bed and Banks Permit		*Rights in Water and Irrigation Act 1914*
Access to and use of water resources	Licence to construction well (26D) and Licence to abstract water (5C)		*Rights in Water and Irrigation Act 1914*
Dewatering at pile construction site and installation of temporary groyne in river	Disposal Licence and Reclamation Licence		*Waterways Conservation Act 1976*
Disturbance of an Aboriginal heritage site(s)	Section 18	Department of Planning, Lands and Heritage (DPLH)	*Aboriginal Heritage Act 1972*
Land acquisition process	Administration of State and Unallocated Crown Land (UCL)	DPLH	*Land Administration Act 1997*
Geotechnical investigation and construction of embankment	Development Application	Western Australian Planning Commission (WAPC)	Regional Planning Scheme
Construction of the access road and bridge			

1.4.1 *Environment Protection and Biodiversity Conservation Act 1999*

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), actions that have, or are likely to have a significant impact on a matter of national environmental significance (MNES), require approval from the Australian Government Minister for Environment. The Minister will decide whether a proposal constitutes a 'controlled action' which requires assessment and approval under the EPBC Act.

There are nine MNES that are protected under the EPBC Act, these are:

- World heritage properties
- National heritage places
- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)

- a water resource, in relation to coal seam gas development and large coal mining development.

A search of the Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) database, based on a 2 km search buffer, identified a number of EPBC Act listed flora and fauna species that are likely to occur within the Proposal DE (DAWE, 2020). The presence and required clearing (0.67 ha) of a federally listed Threatened Ecological Community (TEC) may have required the Proposal to be referred to and assessed by the DAWE. On this basis Southern Ports consulted with DAWE (refer to Section 3) to determine if the Proposal required referral to DAWE under the EPBC Act to assess the proposed clearing of the TEC. Consultation with DAWE was undertaken on 10 July 2020. The potential environmental impacts were discussed with DAWE staff. The meeting advised that the potential environmental impacts would be managed under the (EP Act) and that the Proposal did not require referral to DAWE. A self-assessment report was prepared to inform the meeting.

Section 11 provides further detail relating to relevant MNES to be considered under the EPBC Act and an assessment against the MNES.

1.4.2 *Environmental Protection Act 1986*, Part V Control of pollution

Part V of the EP Act, provides for the regulation, licensing, approval, compliance and enforcement of the following:

- Emissions and discharge
- Waste
- Noise
- Clearing of native vegetation.

Southern Ports submitted an application to clear Native Vegetation Clearing Permit under s51 of the EP Act on 6 August 2020. This application was referred to DWER in parallel to the s38 referral and has subsequently been withdrawn.

1.4.3 *Rights in Water and Irrigation Act 1914*

The *Rights in Water and Irrigation Act 1914* (RIWI Act) provides for the regulation, management, use and protection of water resources. This Act provides for a licensing system to take water and the regulatory framework to assess activities that may damage, obstruct or interfere with water flow or the beds and banks of watercourses and wetlands in proclaimed rivers, surface water management areas and irrigation districts.

The Preston River (and tributaries) is classified as a proclaimed waterway under the RIWI Act and as such, Southern Ports is required to obtain a Bed and Banks Permit for construction of the Proposal from DWER.

1.4.4 *Waterways Conservation Act 1976*

The Proposal lies within the Leschenault Inlet *Waterways Conservation Act 1976* (WC Act) Management Area requiring Southern Ports to obtain a Disposal Licence (related to dewatering at pile and abutment construction sites) and a Reclamation Licence (related to construction of temporary construction causeway within the river).

1.4.5 *Aboriginal Heritage Act 1972*

The *Aboriginal Heritage Act 1972* (AH Act) and associated Aboriginal Heritage Regulations 1974, protect all Aboriginal heritage sites in WA, whether or not they are registered with the

Department of Planning, Lands and Heritage (DPLH). The DPLH is responsible for protecting Aboriginal heritage and assisting with the compliance with the AH Act.

Under Section 17 of the AH Act, it is an offence to excavate, destroy, damage, conceal or in any other way alter an Aboriginal site. It is also an offence to alter, damage, remove, destroy, conceal or deal with in a manner not sanctioned by relevant custom, or assume the possession, custody or control of, any object on or under an Aboriginal site.

Under Section 16 of the AH Act, it is necessary to obtain an authorisation to enter an Aboriginal site and excavate, examine or remove anything on or under the site, in a manner and subject to conditions as the Aboriginal Cultural Material Committee (ACMC) may advise. An application for a Section 16 authorisation will be considered by the Registrar of Aboriginal Sites and may grant authorisation on the advice of and subject to the conditions imposed by the ACMC.

Under Section 18 of the AH Act, consent needs to be given for the Minister for Aboriginal Affairs for the owner of the land to disturb an Aboriginal site of significance (as defined under Section 5 of the AH Act). “Owner of any land” includes a lessee from the Crown. The DPLH processes the lodged Section 18 notice, which also provides notice to the ACMC.

Under the Aboriginal Heritage Regulations 1975, it is prohibited to undertake certain activities within a Protected Area or Aboriginal site without consent. Prohibited activities include those such as digging a hole or disturbing ground, operating a vehicle and altering or damaging a notice or boundary erected by the Registrar or DPLH. Written consent must be obtained from the Minster, Registrar or a person authorised in writing by the Minister or the Registrar. Penalties apply for those who commit offences under the AH Act and Regulations.

As part of the Inner Harbour Structure Plan, Southern Ports obtained a Section 18 approval from DPLH for the Aboriginal Heritage Site ID19795 Preston River. This approval was provided at the time when the Collie River had been removed from WA’s register of Aboriginal sites. The WA Supreme Court in Robinson V Fielding (WASC 108) concluded that the *Guidelines* adopted by the Aboriginal Materials Committee for the determination of what is an Aboriginal site under the AH Act was inconsistent with the definition of ‘Aboriginal site’ in the AH Act. As a result of this decision, the status of Place ID 16713 Collie River Waugal was re-assessed by the ACMC resulting in the Collie River being re-registered as an Aboriginal heritage site under the AH Act.

Southern Ports sought advice from DPLH as to whether the Section 18 approval awarded prior to the legal challenge and decision is valid for the construction and operation of the Proposal given the change of status of the Collie River. DPLH’s review of the Section 18 approval obtained prior to the legal case confirmed the ‘*geotechnical works and bridge construction would fall within the land and purpose of the Ministerial consent issued to the Southern Ports Authority”*, and as such, a new Section 18 approval under the AH Act was not required.

1.4.6 Development Application

Southern Ports will submit a Development Application (DA) to the Western Australian Planning Commission for approval to construct the Proposal. Southern Ports will consult with the City of Bunbury and DPLH regarding the content and submission of the DA. The DA will include:

- Traffic management
- Drainage management
- Power supply.

In the event the value of the Proposal exceeds $10 million, Southern Ports will submit the DA to the Western Australian Planning Commission, where it will be referred to the regional Joint Development Assessment Panel (JDAP) for approval.

1.5 Land tenure

The Proposal is located in the City of Bunbury and traverses a number of parcels of land owned or managed by Southern Ports. The Proposal lies over one (1) parcel of unallocated crown land (UCL) (refer to Table 1-3 for details) for which the Southern Ports has submitted a Crown Land Enquiry application to DPLH to access and use this parcel for the construction and operation of the Proposal.

Table 1-3 UCL within the Proposal DE

Title	Lot number	Parcel Identification number	Area (ha)
UCL	V Crown Land	3086614	2.94

2. The Proposal

2.1 Proposal justification

Public access to Turkey Point is currently through the Port along Leschenault Drive. Interaction between Port traffic and public recreational traffic has the potential to cause both security and safety issues. The Proposal will provide a public access road from Estuary Drive across the Preston River north of the existing rail bridges and power lines joining the existing Turkey Point access road, thus bypassing Port areas and Port related traffic. It will also provide alternative emergency access to the Port's northern berths.

2.2 Proposal description

2.2.1 Key characteristics

Table 2-1 and Table 2-2 present the key Proposal characteristics, which have been developed in accordance with EPA *Instructions and template: Defining the key proposal characteristics*.

The Proposal is further described in Sections 2.2.2 to Section 2.2.5, while **Error! Reference source not found.** outlines the proposed indicative layout of the Proposal within the Proposal DE. The Proposal has a disturbance/clearing footprint of up 6.52 ha.

Table 2-1 Summary of the Proposal

Summary of the Proposal	
Proposal title	Turkey Point Access Bridge
Proponent name	Southern Ports Authority
Short description	The Proposal is to develop a new bridge with a single lane dual carriage road and dual use path over the Preston River, to Turkey Point, Bunbury, Western Australia. The Proposal has a disturbance/clearing footprint (development envelope) of up to 6.52 ha.

Table 2-2 Proposed extent of physical and operational elements

Element	Proposed extent
Physical elements	
Bridge and road construction	The Proposal has a disturbance/clearing footprint (development envelope) of up to 6.52 ha.
Total disturbance area within the Proposal DE:	Up to 6.52 ha

2.2.2 Proposal timing

Table 2-32-3 outlines the proposed timing for development and operation of the Proposal.

Table 2-3 Proposed timing of development and operations of the Proposal

Timeline	Activity
December 2021/ January 2022	Undertake early geotechnical investigations.

Timeline	Activity
March 2022 – May 2022	Construct ground remediation surcharge of the low area to east of Preston River (construction duration estimated to be around eight (8) weeks). Ground remediation (surcharge) will be in in place for around six (6) months.
October 2022	Commence clearing. Construct temporary causeway into river for bridge construction works.
November/December 2022	Bridge piling works.
October 2022 to May 2023	Embankment construction and pavement works will be undertaken progressively.
October 2022 to June 2023	Construction period of the Turkey Point Access Road and Bridge.
January to May 2023	Construction completion of bridge substructure (support piers) and super structure (bridge beams and concrete deck).
June 2023	Rehabilitation completion.
June 2023	Project completion.

2.2.3 Proposal design and alternatives considered

In developing a business case the Southern Ports (2019) considered the following three (3) options for the Proposal:

1. Option 1 - Do nothing where access to Turkey Point and Vittoria Bay remains via Leschenault Drive. This option would maintain access to Leschenault Drive to the public travelling to Turkey Point within the Port potentially increasing health, safety and environmental (HSE) exposure. In addition to HSE exposure, this option impacts operational efficiency due to the increased congestion between vehicles, predominately trucks, entering/leaving the Port and public users of the road. During construction works for the expansion of the Inner Harbour, Leschenault Drive would be temporarily closed and as result removes access to the northern berths of the Port and Turkey Point and Vittoria Bay. Therefore, this option is considered not feasible.
2. Option 2 - Construction of a new access road and bridge from Estuary Drive with a bridge over Preston River and a tie-in to a modified access road out to Turkey Point (as show in Figure 2-1). The proposed road would be a single lane, dual carriage way, with a 9-span road bridge. The road would include three bends and angled upwards at the branch off from Estuary Drive, in order to maximise available land to the south of the new access road for future Port development. The road design allows for only short lane type intersection with limited lighting and no dual use path. There are also several utility assets (overhead and underground) in the vicinity of the proposed road, which would require relocation (Southern Ports Authority, 2019).

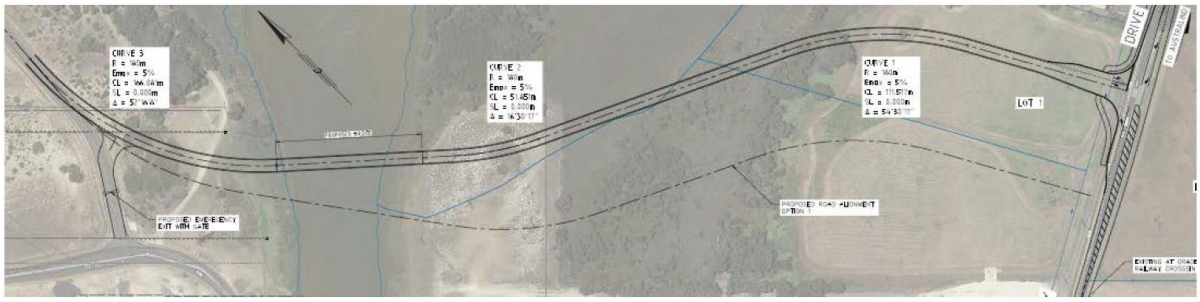

Figure 2-1 Option 2 Access Road and Bridge layout (Southern Ports Authority, 2019)

3. Option 3 – Construction of a new access road and bridge which is shorter than Option 2, with roundabout tie-in to a road out to Turkey Point and Estuary Drive and a dual use path. The proposed road is a straight single lane, dual carriage with 1.5 m shoulders, a 3-span bridge. The location of the road in this option avoids overhead utility assets and other major utility relocation.

Since referral of the Proposal to the EPA in July 2021, Southern Ports has developed a fourth option (Figure 1-1) which includes aspects from Option 3, however reduces impact of fragmentation of native vegetation, by aligning the road adjacent to the existing rail line to the south.

Option 4 was developed over more than ten iterations, after taking on board key comments from the stakeholder consultation process. Option 4 is the preferred and recommended option. By implementing Option 4 (the Proposal) both the Port and the public benefit through safer and easier access to Turkey Point, more efficient Port operations and improved safety and security. The Proposal will provide alternative emergency access to the northern berths enabling the Port to continue operations during construction of the Inner Harbour without restrictions.

The Proposal design allows for some flexibility in detailed design and positioning of alignment within this DE. As far as practicable, the areas of native vegetation to be cleared will be minimised to reduce the potential impacts. It is anticipated the areas of native vegetation to be cleared for the construction of the Proposal will only be for the width of the Proposal footprint, as indicated in the 15% design (Arcadis, 2021) included in Appendix A.

2.2.4 Proposal construction

Options for piling and headstock construction

The following two options are considered to provide access for piling and pier headstock construction over water of Preston River.

Option 1: Temporary construction causeway

The construction of the Proposal will require the installation of a temporary construction causeway (approximately 85 m long x 50 m wide x 1 to 2 m deep) to a level approximately 0.5 m above existing river water level, across the riverbed. A temporary construction causeway is required to enable bridge piling and superstructure works, including erection of bridge beams. The temporary construction causeway will be removed on completion of the bridge works. The temporary construction causeway will be in place for approximately four (4) to five (5) months.

The temporary construction causeway will consist of 1 to 2 m, average depth, layer of clayey gravel and generally limited to a particle size of 75 mm within the footprint of each pile group foundation footprint. Outside the pile group foundation footprint, causeway material will be “rocky” in nature to allow water to pass through the causeway and not cause the water to be

dammed upriver of the temporary construction causeway. Gravel sheeting layer will be placed over the rock fill.

All material for the construction of the temporary causeway will be sourced from a clean source, which will be non-acid sulphate soil or potentially acid sulphate soil, in origin. The temporary construction causeway material will be pushed out into the river from the riverbank over a geotextile layer. The final level of the temporary construction causeway will be approximately 500 mm above the river high water mark.

It is anticipated the temporary causeway will be constructed by end tipping rock and pushing it out into the river to access the pier/abutment locations. Some of the rock will likely punch into the riverbed during this process. All placed rock would be removed from the river to just below the level of the existing riverbed. If deemed better for the river, punched rock will be left in place below this level if any and the river should naturally re-silt over the surface of the rock.

The river flow will be redirected through the opening in the temporary construction causeway (approximately 15 m wide) which may be located at one of the following locations:

- Between abutment and pier 1
- Between piers 1 and 2
- Between pier 2 and abutment.

The flexibility in the location of the opening in the temporary construction causeway must be provided to allow the construction contractor flexibility to undertake the construction works in the safest possible sequence. The net length and areas of the temporary causeway and the opening in the causeway will not be impacted by the proposed location of the opening.

If required, culverts can be installed through the temporary construction causeway to further assist with maintaining the water flow. All flows will be maintained throughout the works. Under no circumstances will surface water be used for construction purposes. It is not anticipated that these proposed actions will adversely affect the natural flow of the water.

Option 2: Temporary false work trestle

The temporary false work trestle is to be established beside the proposed bridge location. Temporary steel H-piles will be initially installed by pilling machine at riverbank with appropriate steel sheets on top of the H-piles. The established trestle formed a platform for pilling machine to continue the construction of temporary trestle and extended to the desired pier location for permanent piles installation. The steel temporary false work trestle can provide a stable and controllable access for pilling works over shallow water like Preston River.

All the temporary false work including H-piles can be removed and reused after the bridge is set up, which will minimize the environmental impact.

Piling

Installation of piles for the abutments and piers will commence once the temporary construction causeway is completed. Each pile group required will consist of up to four (4) nominal 900 diameter permanent steel cased piles to be driven to a depth of approximately -30 m AHD m (depth to be confirmed once geotechnical investigation data is available) using an impact pile driving hammer. These will provide the foundations for the bridge structure.

Temporary causeway is able to provide a reliable access and platform for pilling machine operation and subsequent concrete cast for pier headstock, but it is time-consuming, costly and heavy environmental impact.

Dewatering

Based on current design (piles up to the headstock, no requirements for a pilecap) dewatering is unlikely to be required. Dewatering using sump pumps may be planned if dewatering is required. The dewatered water will be piped (through a lay flat hose) on the downstream side - approximately some 100 m away along the river. The water being pumped will effectively be the subsurface water discharge should be that of the existing water quality. If geotechnical investigation confirms pier pilecaps are required - sheet pile coffer dams will be constructed to enable pilecap construction to prevent water coming into the pilecap work area. The results of groundwater drawdown calculations are preliminary only and indicate that a discharge between 4 and 14 L/s may likely be required to draw the water down for no more than 30 working days.

Bridge

Two (2) concrete piers will be erected in the riverbed (**Error! Reference source not found.**) which will require piling and possibly dewatering works for the development of the concrete foundations. The bridge deck will be supported by either circular concrete piers or blade type concrete piers at intermediate supports and abutments with concrete infill.

Road/bridge drainage management

A road drainage assessment has been undertaken, by Advisian, using a 1:200 longitudinal deck grade and 3% cross fall. It is proposed to use Envirodeck combined kerb and deck drainage for the full bridge length (or similar), with shape conforming to Main Roads WA, Type A mountable kerbs. This drainage system prevents ponding and gutter flow on the bridge deck, increasing driver safety. Provision has also been made for collection “Humeceptor” type pits at the ends of the bridge for treatment of the captured deck drainage. Therefore, no runoff from the bridge will be directly discharged into the river. Runoff shall be directed to capture areas on either side of the bridge.

Waterway analysis of bridge structure

Advisian (2019) has undertaken a waterways analysis of the bridge as part of the Inner Harbour Structure Plan 2009. A detailed scour analysis is to be undertaken during the detailed design phase once geotechnical investigations are complete and hydrology assessment is updated (Advisian, 2019). Flow velocities in the lower reach of the river generally were expected to be low. Under flood conditions higher velocities will develop at the bridge openings due to contraction and may require rock protection for the abutments.

Single dimensional hydraulic modelling of the proposed Turkey Point Road Bridge over the Preston River has been undertaken. The tailwater conditions in the estuary have been modelled. It is evident that the wider bridge opening (100 m vs 80 m) does not significantly affect afflux and hence the longer bridge is unwarranted. The narrower bridge opening results in additional afflux of only 20 mm under design conditions.

For the 100-year ARI design flood however, (including high tide and SLR), 1 m freeboard is achieved with the proposed geometry for both the 100 m and 80 m bridge options. It is apparent also that with sea level rise, the existing rail bridges will become threatened by the 100-year flood (at concurrent high tide) and that the presence of the proposed road bridge will have minimal if any real impact on flood risk to these existing structures.

Further detailed waterways analysis is required to define the 2000-year event as required for design to AS 5100. It may be considered appropriate to raise the soffit an additional amount to ensure the superstructure is generally 600 mm clear of the flood levels up to the 2000-year event to prevent superstructure debris impingement loads. This should be investigated prior to proceeding to 85% detailed design. Velocities are expected to be less than 3 m/s at the 100-year event and as such it is envisaged facing class rock 0.5 m thick is required. It is

recommended that a detailed scour analysis is undertaken during the detailed design phase once geotechnical investigation is complete and hydrology assessment updated.

2.2.5 Proposal construction sequence

The following construction sequence will be followed for the construction of the bridge:

- Site establishment, including clearing of vegetation, mobilisation of site offices and crib huts, establishment of power, water and telecommunications, site fencing and traffic management
- Piling for bridge abutments and piers, including construction of temporary access / piling platform
- Pier and abutment construction
- Deck construction and bridge launching
- Completion of access roads and run-on slabs
- Bridge fit out
- Site demobilisation and rehabilitation.

2.3 Local and regional context

The Proposal lies within the Greater Bunbury Region Scheme (GBRS) which guides land use and provides the legal basis for planning in the Greater Bunbury Region (GBR). The GBRS defines future of land uses, dividing it into zones and reservations. As presented in Figure 2-2, the Proposal traverses land that is zoned for the following uses under the GBRS:

- Regional Open Space (with environmental conditions) - to protect the natural environment, provide recreational opportunities and safeguard important landscapes to be enjoyed by the public.
- Port installations – to provide for the current and future expansions needs of the Port of Bunbury (DPLH, 2014).

The Regional Open Space that the Proposal traverse, was identified as an area of ecological importance during the assessment of the GBRS (EPA Bulletin 1108).

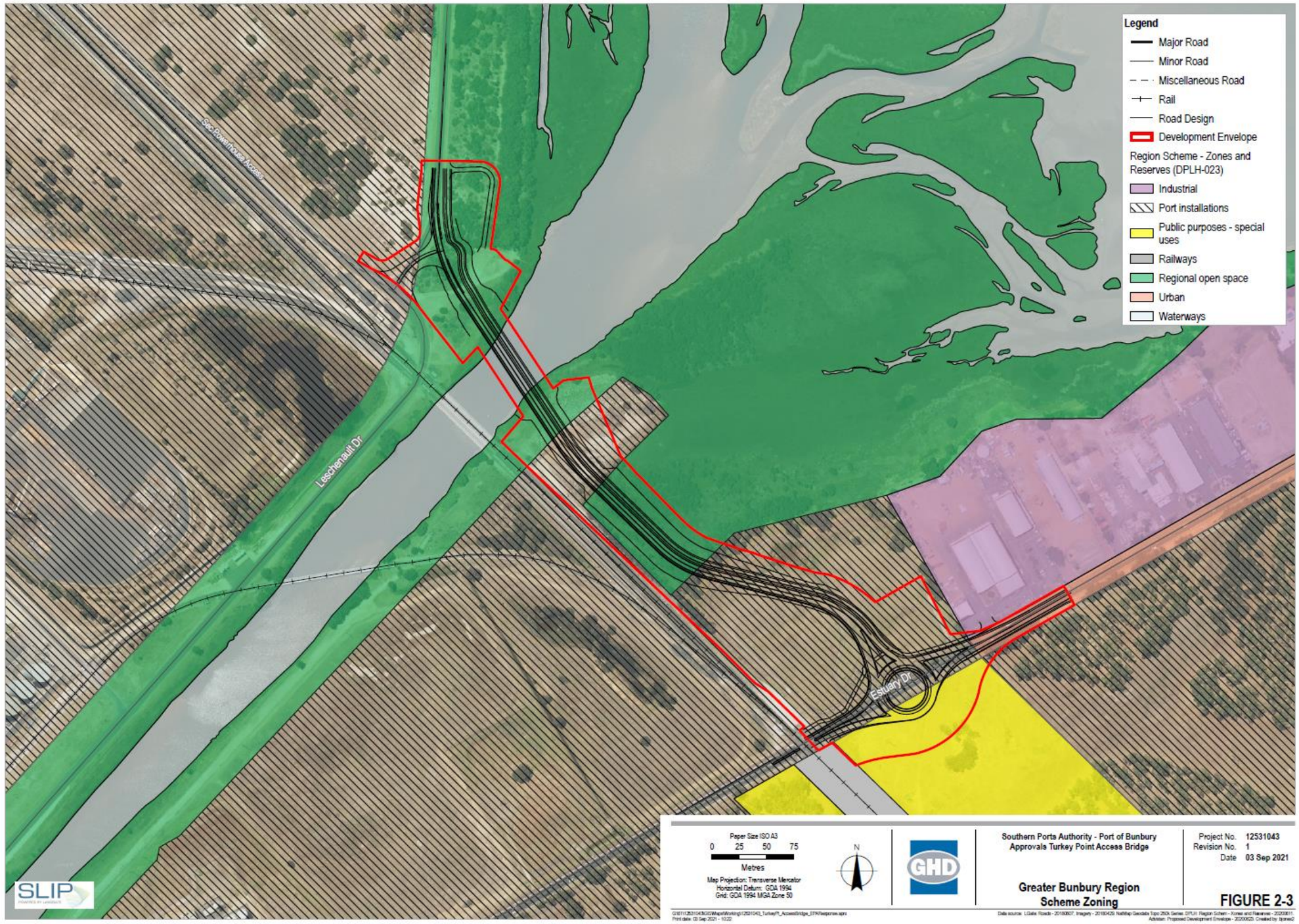

Figure 2-2 Greater Bunbury Region Scheme zoning

3. Stakeholder engagement

Stakeholder consultation has been a key component for the development of the proposal. Southern Ports has been consulting with key stakeholders with interests in the Turkey Point Bridge Project throughout the process and will continue to do so through the planning, approvals, construction, and operational phases of the Proposal.

As part of the consideration of the Proposal, the EPA advertised the referral and invited public submissions over a seven-day period in August 2020. The EPA's determination to assess the Proposal based on Referral Information does not include a further formal public comment period.

Pre referral consultation predominately comprised of meetings and correspondence with a number of State and Federal Departments and Agencies, Local Government Authorities, non-government organisation and interest groups. The pre referral consultation occurred during the Western Australia Government's COVID-19 restrictions. Due to restrictions on "in person meetings" and non-essential travel, all consultation was undertaken by means of video conference. Consultation undertaken prior to the referral is detailed in Table 3-1.

Table 3-1 Summary of stakeholder consultation prior to referral of the Proposal

Stakeholder Group	Date	Organisations / Stakeholders involved
Aboriginal Heritage Groups	27 August 2014	Brad Goode and Associates GHD Members of the Gnaala Karla Booja WC98/58 native title claim group
City of Bunbury	21 September 2018	Southern Ports Authority – Port of Bunbury City of Bunbury Advisian
	09 June 2020	City of Bunbury Southern Ports Authority – Port of Bunbury GHD
Main Roads Western Australia (MRWA)	18 December 2018	Southern Ports Authority – Port of Bunbury MRWA Advisian
Department of Planning, Lands and Heritage	12 June 2020	DPLH Southern Ports Authority – Port of Bunbury GHD
Department of Biodiversity Conservation and Attractions	11 June 2020	DBCA Southern Ports Authority – Port of Bunbury GHD

Stakeholder Group	Date	Organisations / Stakeholders involved
Department of Water and Environmental Regulation	12 June 2020	DWER Southern Ports Authority – Port of Bunbury GHD
DAWE	10 July 2020	DAWE Southern Ports Authority – Port of Bunbury GHD

The EPA's Notice Requiring Information for Assessment (EPA, 2021) included a requirement for further Stakeholder Consultation. Specifically, the following consultation actions were requested:

- Undertake consultation with the South West Aboriginal Land and Sea Council in relation to the proposal and the potential impacts to Aboriginal Heritage sites.
- Undertake targeted consultation with local interest groups, stakeholder groups for the proponent, and the State-wide groups who made submissions in the public comment period.
- Provide evidence and information on the outcome of the consultation and how any comments were considered and incorporated into the proposal, where relevant and appropriate.

3.1 South West Aboriginal Land and Sea Council

Southern Ports meet with David Farrell of the South West Land and Sea Council (SWALSC on 2 July 2021. Southern Ports was represented by Iain Robinson and Lisa Andersen.

Southern Ports provided a briefing on the project. The project overview included the intended constructure sequencing and outcome of the environmental impact assessment. Details on the environmental impact assessment included impacts on flora and vegetation, terrestrial fauna, inland waters and social surrounds.

SWALSC advised that they do not have a comment of the project. They recommended that Southern Ports consult with traditional knowledge holders for the project area, Gnaala Kalra Booja representatives, once the design is sufficiency developed.

Questions from SWALSC that were addressed in the meeting included if there was a Section 18 approval in place, what conditions were on the Section 18 and if archaeological and ethnographic surveys were undertaken to inform the Section 18.

SWALSC had no objections when Southern Ports advised an ethnographic and archaeological survey had been completed to inform the s18, a s18 approval for the Proposal was in place and the conditions of the consent were provided.

3.2 Targeted consultation

Invitations for the post-referral consultation were extended to all State -Wide groups and individuals who had made submissions in the public comment period. Selected local interest groups were also invited. Meeting times were set at the convenience of stakeholders, with four meetings held with representatives of groups and a community consultation meeting for individuals.

The EPA provided assistance is contacting and inviting individuals to attend the consultation meetings as most comments were redacted to maintain anonymity.

An independent facilitator was engaged and responsible for the delivery of post-referral consultation meetings. Invitees were contacted by the independent facilitator prior to the consultation meetings to determine who in each group was most appropriate to include and ensure that meetings were planned to meet participants needs and therefore maximise participation. The open and inclusive approach resulted in more participants than those that had made submissions. Five meetings held over a two-week period, and a variety of approaches were used including face to face and online meetings, to be meet the needs of the participants.

The main feedback from participants was captured on a white board (or screen) and verbally confirmed at the end of each session by the independent facilitator. Written confirmation of comments received and copy of presentation was provided to stakeholders by email after meeting.

The evidence and information on the outcome of these consultation meetings is presented in Table 3-2. Detail as to how comments have been considered and incorporated into the proposal is presented in Table 3-3.

Table 3-2 Stakeholder consultation (following EPA Notice Requiring Information for Assessment (EPA, 2021))

Stakeholder	Date and Type of consultation	Organisations / Stakeholders involved	Summary of communication	Main Feedback
Wildflower Society	4th May 2021 Video conference (with additional input provided via email)	Craig Salt (facilitator) Southern Ports GHD <u>Stakeholders</u> Bernhard Bischoff Brett Loney Pia Parker Richard Clark	• Project Overview. • Environmental approvals process (Including: environmental assessment, flora and vegetation, terrestrial fauna and social surrounds)	<u>Concerns:</u> • Potential for groundwater and water quality impacts • Potential for acid generation • Further geotechnical studies are required to gather relevant data • Potential for surcharging activities to adversely impact adjacent remnant vegetation • Potential for increased weeds in adjacent natural vegetation • This project does not take account of cumulative impacts in the local area / broader region <u>Suggestions:</u> • Offsets should be considered for relevant impacts • Potential remediation strategies for impacted samphire, casuarinas, mangroves, rushes and herbs need to be understood • The clearing of remnant vegetation should be minimised • Ensure careful and persistent monitoring of project effects on remaining vegetation <u>Questions:</u> • Is there evidence that other alternative project locations have been given due consideration? • Is this project the thin-edge-of-the-wedge for future developments?
Southwest Catchments Council (SWCC)	5th May 2021 Face to face meeting	Craig Salt (facilitator) Southern Ports GHD <u>Stakeholders</u> Mike Christensen	• Project Overview. • Environmental approvals process (Including: environmental assessment, flora and vegetation, terrestrial fauna and social surrounds)	<u>Concerns:</u> • No major concerns • Hydrological connectivity seems to be the biggest factor to address <u>Questions:</u> • Are offsets being considered for this project? (If so, SWCC has some ideas about potential projects) • Is there potential for acid sulphate to be generated? <u>Other:</u> • There are signs on the ground of the current mangrove community spreading • There is evidence that the downstream delta on the Preston River grew following past activity at Bunbury Port
Birdlife Australia and Leschenault Catchment Council	5 May 2021 Face to face meeting with Bird Life Australian and Leschenault Catchment Council	Craig Salt (facilitator) Southern Ports GHD Birdlife Australia: <u>Stakeholders</u> Kerry Bemrose Bruce Buchanan Diane Cavanagh Sharon Gear Sue Kalab Brendan Kelly Jane Putland Don Reid	• Project Overview. • Environmental approvals process (Including: environmental assessment, flora and vegetation, terrestrial fauna and social surrounds)	<u>Concerns:</u> • ‘Spurious and inconsistent’ justification for the project (The full project rationale has not been disclosed) • Impact on birdlife and plants • Incremental creep into the saltmarsh Threatened Ecological Community • Impact of the embankment on the saltmarsh Threatened Ecological Community • Increased risk of weeds and feral animals • Impact of the proposed cycle path on what is a natural refugia • Acid sulphate potential • Impact of the bridge being located so close to the mouth of the Preston River / associated delta • Cumulative environmental impacts (over-and-above this project considered in isolation)

Stakeholder	Date and Type of consultation	Organisations / Stakeholders involved	Summary of communication	Main Feedback
		Chris Howe (Leschenault Catchment Council)		• Disruption to traffic flow along Estuary Drive (associated with the proposed roundabout) • Increased impacts from noise, light and vibrations <u>Suggestions:</u> • Locate the project elsewhere to reduce adverse impacts • Contamination studies should be undertaken prior to the project receiving any environmental approvals • Provide alternative parking at Point Mornington • Ensure focus is given to marine and aquatic organisms • Consider offsets if the project proceeds • Encourage more sharing of data between Birdlife Australia and Bunbury Port <u>Questions:</u> • Have all alternative options been given genuine consideration? • Have other alternatives been considered in line with the EPA's mitigation hierarchy? • Can the project be put-off until a later time? • Where will fill be sourced from? • Will a roundabout be required at the Turkey Point end of the road? • Will the project necessitate the relocation of existing powerlines? • Can we secure a copy of the terrestrial fauna map for the project?
Community consultation event	20th May 2021 Group session held at 5:30 pm BREC	Craig Salt (facilitator) Southern Ports GHD <u>Stakeholders</u> Individuals who had participated during the comment period were invited via EPA Peter Eckersley Sora Marin Estrella Beth Golden Michael Gollan Michael Pekin John Sherwood	• Project Overview. • Environmental approvals process (Including: environmental assessment, flora and vegetation, terrestrial fauna and social surrounds)	<u>Concerns:</u> • Is this the only / best location for the project? • Potential sediment plume from the causeway construction (Why are some potentially critical studies left until after the EPA approval is secured?) • Potential for acid sulphate generation <u>Suggestions:</u> • Take the opportunity to add to the local cycle-way network • Ensure dolphin welfare is factored into the project • Ensure climate change implications are factored into the project <u>Questions:</u> • Is it possible to find an alternative route that doesn't adversely impact on the TEC? • What implications will this project have on current powerlines in the area? • What are the future plans for Leschenault Drive?

Stakeholder	Date and Type of consultation	Organisations / Stakeholders involved	Summary of communication	Main Feedback
Beeliar Group	24th May 2021 Video conference (with additional input provided via email)	Craig Salt (facilitator) Southern Ports GHD <u>Stakeholders</u> Peter Newman	• Project Overview. • Environmental approvals process (Including: environmental assessment, flora and vegetation, terrestrial fauna and social surrounds)	<u>Concerns:</u> • No major environmental issues based on the information shared <u>Suggestions:</u> • It will be important to maintain hydrological connectivity with the section of TEC isolated by the access road • It is important to think about projects like this in the context of climate change and sea-level rise (Ports have the potential to play an important regenerative role to help offset the impacts of climate change and move towards a zero-carbon economy (e.g., through the export of green hydrogen and lithium in the case of Bunbury)) <u>Other:</u> • The Preston River delta is presumably an important, but not the only significant, bird sanctuary in the area (It is interesting that evidence exists to suggest the Preston River delta was formed by previous Bunbury Port activity)

Table 3-3 How comments have been addressed

Concern Raised	Stakeholders	Southern Ports Response
Due consideration of alternative routes	Wildflower Society, Birdlife Australia, Leschenault Catchment Council and community	Three alternative routes were considered in the original referral documentation. Constraints on location include adequate traffic safety distance between the railway crossing and the entrance onto Estuary Drive, separating the light traffic from heavy traffic on Port land and minimising clearing. Community concerns and suggestions were taken into consideration. An updated route developed through over ten iterations and the resulting proposed design has now been selected that both reduces the impact footprint and will not cause fragmentation of the TEC.
Potential acid sulphate soil (ASS) issues during construction	Wildflower society, Southwest Catchments Council, Birdlife Australia and community	An assessment for the presence and nature of ASS that may be disturbed during construction will be undertaken during the geotechnical investigation. This assessment will be undertaken in accordance with the requirements under the *Contaminated Sites Act 2003.*
Will environmental offsets be required for the project	Wildflower society, Southwest Catchments Council, Birdlife Australia	A Draft Offset Strategy has been prepared and is included in this ARI for assessment (Section 13).
Project need and the long-term planning/strategy for the port	Wildflower Society, Birdlife Australian and Beeliar Group	The Port is currently preparing a Port Master Plan and key stakeholders have been consulted in the preparation of this Plan. The development of this Plan has included consultation with key stakeholders. The Proposal is required to meet the long-term objectives of the Port to maintain public access to Turkey Point whilst segregating public light vehicles from port roads, increase safety, increase security, and provide a secondary access route to the northern berths in case of emergency.
Maintaining the hydrological connection to the TEC upstream of the bridge	South West Catchments Council and Beeliar Group	Hydrological investigations were undertaken by GHD (2021a) to determine site-specific tidal flows and the impact of the design referred in July 2020. This investigation (Appendix B) determined that modelling of the existing and proposed design would not significantly impact on the spatial extent, depth, duration and frequency of inundation patterns at the TEC/PEC site. The culverts were predicted to be effective mitigative structures that allow the flows between the tidal flats and the TEC/PEC site to be maintained following construction of the Proposed. However, subsequent to referral of the Proposal in July 2020, the Proposal DE has been reduced and the design realigned so that the proposed road lies adjacent to the existing rail line. This has resulted in a reduction of impact on the TEC/PEC. Clearing of this TEC/PEC is reduced to 0.67 ha and there is no longer fragmentation of the vegetation community and therefore no impact on tidal flows and hydrological connection.
Further geotechnical studies to determine construction impact	Wildflower society and community	The required geotechnical studies are planned to commence, pending EPA approval. A Development Application for these works is also in preparation and, pending EPA approval, will be assessed by the Department of Planning, Lands and Heritage
Potential for groundwater and water quality impacts during construction, in	Wildflower society and community	A Construction Environmental Management Plan will be prepared with actions to minimise direct impacts on water quality during the construction phase. These actions will include consideration of suitable fill material, silt curtains and monitoring.

Concern Raised	Stakeholders	Southern Ports Response
particular the risks from the fill used for temporary causeway.		
Impacts on marine and aquatic fauna during construction, including dolphins	Birdlife and community	A Construction Environmental Management Plan (CEMP) will direct management to reduce impacts on fauna during construction. The CEMP will include fauna spotters, specifically for the dolphins. If dolphins are spotted in the construction zone, work that may impact their movement will cease and only recommence once the dolphins are no longer in the construction zone.
Potential long-term impacts to habitat due to increased exposure to weeds, ferals, light, noise and vibration.	Wildflower Society and Birdlife Australia.	The updated route and proposed design brings the bridge closer to the existing rail infrastructure. This design change reduces the impact of edge effects such as weed invasion, as the proposed design has now been selected that both reduces the clearing impact footprint and will not cause fragmentation of the TEC.
Community facilities: cycle way and parking at Point Mornington.	Birdlife Australia and community	A cycleway across the bridge and how it interacts with the roundabout on Estuary drive have been considered in the design. Maintaining community access to Point Mornington will be included in the design. Specifically, the suggestion that parking at Point Mornington, to support birdwatching areas has been included in the proposed design.
Cumulative impact of TEC clearing	Birdlife Australia	Referral documentation considers the area of TEC that will be impact in relation to the existing area of TEC. Minimising clearing was a consideration in selecting site location. An update route and proposed design has now been selected that both reduces the clearing impact footprint and will not cause fragmentation of the TEC. An offset strategy has been developed and has been provided in this ARI for assessment (Section 13).
Traffic impacts and placement of roundabouts	Birdlife Australia	Traffic studies have been conducted to inform road design. The safety of all road users is a priority during design. Roundabouts will be located to minimise the requirement of clearing of native vegetation.
Increased data sharing with Birdlife Australia	Birdlife Australia	The Port of Bunbury Environmental team and Birdlife Australia will continue to explore data sharing opportunities
Copy of the terrestrial fauna map for the project	Birdlife Australia	A copy of the Presentation was shared with all participants

4. Environmental principles and factors

4.1 Principles

Section 4A of the EP Act establishes the objectives and principles of the Act. In accordance with the EPA's (2020b) Statement of Environmental Principles, Factors and Objectives, this section describes how each of the five principles has been applied to the Proposal (Table 4-1).

Table 4-1 EP Act Principles

Principle	Consideration of the principles in the proposal
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In the application of the precautionary principle, decisions should be guided by –* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*	Technical and scientific investigations have been undertaken for the development of the Proposal. Specific studies for flora and fauna, water, noise, air quality have supported Southern Ports understanding of the existing and receiving environment in which the Proposal is located. The information from these investigations have supported the development of this referral. The Proposal will have a relatively small disturbance footprint, located predominantly within a previously disturbed area. No significant impacts have been identified in association with the construction and operation of the Proposal.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.*	The Proposal will not result in any significant or cumulative impacts, which would pose a threat to health, diversity and productivity of the existing environment. Development of the Proposal will support the growth of the Port of Bunbury and its economic contribution to the economy of Western Australia. Southern Ports has secured State Government Royalties for Regions funding for the Proposal and the Proposal has been selected by the State Government as a post COVID-19 stimulus project for the Bunbury region and as such, there is an expectation by the State Government that the Port is working hard to bring this Proposal to fruition.
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	Biological investigations of the Proposal DE have been undertaken. These investigations have informed the Proposal and to assess potential impacts to biological diversity. The Proposal will not threaten biological diversity or ecological integrity.

Principle	Consideration of the principles in the proposal
4. Principles relating to improved valuation, pricing and incentive mechanisms *(1) Environmental factors should be included in the valuation of assets and services.* *(2) The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement.* *(3) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes.* *(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.*	While the Proposal will generate construction waste, Southern Ports accepts the responsibly and cost associated with containment, abatement and appropriate disposal of waste. Southern Ports is committed to managing construction wastes in accordance with the waste hierarchy and where possible will actively seek beneficial reuse options for waste materials. Southern Ports recognises the 'polluter pays' principle and will safeguard sufficient funding to ensure environmental management measures are implemented throughout the life of the Proposal, including closure, rehabilitation and decommissioning.
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment*	Southern Ports will employ best practice to minimise waste and avoid discharge to the environment. Where possible, waste will be recycled.

4.2 Identification of Environmental Factors

Environmental factors are those parts of the environment that may be impacted by an aspect of a Proposal. The EPA has 14 Environmental Factors, organised into five themes: Sea, Land, Water, Air and People.

The environmental factors relevant to this Proposal, in accordance with the approach in the EPA's Statement of Environmental Principles, Factors and Objectives (EPA, 2020b) and the EPA's Environmental Factors Guidelines and Environmental Factor Technical Guidance. The relevance of each factor to the Proposal is summarised and the significant environmental factors that require further consideration are identified in Table 4-2.

Based on the assessment for potential impacts associated with the construction and operation of the Proposal the following environmental factors are considered key environmental factors:

- Flora and vegetation (refer to Section 5).
- Terrestrial fauna (refer to Section 6).
- Inland waters (refer to Section 7).
- Social surroundings (refer to Section 8)
- Greenhouse gas emissions (refer to Section 9).

The following environmental factors are considered to be Other Environmental Factors and are addressed in Section 10:

- Coastal processes
- Marine environmental quality
- Terrestrial environmental quality.

Table 4-2 Identification of environmental factors

Factor	Objective	Potential for impact	Potential impacts identified	Further consideration
Sea				
Benthic communities and habitat	*To protect benthic communities and habitats so that biological and ecological integrity are maintained.*	No impacts expected. The Proposal is located approximately 1.5 km east of the marine environment and will have no impacts on benthic communities and habitats.	Not applicable	Not applicable
Coastal Processes	*To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected.*	No impacts expected. The Proposal is located approximately 1.5 km east of the marine environment and potential impacts are not predicted to extend beyond the Proposal DE. Application of standard construction controls and other regulatory mechanisms are considered to adequate to minimise and control any identified potential impacts.	Temporary increased scour and/or deposition of fine sediments during construction while the temporary construction causeway is in place. Permanent alteration of sediment mobilisation and deposition due to in channel structures.	Section 10
Marine Environmental Quality	*To maintain the quality of water, sediment and biota so that environmental values are protected.*	No impacts expected. The Proposal is located approximately 1.5 km east of the marine environment and potential impacts are not predicted to extend beyond the Proposal DE. Application of standard construction controls and other regulatory mechanisms, are considered to be adequate to minimise and control any identified potential impacts.	Accidental release of environmentally hazardous materials during storage and handling, resulting in contamination of soil and/or groundwater and subsequent impacts to water quality. Excavation of contaminated/acid sulfate soils during preliminary earthworks mobilising contaminants to soil and/or	Section 10

Factor	Objective	Potential for impact	Potential impacts identified	Further consideration
			groundwater, resulting in impacts to water quality. Inappropriate disposal of solid and liquid wastes, resulting in contamination of land and/or groundwater and subsequent impacts to water quality.	
Marine fauna	*To protect marine fauna so that biological diversity and ecological integrity are maintained.*	No impacts expected. The Proposal is located approximately 1.5 km east of the marine environment and will have no impacts on marine fauna.	Not applicable	Not applicable
Land				
Flora and vegetation	*To protect flora and vegetation so that biological diversity and ecological integrity are maintained.*	As far as practicable, the Proposal has been designed to avoid and minimise the clearing of native vegetation. No conservation significant flora occur within the Proposal DE. Subtropical Temperate Coastal Saltmarsh TEC (VT03 and VT04) is present within the Survey Area. VT04 is present within the Proposal DE and will require clearing of approximately 0.67 ha. The vegetation condition is rated as Excellent.	Direct loss of native vegetation of flora. Introduction and/or spread of invasive weeds. Smothering of vegetation by dust. Accidental bushfire.	Section 5
Landforms	*To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected.*	No impacts expected. There are no distinctive physical landforms within or adjacent to the Proposal DE.	Not applicable.	Not applicable

Factor	Objective	Potential for impact	Potential impacts identified	Further consideration
Subterranean Fauna	*Maintain representation, diversity, viability and ecological function at the species, population and assemblage level.*	No impacts expected. No suitable habitat occurs within the Proposal DE.	Not applicable.	Not applicable
Terrestrial Environmental Quality	*To maintain the quality of land and soils so that environmental values are protected.*	No impacts expected. Acid sulphate soil (ASS) risk mapping over the Proposal DE indicating the Proposal is within an area that has a high to moderate risk. Review of the DWER Contaminated Sites Database (DWER, 2020), which is included in Appendix C, indicates there are two (2) registered contaminated sites within the Proposal DE. Application of standard construction controls and other regulatory mechanisms, are considered to adequate to minimise and control any identified potential impacts.	Soil erosion from vegetation clearing, and earthworks. Disturbance of ASS during earthworks resulting acidification of soils and potential leaching of metals to surface and/or groundwater. Disturbance of contaminated soils resulting in leaching of metals to surface and/or groundwater. Contamination of ground and/or surface water due to release/spillage of environmentally hazardous materials. Waste (solid and/or liquid) discharge resulting in contamination of soils, surface and groundwater.	Section 10

Factor	Objective	Potential for impact	Potential impacts identified	Further consideration
Terrestrial Fauna	*To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*	The landscape is locally and regionally fragmented. The habitat is most likely o to be utilised by avian species. The development of the Proposal will require the clearing of approximately 0.67 ha of potential foraging habitat for Black Cockatoos.	Direct loss of fauna habitat. Direct loss of potentially suitable foraging habitat for Black Cockatoo. Death, injury or displacement of native fauna species. Noise, vibration, light and dust emissions. Accidental bushfires. Attraction of feral fauna species.	Section 6
Water				
Inland Waters	*To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*	The Proposal will be constructed over Preston River. The following construction activities could potentially impact this factor: Ground disturbance (earthworks and vegetation clearing). Establishment and removal of the temporary construction causeway.	Sedimentation of surface water. Contamination of ground and/or surface waters due to release/spillage of environmentally hazardous material. Increased likelihood of and/or intensity of flooding.	Section 7
Air				
Air quality	*To maintain air quality and minimise emissions so that environmental values are protected.*	No impacts expected. The emission of air pollutants during construction and operation will be limited.	Not applicable.	Not applicable

Factor	Objective	Potential for impact	Potential impacts identified	Further consideration
Greenhouse gas emissions	*To reduce net greenhouse gas emission in order to minimise the risk of environmental harm associated with climate change.*	No impacts expected.	Not applicable.	Section 9
People				
Social Surroundings	*To protect social surroundings from significant harm.*	Two (2) registered Aboriginal heritage sites are known to occur within the Proposal DE. The closest receptors are located approximately 600 m north east of the Proposal DE. Proposal activities potentially impacting this factor: • Ground disturbance (vegetation clearing, and earthworks). • Operation of machinery/vehicles.	Direct impacts to Aboriginal heritage sites Noise and vibrations emissions impacts to nearby sensitive receptors associated with operation of vehicles/plant and construction of the Proposal.	Section 8
Human health	*To protect human health from significant harm.*	No impacts expected. The Proposal will not emit radiation emissions. Potential impacts to human health from discharges to soil (and subsequently groundwater and surface water), and noise emissions are assessed in the Social Surroundings chapters.	Not applicable.	Not applicable

5. Flora and Vegetation

5.1 EPA Objective

The EPA's objective for flora and vegetation is '*to protect flora and vegetation so that biological diversity and ecological integrity are maintained*' (EPA, 2016b).

5.2 Policy and guidance

The following contemporary policy and guidance documents are currently considered applicable to the Proposal:

- Environmental Factor Guideline Flora and Vegetation (EPA, 2016b).
- Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016h).
- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations*.
- *Biodiversity Conservation Regulations Act 2018*.
- Conservation Advice for Subtropical and Temperate Coastal Saltmarsh (TSSC, 2013).

5.3 Receiving environment

5.3.1 Surveys and studies

Southern Ports have commissioned ecological investigations for the Bunbury Inner Harbour Structure Plan (GHD, 2018a). These investigations comprised the areas of the Port of Bunbury Inner Harbour and areas south and south-east of the harbour, covering an area of 579.51 ha. These investigations included reconnaissance flora and vegetation surveys in October of 2013 and 2017. The 2017 flora and vegetation assessment was completed with reference to Technical Guidance Flora and Vegetation Survey for Environmental Impact Assessment (EPA, 2016h). This report considered previous biological surveys/ studies for the Port including:

- Proposed Preston River Diversion – Biological Impact Assessment (HGM, 1998)
- Flora and Vegetation Port Expansion City of Bunbury (Bennett Environmental Consulting, 2007)
- Flora and Vegetation Port Expansion City of Bunbury (Bennett Environmental Consulting, 2008)
- Bunbury Inner Harbour Redevelopment Conservation Category Wetlands (360 Environmental, 2008)
- Technical Report 12 Development of Berth 14A at Port of Bunbury: Flora and Fauna Assessment (Parsons Brinckerhoff, 2012).

The entire extent of the Proposal DE falls within the GHD (2018a) study area and this document has been used primarily to define the flora and vegetation values (Appendix D).

5.3.2 Regional biogeography and vegetation description

The Proposal is located in the South West Botanical Province of WA within the Swan Coastal Plain bioregion and the Perth subregion as described by the Interim Biogeographic Region of WA (IBRA). The Perth subregion is composed of colluvial and Aeolian sands, alluvial river flats and coastal limestone. Heath and/or Tuart woodlands occur on limestone, *Banksia* and *Jarrah*-

Banksia woodlands on Quaternary marine dunes of various ages and Marri on colluvial and alluvial soils. The subregion also includes a complex series of seasonal wetlands (GHD, 2018a).

Regional mapping by Heddle *et al*. (1980) indicates the Proposal DE is in an estuarine and lagoonal deposit, the Yoongarillup Complex, which is described as woodland to tall woodland of *Eucalyptus gomphocephala* with *Agonis flexuosa* in the second storey. Less consistently an open forest of *E. gomphocephala - E. marginata - Corymbia calophylla*.

Broad scale (1:250,000) pre-European vegetation mapping of the area has been completed by Smith (1974) at an association level. One (1) vegetation association is present within the Proposal DE, namely: Medium woodland; tuart (association 998).

5.3.3 Vegetation within the Proposal Development Envelope

The Proposal is in an area that has been cleared for pasture and replanted or significantly affected by weed invasion and disturbances associated with historical clearing. The Preston River mouth was relocated during the construction of the inner harbour, with significant modifications to remnant vegetation and hydrology as a result.

A summary the vegetation types, their extent and condition is presented in Table 5-1. The distribution of vegetation types within the DE is shown in Figure 5-1.

As indicated in Figure 5-2 and Table 5-1 the majority of the vegetation in the Proposal DE is in Degraded to Completely Degraded (5.85 ha), with the exception of *Casuarina obesa* low open woodland (VT04) that was in Excellent condition (0.67 ha) (GHD, 2018a).

Table 5-1 Vegetation types, extent and condition recorded in the Proposal DE (GHD, 2018a)

Vegetation type	Vegetation description	Landform and substrate	Extent in Proposal DE	Condition	Indicative photograph
Tecticornia spp. Herbland (VT03)	*Juncus kraussii* open sedgeland over *Tecticornia* spp., *Suaeda australis* and *Samolus repens* herbland. Vegetation consistent with the Subtropical Temperate Coastal Saltmarsh TEC	Seasonally wet depression with clayey black soil.	0 ha Note: This vegetation type was previously within the DE presented in the July 2020 EPA submission. Southern Ports has since revised the design and this vegetation type is no longer within the DE.	Very Good	
Casuarina obesa low open woodland over *Tecticorna spp.* Open herbland (VT04)	*Casuarina obesa* low open woodland over *Frankenia pauciflora* and *Rhagodia baccata* open low heath over *Juncus kraussii* and *Bolboschoenus caldwellii* very open sedgeland and *Tecticornia* spp. Open herbland. Vegetation consistent with the Subtropical Temperate Coastal Saltmarsh TEC	Seasonally wet depression with clayey black soil.	0.67 ha	Excellent	
Scattered natives over weeds (VT07)	*Casuarina obesa*, *Corymbia calophylla*, *Eucalyptus marginata*, *Agonis flexuosa* and/ or *Melaleuca rhaphiophylla* isolated trees over cleared pasture/ parkland	Clayey black soils and or occasionally sandy grey soils.	4.84 ha	Degraded to Completely Degraded	

Vegetation type	Vegetation description	Landform and substrate	Extent in Proposal DE	Condition	Indicative photograph
Planted trees (VT08)	**Eucalyptus camaldulensis* and **Eucalyptus* spp. Isolated trees over cleared pasture/parkland.	Clayey black soils and or occasionally sandy grey soils.	0.35 ha	Degraded to Completely Degraded	
Revegetation (VT09)	Completely or partially cleared areas that have been planted for revegetation purposes. Depending on the age of the plantings, the species are a mix of local native, non-local native and non-native/introduced tree and shrub species over introduced herbs and grasses.	Sandy brown soils.	0.66 ha	Not rated	
		Total area within the Proposal DE	**6.52 ha**		

5.3.4 Conservation significant ecological communities

Desktop searches of the EPBC Protected Matters Search Tool (PMST) and the DBCA Threatened or Priority Ecological Communities (TEC and PEC) database returned eight (8) significant communities within a 5 km buffer of the broader GHD survey area (GHD, 2018a).

The GHD survey identified one significant community within the DE:

- The Subtropical Temperate Coastal Saltmarsh is listed as 'Vulnerable' under the EPBC act and 'Priority 3' by the DBCA. The GHD (2018a) *Tecticornia spp.* Herbland (VT03) and *Casuarina obesa* low open woodland over *Tecticorna spp.* Open herbland (VT04) vegetation types are representative of this significant community. Only VT04 occurs within the revised DE.

This community is discussed in further detail below.

Subtropical and Temperate Coastal Saltmarsh TEC / PEC

The Subtropical Temperate Coastal Saltmarsh is listed as 'Vulnerable' under the EPBC act and 'Priority 3' by the DBCA.

The Subtropical and Temperate Coastal Saltmarsh community consists of an assemblage of plants, animals and micro-organisms associated with saltmarsh in coastal regions of sub-tropical and temperate Australia (south of 23 ºS latitude). The habitat is coastal areas under tidal influence. In southern latitudes saltmarsh are the dominant habitat in the intertidal zone and often occur in association with estuaries. It is typically restricted to the upper intertidal environment, generally between the elevation of the mean high tide, and the mean spring tide.

The community consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, reeds, sedges and shrubs. Succulent herbs and grasses generally dominate and vegetation is generally <0.5 m tall with the exception of some reeds and sedges. Many species of nonvascular plants are also found in saltmarsh, including epiphytic algae, diatoms and cyanobacterial mats. Saltmarsh consists of many vascular plant species but is dominated by relatively few families. There is also typically a high degree of endemism at the species level. The two most widely represented coastal saltmarsh plant families are the Chenopodiaceae and Poaceae. Four structural saltmarsh forms are currently recognised based on dominance of a particular vegetation type:

- Dominance by succulent shrubs (e.g. *Tecticornia*).
- Dominance by grasses (e.g. *Sporobolus virginicus*).
- Dominance by sedges and grasses (e.g. *Juncus kraussii*, *Gahnia trifida*).
- Dominance by herbs (e.g. low-growing creeping plants such as *Wilsonia backhousei*, *Samolus repens*, *Schoenus nitens*) (GHD, 2018a).

A key diagnostic feature of this community is that it maintains a connection with a tidal regime. This connection may be via surface and/or groundwater connectivity and can be regular or intermittent via spring tides or storm surges. Area which are disconnected artificially from tidal influence are excluded from the community (TSSC, 2013).

There is 0.67 ha of this saltmarsh community, that aligns with the TEC/PEC, within the DE.

Riparian / Wetland Vegetation

The *Casuarina obesa* low open woodland (GHD vegetation type VT04, saltmarsh community) is associated with the Leschenault Estuary and is considered representative of riparian and wetland vegetation.

5.3.5 Flora diversity

The GHD survey identified 83 flora species from 39 families and 70 genera within the broader GHD survey area. This comprised 48 native species and 53 introduced/planted species (GHD, 2018a).

5.3.6 Conservation significant flora

Desktop searches of the EPBC Act Protected Matters Search Tool (PMST) (DAWE, 2020), DBCA Threatened and Priority Flora List, NatureMap and WA Herbarium databases identified the presence/potential presence of 41 conservation significant flora taxa within 5 km of the broader GHD survey area (GHD, 2018a).

No EPBC Act, BC Act or priority listed flora were recorded in the Proposal DE, broader GHD survey area or from previous biological surveys.

Thirteen (13) Priority flora species were considered possibly occurring, based on a likelihood of occurrence assessment conducted post-survey considering available habitats in the broader survey area (GHD, 2018a). One (1) species *Puccinellia vassica* (P1) grows in saline soils and is associated with the margins of coastal saltmarshes. This species was not observed during the GHD survey or during previous field surveys (Bennett Environmental Consulting, 2007; 2008; HGM, 1998; Parsons Brinckerhoff, 2012; GHD, 2013). The 0.67 ha of saltmarsh community (VT04) would provide suitable habitat for *P. vassica* within the DE and this species is considered to possibly occur.

5.3.7 Introduced species and pathogens

A number of significant weeds were recorded in the broader survey area, the closest being Narrowleaf Cottonbush (**Gomphocarpus fruticosus*), a Declared Plant approximately 80 m from the DE (GHD, 2018a).

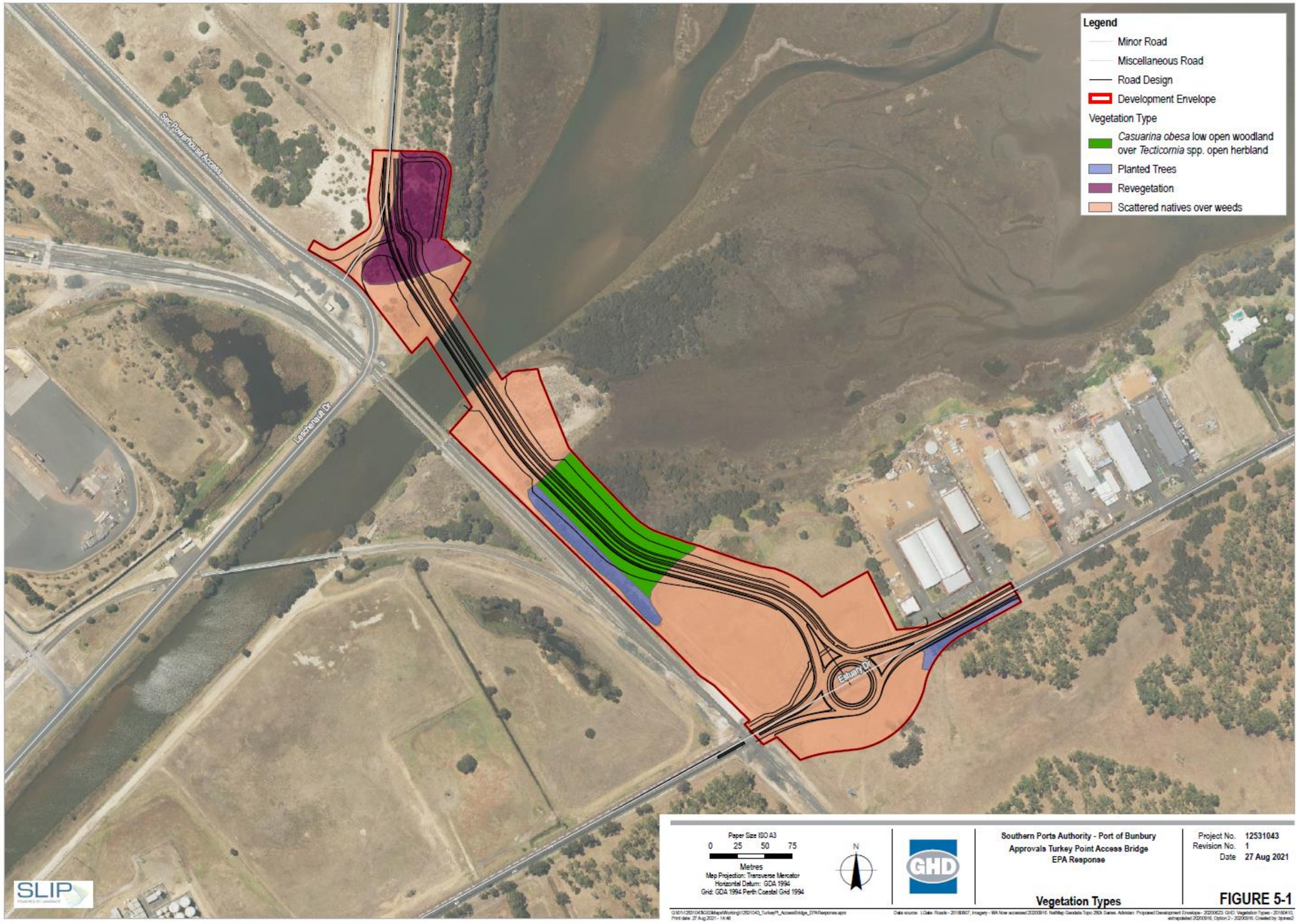

Figure 5-1 Vegetation types recorded in the Proposal DE (GHD, 2018a)

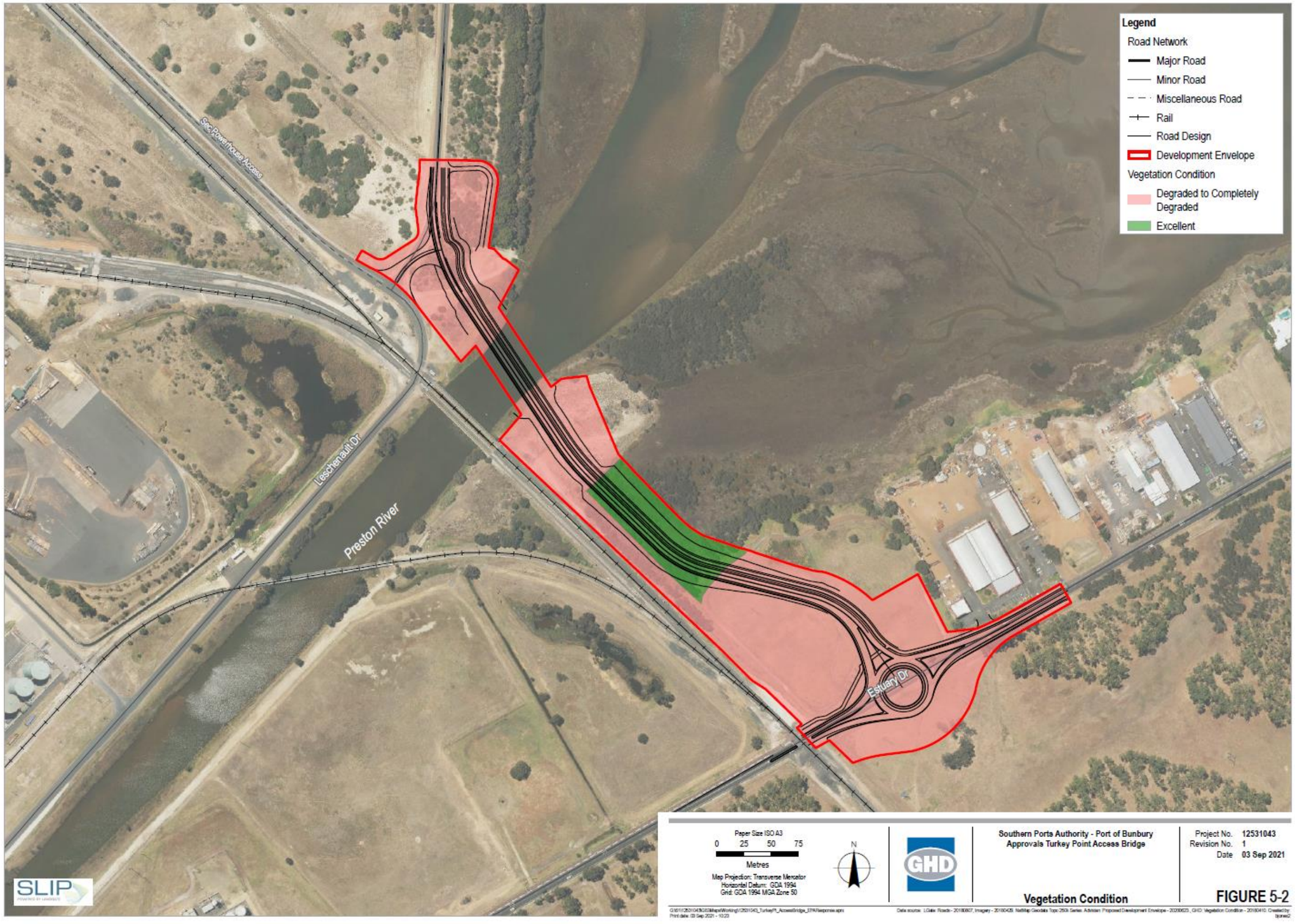

Figure 5-2 Vegetation condition (GHD, 2018a)

5.4 Potential impacts

The Project will require the disturbance of up to 6.52 ha for construction. The majority (89.7 %) of this area (5.85 ha) consists of scattered natives over weeds (VT07), planted trees (VT08) and revegetation (VT09). This vegetation is in Completely Degraded-Degraded condition and provides low ecological value. Up to 0.67 ha of *Casuarina obesa* low open woodland over *Tecticorna spp.* Open herbland (VT04), in Excellent condition will be cleared.

The Proposal will result in the loss of flora and vegetation through:

- Direct loss of up to 6.52 ha of native / non-native and planted vegetation including:
    - 0.67 ha of *Casuarina obesa* low open woodland over *Tecticorna spp.* Open herbland (VT04). This is recognised as saltmarsh TEC /PEC, riparian / wetland vegetation and provides potential habitat for the Priority 1 *Puccinellia vassica*
    - 4.84 ha of scattered natives over weeds (VT07)
    - 0.35 ha of planted trees (VT08)
    - 0.66 ha of revegetation (VT09)

The Proposal could also result in the following indirect impacts for vegetation and flora:

- Introduction and/or spread of invasive species (weeds/pathogens), from movement of vehicles and plant, causing increased competition with native vegetation in undisturbed and rehabilitated areas.
- Reduction in vegetation condition by dust generated from Proposal activities (i.e. clearing and excavation), resulting in reduced vegetation health.
- Accidental bushfire caused by the operation of vehicles/plant/equipment, resulting in damage/loss of surrounding vegetation and flora.

Changes to tidal regimes and fragmentation were previously considered as an indirect impact to vegetation and flora, however further revision of the design has eliminated these potential impacts (further information is provided in Section 7).

5.5 Assessment of impacts

5.5.1 Loss of flora and vegetation

The Government of Western Australia (GoWA, 2019) has assessed the current extent of vegetation association 998 and the Yoongarilup complex, which are mapped within the DE, against their presumed pre-European extents (Table 5-2 and Table 5-3).

Current extents of association 998 and the Yoongarilup complex are greater than 30 % of their pre-European extents at the Swan Coastal Plain bioregion scale. At this scale the Proposal will require the clearing of 0.67 ha of vegetation, this represents less than 0.01 % of association 998 (Table 5-2) and a reduction of 0.01 % of the Yoongarilup complex (Table 5-3).

At the LGA scale, association 998 has 10.69 % remaining and the Proposal will result in a reduction of 0.04% (Table 5-2). Similarly, at the LGA scale, the Yoongarilup complex has 10.89 % remaining and the Proposal will result in a reduction of 0.05% (Table 5-3).

Table 5-2 Clearing impacts to vegetation association 998

Vegetation association	Scale	Pre-European extent (ha)	Current extent (ha)	Remaining (%)	% current extent in all DBCA managed lands	Current extent remaining after Proposal clearing
998	State: WA	51,015.33	18,492.63	36.25	48.68	18,491.96 ha (36.25 %)
	IBRA bioregion: SWA (SWA)	50,867.50	18,492.32	36.35	46.68	18,491.65 ha (36.35%)
	IBRA sub-region: Perth (SWA2)	50,867.50	18,492.32	36.35	46.68	18,491.65 ha (36.35 %)
	LGA: City of Bunbury	1,405.24	150.28	10.69	0	149.61 ha (10.65 %)

Table 5-3 Clearing impacts to Yoongarilup complex

Pre-European Extent (ha	Current Extent (ha)	% Remaining	Extent within DE (ha) (%)	Current extent remaining after Proposal clearing
Swan Coastal Plain				
27,977.93	10,018.14	35.81	0.67	10,017.47 ha (35.80 %)
City of Bunbury				
1,435.65	156.36	10.89	0.67	155.69 ha (10.84 %)

5.5.2 Loss of Subtropical and Temperate Coastal Saltmarsh TEC/PEC

Subtropical and Temperate Coastal Saltmarsh TEC/PEC, it is considered that the original extent in WA would have been approximately 3,000 to 4,000 ha (TSSC, 2013). Of this, 750 ha is expected to have been present within the Leschenault Estuary, with an approximate decline of 50% to less than 350 ha (TSSC, 2013).

Clearing of 0.67 ha of Subtropical and Temperate Coastal Saltmarsh TEC/PEC represents 0.2 % of the remaining extent within the Leschenault Estuary. It is considered that clearing of 0.67 ha of this ecological community is not likely to have a significant impact on the remaining vegetation within the Leschenault Estuary.

5.5.3 Introduction and/or spread of invasive weeds

The Proposal has the potential to introduce and/or spread invasive flora species, as a result of:

- Vehicle or heavy equipment moving through the Proposal DE
- Land clearing and/or movement of soil and plant material.

Weeds can also be carried downstream via hydrological systems.

5.5.4 Dust causing vegetation condition decline

Excessive dust can potentially affect the health and condition of vegetation. If dust particles settle and accumulate on the surface of leaves, it can block stomata, causing reduced transpiration and photosynthesis, resulting in a decline in plant health. Land clearing activities and/or movement of soil are likely to generate dust.

Dust also has the potential to travel long distances, depending on the particle characteristics, weather conditions and topography. As a consequence, there is the potential for dust to affect vegetation outside the Proposal DE.

5.5.5 Accidental bushfire

As development of the Proposal is being undertaken in a highly modified environment, it is unlikely a fire will become established in the operational area and spread to surrounding vegetation. In the unlikely event a fire does occur and spread beyond the Proposal DE, widespread damage and loss of vegetation within the surrounding area could occur.

The process of clearing native vegetation is the activity most likely to potentially cause a bushfire, as it is undertaken in areas with fuel loads that could support a bushfire.

5.5.6 Alteration of hydrology

The Proposal has been designed to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal. Based on modelling and the revised design it is not considered that the hydrology will be substantially changed (see Section 7 for further information).

5.5.7 Cumulative impacts

Regional cumulative impacts

For the purposes of cumulative impact assessment for flora and vegetation the regional scale impacts have been considered by comparing known regional/ LGA extents of vegetation associations/ complexes against published information (GoWA, 2018; 2019) on their extent to estimate the overall percent impact of the Proposal. This shows that:

- At a regional scale the Proposal will require the clearing of 0.67 ha of vegetation, this represents a reduction of 0.01 % of the Yoongarilup complex and less than 0.01 % of association 998.
- At the LGA scale, the Yoongarilup complex has 10.89 % remaining and the Proposal will result in a reduction of 0.05%. Similarly, at the LGA scale, association 998 has 10.69 % remaining and the Proposal will result in a reduction of 0.04%.

Local cumulative impacts

The cumulative impacts at the local scale have considered the vegetation associated with the Leschenault Estuary, in particular the saltmarsh community. The saltmarsh community within Leschenault Estuary is estimated to have undergone an approximate decline of 50%, with around 350 ha remaining (based on date published in 2013) (TSSC, 2013). Clearing of 0.67 ha represents 0.2 % of the remaining extent within the Leschenault Estuary.

A review of aerial photography shows areas and DBCA mapping shows areas of intact saltmarsh community lining the shores of Leschenault Estuary. This vegetation is largely located within the areas designated as Regional Open Space (ROS) under the Greater Bunbury Regional Scheme and are also within reserves and Crown land owned by State government agencies (Figure 5-3).

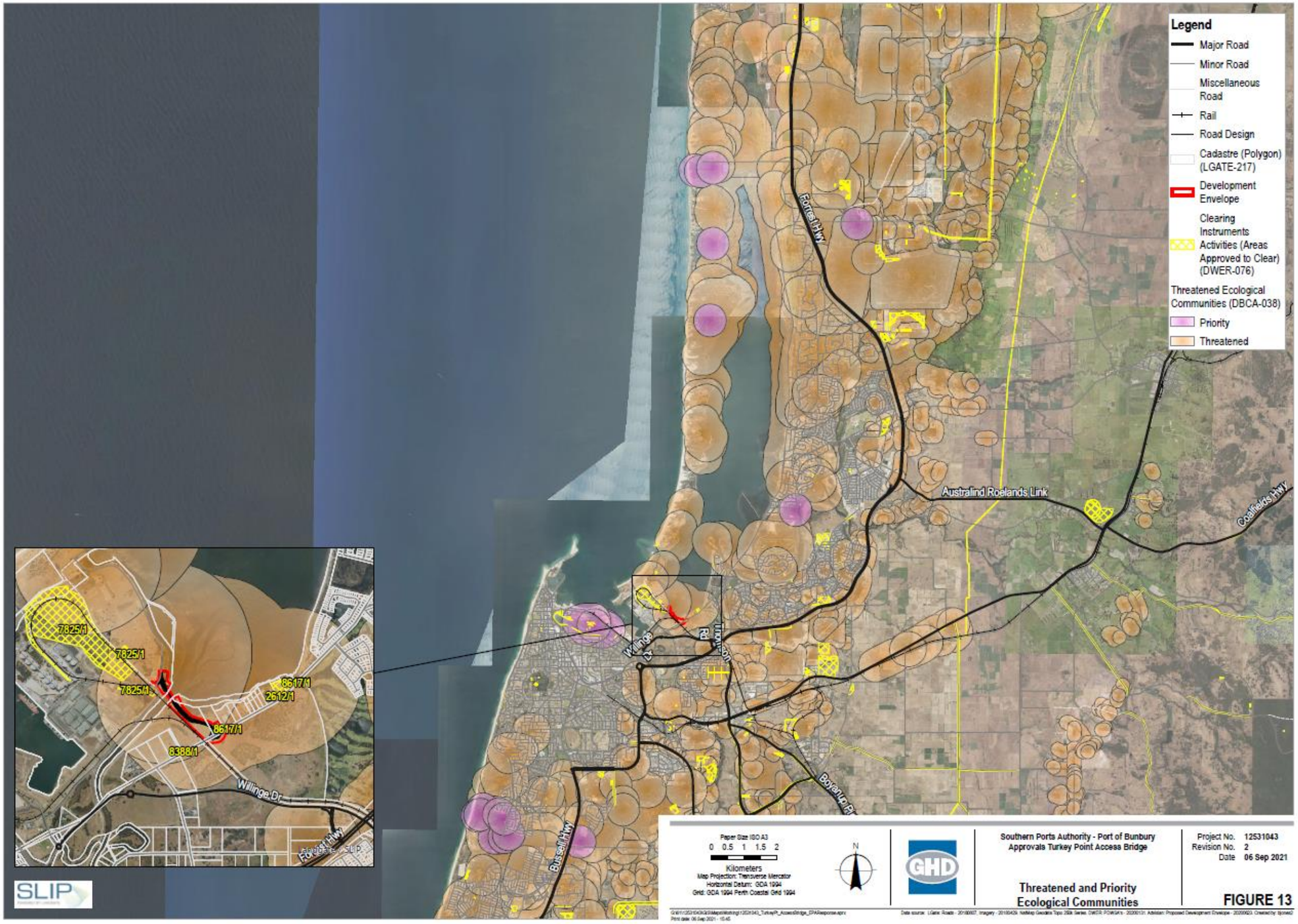

Figure 5-3 Threatened and Priority Ecological communities

Figure 5-3 illustrates 'Clearing Instruments Activities' (areas approved to be cleared under a clearing permit) for Western Australia are derived from authorisations and other instruments relating to Clearing of Native Vegetation under the EP Act (GoWA, 2021) within local area and in the vicinity of the Subtropical and Temperate Coastal Saltmarsh mapped in the Leschenault Inlet. Assessment of the DWER 'Clearing Instruments Activities' (Areas Approved to Clear and Areas Applied to Clear) datasets for approved and applied clearing permits, that occur within the fringing vegetation of Leschenault Estuary (using an approximately 50 m buffer) include 0.421 ha since 2013 (GoWA, 2021). This identifies a total extent of <350 ha that is either approved for clearing or proposed to be cleared.

If the total extent of the above clearing permits plus the 0.67 ha proposed to be cleared for this Proposal is removed from the estimated extent of saltmarsh community within Leschenault Estuary (<350 ha) it is expected that it would not substantially have changed.

5.6 Mitigation

5.6.1 Avoid

The Proposal footprint has been minimised as far as practicable through engineering design and location selection (i.e. most direct route with the smallest footprint). The design has been realigned since the submission of the s38 application in July 2021 to reduce the size of the Proposal DE, extent of clearing and avoid fragmentation of the Subtropical and Temperate Coastal Saltmarsh TEC/PEC.

5.6.2 Minimise

Southern Ports / their contractor will prepare a construction environmental management plan (CEMP) that will provide details on the procedures for clearing/land disturbance within the approved Proposal DE, this will include:

- Internal clearing permit to be granted prior to any clearing being undertaken.
- All clearing area will be demarcated prior to clearing.
- All clearing area will be surveyed after clearing to confirm compliance with issued clearing permits (i.e. internal and regulator issued)
- Implement the following procedures during the construction period:
    - Dust control measures
    - A vehicle/plant hygiene
    - Ground disturbance procedure
    - Weed control program.
- Clearing activities will not be undertaken when the Fire Danger Rating is severe or high. The implementation of a Hot Works Permit system and Emergency Management Procedures will be implemented to minimise the likelihood of accidental bushfires.

5.6.3 Rehabilitate

Southern Ports will prepare a landscaping and rehabilitation plan for the Proposal. Any areas that have been temporarily cleared for construction of the Proposal will be rehabilitated or landscaped in accordance with this plan. Where possible, the aim will be to reinstate similar vegetation types to the adjacent areas (i.e. if the adjacent area contains parkland with scattered vegetation this will be reinstated). This will include approximately 0.15 ha of saltmarsh community that will be temporarily cleared, and will be rehabilitated post construction.

Where landscaping is applied, such as batter slopes or for visual amenity, this will use local native species that are endemic to the area.

Southern Ports will undertake regular weed monitoring and control programs to limit the spread of invasive species during the first three growing seasons to minimise weeds and promote native vegetation growth. If required, weed spraying will be undertaken in late winter or early spring. Weed management techniques will include:

- Spraying with herbicides (to be undertaken in late winter or early spring).
- Hand pulling and cutting.
- Progressive rehabilitation with seeding native species in cleared areas at the earliest opportunity.

5.6.4 Offset

Southern Ports Authority propose to offset clearing of 0.67 ha of Subtropical and Temperate Coastal Saltmarsh. The offset strategy is outlined in Section 13.

5.7 Predicted Outcome

The Proposal DE has been extensively disturbed over time and the majority (5.85 ha (90%)) of the vegetation in the Proposal DE is in Degraded to Completely Degraded condition and 0.67 ha (10%) is in Excellent condition.

The residual impact of the Proposal will be clearing of 0.67 ha of Subtropical Temperate Coastal Saltmarsh TEC/PEC in Excellent condition, listed as ‘Vulnerable’ under the EPBC Act and ‘Priority 3’ by the DBCA.

Clearing of 0.67 ha of Subtropical and Temperate Coastal Saltmarsh TEC/PEC represents 0.2 % of the remaining extent within the Leschenault Estuary. It is considered that clearing of 0.67 ha of this ecological community is not likely to have a significant impact on the remaining vegetation within the Leschenault Estuary.

It is proposed to offset the clearing of 0.67 ha of Subtropical Temperate Coastal Saltmarsh as a precautionary measure (refer to Section 13 Offsets). The residual impact of development of the Proposal will not significantly impact the biological diversity and ecological integrity at a local or regional level.

6. Terrestrial fauna

6.1 EPA Objective

The EPA's objective for terrestrial fauna is '*to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*' (EPA, 2016f).

6.2 Policy and guidance

- Environmental Factor Guideline Terrestrial Fauna (EPA, 2016f)
- Technical Guidance – Sampling methods for terrestrial vertebrate fauna (formerly Statement 56) (EPA, 2016i)
- Technical Guidance Terrestrial Fauna Surveys (EPA, 2016j)
- EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's Cockatoo *Calyptorhynchus latirostris* (Endangered), Baudin's Cockatoo *Calyptorhynchus baudinii* (Endangered) and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso* (Vulnerable) (DSEWPAC, 2012b).

6.3 Receiving environment

6.3.1 Survey and studies

The following reports have provided data and results to describe terrestrial fauna populations within the receiving environment:

- The *Southern Ports Bunbury – Ecological Investigations* (GHD, 2018a) study completed for the Southern Ports Bunbury Inner Harbour Structure Plan has been used for the assessment of fauna for the development of the Proposal. The study area for the *Ecological Investigations* (GHD, 2018a) comprised the areas of the Port of Bunbury Inner Harbour and areas south and south-east of the harbour, covering an areas of 579.51 ha. The Proposal DE falls within the study area for the *Ecological Investigations* (GHD, 2018a). The full report is provided in Appendix D.
- The Southern Ports Authority, *Port of Bunbury Strategic Public Environmental Review Technical Investigations – Terrestrial Shorebird and Waterbirds Assessment* (GHD, 2018b) study completed for the Southern Ports Bunbury Inner Harbour Structure Plan has been used for the assessment of terrestrial fauna for the development of the Proposal. The study area for the *Terrestrial Shorebird and Waterbirds Assessment* (GHD, 2018b) included the Leschenault Estuary (mainly the area within Vittoria Bay and Collie River Delta) and the numerous wetlands within the Southern Ports land holdings. A total of 18 sites, with in the broader survey area, were surveyed for waterbird and shorebird values. Site 3 (Preston River Delta, located about 150 m north of the existing railway bridge) is relevant to the Proposal DE (GHD, 2018b).
- The Southern Ports Authority, Port of Bunbury – Carter's Freshwater Mussel (*Westralunio carteri*) Survey Report (GHD, 2015a).

6.3.2 Fauna habitats

The fauna habitats identified in the Proposal DE are based on the predominant landforms, soil and vegetation structure. The terrestrial habitat types closely correspond to the vegetation types outlined in Section 5.3.3 and Figure 5-1; and include:

- Highly modified

- Mudflats
- Wetlands
- Riparian
- *Casuarina* low open woodland (GHD, 2018a).

The mudflats, and riparian vegetation are of high values to shorebirds and waterbirds as feeding habitat. The area of *Casuarina* low open woodland is likely to be used opportunistically by Black Cockatoos as foraging habitat (Figure 6-1) (GHD, 2018a).

The intertidal mud and sand flats around the mouth of the Preston River and delta provide feeding habitat for waterbirds and shorebirds. This foraging habitat would extend into the open water areas of the river and Vittoria Bay (GHD, 2018a).

6.3.3 Fauna habitat condition

Much of the area in the Proposal DE has historically been disturbed and modified. The condition of the fauna habitat is linked to the vegetation types and condition discussed in Section 5 and outlined in Table 5-1 and Figure 5-2.

6.3.4 Fauna habitat linkages

Habitat linkages are important to allow animals to move between areas of resource availability. They are important for ground and aerial fauna, cover, resources, and linking areas suitable for rest and reproduction. Fragmentation of habitat limits the resources available to species, particularly sedimentary species, which means they may be more vulnerable to natural disasters or habitat changes over time. Fragmentation of habitat can also lead to edge effects, leading to degradation of habitat. Where the distance between habitat fragments is small species may still be able to move between these habitats but may be more exposed to predation pressures in the cleared area (GHD, 2018a).

The Proposal DE is part of a vegetated habitat linkage around the Leschenault Estuary, however is highly modified from past relocation of the waterway and agricultural land uses. The Proposal is located adjacent to existing infrastructure and will not fragment this habitat.

6.3.5 Fauna diversity

The *NatureMap* database search for the greater survey area identified 354 fauna species previously recorded within 5 km of the broader GHD study area (GHD, 2018a). This total included 175 birds, 33 reptiles, 29 mammals and eight (8) amphibians. The remainder of species are invertebrates and fish, so were not considered as part of this survey (except for conservation-listed invertebrates that were recorded opportunistically) (GHD, 2018a).

Terrestrial Shorebirds and Waterbirds

The Southern Ports Bunbury – Terrestrial Shorebird and Waterbirds Assessment included a number of survey efforts including the Preston River Delta, located about 150 m north of the existing railway bridge (identified as Site 3) (GHD, 2018b). Surveys completed in October 2013 and March 2014 provided varied results with fewer species recorded in October 2013 (12) than March 2014 (23). The number of birds present was also variable with 217 recorded in October 2013 and 4897 recorded in March 2014. The most common species reordered at Site 3 was:

- Silver Gulls
- Black Swans
- Pelicans

- Common Sandpiper
- Black-winged Stilts
- Common Greenshank (Plate 6-1)
- Marsh Sandpiper
- Grey Plover
- Pacific Golden Plover
- Red-capped Plover (GHD, 2018b).

Surveys in October 2017 and March 2018 had similar species recorded (22 and 18, respectively). However, the number of birds recorded differed, with 472 and 212 recorded respectively (GHD, 2018b).

Plate 6-1 Common Greenshank (GHD, 2018b)

6.3.6 Introduced species

Six (6) introduced species were recorded within the broader survey area. The species recorded were:

- Fox (*Vulpes vulpes*)
- European rabbits (*Oryctolagus cuniculus*)
- House mice (*Mus musculus*)
- Feral pigeon (*Columba livia*)
- Laughing Dove (*Streptopelia senegalensis*).
- Laughing Kookaburras (*Dacelo novaeguineae*) (GHD, 2018a).

6.3.7 Conservation significant fauna

The EPBC Act Protected Matters Search Tool (PMST) database search for the broader GHD survey area (GHD, 2018a) identified the presence of 35 Threatened fauna species and 23 migratory marine/terrestrial/wetland birds. The *NatureMap* database search for the border GHD survey area identified 54 conservation significant fauna species within 5 km of the broader survey area (GHD, 2018a). Included in this total were marine mammals, sharks and reptile species. These species have been excluded from this assessment as they are outside the scope of the terrestrial fauna study and the Proposal is unlikely to result in any potential impacts to the species. Marine birds have been included as they may potentially utilise the terrestrial riverine habitats within the Proposal DE (GHD, 2018a).

A likelihood of occurrence assessment concluded that:

- 13 species are known to occur (this includes the 11 species identified by GHD and a further two (2) species identified in previous surveys)
- 13 species are likely to occur
- Eight (8) species may possibly occur
- Eight (8) species are considered unlikely or highly unlikely to occur within the study area (GHD, 2018a).

The majority of the species identified as known, likely or possibly occurring in the assessment are listed as Migratory Birds. The Proposal DE habitat was assessed and not found to be critical for the survival of all the species identified as known, likely or possibly occurring in the likelihood of occurrence assessment (GHD, 2018a).

Carter's Freshwater Mussel

Carter's Freshwater Mussel (*Westralunio carteri*) (CFM) is the only known native freshwater mussel in the south west of Western Australia and is endemic to the region. The species is found in freshwater rivers, including the Preston River and is listed as a Schedule 1 (Threatened) species under the WA *Wildlife Conservation Act 1950* and listed as Vulnerable under the EPBC Act (GHD, 2015a).

The species is known to historically occur between the Moore River near Gingin in the North to Albany in the southeast of Western Australia. The nearest recorded records of CFM from the Bunbury area are in the Preston River from near Glen Iris (Lymbery, Lymbery, Morgan, & Beatty, 2008), although this record is not present on *Naturemap* (DPAW, 2015). The next closest records to Bunbury shown in the *Naturemap* search (DPAW, 2015) are Burekup (2010), Brunswick Junction (2010), Boyanup (2010). Additionally, GHD recorded CFM in the Abba River (2013) between Capel and Bunbury. The species prefers slow flowing freshwater containing stable sediments that are soft enough to allow burrowing (Morgan, Beaty, Klunzinger, Allen, & Burnham, 2011). They are also found amongst woody debris or tree roots. The species is very intolerant to salinity, resulting in a reduction in their natural range. Salinities of greater than 3 g/L (35,000 ppm or approximately 5,000 µs/cm) is fatal to CFM (GHD, 2015a).

The CFM *(Westralunio carteri)* survey completed by GHD (2015a) included 15 transects (each 50 m long, along the banks or within the river) along the Preston River, searching for living or dead mussels in the adjacent water up to 5 m from shore. All transects were located south of the Proposal DE (GHD, 2015a).

GHD ecologists found no mussels in situ within the Preston River study area, either alive or dead in any of the 15 transects examined. The water in the lower reaches of the Preston River is subject to tidal fluctuations and marine water influences. CFM has a low tolerance to salinity and is unlikely to be present in the lower reaches of the Preston River (GHD, 2015a).

Black Cockatoos

The fauna assessment (GHD, 2018a) identified 0.67 ha of potential foraging habitat for Black Cockatoo within the Proposal DE (Figure 6-1). This foraging habitat would be considered low value as it only contains scattered feeding tree's (*Casuarina obesa)*.

Eight (8) Baudin's Black Cockatoo were sighted feeding on *Casuarina* near the Preston River estuary approximately 100 m south of the south-west end of the Proposal DE. Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo are also considered likely to occur. The *Casuarina obesa* low open woodland vegetation type (VT04) is considered to support Black Cockatoo foraging habitat (GHD, 2018a).

No trees meeting the referral requirements for Black Cockatoos (DSEWPAC, 2012b) were recorded in the Proposal DE. Black Cockatoo breeding habitat in the Proposal DE and broader GHD survey area is considered unlikely due to limited foraging habitat and limited available breeding hollows (GHD, 2018a).

No roosting habitat was identified in the Proposal DE (GHD, 2018a).

Migratory Birds

Migratory birds have been recorded using a wide variety of habitats within the broader GHD (2018a) study area, including the sand/mud flats of the Preston River delta, within Vittoria Bay, open waters and shorelines of Leschenault Estuary. The sand and mudflat and associated habitats in Vittoria Bay would be considered high value for migratory birds.

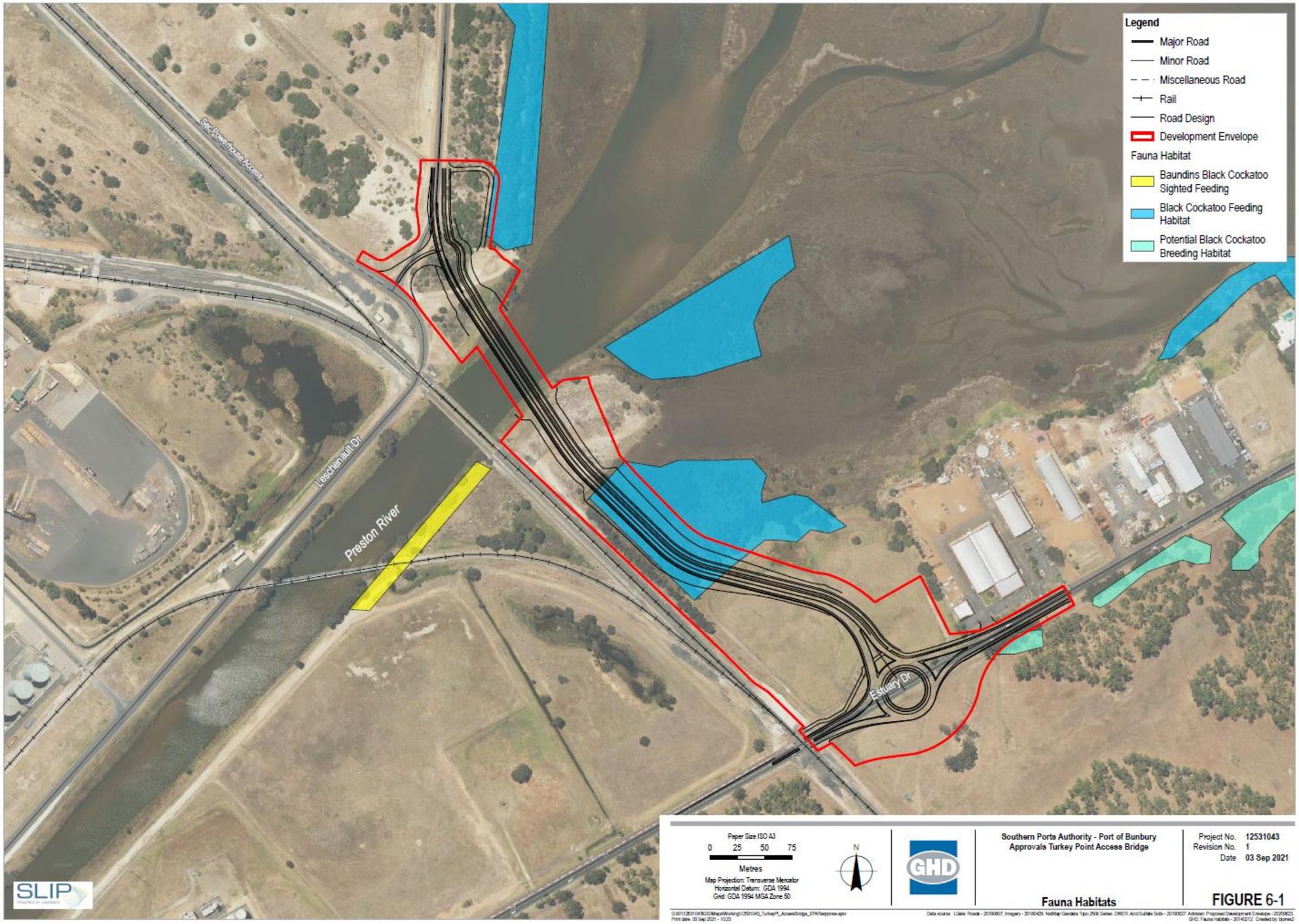

Figure 6-1 Fauna habitat

6.4 Potential impacts

The Proposal has the potential to result in direct and indirect impacts to terrestrial fauna during construction and operations through:

- Direct loss of 6.52 ha of fauna habitat, of which 89.7 % is highly modified and 0.67 ha the Casuarina low woodland which provided low quality Black Cockatoo foraging habitat.
- Death, injury or displacement of native fauna species due to vehicle interactions or entrapment associated with construction of the Proposal.
- Noise, vibration, light and dust emissions disrupting native fauna.
- Accidental bushfire caused by the operation of vehicles/plant/equipment, resulting in damage/loss of surrounding fauna habitats.
- Attraction of feral fauna due to food/water availability on-site, increasing competition with, or predation on, native fauna species.

6.5 Assessment of impacts

6.5.1 Direct loss of fauna habitat

The Proposal will result in the clearing of 6.52 ha of fauna habitat, which is largely highly modified majority (89.7 % consisting of scattered natives over weeds, planted trees and revegetation) with 0.67 ha of *Casuarina* low open woodland.

The habitat present within the DE is surrounded by developed areas and has already been impacted by the existing harbour, infrastructure, and clearing for development of residential and industrial areas.

Clearing of 6.52 ha of fauna habitat for the Proposal is not expected to result in significant impacts on terrestrial fauna.

6.5.2 Black Cockatoos

The Proposal will result in the clearing of up to 0.67 ha of low-quality Black Cockatoo foraging habitat. The Proposal will not result in the clearing of any potential breeding or roosting trees.

In consideration of the extent and quality of Black Cockatoo foraging habitat proposed to be cleared, the impact of the Proposal on Black Cockatoos is unlikely to be significant at a local or regional scale.

6.5.3 Migratory and estuarine bird species

The fringing vegetation of Leschenault Estuary is known to provide habitat for a variety of bird species, including migratory birds. The Proposal includes clearing of 0.67 ha of *Casuarina obesa* woodland (saltmarsh community) that is habitat to these species. However, the Proposal is adjacent to existing clearing, and although it will reduce the width of the fringing vegetation at the Proposal location the does not fragment this habitat. Given the small extent of clearing, presence of the same habitat adjacent and in the local Leschenault Estuary and maintenance of habitat connectivity it is expected that the Proposal will have a negligible to minor impact on migratory and estuarine birds.

6.5.4 Death, injury or displacement of native fauna species

The Proposal may result in direct impacts to terrestrial fauna during construction and operations through fauna injury/mortality from vehicle/plant collisions. Interaction between vehicles/plant and fauna species is most likely to occur during vegetation clearing activities. Due to the Proposal being located in an area which was previously been disturbed/cleared, fauna mortality and/or injury is expected to be limited. The majority of the species recorded in the Proposal DE are likely to be migratory and terrestrial shorebirds and wetland birds, which are likely to relocate to more suitable habitats if the existing habitat is no longer suitable.

6.5.5 Noise, vibration, light and dust emissions

Development and operation of the Proposal will result in the generation of noise, vibration, light and dust emission, which can disrupt or displace fauna, causing them to avoid habitat in impacted area. The location of the Proposal is within a previously disturbed area surrounded by infrastructure (e.g. road and rail) and industry. As a result, fauna residing in the local area are likely to be accustomed to noise, vibration, light and dust emissions.

6.5.6 Accidental bushfire

The potential impact and likelihood of bushfires caused by the Proposal has been discussed in Section 5.5.55.5.5.

6.5.7 Attraction of feral fauna species

Primarily due to the ready availability of food and water sources, construction and operation activities can potentially lead to an increase in the presence of introduced (feral) fauna species. Introduced fauna species compete with native species for food and shelter and can predate on native fauna species. As the Proposal is located within a previously disturbed area with associated infrastructure and industry, it is likely introduced species are already present and established in the area.

6.5.8 Cumulative impacts

The fauna habitat types recorded within the DE are not restricted to the local area. Clearing for the project will result in an estimated 0.2 % reduction in the saltmarsh community within the Leschenault Estuary (see Section 5).

6.6 Mitigation

6.6.1 Avoid

The Proposal footprint has been minimised as far as practicable through engineering design and location selection (i.e. most direct route with the smallest footprint). The design has been realigned since the submission of the s38 application in July 2021 to reduce the Proposal DE, native vegetation, thereby fauna habitat, to be cleared.

6.6.2 Minimise

The Proposal induction will include information on the potential presence of conservation significant fauna which may be encountered within the Proposal DE. Information will include description of the fauna, specific management measures to protect them, responsibilities for reporting sightings and incidents involving conservation significant fauna.

A suitably qualified environmental professional (fauna spotter) will be present during all land clearing activities. The person will hold a permit to handle and move significant fauna under

Regulation 15 of the *Wildlife Conservation Act 1950*, and have access to a care facility which can be used to rehabilitate injured or sick fauna.

Where practicable, land clearing will be undertaken on one front and only in one direction, thereby providing fauna the opportunity to relocate from the clearing areas to surrounding habitat.

All native fauna injuries and mortalities will be recorded and reported internally, and to appropriate regulatory agencies, where required.

In the event of trenches being established which native fauna may be unable to escape from, they will be inspected on a regular basis (i.e. dawn, midday and prior to sunset). Any entrapped fauna will be removed and relocated to surrounding vegetation. If trenches are left open overnight, ramps will be established to permit native fauna to escape.

Clearing activities will not be undertaken when the Fire Danger Rating is severe or high. The implementation of a Hot Works Permit system and Emergency Management Procedures will be implemented to minimise the likelihood of accidental bushfires.

6.6.3 Rehabilitate

Information on rehabilitation measures is provided in Section 5.6.3.

6.6.4 Offset

No specific offsets are proposed for terrestrial fauna, however the proposed Subtropical and Temperate Coastal Saltmarsh offset, will provide like for like fauna habitat values. For further details regarding offsets refer to Section 13.

6.7 Predicted Outcome

The development of the Proposal will result in loss of 6.52 ha of native and non-native vegetation, including 0.67 ha low quality potential foraging habitat for the conservation significant Black Cockatoos.

Potential secondary impacts associated with noise, dust, vibration and light emissions are unlikely to be significant as the areas has been previously disturbed and has existing infrastructure and industry present in the surrounding areas.

Given the degraded condition of the fauna habitat within the Proposal DE, the avoidance of habitat fragmentation, offsets being applied for the clearing of the Subtropical and Temperate Coastal Saltmarsh TEC/PEC, the clearing is unlikely to result in significant impacts to fauna species.

It is considered the Proposal will meet the EPA's objective to protect terrestrial fauna so that biological diversity and ecological integrity are maintained through offsets and adequate management practices.

7. Inland water

7.1 EPA Objective

The EPA's objective for inland water is '*to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*' (EPA, 2018a).

Inland Waters for the purpose of this EPA referral is the occurrence, distribution, connectivity, movement, and quantity (hydrological regimes) of inland waters including its chemical, physical, biological and aesthetic characteristics (quality).

7.2 Policy and guidance

The following contemporary policy and guidance documents are currently considered applicable to the Proposal:

- Environmental Factor Guideline Inland Waters (EPA, 2018a)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)
- *Waterways Conservation Act 1976*
- *Rights in Water and Irrigation Act 1914*.

7.3 Receiving environment

7.3.1 Baseline studies

The following reports have been utilised to develop an understanding of the receiving environment:

- Strategic Public Environmental Review Technical Investigations – Surface Water Quality (GHD, 2014d)
- Strategic Public Environmental Review Technical Investigations – Groundwater Quality (GHD, 2014c)
- Preston River Delta Investigations (GHD, 2014a).

7.3.2 Surface water

The Proposal will be constructed over the Preston River which passes through land that has been subject to extensive agriculture or urbanisation and finally discharges into the Leschenault Estuary. The lower Preston River is subject to saltwater intrusion from marine tidal exchange in the Leschenault Estuary. The majority of the river catchment has been cleared for agriculture although some remnant forest vegetation exists at the headwaters.

The Preston River is one of the few remaining larger rivers in southern Western Australia the majority of which is not unduly impacted by salinity generated as result of land clearing. There was an increase in sedimentation in the Preston River arising from river foreshore erosion and land erosion in the catchment but this has reduced as a result of improvements to both land management and foreshore management practices.

The current alignment of the lower Preston River was constructed in the late 1960's as part of the development of the Bunbury Port Inner Harbour.

The Proposal lies within the Leschenault Inlet Management Area under the *Waterways Conservation Act 1976*. As such, Southern Ports will require a Disposal Licence (related to dewatering at pile construction sites) and a Reclamation Licence (related to construction of the

temporary construction causeway within the river) to be issued by DWER prior to undertaking any construction activities.

The Preston River and its tributaries is a proclaimed waterway under the *Rights In Water and Irrigation Act 1914.* Southern Ports will be required to obtain a Bed and Banks Permit from DWER authorising the disturbance and interference of the riverbed and banks during construction.

Water quality

The Preston River originates in the Darling Range and runs through a combination of open woodland and cleared agricultural land before draining into the Leschenault Estuary. The Preston River catchment covers an area of approximately 1,190 km^2. The Preston River catchment has undergone significant changes since European settlement. Agriculture and urbanisation to the catchment has increased sediment loads entering the river. Although rainfall decreases since the 1970's and better catchment management would have seen loads fall from those in the 1970's and earlier (GHD, 2014d).

Frequent summer and autumn algal blooms have been reported in the middle and lower reaches of the Preston River, although the algae and their toxicity in unknown. No fish kills from loss of oxygen due to the blooms have been observed in the river and no kills have been reported for the Estuary (GHD, 2014d).

The Surface Water Quality Technical Investigation for the Inner Harbour Structure Plan (GHD, 2014d) included sediment samples, the results of which are summarised in Table 7-1. The highest concentrations of lead recorded near Estuary Road bridge may be linked to historical contamination from lead in petrol (GHD, 2014d).

Table 7-1 Metal concentrations (GHD, 2014d)

Location	Cobalt ppm	Copper ppm	Lead ppm	Manganese ppm	Nickel ppm	Vanadium ppm	Zinc ppm
Estuary Road Bridge	7	13	18	32	6	38	30
Estuary Road Bridge	5	9	11	40	5	33	18
Before Railway Bridge	5	8	8	67	4	20	15
At Railway Bridge	4	5	5	47	4	22	11
Entry to Estuary	4	5	5	35	4	24	11

The Preston River Delta Investigation (GHD, 2014a) completed for the Inner Harbour Structure Plan, included suspended sediment sampling in the Preston River at the rail bridge immediately south of the Proposal DE. Table 7-2 presents the results from the suspended load sampling events. The results are depth averaged and reported from the middle of the channel, as well as five (5) m from the edge of the right and left banks. It should be noted the average flow velocity during the 9th May 2014 sample is negative indicating tidal ingress at the time of sampling (GHD, 2014a).

Table 7-2 Suspended sediment sampling results (GHD, 2014a)

Date	Flow rate at Boyanup (m^3/s)	Average flow velocity (m/s)			Suspended solids (mg/L)		
		Right	Centre	Left	Right	Centre	Left
09/08/2013	54	0.35	0.68	0.63	37	28	27
17/09/2013	20	0.23	0.24	0.01	19	23	16
09/05/2014	5	-0.13	0.04	-0.06	6	26	139

Flood behaviour

Preston River has a flat gradient and is constrained to run between high banks and levees and would overtop in the most severe rainfall conditions. Flow rates in the river for heavy flow conditions during storm events are shown in Table 7-3 (GHD, 2014d).

Table 7-3 Existing Preston River flows (GHD, 2014d)

ARI (years)	Peak flow (m^3/s)
10	173.87
100	361.35
500	612.29

Between Picton Bridge and its mouth, the river is flanked by constructed levee banks of unknown structural integrity. In a 100-year ARI flood, it is assumed these levees would breach, leading to widespread shallow flooding of the land between the existing harbour and Forrest Highway (GHD, 2014d).

Preston River Delta

The Preston River Delta Investigation (GHD, 2014a) completed for the Inner Harbour Structure Plan, completed a qualitative aerial imagery analysis, using aerial imagery taken between 1967 and 2012. Table 7-4 provides a summary of observed changes over the period covered by the historical aerial imagery.

Table 7-4 Observed changes to Preston River delta (GHD, 2014a)

Year	Date	Notes
1967	Feb	First available aerial photograph. Taken before realignment to Vittoria Bay. Leschenault Inlet closed at Point Macleod. Preston River delta is south southwest of Turkey Point and “the Cut”. Tidal flats exist in the Vittoria Bay area.
1970	Feb	River realignment to Vittoria Bay. Reclamation has begun on land to west of new alignment and possible siltation in adjacent shallow water can be seen. No obvious delta formation. Water appears shallower on western side. No inner harbour development.
1972	Oct	The Inner Harbour Development works have commenced. A bund has been constructed on outer edge port reclaim area to the west of the river mouth. Channel outlet structure to the east of the delta (North west/south east alignment). An obvious delta with divergent channels has formed at the river mouth. No vegetation within the delta.
1973	Oct	Delta has extended marginally along the central and western front. No vegetation.
1974	Oct	Eastern side of the delta has connected to the land and covering existing tidal flats. Smaller channels in the previous delta have filled in and more defined channels developed on the eastern side. Western island in delta

Year	Date	Notes
		reworked and western channel has widened. The outlet channel to the east appears to have in filled.
1975	Feb	No significant changes.
1977	Dec	Small channels on the western side of the delta have filled in and the main western channel is more defined and appears deeper. Overall extent of delta appears to have expanded. Scattered vegetation has developed on the south eastern island.
1979	Aug	Significant vegetation growth on both sides of the main channel. Better main channel definition.
1980	Mar	Small amount of vegetation on three little islands of delta. Extent of delta has not changed.
1981	Mar	Possible delta extension (possibly due to low tide level at the time of the photograph). Outlet channel definition east of delta not obvious.
1984	Jan	Low tide photo and reflections off water make comparison between previous photos difficult. Possible initiation of new fan at end of main channel. Northern delta island has split into two with a deeper channel through the middle. Significant development of vegetation on 2 channel sides and 3 persistent islands.
1985	Jan	Low tide photo and reflections off water make comparison between previous photos difficult. New channel between northern islands has widened. No significant changes in delta extents.
1986	Mar	New fan formation at the end of the main channel observable. Two islands on outer edge of new channel have been reworked with smaller channels dividing them. Significant vegetation growth on three eastern channel islands. Areas in the middle have increased vegetation density.
1987	Feb	No major observable changes.
1989	Jan	North western minor island channels filled in. Main channel is wider and more defined. Vegetation growth extending outwards.
1990	May	No significant change in delta extent or vegetation.
1991	Nov	Major extension in the form of a new fan at delta front.
1992	Oct	No change in vegetation extent. New fan formation persists at the end of the main channel. Reclamation area has been divided into two areas with one connected to estuary and the other closed. Some vegetation has established in the reclaim area on the delta side.
1993	Jan	No significant changes.
1998	Dec	Evidence of reworking and extension of new delta fan by 30 to 50 m in places and widening of channel at fan end of delta. Widening of secondary channel to the east of the main channel.
2001 to 2012		No significant changes in the delta were observed between 1998 and 2012.

Between 1970 and 1991 significant changes in the delta extent, channel locations and vegetation coverage were observed. Three main periods of delta growth were identified:

- February 1970 to October 1977 – initial development of the delta over shallower intertidal mudflat area up until October 1972, followed by progressive extensions of the delta front by approximately 100 to 250 m.
- March 1986 to November 199 – Formation and enlargement of a new fan in the central section of delta front.

- January 1993 and December 1998 – Further extension of the new fan front by 30 to 50 m in places (GHD, 2014a).

Since 1998 the delta has essentially remained static with only small fluctuation in the position of the delta front being evident. This may indicate that upstream sediment delivery has been more or less in balance with processes that erode the delta (GHD, 2014a).

Vegetation colonisation of the delta commenced around 1979, with current coverage maintained since approximately 1987 (GHD, 2014a).

7.3.3 Wetlands

No Ramsar listed wetlands occur within or in proximity to the Proposal DE. The nearest Ramsar wetland (Peel-Yalgorup System) is located approximately 25 km to the north from the Proposal DE.

As indicated in Figure 7-1 and summarised in Table 7-5 there are three (3) Geomorphic Wetlands of the Swan Coastal Plain present within the Proposal DE.

Table 7-5 Geomorphic wetlands occurring in the Proposal DE (GHD, 2018a)

Wetland	Category	Extent of wetland within the Proposal DE (ha)	Vegetation present	Image
UFI 15513 Estuary waterbody	Conservation	0.52	• Scattered natives over weeds (VT07). • Planted trees (VT08). • Revegetation (VT09). • Open Water.	 Looking west  Looking north-west

Wetland	Category	Extent of wetland within the Proposal DE (ha)	Vegetation present	Image
UFI 15505 Estuary- Waterbody	Multiple use	0.56	• Scattered natives over weeds (VT07). • Revegetation (VT09).	 Looking south-east
UFI 14329 Palusplain	Multiple use	5.18	• *Tecticornia* spp. herbland (VT03). • *Casuarina obesa* low open woodland over *Tecticornia* spp. open herbland (VT04). • Scattered natives over weeds (VT07). • Planted trees (VT08). • Open Water. • Infrastructure.	 Looking west

7.3.4 Proclaimed water resources

The Proposal DE does not fall within a Public Drinking Water Source Area (PDWSA). As indicated in Figure 7-2 and Table 7-6 there are four (4) PDWSAs within 3 km from the Proposal DE.

Table 7-6 PDWSAs within 3 km from the Proposal DE

Name	Priority	Distance from Proposal DE
Bunbury Water Reserve	P3	Approximately 3 km south west
Bunbury East Water Reserve	P1	Approximately 2.5 km south east
Picton Water Reserve	P1	Approximately 2.7 km east
Eaton Water Reserve	P1	Approximately 2.7 km north east

7.3.5 Groundwater

Superficial aquifer

The strategic units which make up the superficial aquifer include the Safety Bay Sand, Tamala Sand, the Guilford Formation and localised alluvial sediments. In general, the superficial aquifer forms a relatively thin lens above the less permeable beds of the Leederville and Yarragadee formation, and weathered basalt, where present (GHD, 2014c).

Groundwater levels

The Groundwater Quality Technical Assessment completed for the Inner Harbour Structure Plan (GHD, 2014c) utilised a number of key DWER (then Department of Water) groundwater monitoring locations to identify that on a regional scale groundwater is expected to move in a north westerly direction (i.e. towards the coast). While local drainage features (discharges and recharge zones), such as the Current Preston River alignment, may affect the local groundwater flow direction. The Preston River is not considered to be source of groundwater recharge because the channel is incised below the regional potentiometric surface (GHD, 2014c).

Groundwater quality

Shallow groundwater within the superficial aquifer is generally fresh (a salinity of less than 500 mg/L), although some areas closest to the coast are likely to be affected by higher salinities due to mixing with sea water (GHD, 2014c).

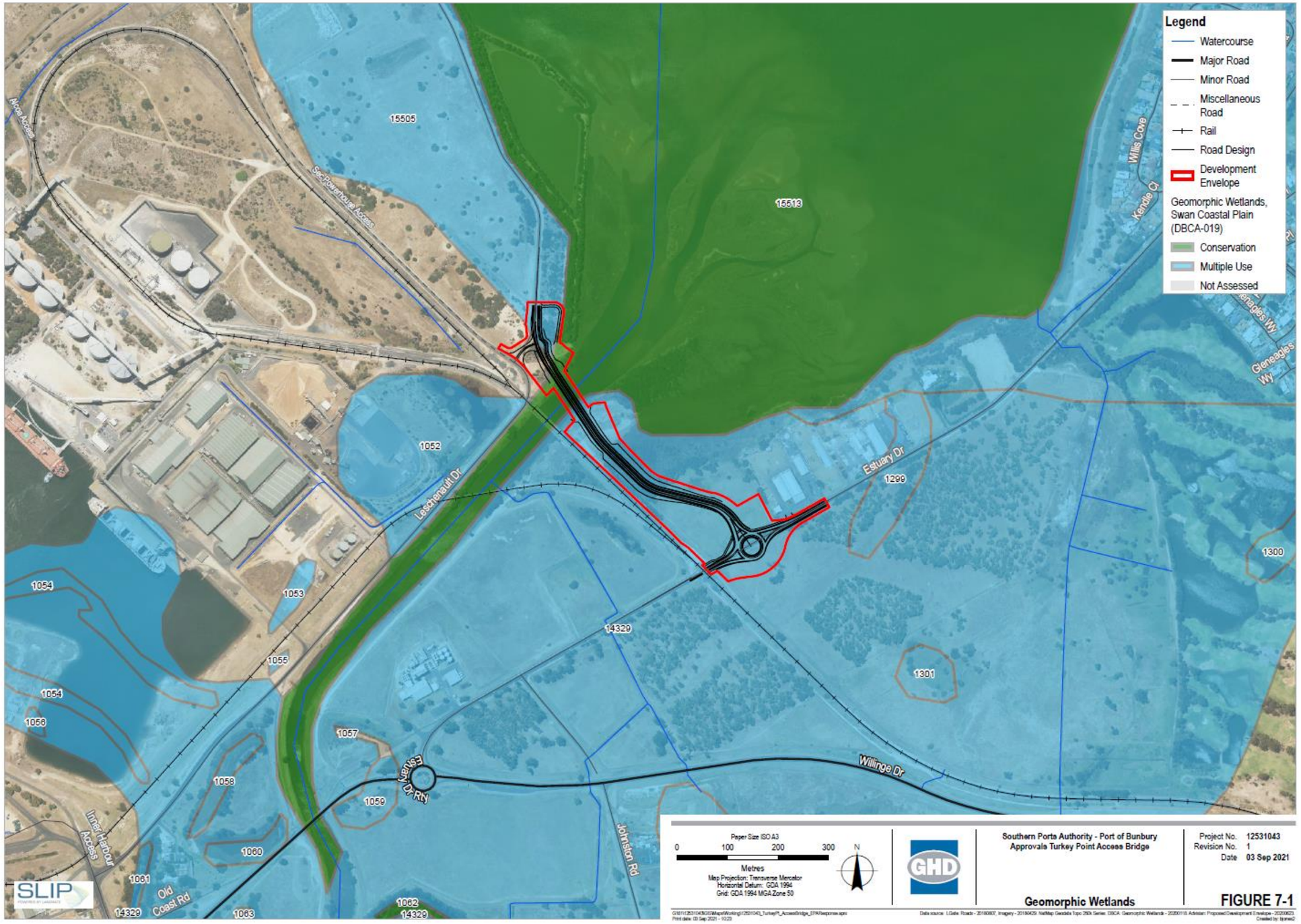

Figure 7-1 Geomorphic wetlands

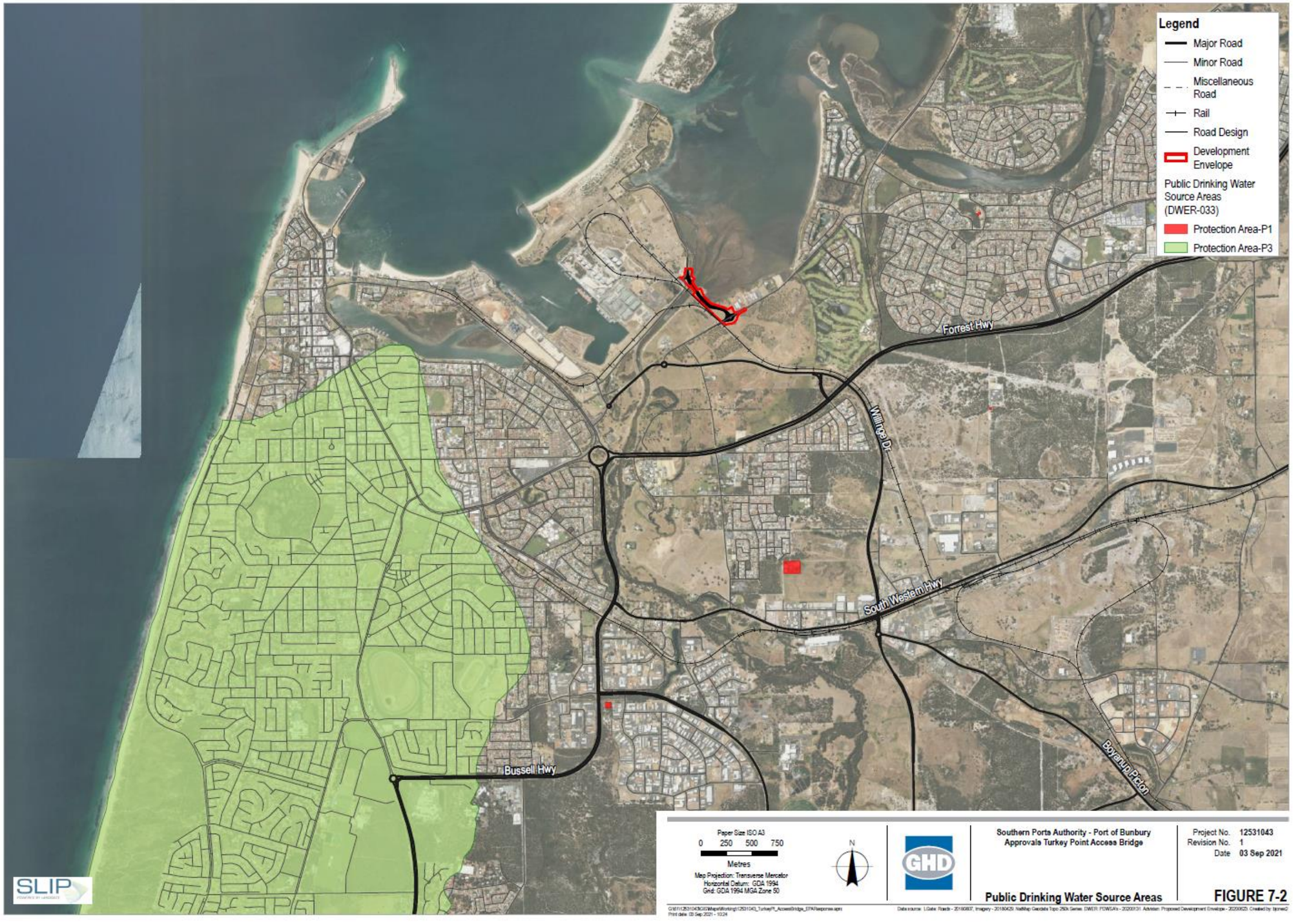

Figure 7-2 Public Drinking Water Source Areas

7.4 Potential impacts

The Proposal has the potential to result in impacts to inland waters during construction and operations through:

- Sedimentation of surface waters, resulting from erosion following ground disturbance works (i.e. vegetation clearing and earthworks).
- Contamination of ground and/or surface water due to accidental release/spillage of environmentally hazardous materials (diesel) used during construction and operation.
- Increased likelihood of and/or intensity of flooding associated with clearing of native vegetation.

7.5 Assessment of impacts

7.5.1 Direct impacts

7.5.1.1 Sedimentation of surface water – construction phase

Installation of the temporary construction causeway required for undertaking the piling operations may potentially result in short-term increased turbidity of the surface water.

Clearing of vegetation and earthworks will disturb and expose soils increasing susceptibility to erosion by wind or water, and subsequent transfer of sediments to surrounding areas. Erosion of exposed surfaces is not expected to cause a significant impact to soil, land quality or inland waters at the regional scale.

7.5.1.2 Contamination of ground and / or surface waters due to release /spillage of environmentally hazardous materials

Direct contamination of soils and land could occur as a result of releases of hazardous materials (such as hydrocarbons, chemicals and reagents) from storage or handling areas. Storage of hazardous materials during the construction period will be limited to temporary storage areas holding minor quantities of oils and grease for maintenance, and fuel supply for small construction equipment.

7.5.2 Indirect impacts

7.5.2.1 Increased likelihood of and /or intensity of flooding

The Proposal places an additional hydraulic constraint on the Preston River potentially increasing flood elevations during storm events. Single dimensional hydraulic modelling of the proposed Turkey Point Road Bridge over the Preston River under existing conditions and with the addition of the Proposal has been undertaken (Advisian, 2019). The tailwater conditions in the estuary were modelled to represent high tide conditions with Sea Level Rise (SLR) to 2110 of 0.9 metres. For the 100-year ARI flood at High Tide and with SLR included, there was little difference in water level between the proposed design and existing conditions, as presented in Table 7-7.

Table 7-7 Hydraulic modelling of Preston River under existing conditions and with the Proposal (Advisian, 2019)

Simulation	Flood Event (ARI), years	Design Flow, m^3/s	WSL increase at new Bridge Location, m	WSL at new bridge (U/s), m AHD
Existing Conditions	100	361	n/a	2.57
	500	615	n/a	3.24
With Proposed Bridge	100	361	0.03	2.60
	500	615	0.06	3.30

7.5.1 Cumulative impacts

The Proposal has been designed to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal.

Temporary impacts on groundwater and surface water during construction will be managed via implementation of a Proposal specific CEMP.

Operation of the Proposal, once built, is considered unlikely to significantly impact on surface water and groundwater quality due to WSUD principles integrated during the design process.

Therefore, it is considered that the design, construction and operation of the Proposal are unlikely to have a cumulative impact on the surrounding inland waters.

7.6 Mitigation

7.6.1 Avoid

Sedimentation of surface water

- In the event of extreme weather conditions (e.g. storm events) construction work will cease and the need for additional erosion and sediment control will be assessed and implemented where required.

Contamination

- Inspection of all machines and hoses conducted each day before use, to confirm their integrity, in order to reduce the risk of a spill. Any equipment failing inspection will be removed from site for repair.
- Refuelling and repairs/servicing will be undertaken in a designated, bunded area.
- Vehicles will be kept to defined access routes, no unauthorised driving in adjacent areas will be permitted.

7.6.2 Minimise

Sedimentation of surface water

- The contractor will visually monitor turbidity during all waterway crossing activities.
- A daily log or journal which references the weather conditions, date, time, location, photos as well as the turbidity test results will take place throughout the duration of the contract.
- If required, a silt curtain will be installed to manage the turbidity of the water crossings should turbidity become an issue.

- The bridge structure has been designed to minimise scouring through maintaining expected drainage flow and includes minor rock protection on the banks of the bridge. Geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge, if necessary.
- Equipment will not be placed on the banks of the creeks or drainage crossings when not in use.
- If necessary, geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge. Equipment will not be placed on the banks of the creeks or drainage crossings when not in use.
- Piling works will require a 500 – 1,000 mm bund to be placed around the pile cap in order to contain the mud residue. This residue will then be taken out of the river bed and left to dry then used with other cut/fill material if suitable or disposed of off-site if unsuitable. Generally, a windrow will be constructed at the perimeter of the temporary causeway to ensure no spillage of concrete or construction water contaminates the river.

Contamination

- Spill kits will be readily available and contents check at the end of each day and replenished, as required. Staff will be trained in the use of spill kits and appropriate disposal of contaminated material.
- Any soil contaminated by hydrocarbons will be disposed of at an appropriately licenced waste disposal facility.
- The risk of erosion, sedimentation and spills of hazardous chemicals during operation of the Proposal will be managed through drainage design:
    - Erosion control will be applied at drainage discharge points.
    - Detention / infiltration basins where there is potential for discharge of hazardous spills into the major waterways.

Flooding

The bridge structure has been designed to minimise scouring through maintaining expected drainage flow and includes minor rock protection on the banks of the bridge. Geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge, if necessary.

7.6.3 Rehabilitate

Where possible, progressive rehabilitation will be undertaken, for further information refer to Section 55.6.3.

The Proposal has been designed to incorporate WSUD principles to treat stormwater quality prior to entering waterways and wetland areas. Steep batter slopes will be armoured with rock, or similar, to prevent scour and erosion which may result in sedimentation of waterways and wetland areas.

7.6.4 Offset

No offsets are proposed for Inland Waters.

7.7 Predicted Outcome

There are no Ramsar listed, Nationally Important wetlands or PDWSAs occurring within 3 km of the Proposal DE.

The Proposal has been designed to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal.

Temporary impacts on groundwater and surface water during construction will be managed via implementation of a Proposal specific CEMP.

Operation of the Proposal, once built, is considered unlikely to significantly impact on surface water and groundwater quality due to WSUD principles integrated during the design process.

With the adoption and implementation of the mitigations measures, and adherence to the permit conditions obtained under the RIWI Act and WC Act, it is considered the Proposal meets the EPA objective to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected. The EPA objective for Inland Waters will therefore be met for the Proposal.

8. Social surroundings

8.1 EPA Objective

The EPA's objective for social surroundings is '*to protect social surroundings from significant harm*' (EPA, 2016d).

8.2 Policy and guidance

- Environmental Factor Guideline: Air Quality (EPA, 2020a)
- Environmental Factor Guideline: Social Surroundings (EPA, 2016d)
- Guidance for the Assessment of Environmental Factors, Assessment of Aboriginal Heritage No. 41 (EPA, 2004)
- *Aboriginal Heritage Act 1972*
- Environmental Protection (Noise) Regulations 1997 (Noise Regulations)
- Australian Standard (AS) 2436-2010 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites (Standards Australia, 2010)
- The Draft State Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning (SPP 5.4) (WAPC, 2019b).

8.3 Baseline studies

The following reports have been utilised to develop an understanding of the receiving environment:

- The Report of an Aboriginal Heritage Survey of the Preston River Realignment and the Bunbury Port Inner Harbour Expansion Plan (Brad Goode & Associates, 2014) has been used for review and assessment of Aboriginal heritage for the Proposal
- Strategic Public Environmental Review Technical Investigations – Noise (GHD, 2015b)
- Strategic Public Environmental Review Technical Investigations – Air Quality (GHD, 2014b).

8.4 Receiving environment

8.4.1 Cultural heritage – Aboriginal and European

Review of the following online inquiry systems (accessed 04 June 2020) indicates there are no known or registered European heritages sites within, or in the immediate vicinity of the Proposal DE:

- WA Heritage Council inHerit database
- DAWE (Commonwealth) Protected Matters Search Tool.

As outlined in Figure 8-2 and Table 8-1, review of the WA Aboriginal Heritage Inquiry System (AHIS) indicates the Proposal DE lies over two (2) registered Aboriginal heritage sites.

Table 8-1 Aboriginal heritage sites search results

ID	Name	Status	Type
19795	Preston River	Registered	Mythological
16713	Collie River Waugal	Registered	Mythological, Nature Feature, Water Source

8.4.2 Land use

Existing land use

The Proposal lies within an area surrounded by industrial activities, such as logistics (rail, road and port).

The land tenure and zoning for the Proposal DE is outlined in Section 1.5.

Conservation area

No DBCA-managed lands are within or intersect the Proposal DE. The closest DBCA-managed land is the Leschenault Peninsula Conservation Park, located 1.7 km north of the Proposal DE.

Environmentally Sensitive areas

The majority of the Proposal DE lies within an Environmentally Sensitive Area (ESA) (Figure 8-3), which is associated with the Preston River, wetlands and TEC/PEC buffers located in the broader area.

8.4.3 Noise

The Technical Noise Assessment (GHD, 2015b) undertaken for the Strategic Inner Harbour Structure Plan identified a number of receptors, those relevant to and closest to the Proposal are summarised in Table 8-2.

Table 8-2 Identified receptors in proximity to the Proposal DE (GHD, 2015b)

ID	Details	Coordinate m MGA50	
		Easting	Northing
R2	Kendle Close, south west corner	377,966	6,312,646
R3	Gleneagles Way, approximate midway point	378,206	6,312,430

Existing noise within the vicinity of the Proposal is anticipated to be dominated by local industrial and traffic noise sources. Receptors in proximity to the Proposal may also hear other noise sources on occasion such as:

- The ocean (waves on the beach)
- Nature (wind through trees, animals and insects)
- Commercial areas (people, vehicles and machinery associated with various commercial enterprises
- Neighbourhood noise (GHD, 2015b).

During construction temporary noise sources associated with the Proposal are likely to include mobile plant and equipment, and for a limited time, pile driving. While operational noise for the Proposal will be from traffic sources.

8.4.4 Visual amenity

The Proposal would add new infrastructure downstream of the existing rail bridge and in an area where the Preston River intersects the intertidal area of Vittoria Bay that would alter the immediate visual context, the overall character and context of the site would not be significantly altered for visual receptors and would look similar to the existing visual context of light industrial land use.

The height of the structure would not obstruct the further views of the Leschenault Estuary and Vittoria Bay for receptors. Therefore, alteration of the visual context would not be significant and is consistent with the existing infrastructure in the immediate vicinity.

8.4.5 Air Quality

The Bunbury area has a Mediterranean climate, with warm dry summers and cool wet winters, with the majority of rain falling in the winter. The closest Bureau of Meteorology (BoM) weather station, which records wind speeds and direction to the Proposal is the Bunbury Automatic Weather Station (AWS) (Site number 009965). A summary of the meteorological data from this AWS is provided in Table 8-3.

Table 8-3 Meteorological data for Bunbury (BoM, 2020)

Parameter	Summer			Autumn			Winter			Spring		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Mean max temp (°C)	27.4	29.7	30.0	27.7	24.2	21.0	18.5	17.3	17.7	18.6	21.1	24.5
Mean min temp (°C)	13.5	15.3	15.9	14.3	11.8	9.1	8.0	7.1	7.6	8.4	9.6	12.1
Mean rainfall (mm)	17.0	11.7	7.2	19.7	35.9	97.0	136.2	140.5	120.2	79.1	33.1	21.9
Mean no. rain days >1 mm	2.0	1.6	1.1	2.4	5.3	9.2	13.2	14.9	13.9	11.6	5.7	3.4
Mean 9.00 am wind speed (km/hr)	17.3	18.2	18.0	16.7	13.8	12.1	12.5	12.7	12.8	16.1	16.8	18.4
Mean 3.00 pm wind speed (km/hr)	22.0	22.3	22.0	20.4	18.3	17.1	17.9	18.5	19.2	20.9	20.8	22.6

Note: red and blue cells are the highest and lowest (respectively) monthly average values for the parameter.

Southern Ports maintains an air quality and monitoring management plan for the existing operations. This plan includes air quality monitoring, which has been ongoing since 2006. PM_{10} dust levels, which are of most concern for human health has been monitored at four (4) sites (Figure 8-1). Table 8-4 provides the monitoring site names and type of dust monitored at each site.

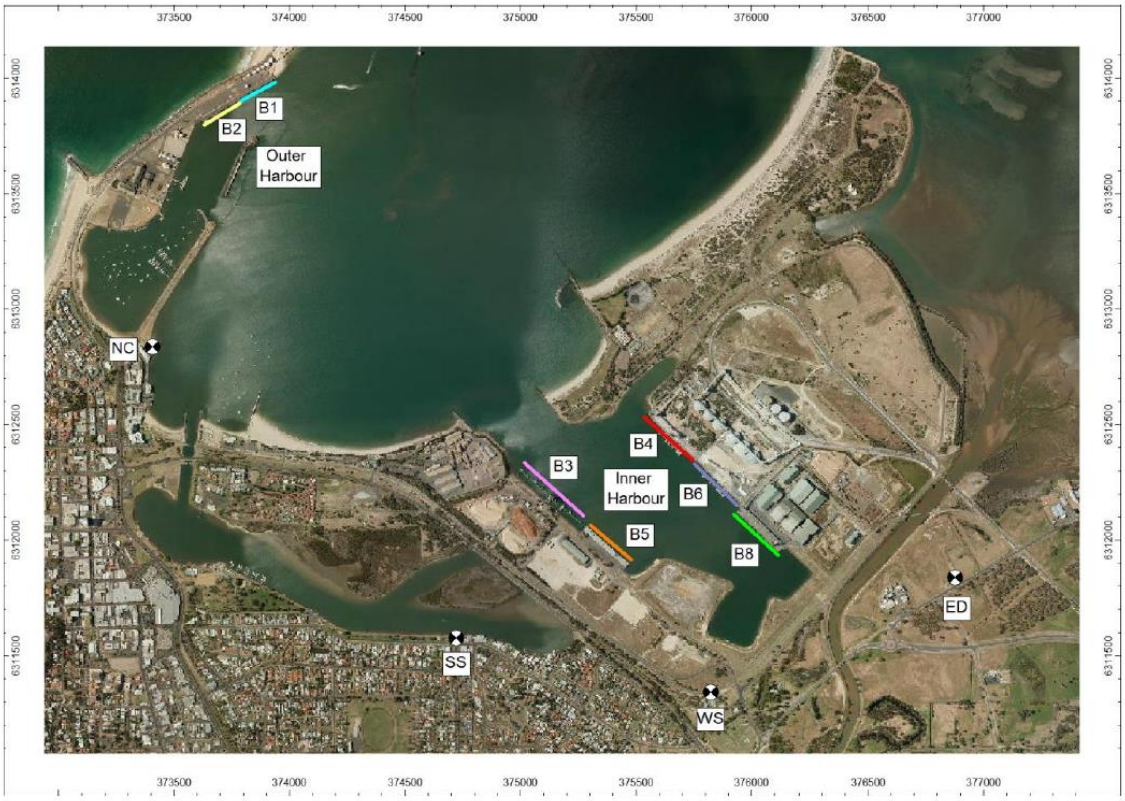

Figure 8-1 Southern Ports dust monitoring locations (GHD, 2014b)

Table 8-4 Southern Ports dust monitoring sites (GHD, 2014b)

Site name (ID)	Coordinates		Parameters monitored	Period of data provided for this assessment
	GDA mE	GDA mN		
Estuary Drive (ED)	376,876	6,311,839	PM_{10} (TEOM), wind speed and direction at 10 m	1 Jan 2012 – 31 Mar 2014
Stirling Street (SS)	374,722	6,311,577	PM_{10} (TEOM)	1 Jan 2012 – 31 Mar 2014
			TSP (TEOM)	1 Jan 2012 – 23 Jul 2018
Workshop (WS)	375,822	6,311,342	PM_{10} (TEOM)	1 Jan 2012 – 31 Mar 2014
Naval Cadets (NC)	373,408	6,312,838	PM_{10} (TEOM)	1 Jan 2012 – 31 Mar 2014

For the 821 monitoring days between 01 January 2012 and 31 March 2014, there were nine (9) days where one or more monitoring sites exceeded the 24-hour PM_{10} 50 µg/m^3 criteria. No exceedances of the 24-hour TSP 90 µg/m^3 criteria were observed during this same monitoring period. For the event analysis, time series of measured concentrations were compared with meteorological condition time series, graphs indicating whether the Inner Harbour was a potential dust source (determined by the presence of loading vessels) and whether Inner Harbour berths were upwind from the monitoring sites. The likely causes of exceedances as determined by event analysis are:

- Regional event (e.g. smoke from distant fires)
- Inner Harbour port activities (e.g. ship loading)
- Local dust source other than Inner Harbour berths (GHD, 2014b).

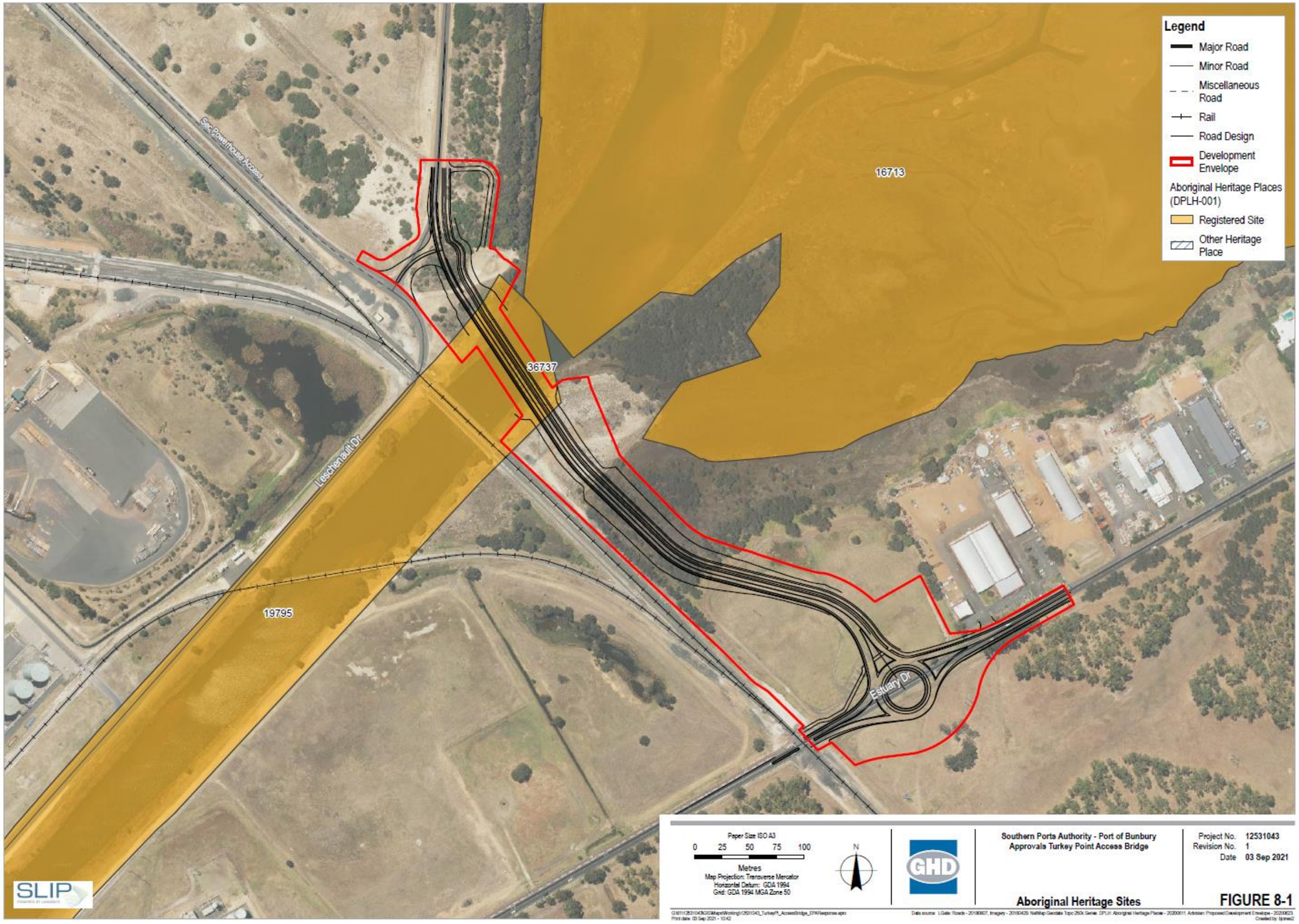

Figure 8-2 Aboriginal heritage sites

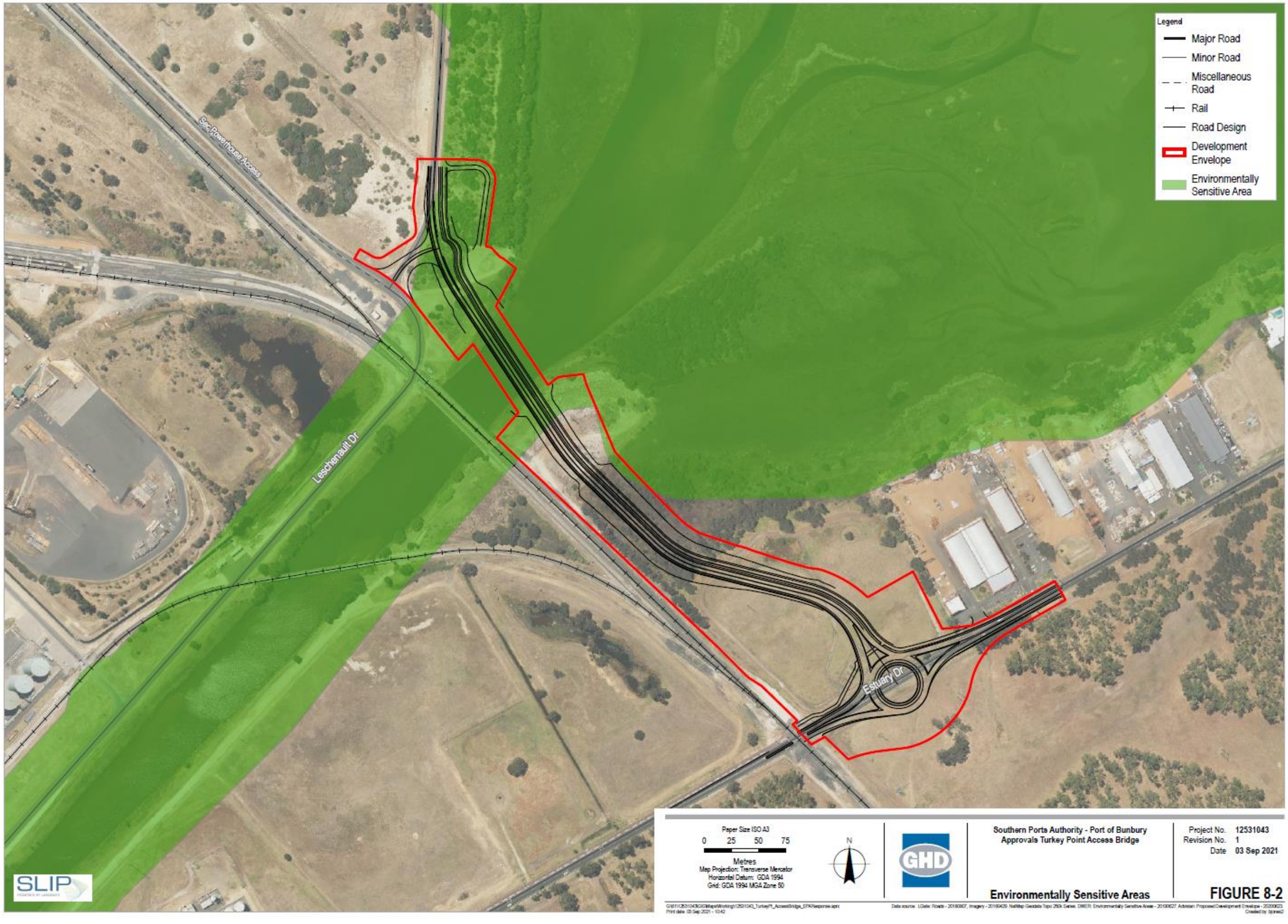

Figure 8-3 Environmentally sensitive areas

8.5 Potential impacts

The Proposal has the potential to result in impact to social surroundings during construction and operations through:

- Direct impacts to Aboriginal heritage sites during ground disturbance activities.
- Noise, light, vibrations and dust emissions affecting sensitive receptors during construction.
- Release of pollutants/particulates to air associated with clearing and earthworks during construction.

8.6 Assessment of impacts

8.6.1 Direct impacts

8.6.1.1 Direct impacts to Aboriginal heritage sites

The Proposal will involve ground disturbing activities, including clearing vegetation and earthworks (i.e. collection of topsoil and piling) which have the potential to disturb registered Aboriginal heritage sites located within the Proposal DE.

Southern Ports consulted with the local Aboriginal groups for the Strategic Inner Harbour Structure Plan and obtained a section 18 (s18) and notice of consent for the Project from DPLH under the Aboriginal Heritage Act 1972 (AH Act). However, after obtaining this approval the Preston River and its tributaries were subsequently listed as a registered Aboriginal heritage site under the AH Act. On this basis Southern Ports has consulted with DPLH to determine of the validity of the s18 and notice of consent originally granted. Southern Ports has received confirmation from DPLH the '*geotechnical works and bridge construction would fall within the land and purpose of the Ministerial consent issued to the Southern Ports Authority"*, and as such no additional approvals are required under the AH Act.

8.6.2 Indirect impacts

8.6.2.1 Noise, light, vibrations and dust emissions

Primary emission (i.e. noise and vibrations) sources associated with construction of the Proposal, will be temporary in nature and are likely to include:

- Operation of mobile plant
- Piling
- Vehicle movements.

Construction activities will be undertaken during normal construction hours (i.e. 7:00 am to 7:00 pm, Monday to Saturday).

Noise sources during the operational phase of the Proposal will be from traffic sources.

8.6.2.2 Release of pollutants/particulates to air

The Proposal has the potential to generate short-term dust during construction through:

- Vegetation clearing, earthworks and excavation
- Loading and dumping of product for pre-consolidation works
- Wind erosion from stockpiles and traffic movements on unsealed rods.

With the implementation of dust mitigation measures during construction, the Proposal is not expected to result in significant dust emissions that would impact the amenity of the surrounding environment or receptors.

8.6.3 Cumulative impacts

The Proposal is not anticipated to result in significant cumulate impact to social surroundings given:

- It is situated in an area that has extensive historical disturbance
- There are no DBCA managed lands within or adjacent to the Proposal DE
- There are no European heritage sites within or adjacent to the Proposal DE
- Southern Ports has undertaken extensive consultation over a number of years with the Traditional Owners/local Aboriginal heritage groups and has sought to confirm all the necessary approvals under the AH Act for the construction and operation of the Proposal
- Construction activities will be undertaken during normal construction hours (i.e. 7:00 am to 7:00 pm, Monday to Saturday).
- Maintaining community access to Point Mornington will be included in the design. Specifically, parking at Point Mornington, to support birdwatching areas has been included in the proposed design (Appendix A).

8.7 Mitigation

8.7.1 Avoid

Nosie and Vibration

- Construction will be preferentially undertaken during normal construction hours (i.e. 7:00 am to 7:00 pm, Monday to Saturday).

8.7.2 Minimise

Aboriginal heritage

- Heritage monitors will be engaged for initial ground disturbing construction works
- Aboriginal heritage monitoring will be undertaken in accordance with Aboriginal Due Diligence Guidelines (DPLH, 2013) and the Guidelines for the Engagement of Aboriginal Heritage Monitors (DPLH, 2015)
- Should any Aboriginal artefacts be discovered during construction, all works will cease within the immediate area, and an Aboriginal heritage consultant will be engaged to record and report the material to DPLH
- If skeletal material is uncovered during construction activities, works will cease in the immediate areas, and the discovery reported to the WA Police Force under the *Coroners Act 1996.* If the police determine the remains are likely of Aboriginal origin, then the discovery will be reported to the Registrar at the DPLH
- Southern Ports will adhere to all conditions outlined in the s18 approvals obtained under the AH Act for the Proposal.

Noise and vibrations

- If construction occurs outside of normal construction hours, the following measures will apply:
  - Construction work carried out in accordance with Section 6 of AS 2436-2010
  - Equipment used is the quietest reasonably available

  - All sensitive receptors will be notified of works at least 24 hours ahead of works commencing
  - Preparation and approval of a noise management plan (internal) at least 7 days prior to the works commencing
- Best available technology will be used to minimise noise and vibration emission from plant and equipment
- A complaints register relating to noise and vibrations will be maintained with measures undertaken to address/mitigation the noise and vibration emissions.

Air quality (dust)

- Access roads and other trafficked areas will be treated with water or dust suppressants, as required
- Application of water or dust suppressants where materials are handled or stockpiled
- Cease handling of materials during adverse wind conditions, or if complaints are received from sensitive receptors, until such time as an internal investigation and additional mitigation measures are identified
- Haul trucks to be covered to minimise loss of material along transport routes.

8.7.3 Rehabilitate

Where possible, progressive rehabilitation of disturbed areas will be undertaken, and active areas rehabilitated at the end of the construction period. For further information refer to Section 5.6.3.

8.7.4 Offset

No offsets are proposed for Social Surrounding.

8.8 Predicted Outcome

Dust and noise are expected to be generated during construction. This impact will be controlled using standard mitigation measures implemented under the Proposal CEMP. Appropriate measures will be implemented to ensure that short term construction related air quality impacts are effectively managed.

Potential impacts to Aboriginal heritage sites associated with the Proposal will be managed through consultation with all relevant groups and works will be undertaken in accordance with AH Act. Potential impacts to Aboriginal heritage will be managed through the AH Act.

Community access to the birdwatching area at Point Mornington will be maintained, via a new access road to the existing carpark at Point Mornington.

Management and mitigation actions will be implemented to control both the direct and indirect impacts of the Proposal on social surroundings values. Based on the above assessment, it is considered unlikely that the Proposal will have a significant impact on Social Surroundings values. The EPA objective for Social Surroundings will therefore be met for the Proposal.

9. Greenhouse Gas Emissions

9.1 EPA Objective

The EPA's objective for social surroundings is '*to reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change*' (EPA, 2021)

9.2 Policy and guidance

- Environmental Factor Guideline: Greenhouse Gas Emissions (EPA, 2021).

9.3 Baseline studies

The following reports have been utilised to develop an understanding of the receiving environment:

- Turkey Point Access Bridge Greenhouse Gas Assessment (GHD, 2021b) included in Appendix E.

9.4 Receiving environment

The Proposal occurs within the Bunbury Regional Airshed, which encompasses an area approximately 38,610 km^2 and includes 22 Shires including the City of Bunbury. Economic activities in the Bunbury Regional Airshed are diverse and include mining, agriculture, tourism, forestry and manufacturing. Motor vehicles dominate the emissions of carbon monoxide (CO), volatile organic carbon (VOC) and nitrous oxides (NOx) (SKM, 2003).

9.5 Potential impacts

For assessment purposes, GHG emissions are categorised according to 'Scopes' set out in the *Greenhouse Gas Protocol* (World Business Council, 2004). These can be summarised as follows:

- Scope 1 – Emissions released into the atmosphere as a direct result of an activity, or series of activities (including ancillary activities) that constitutes the facility.
- Scope 2 – Emissions released as a result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do no form part of the facility.
- Scope 3 – Emissions that occur outside the site boundary of a facility as a result of activities at a facility that are not Scope 2 emissions.

As per Issue 4 – Greenhouse Gases in the EPA (2021) Notice Requiring Information for Assessment, the Proposal has been assessed based on Scope 1 GHG emissions (annual and total) over the life of the Proposal.

Further to thus requirement the GHG assessment considered Scope 1, 2 and 3 emissions across the construction, maintenance and operational phases of the Proposal. The GHG emissions assessment includes a breakdown of emissions by source (Appendix E).

9.5.1 Construction

Construction GHG emissions are calculated under Scope 1 emissions. Key construction phase activities associated with potential GHG emissions are:

- Vegetation clearing

- Demolition and earthworks
- Construction
- Site offices/general areas.

GHG emissions associated with construction activities are expected to occur for approximately 2 – 3 years while construction work is ongoing.

9.5.2 Operation including maintenance

Operational GHG emissions are calculated under Scope 3 emissions. Potential emissions associated with operation of the Proposal primarily derive from vehicle emissions (both light and heavy vehicles), ongoing street lighting, traffic signals and road maintenance activities (including the use of mobile construction equipment and materials used for maintenance activities). Calculation of operational emissions includes the calculation of fuel consumption on each road link and the conversion of fuel consumption to emissions (tCO_2-e).

Indirect operational emission sources also include those associated with operation of Southern Ports Authority buildings, depots and light vehicle fleet (emission from power generation and vehicles).

No Scope 2 indirect emissions are expected to result from the Proposal.

9.6 Assessment of impacts

9.6.1 Direct impacts

9.6.1.1 Vegetation clearing

Vegetation removal refers to the fuel combustion by the plant and equipment used for removal, and the lost carbon sink from vegetation removed. The Carbon Gauge Tool does not differentiate between vegetation condition, nor the difference between native and non-native vegetation, and revegetation. Substantial improvements to the Proposal design have been made subsequent to referral of the Proposal in July 2020 to reduce impacts to vegetation, resulting in a reduction in the area required to be cleared by 4.82 ha (approx. 43%). This will proportionately reduce GHG emissions generated from clearing operations.

9.6.1.2 Demolition and earthworks

Demolition and earthworks accounts for fuel combustion for demolition and earthworks plant and equipment, based on the cut to fill, cut to spoil, and the import and placement of fill materials.

9.6.1.3 Construction

Construction accounts for the production of construction materials, fuel combustion from construction and the transportation of manufactured materials to site.

9.6.1.4 Site offices / general areas

Site office and general areas refers to the fuel combustion associated with electricity generation and use of site vehicles, based on Carbon Gauge tool assumptions (TAGG, 2013).

9.6.2 Indirect impacts

9.6.2.1 Operation including maintenance

Operational emissions associated with the Proposal may include street lighting and pavement maintenance. Opportunities to reduce on-going energy that will be implemented for the Proposal include but are not limited to the following, where practicable:

- Use of energy efficient electrical assets such as LED streetlights
- The Preliminary Design includes alternative design treatments to traffic signals such as roundabouts or modified intersections to assist with reducing congestion
- Use of renewable energy sources
- Use of materials with lower embodied energy
- Maintenance of vehicles in accordance with manufacturer's specifications to minimise exhaust emissions
- Low emissions producing equipment will be selected (if possible).

9.6.3 Cumulative impacts

Estimated emissions were calculated using the Carbon Gauge tool, with input data from the Port and TAGG default quantity factors (TAGG, 2013). The assessment considered Scope 1, 2 and 3 emissions across the construction, maintenance and operational phases of the Proposal and a summary is presented in Table 9-1.

Table 9-1 Summary of estimated GHG emissions

Emission Source	Scope 1 (t CO_2-e)	Scope 2 (t CO_2-e)	Scope 3 (t CO_2-e)	Total Emissions (t CO_2-e)
Construction				
Site Offices / General Areas	270		21	290
Demolition and Earthworks	605		39	644
Construction – Pavements	186		2,252	2,438
Construction – Structures	113		1,557	1,670
Construction - Drainage	38		123	162
Construction – Road Furniture			1	1
Construction Total	**1,212**		**3,992**	**5,204**
Operation				
Lighting		793	97	890
Operational total		**793**	**97**	**890**
Maintenance (by pavement type)				
Full Depth Asphalt	415		533	948
Deep Strength Asphalt	99		127	226
Maintenance total	**514**		**660**	**1,174**
Project Total	**1,726**	**793**	**4,749**	**7,268**

9.7 Mitigation

Based on the above assessment, implementation of the Proposal will not result in a significant increase in operational emissions, therefore, mitigation measures are not proposed. Southern Ports business as usual carbon reduction measures, described above in Section 9.6, will be implemented for the Proposal as appropriate.

9.8 Predicted outcome

Greenhouse gas emissions were estimated for the construction and ongoing operation of the Turkey Point Access Bridge. Based on available data, the total GHG emissions (Scope 1, 2 and 3) for the Proposal are estimated as approximately 7,268 t CO_2-e. When compared to Western Australia's total GHG emissions of 91,852 Mt CO_2-e, the emissions from the Proposal are negligible.

The combined construction and annual maintenance Scope 1 emissions for the Proposal are 1,726 t CO_2-e, below the threshold of the Factor Guideline at approximately 2% of the 100,000 t CO_2-e (Scope 1) limit.

In response to the preliminary stage of design, a 50% up lift to the construction footprint would still put the resultant Scope 1 emissions at 2,938 t CO_2-e, several orders of magnitude below the threshold.

Scope 1 Emissions estimates are negligible compared to the annual emissions from Western Australia and do not trigger the threshold of 100,000 t CO_2-e for the EPA Factor Guideline: GHG Emissions for further assessment (EPA, 2021).

The results of the GHG assessment for construction and operation of the Proposal indicate that the constructed Proposal is unlikely to produce significant GHG emissions. The EPA's objective for the factor GHG is to reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change. Given the above assessment, no residual impacts are expected for this aspect and the Proposal meets the EPA objective for GHG.

10. Other environmental factors

Due to the low level of potential impact, application of standard construction controls and other regulatory mechanisms, the following Environmental Factors are not expected to require a detailed assessment:

- Coastal processes
- Marine environmental quality
- Terrestrial environmental quality.

Table 10-1 summaries the potential impacts, mitigations and outcomes for each of the Other environmental factors.

Table 10-1 Other Environmental Factors

Element	Description
Coastal processes	
EPA objective	To maintain the geophysical processes that shape coastal morphology so that the environmental values of the coast are protected.
Policy and guidance	• Environmental Factor Guideline – Coastal Processes (EPA, 2016a) • WA Coastal Zone Strategy (DPLH, 2017) • State Planning Policy No. 2.6: State Coastal Planning Policy (WAPC, 2013) • State Coastal Planning Policy Guidelines (WAPC, 2020) • Coastal Hazard Risk Management and Adaptation Planning Guidelines (WAPC, 2019a) • Sea Level Change in Western Australia – Application of Coastal Planning (DOT, 2010).
Potential impacts	• Temporary increased scour and/or deposition of fine sediments during construction while the temporary groyne is in place. • Permanent alteration of sediment mobilisation and deposition due to in channel structures.
Mitigation	Avoid:
	• The Proposal has been designed to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal.
	Minimise:
	• In the event of extreme weather conditions (e.g. storm events) construction work will cease and the need for additional erosion and sediment control will be assessed and implemented where required. • The contractor will visually monitor turbidity during all waterway crossing activities. • A daily log or journal which references the weather conditions, date, time, location, photos as well as the turbidity test results will take place throughout the duration of the contract. • If required, a silt curtain will be installed to manage the turbidity of the water crossings should turbidity become an issue. • The bridge structure has been designed to minimise scouring through maintaining expected drainage flow and includes minor rock protection on the banks of the bridge. Geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge, if necessary.

Element	Description
	• Equipment will not be placed on the banks of the creeks or drainage crossings when not in use. • If necessary, geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge. Equipment will not be placed on the banks of the creeks or drainage crossings when not in use. • Piling works will require a 500 – 1,000 mm bund to be placed around the pile cap in order to contain the mud residue. This residue will then be taken out of the riverbed and left to dry then used with other cut/fill material if suitable or disposed of off site if unsuitable. Generally, a windrow will be constructed at the perimeter of the temporary causeway to ensure no spillage of concrete or construction water contaminates the river. • The bridge structure has been designed to minimise scouring through maintaining expected drainage flow and includes minor rock protection on the banks of the bridge. Geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge, if necessary.
	Rehabilitate: • Where possible, progressive rehabilitation of disturbed areas will be undertaken, and active areas will be rehabilitated at the end of the construction period. • Growth medium will be applied to rehabilitation areas to improve the likelihood of suitable vegetation establishment. Growth medium may comprise topsoil, if available. Ongoing weed management will be undertaken in rehabilitation areas during the first three growing seasons to minimise weeds and promote native vegetation growth. If required, weed spraying will be undertaken in late winter or early spring.
	Offset: • No offsets proposed.
Outcomes	Residual impact: • The Proposal is located approximately 1.5 km east of the marine environment and potential impacts are not predicted to extend beyond the Proposal DE. Application of standard construction controls and other regulatory mechanisms are considered to adequate to minimise and control any identified potential impacts. It is not anticipated the construction and operation of the Proposal will result in any adverse impacts to coastal processes.
Marine environmental quality	
EPA objective	To maintain the quality of water, sediment and biota so that environmental values are protected.
Policy and guidance	• Environmental Factor Guideline – Marine Environmental Quality (EPA, 2016c) • Technical Guidance – Protecting the quality of Western Australia's Marine Environment (EPA, 2016k) • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).
Potential impacts	• Accidental release of environmentally hazardous materials during storage and handling, resulting in contamination of soil and/or groundwater and subsequent impacts to water quality. • Excavation of contaminated / acid sulphate soils during preliminary earthworks mobilising contaminants to soil and/or groundwater, resulting in impacts to water quality. • Inappropriate disposal of solid and liquid wastes, resulting in contamination of land and/or groundwater and subsequent impacts to water quality.

Element	Description
Mitigation	Avoid:
	• The Proposal footprint has been minimised as far as practicable through engineering design and location selection.
	Minimise
	• In the event of extreme weather conditions (e.g. storm events) construction work will cease and the need for additional erosion and sediment control will be assessed and implemented where required. • The contractor will visually monitor turbidity during all waterway crossing activities. • A daily log or journal which references the weather conditions, date, time, location, photos as well as the turbidity test results will take place throughout the duration of the contract. • If required, a silt curtain will be installed to manage the turbidity of the water crossings should turbidity become an issue. • The bridge structure has been designed to minimise scouring through maintaining expected drainage flow and includes minor rock protection on the banks of the bridge. Geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge, if necessary. • Equipment will not be placed on the banks of the creeks or drainage crossings when not in use. • If necessary, geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge. Equipment will not be placed on the banks of the creeks or drainage crossings when not in use. • Piling works will require a 500 – 1,000 mm bund to be placed around the pile cap in order to contain the mud residue. This residue will then be taken out of the river bed and left to dry then used with other cut/fill material if suitable or disposed of off-site if unsuitable. Generally, a windrow will be constructed at the perimeter of the temporary causeway to ensure no spillage of concrete or construction water contaminates the river. • The bridge structure has been designed to minimise scouring through maintaining expected drainage flow and includes minor rock protection on the banks of the bridge. Geotechnical fabrics will be used on disturbed banks to prevent erosion during construction of the bridge, if necessary.
	Rehabilitate
	• Where possible, progressive rehabilitation of disturbed areas will be undertaken, and active areas will be rehabilitated at the end of the construction period. • Growth medium will be applied to rehabilitation areas to improve the likelihood of suitable vegetation establishment. Growth medium may comprise topsoil, if available. Ongoing weed management will be undertaken in rehabilitation areas during the first three growing seasons to minimise weeds and promote native vegetation growth. If required, weed spraying will be undertaken in late winter or early spring.
	Offset:
	• No offsets proposed
Outcomes	Residual impact:

Element	Description
	• The Proposal is located approximately 1.5 km east of the marine environment and potential impacts are not predicted to extend beyond the Proposal DE. Application of standard construction controls and other regulatory mechanisms are considered to adequate to minimise and control any identified potential impacts. The Proposal is unlikely to result in significant impacts to coastal processes from the construction and operation of the Proposal.
Terrestrial environmental quality	
EPA objective	• To maintain the quality of land and soils so that environmental values are protected. • Terrestrial Environmental Quality for the purpose of this EPA referral and relevant reporting section is the chemical, physical, biological and aesthetic characteristics of soil.
Policy and guidance	• EPA, Environmental Factor Guideline, Terrestrial Environmental Quality (EPA, 2016e) • Assessment and management of contaminated sites (DER, 2014) • *Environmental Protection Act 1986* • Environmental Protection (Controlled Waste) Regulations 2004 • Environmental Protection (Unauthorised Discharges) Regulations 2004 • Environmental Protection Regulations 1987 • *Contaminated Sites Act 2003* • Contaminated Sites Regulations 2006 • *Waste Avoidance and Recovery Act 2007* (WARR Act) • *Waste Avoidance and Resource Recovery Levy Act 2007* (WARR Levy Act) • Waste Avoidance and Resource Recovery Levy Regulations 2008 (WARR Levy Regulations) • *Soil and Land Conservation Act 1945* • Department of Environmental Regulation, Identification and investigation of acid sulphate soils and acidic landscapes (DER, 2015a) • Department of Environmental Regulation, Treatment and management of soil and water in the acid sulphate soil landscapes (DER, 2015b) • *Dangerous Goods Safety Act 2004* • Dangerous Goods Safety (General) Regulations 2007 • Dangerous Good Safety (Major Hazard Facilities) Regulations 2001 • Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007.
Potential impacts	• Soil erosion from vegetation clearing, and earthworks. • Disturbance of ASS during earthworks resulting acidification of soils and potential leaching of metals to surface and/or groundwater. Acid sulphate soil (ASS) risk mapping over the Proposal DE indicating the Proposal is within an area that has a High to Moderate risk. • Disturbance of contaminated soils resulting in leaching of metals to surface and/or groundwater. Review of the DWER Contaminated Sites Database (DWER, 2020), indicates there are two (2) registered contaminated sites within the Proposal DE. The Summary of Records from each of the sites obtained from the DWER Contaminated Sites Database are provided in Appendix C. • Contamination of ground and/or surface water due to release/spillage of environmentally hazardous materials.

Element	Description
	• Waste (solid and/or liquid) discharge resulting in contamination of soils, surface and groundwater.
Mitigation	Avoid:
	• Establishment of exclusion zones and access controls to prevent authorised disturbance. • All wastes to be disposed off-site at appropriately licensed facilities. • Soils affected by ASS or contamination will be collected separately and disposed of off-site at an appropriately licensed facility. • Hydrocarbons to be stored in accordance with *AS 1940:2017 The Storage and Handling of Flammable and Combustible Liquids* (Standards Australia, 2017). • Water Quality Protection Notice 56 Tanks for fuel and chemical storage near sensitivity water resources (DWER, 2018).
	Minimise:
	• Where possible, clearing will be undertaken in stages and limited to the extent required for construction of the Proposal. • Topsoil collection and stockpiling will be undertaken immediately following vegetation clearing to prevent loss of topsoil from wind/water erosion. • Where practicable, topsoil will be used for progressive rehabilitation, in preference to stockpiling. • Soil stockpiles maintained at a height not exceeding 2 m. • Provision of erosion protection (i.e. rock armouring), where required, to prevent soil erosion by stormwater. • Emergency management procedures and equipment for the recovery of contaminated soils in the event of accidental release.
	Rehabilitate:
	• Progressive rehabilitation, where practicable, thereby minimising soil erosion.
	Offset:
	• No offsets proposed
Outcomes	Residual impact:
	• The Proposal has the potential to affect soil or land quality. However, it is expected that potential impacts can be mitigated through appropriate management and mitigation measures (as outlined above) and it is anticipated the construction and operation of the Proposal will not result in significant or lasting impacts to soil and land quality within the and adjacent to the Proposal DE.

11. Matters of National Environmental Significance

Referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is triggered if a proposed action has or potentially has a significant impact on any matters of national environmental significance (MNES). MNES are factors that require legislated protection in order to conserve biodiversity, protect World Heritage and National Heritage Places, and comply with international treaties.

A Protected Matters Search Tool (PMST) was undertaken for the Proposal, including a 2 km buffer ((DAWE, 2020)). The PMST identified:

- Three (3) Threatened Ecological Communities (TECs)
- 51 listed threaten species
- 42 listed migratory species
- 65 listed marine species
- 13 whales and other cetaceans
- One (1) state and territory reserve
- 28 invasive species.

An assessment was undertaken to determine whether MNES are likely or maybe present within the Proposal DE Table 11-1.

The assessment excluded marine mammals, sharks and reptile species, as these species are considered unlikely to occur within or immediately adjacent to the Proposal DE and therefore it is considered unlikely the Proposal will result in any potential impacts to the species. Marine birds have been included as they may potentially utilise the terrestrial riverine habitats within the Proposal DE.

A copy of the Protected Matters Search Tool used for the assessment against MNES is provided in Appendix F.

The Proposal is considered unlikely to have an impact on MNES, and consequently, in consultation with DAWE, has not been referred under the EPBC Act. Potential impacts to listed threatened species and communities will be managed and mitigated through appropriate actions during detailed design, construction and operation of the Proposal.

Table 11-1 Assessment against MNES

Matter of National Environmental Significance	Presence / potential presence within Proposal DE
World heritage properties	None present.
National heritage places	None present.
Wetlands of international importance	None present.

Matter of National Environmental Significance	Presence / potential presence within Proposal DE
Nationally threatened species and ecological communities	**Threatened Ecological Communities**: The *Southern Ports Bunbury – Ecological Investigations* (GHD, 2018a) study completed for the Southern Ports Bunbury Inner Harbour Structure Plan, which included the Proposal DE, only identified one TEC being present in the Proposal DE (i.e. Subtropical and Temperate Coastal Saltmarsh). As detailed in Section 5, 0.67 ha of this TEC, mapped in Excellent condition, will be cleared for development of the Proposal. **Nationally threatened species:** No species of flora listed as a MNES under the EPBC Act or as Threatened under the BC Act, were recorded by GHD (2015a; 2018a; 2018b) within the surveyed area. The Proposal will result in the clearing of up to 0.67 ha of low-quality Black Cockatoo foraging habitat. The Proposal will not result in the clearing of any potential breeding or roosting trees. In consideration of the extent and quality of Black Cockatoo foraging habitat proposed to be cleared, the impact of the Proposal on Black Cockatoos is unlikely to be significant at a local or regional scale.
Migratory species	The Preston River Delta is one of a number of significant migratory water bird sites in the southern part of Leschenault Estuary that support foraging habitat for migratory species. Migratory shorebirds and waterbirds are wide ranging and highly mobile, as such it is considered unlikely the development of the Proposal will adversely affect the availability of suitable habitat in the local and surrounding areas.
Commonwealth marine areas	Not applicable
Great Barrier Reef Marine Park	
Nuclear actions (including uranium mining)	
A water resource, in relation to coal seam gas development and large coal mining development	

12. Consistency with Greater Bunbury Region Scheme Ministerial Statement 697

Issue 3 of the EPA Notice Requiring Information for Assessment (EPA, 2021) required Southern Ports to demonstrate how the proposal has had regard to and is not inconsistent with the requirements and intent of the relevant conditions outlined in Ministerial Statement 697

Under the GBRS Ministerial Statement 697 (MS 697) (WAPC, 2005) the Minister for the Environment conditioned the following with regard to the Port Installation Reserve:

- 5-3 Foreshore adjoining Port Installation Reserve
    - Land shall be reserved for conservation purposes to protect the integrity, function and environmental value of the foreshore adjacent to the Port Installations Reserve to the requirements of the Western Australian Planning Commission on advice of the Environmental Protection Authority and shall only be used for conservation and complementary purposes.

The Proposal DE intercepts areas of Regional Open Space (POS) which comprises part of the Port Installation Reserve. It is considered that inclusion of parts of the ROS with the Proposal DE is consistent with Condition 5-3 of MS 697 and the environmental integrity and function of the foreshore adjoining Port Installation Reserve is maintained as a result of the following:

- Realignment of the Proposal DE to minimise clearing of native vegetation and soil disturbance areas adjacent to the foreshore
- Avoidance of fragmentation of Subtropical and Temperate Coastal Saltmarsh TEC/PEC to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal
- Temporary impacts on groundwater and surface water during construction will be managed via implementation of a Proposal specific CEMP
- Offset the clearing of 0.67 ha of Subtropical Temperate Coastal Saltmarsh TEC/PEC.

13. Offsets

Environmental offsets are conservation actions that provide environmental benefits intended to counterbalance the significant residual environmental impacts associated with a proposal (GoWA, 2014). Southern Ports intend to counterbalance the residual impact of the Proposal through implementation of an environmental offset strategy. The strategy will be prepared in accordance with the WA Government's Environmental Offset Policy (GoWA, 2011), WA Offset Guideline (GoWA, 2014) and the Australian Government's EPBC Act Environmental Offset Policy (DSEWPAC, 2012a).

The section provides information on the draft offset strategy for the Proposal. Offset requirements have been determined through assessment of the direct residual impacts of the Proposal based on the revised design, field survey and site assessment. Offsets are proposed for unavoidable residual impacts to the saltmarsh community. This saltmarsh community aligns with the Federally listed EPBC Act Vulnerable TEC and a State PEC (Priority 3).

Further assessment of offsets will be undertaken, and an offset implementation plan developed as part of the final strategy. This will include details for targets for each offset, the management actions (including their timing), responsible parties, monitoring and corrective actions.

The Commonwealth Offsets Assessment Guide has been used to define the quantum of impact for the saltmarsh community and extent of offset provided by each offset area. Summary tables are provided herein that detail the key inputs and outcomes of the assessment against Commonwealth Offsets Assessment Guide.

13.1 Impact avoidance

The WA Environmental Offsets Policy (2011) notes that environmental offsets will only be considered after avoidance and mitigation options have been pursued. Southern Ports operates on a hierarchy of avoid, minimise, reduce, rehabilitate and offset environmental impacts. This hierarchy has been applied through changes in scope and design, development of strategies and finally, an offset proposal. Since the referral of the Proposal in July 2020, Southern Ports has reviewed the design and amended the Proposal Area to reduce the potential impacts on key environmental feature, namely:

- Subtropical and Temperate Coastal Saltmarsh TEC/PEC

Table 13-1 provides a summary of the design improvements to the Proposal.

Table 13-1 Proposed changes to impacts

Aspect	Submitted Proposal (s38)	Proposal update 4 December 2020	Change to Proposal (s43A)
Proposal Area (Development Envelope)	11.34 ha	10.38 ha	6.52 ha
Subtropical and Temperate Coastal Saltmarsh TEC (Commonwealth)/ Priority 3 (DBCA)	1.36 ha	1.374 ha	0.67 ha
Black Cockatoo species foraging habitat (VT04)	1.22 ha	1.216 ha	0.67 ha

13.2 Offset suitability policy framework

13.2.1 EPBC Act Environmental Offsets Policy (DSEWPAC, 2012a)

The EPBC Environmental Offsets Policy (DSEWPAC, 2012a) requires the following Principles are met by an offset:

- Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter
- Suitable offsets must be built around direct offsets but may include other compensatory measures
- Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter
- Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter
- Suitable offsets must effectively account for and manage the risks of the offset not succeeding
- Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs
- Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable
- Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

13.2.2 WA Environmental Offset Policy (GoWA, 2011)

The WA Environmental Offsets Policy (GoWA, 2011) requires the following Principles are considered when developing an offset proposal:

- Environmental offsets will only be considered after avoidance and mitigation options have been pursued
- Environmental offsets are not appropriate for all projects
- Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted
- Environmental offsets will be based on sound environmental information and knowledge
- Environmental offsets will be applied within a framework of adaptive management
- Environmental offsets will be focussed on longer term strategic outcomes.

13.3 Residual impact calculation

Residual impacts associated with the Proposal have been determined through application of the residual impact significance model detailed in the WA Environmental Offsets Guidelines (GoWA, 2014). Due to residual impacts being related to threatened species or communities the EPBC Act Environmental Offsets Policy and Offset Assessment Guide calculator has been applied (DSEWPAC, 2012a). Residual impacts for which Southern Ports proposes environmental offsets are:

- Subtropical and Temperate Coastal Saltmarsh TEC (Commonwealth)/ Priority 3 (DBCA): 0.67 ha in Excellent quality.

Although there is a residual loss of fauna habitat (including low quality foraging habitat for Black Cockatoos) associated with the Proposal, the residual impact to fauna is not considered significant given the small extent of habitat, presence of similar habitat adjacent and its condition. As such, specific fauna habitat offsets are not proposed, however the offsets for the saltmarsh community will also provide like for like fauna habitat offsets.

13.4 Proposed offsets

Southern Ports has investigated a number of options in developing a package of offsets to counterbalance these residual impacts. The proposed offset locations are shown in Figure 13- and the proposed offset areas described below.

13.4.1 Proposed offset area 1

This is located immediately north of the revised DE and extends across two separate properties (Area 1A and Area 1B).

Community type: Saltmarsh TEC/PEC **Amount**: 1.23 ha

The existing saltmarsh community is in Very Good- Excellent condition and forms part of a larger area of saltmarsh (Plate 13-1).

Proposed Offset measures

The Port would undertake yearly inspection of the saltmarsh and weed management (as needed) along the southern border.

The existing saltmarsh community would be protected by a conservation covenant within 12 months of the Proposal being approved.

Plate 13-1 Proposed offset area 1

13.4.2 Proposed offset area 2

The proposed offset is located to the north-east of the revised DE and is located within Lot 61 Estuary Drive, which is a freehold lot owned by the Port.

The proposed offset area is divided into three parts, based on the current condition of the vegetation communities.

- Area 2A: Community type: Saltmarsh TEC Amount: 0.35 ha
    - Very Good condition saltmarsh TEC (Plate 13-2 and 13-3).
- Area 2B: Community type: Potential saltmarsh TEC but condition score currently does not meet TEC Amount: 0.34 ha
    - Degraded condition with grass invaded on edges.

- Area 2C: Community type: Potential saltmarsh TEC but condition score currently does not meet TEC Amount: 2.63 ha
    - This area is likely to have historically been a saline community. Saline species such as Juncus kraussii, Sporobolus virginicus, Salicornia/Tecticornia species were present but limited coverage due to grazing. Soil is a saline influenced clay pan (Plate 13-4 and 13-5).

Current threats

The areas of saltmarsh / potential saltmarsh within Lot 61 have a modified tidal regime due to existing culverts that have a one-way gate and a weir that impede tidal movement. Additionally, the property is used for grazing, and edge effects and weed invasion was evident.

Proposed Offset measures

Vittoria Bay – improved connection: further work is currently being undertaken to model the level of inundation, assuming the one-way gate and weir are removed. This modelling will further refine the extent of potential saltmarsh TEC. It is important to note that the Ports intention is to only look at modifying the existing hydraulic controls (one-way gate / weir) and not undertake any further drainage works. Any changes to the existing hydraulic controls will also need to take into account indirect impacts of increased tidal flooding risk to existing infrastructure / properties.

A cursory review of the water levels during a period that included high tide events as well as non-astronomical influences such as river floods and low pressure fronts indicates that the water level will exceed the 0.61 m AHD elevation at the site. It is reasonable to assume that given the water levels and elevation that the tide would inundate the areas nominated for the proposed offset if the hydraulic control measures (one-way gate and weir) are removed.

Rehabilitation and weed control: the Port will fence the proposed offset area to prevent stock access, the site will undergo weed management and if necessary, rehabilitation.

Rehabilitation is likely to be successful, areas of *Casuarina* revegetation and natural regeneration are common around the Bunbury Port. The Preston River delta is itself a regenerated community, established following the realignment of the Preston River following construction of the Port Inner Harbour.

Southern Ports has experience and success in rehabilitating temporary construction areas and wetlands in close proximity to the Proposal.

The potential saltmarsh community would be protected by a conservation covenant within 12 months of the Proposal being approved.

Plate 13-2 Area 2A and 2B

Plate 13-3 Area 2A and 2B

Plate 13-4 Area 2C

Plate 13-5 Area 2C

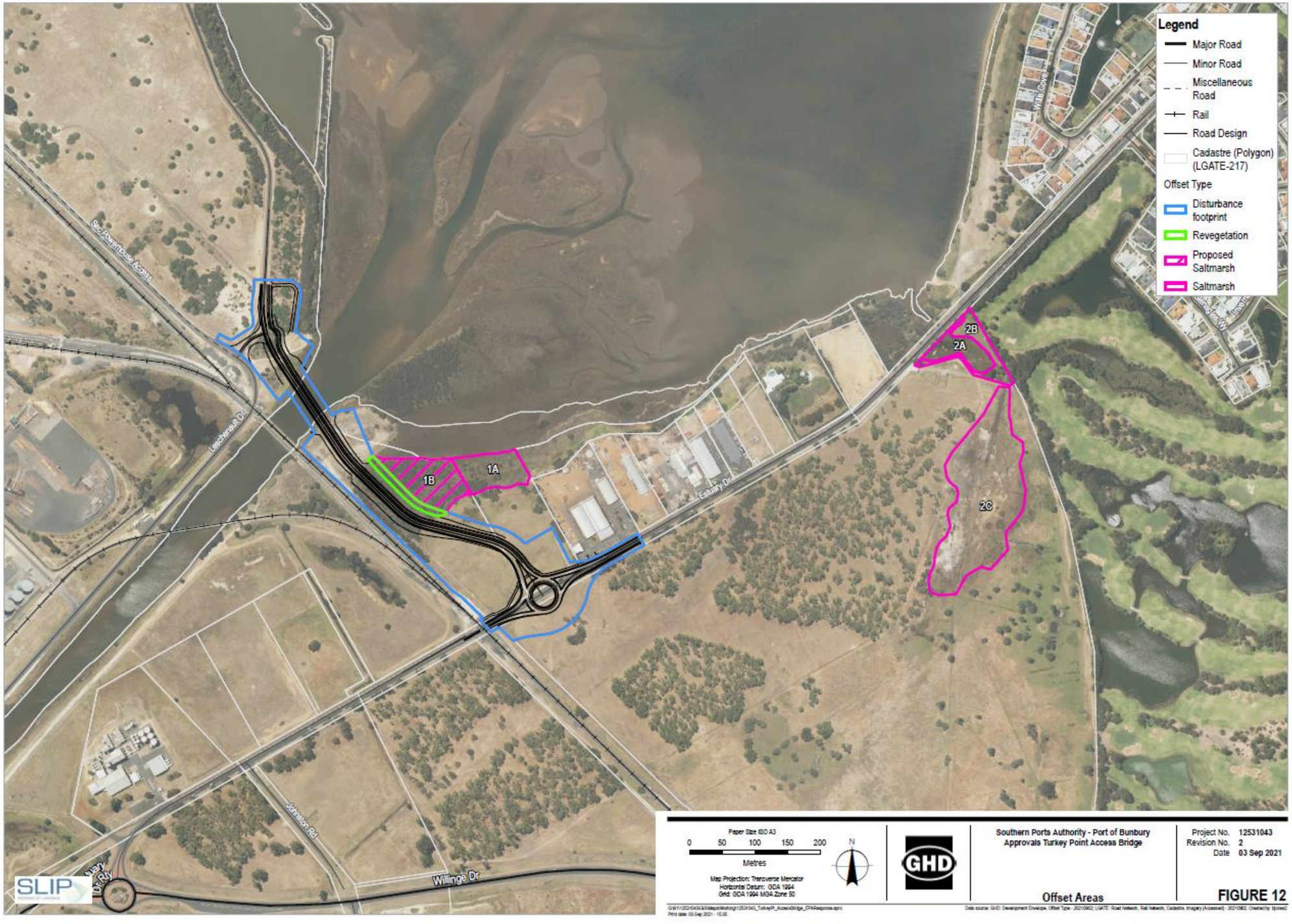

Figure 13-1 Offset areas

13.5 Justification of offsets

The principles of the WA Environmental Offsets Policy 2011, completion of the WA Offsets Template, as described in the WA Environmental Offsets Guidelines 2014 have been applied to the proposed offsets to justify the offset counterbalances the residual impact to the saltmarsh community.

13.5.1 Consistency of the Proposal with the principles of the WA Environmental Offset Policy

Table 13-2 demonstrates how the Proposal is consistent with the six principles identified in the WA Environmental Offset Policy (GoWA 2011).

Table 13-2 Assessment of offsets against the principles of the WA Environmental Offsets Policy (2011)

Principle	Assessment
Environmental offsets will only be considered after avoidance and mitigation options have been pursued	The potential impacts from the Proposal have been significantly reduced as a result of the efforts applied during design phase. This reduction has been largely achieved through the additional avoidance and mitigation measures that have been developed for the Proposal.
Environmental offsets are not appropriate for all projects	The hierarchy of avoid, minimise, reduce, rehabilitate and offset environmental impacts has been applied to this Proposal. This hierarchy is achieved primarily through changes in scope and design, implementation of mitigation measures and a CEMP and finally, an offset proposal. Southern Ports has proposed offsets to counterbalance the significant residual impacts the saltmarsh community (TEC and PEC).
Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted	Southern Ports has identified two areas as part of the offsets to counterbalance residual impacts that are relevant and appropriate for the locality and quantum of impact. The offsets are within Port managed land and will be managed by the Port for conservation and the portion of the properties that contains / potentially contains saltmarsh community will be placed under a conservation covenant.
Environmental offsets will be based on sound environmental information and knowledge	The presence, extent and condition of saltmarsh community at each offset site has assessed by a senior ecologist. Rehabilitation within Lot 61 is likely to be successful, areas of Casuarina revegetation and natural regeneration are common around the Bunbury Port. The Preston River delta is itself a regenerated community, established following the realignment of the Preston River following construction of the Port
Environmental offsets will be applied within a framework of adaptive management	The final offset strategy will establish targets for each offset area and include an implementation plan, monitoring and corrective actions.

Principle	Assessment
Environmental offsets will be focussed on longer term strategic outcomes.	All offset sites will be managed by Southern Ports through a conservation covenant over a portion of the Lot (s).

13.5.2 Application of the WA Environmental Offsets Guidelines to proposed offsets

Table 13-3 provides a summary as to how the key concepts and requirements of the WA Environmental Offsets Guidelines (GoWA, 2014) have been considered in the development of this Draft Offset Strategy, such that the offsets are relevant and proportionate to the significance of the environmental values impacted.

Table 13-3 Evaluation of offset sites against WA Environmental Offset Guidelines

Concept	Application
Type	On-ground management and revegetation.
In proximity to the area of impact	Area 1 is adjacent to the area of impact, and Area 2 is within 1 km the area of impact
Similar or better vegetation condition than the area impacted	Area 1 (1.23 ha) contains saltmarsh vegetation in similar condition to the 0.67 ha impacted within the DE. Area 2 is a proposed revegetation site, the vegetation in this area ranges from Good to Completely Degraded. The intention is to reconnect the tidal influence and undertake revegetation and weed management to reinstate a saltmarsh community over time.
Similar habitat structure to undisturbed examples of impacted vegetation type	Area 1 (1.23 ha) contains saltmarsh habitat that is similar in structure to the 0.67 ha impacted within the DE. Area 2 is a proposed revegetation site, habitat values will be reinstated over time.
Has a better area to perimeter ratio that the area impacted	The 0.67 ha of saltmarsh community within the DE has cleared / parkland areas on the eastern and western edges, with planted vegetation to the south. Proposed offset Area 1 will have revegetation from this Proposal on its eastern border (intended to be revegetated to saltmarsh community) and parkland on the southern boundary. It is considered to have a similar (slightly better) edge effect (perimeter) ratio to the saltmarsh extent within the DE. Area 2 is surrounded by grazing land.

Concept		Application
Contains additional rare or otherwise significant species and threatened species or community compared with the impact site		Offset area 1 is part of the same saltmarsh community to be cleared within the DE. Offset area 2 – will be revegetated to establish saltmarsh community.
Close to or contiguous with an existing conservation area (e.g. Bush Forever)		The offset areas are close to the Leschenault Estuary's Regional Open Space (ROS), as designated in the Greater Bunbury Regional Scheme (GBRS).
Likely to enhance biological corridors or ecological linkages between conservation areas		Offset area 1 forms part of the fringing vegetation surrounding Leschenault Estuary and forms part of a habitat corridor. Area 2, will have some connection to the Leschenault Estuary via culverts but is fragmented by Estuary Drive. However, given it proximity to the Estuary once established would provide supporting habitat for migratory / wetland birds.
It includes actions to address threatening processes		Area 1 will undergo weed management/ Area 2 will be rehabilitated including allowing a connection to be reformed with Leschenault Estuary, which will allow the area to be inundated (currently a key threat to the establishment of a saltmarsh community at this site). The area will also be fenced to prevent stock from entering the stie and undergo weed and rehabilitation management.
Allows for secure management arrangements in place that will provide for long term conservation		The offset areas will be placed under a conservation covenant.
Sound knowledge and adaptive management		The presence, extent and condition of saltmarsh community at each offset site has assessed by a senior ecologist. The final offset strategy will establish targets for each offset area and include an implementation plan, monitoring and corrective actions.
Likely offset success	Can the values be defined and measured?	The vegetation type, condition and extent are measurable.
	Operator experience/Evidence?	Southern Ports will engage suitably qualified contractors to undertake the weed management and rehabilitation works.
Time lag		The offsets areas will be placed under a conservation covenant within 12 months of the Proposal being approved. Weed and rehabilitation management will be also occur within 12 months. There is no time lag for ecological benefit for Area

Concept	Application
	1. It is anticipated that Area 2 will be rehabilitated over a five year period.
Long term strategic outcomes	The offset site offer a greater level of protection (through the conservation covenant) for fringing vegetation of the Leschenault Estuary.
Offset quantification	Each offset site has been quantified using the Commonwealth Offsets Assessment Guide. See Section 13.5.3.

13.5.3 Quantifying the extent of offset provided by the proposed areas

Preliminary offset calculations have been based on the DAWE Environmental Offset Calculator and EPBC Offset assessment guide. Offsets are proposed for the area of saltmarsh community. The Proposal has undergone further design revision, and the extent of impacts to the Saltmarsh community has been reduced to 0.67 ha (Table 13-4).

As shown in Table 13-5, Table 13-6 and Table 13-7, the proposed offset areas meet and exceed the quantum of impacts. Areas 1A and 1B provide a direct like for like offset immediately adjacent to the impact area (offset 25.73 % of the impact), offset area 2B provides an opportunity to improve an existing saltmarsh community (offsets 26.18 % of the impact) and offset area 2C is a area that is likely to establish a saltmarsh community rehabilitation works (offsets 100.02 %):

- Offset area 1A and 1B: offsetting 25.73 % of the impact
- Offset Area 2A and 2B offsets 26.18% and
- Offset Area 2C potentially offsets 100.02% of the impact.

This exceeds the offset requirements with 152.11 % of the impact offset. However, it is recognised that further investigations are required as part of offset area 2C to confirm the extent of area that can be offset while protecting nearby infrastructure/properties from flooding. Based on cursory reviews, it is reasonable to expect that at least area 2C can be re-connected and sufficient area could be rehabilitated within Lot 61 to meet the offset requirements.

Table 13-4 Impact calculator – Saltmarsh TEC/PEC

Attribute	Value	Justification
Area of impact	0.67 ha	Site assessments have identified Saltmarsh TEC/PEC within the DE.
Quality	8	High score based on the excellent quality, and connection to larger area of saltmarsh.
Quantum of impact	0.54 ha	

Table 13-5 Offset calculator – Saltmarsh TEC/PEC – Patch 1A and 1B

Attribute	Value	Justification
Offset area	1.23 ha	
Start Quality	8	Desktop review and site inspection indicates that the site has Very Good to Excellent condition saltmarsh community that is connect to a larger TEC extent. Some (minor) edge effects from adjacent cleared land.
Future quality without offset	7	Currently zoned Regional Open Space. Potential for slight degradation over time from edge effects.
Future quality with offset	8	Southern Ports will undertake weed monitoring and management for five years.
Time of which the loss is averted	1	A conservation covenant will be placed over the portion of both lots that contains the saltmarsh community. This will occur within 12 months of the Proposal being approved.
Time until ecological benefit (years)	2	The land will undergo weed management in 2022.
Risk of loss without offset (%)	15 %	As the area is located within Regional Open Space under the Greater Bunbury Regional Scheme and also contains saltmarsh TEC / PEC it is considered that there would be a low chance of the site being developed in the future.
Risk of loss with offset (%)	10 %	The risk of loss once a conservation covenant is also in place would offer a higher level of protection than currently afforded to area.
Confidence in result (%)	90 %	High level of confidence that there is a very low risk of loss and that the quality can be maintained (or improved) with management.
% of impact offset	25.73 %	

Table 13-6 Offset calculator – Saltmarsh TEC/PEC – Patch 2A and 2B

Attribute	Value	Justification
Offset area	0.69 ha	Combination of 2A and 2B
Start Quality	6	Desktop review and site inspection indicates that the site has good potential to contain areas of the TEC in the central portion, with weed incursion and edge effects in the outer extent. This site has disrupted tidal influence from the existing weir / gated culverts.
Future quality without offset	5	Overtime it is expected that weed incursion and increased edge effects will continue to adversely impact the quality.

Attribute	Value	Justification
		The existing weir / gated culvert will continue to impact tidal influence.
Future quality with offset	7	Southern Ports will undertake weed management in the outer zones, fencing and stock exclusion. The opportunity to increase tidal flows by removing the gates on the culverts and the weir will also allow improved connection to Vittorea Bay.
Time of which the loss is averted	1	The portion of Lot 61 with the saltmarsh TEC will be placed under a conservation covenant within 1 year of the Proposal being approved.
Time until ecological benefit (years)	2	The opportunity to improve tidal flows by removing the gates on the existing culvert and weir will be modelled and further investigated in 2021. A solution to improve flows whilst still protecting adjacent landowners / existing infrastructure will be implemented in 2022. The land will undergo fencing, rehabilitation and weed management works within 2022.
Risk of loss without offset (%)	25 %	The land is freehold and zoned as Rural under the Greater Bunbury Regional Scheme. There is a low to medium risk that the land will be developed given its location / tenure and zoning.
Risk of loss with offset (%)	10 %	Low risk as conservation covenant will be placed over the area. Southern Ports has also committed to actively managing, monitoring and undertaking corrective actions.
Confidence in result (%)	80 %	High level of certainty of habitat attributes being retained. Given the site already contains a good quality patch of saltmarsh in the central portion, it is likely with increased tidal flows / inundation and weed management with some infill planting (if needed) that the entire patch can be improved.
% of impact offset	26.18 %	

Table 13-7 Offset calculator – Saltmarsh TEC/PEC – Patch 2C

Attribute	Value	Justification
Offset area	2.63 ha	The extent is based on field observations, aerial photography and topography. The final extent will be dependent on tidal modelling that shows the extent of inundation that can be achieved by removing existing hydraulic controls, without having adverse impacts to existing infrastructure / adjacent properties.
Start Quality	1	Poor quality, high level of weeds and currently grazed. Some scattered saline / brackish tolerant native species

Attribute	Value	Justification
		and saline / clay substrate indicate this is likely to regenerate into a saltmarsh community over time if tidal connection is resumed.
Future quality without offset	1	It is unlikely that the community would recover without management measures.
Future quality with offset	4	Reinstating tidal connection, coupled with fencing, weed management and rehabilitation are proposed. It is expected that a quality 4 score (or greater) could be achieved within five years.
Time of which the loss is averted	1	The portion of Lot 61 with the saltmarsh TEC will be placed under a conservation covenant within 1 year of the Proposal being approved. The site will be managed for conservation purposes for the long term.
Time until ecological benefit (years)	5	The opportunity to improve tidal flows by removing the gates on the existing culvert and weir will be modelled and further investigated in 2021. A solution to improve flows whilst still protecting adjacent landowners / existing infrastructure will be implemented in 2022. The land will undergo fencing, rehabilitation and weed management works within 2021/2022. Given the current poor quality it is expected that rehabilitation to a quality 4 score would take up to five years. The Proposed site would be monitored yearly over this time and corrective actions such as further weed management or infill planting undertaken as needed.
Risk of loss without offset (%)	25 %	The land is freehold and zoned as Rural and Port Installations under the Greater Bunbury Regional Scheme. There is a low to medium risk that the land will be developed given its location / tenure and zoning.
Risk of loss with offset (%)	10 %	Low risk as conservation covenant will be placed over the area. Southern Ports has also committed to actively managing, monitoring and undertaking corrective actions.
Confidence in result (%)	70 %	There is evidence from other saltmarsh communities within Australia that on tidal connections are reinstated that the saltmarsh community re-establishes. This coupled with stock removal, weed management and infill planting is likely to achieve at least a 4 quality score over a five year period. After this period, it is expected that the site would be trending towards becoming a sustainable ecosystem. Ongoing corrective actions will be undertaken on an as needs basis.
% of impact offset	100.02 %	

14. Holistic Impact Assessment

The environmental factors relevant to this Proposal include Flora and Vegetation, Terrestrial Fauna, Inland Waters, and Social Surroundings. This document provides an assessment of the potential environmental impacts associated with the Proposal, the management and mitigation strategies, and predicted outcome for each factor. The Proponent recognises the connections and interactions between the preliminary key environmental factors and has considered these interrelationships when applying the mitigation hierarchy (avoid, minimise, rehabilitate) and developing mitigation and management measures for this Proposal. Where possible, the management and mitigation measures described throughout this document have considered a holistic perspective; they are also considered sufficient to meet the principles contained in the EP Act and the EPA's objectives for individual factors.

Table 14-1**Error! Not a valid bookmark self-reference.** presents a holistic impact assessment regarding the key themes and key environmental factors of Land, Water, and People which have potential interactions/interrelationships with the residual impact from the Proposal.

Table 14-1 Potential interactions/ interrelationships – residual impact from the Proposal

Environmental Factor 1	Environmental Factor 2	Interactions/ Interrelationships	Predicted outcome
Flora and vegetation	Terrestrial fauna	Vegetation within the Proposal DE provides habitat for fauna, including low value foraging habitat for Black cockatoo species and would also provide habitat for migratory water birds.	The loss of the flora and vegetation is not expected to have a significant impact to terrestrial fauna. The surrounding area contains intact saltmarsh and the highly modified vegetation/habitat types that would maintain the inter-relationship between these two factors. Furthermore, the proposed offsets would offer a higher level of protection for the saltmarsh community adjacent to the Proposal (proposed offset area 1), and rehabilitation measures for offset area 2 would create a net increase in the saltmarsh community and habitat over time.
	Terrestrial environmental quality	Flora and vegetation play an important role in stabilising soil. Disturbance of soil within the Proposal DE during the construction phase may potentially result in the following impacts on the ESA within Preston River and vegetation to the north of the Proposal DE: • Transport of soil or vegetative material and facilitate the	The Proposal has the potential to affect soil or land quality. However, it is expected that potential impacts can be mitigated through appropriate management measures put in place via a CEMP for construction works. It is anticipated the construction and operation of the Proposal will not result in significant or lasting impacts to soil and land quality within the and adjacent to the Proposal DE.

Environmental Factor 1	Environmental Factor 2	Interactions/ Interrelationships	Predicted outcome
		spread of weed species. • Silt runoff and sedimentation of adjacent wetland vegetation, Preston River and Vittoria Bay. • Disturbance of ASS resulting in contamination of groundwater and surface water.	
	Inland waters	Clearing of vegetation within the Proposal DE has potential to impact on water dependent habitats such as the saltmarsh community. Impacts to inlands waters may include: • Disturbance of hydrological regime of the Preston River and tidal influence within Vittoria Bay. • Silt runoff and sedimentation of adjacent wetland vegetation, Preston River and Vittoria Bay. • Disturbance of ASS resulting in contamination of groundwater and surface water.	There are no Ramsar listed, Nationally Important wetlands or PDWSAs occurring within 3 km to the Proposal DE. The Proposal has been designed to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal. Temporary impacts on groundwater and surface water during construction will be managed via implementation of a Proposal specific CEMP. Operation of the Proposal, once built, is considered unlikely to significantly impact on surface water and groundwater quality due to WSUD principles integrated during the design process. With the adoption and implementation of the mitigations measures, and adherence to the permit conditions obtained under the RIWI Act and WC Act, it is not anticipated the development and operation of the Proposal will result in any significant impacts to inland waters.
	Social surroundings	Clearing of vegetation within the Proposal DE has the potential to impact on the Environmental Factor Social Surroundings including the following during clearing activities: • Generation of dust.	Dust is expected to be generated during construction. This impact will be controlled using standard mitigation measures implemented under the Proposal CEMP. Appropriate measures will be implemented to ensure that short term construction related air quality impacts are effectively managed. Potential impacts to Aboriginal heritage sites associated with the

Environmental Factor 1	Environmental Factor 2	Interactions/ Interrelationships	Predicted outcome
		• Disturbance of Aboriginal heritage aspects. • Reduced visual amenity.	Proposal will be managed through consultation with all relevant groups and works will be undertaken in accordance with AH Act. Potential impacts to Aboriginal heritage will be managed through the AH Act. Community access and visual amenity of the birdwatching area at Point Mornington will be maintained, via a new access road to the existing carpark at Point Mornington. Management and mitigation actions will be implemented to control both the direct and indirect impacts of the Proposal on social surroundings values. Based on the above assessment, it is considered unlikely that the Proposal will have a significant impact on Social Surroundings values.

15. Conclusion

15.1 Key environmental factors

15.1.1 Flora and Vegetation

The Proposal DE has been extensively disturbed over time and the majority (5.85 ha (90%)) of the vegetation in the Proposal DE is in Degraded to Completely Degraded condition and 0.67 ha (10%) is in Excellent condition.

The residual impact of the Proposal will be clearing of 0.67 ha of Subtropical Temperate Coastal Saltmarsh TEC/PEC in Excellent condition, listed as 'Vulnerable' under the EPBC Act and 'Priority 3' by the DBCA.

Clearing of 0.67 ha of Subtropical and Temperate Coastal Saltmarsh TEC/PEC represents 0.2 % of the remaining extent within the Leschenault Estuary. It is considered that clearing of 0.67 ha of this ecological community is not likely to have a significant impact on the remaining vegetation within the Leschenault Estuary.

It is proposed to offset the clearing of 0.67 ha of Subtropical Temperate Coastal Saltmarsh TEC/PEC as a precautionary measure (refer to Section 13 Offsets). The residual impact of development of the Proposal will not significantly impact the biological diversity and ecological integrity at a local or regional level.

15.1.2 Terrestrial Fauna

The development of the Proposal will result in loss of 6.52 ha of native and non-native vegetation, including 0.67 ha low quality potential foraging habitat for the conservation significant Black Cockatoos.

Potential secondary impacts associated with noise, dust, vibration and light emissions are unlikely to be significant as the areas has been previously disturbed and has existing infrastructure and industry present in the surrounding areas.

Given the degraded condition of the fauna habitat within the Proposal DE, the avoidance of habitat fragmentation, offsets being applied for the clearing of the Subtropical and Temperate Coastal Saltmarsh TEC/PEC, the clearing is unlikely to result in significant impacts to fauna species.

It is considered the Proposal will meet the EPA's objective to protect terrestrial fauna so that biological diversity and ecological integrity are maintained through offsets and adequate management practices.

15.1.3 Inland water

There are no Ramsar listed, Nationally Important wetlands or PDWSAs occurring within 3 km of the Proposal DE.

The Proposal has been designed to maintain the hydrological regime of the Preston River and tidal influence within Vittoria Bay during construction and operation of the Proposal.

Temporary impacts on groundwater and surface water during construction will be managed via implementation of a Proposal specific CEMP.

Operation of the Proposal, once built, is considered unlikely to significantly impact on surface water and groundwater quality due to WSUD principles integrated during the design process.

With the adoption and implementation of the mitigation measures, and adherence to the permit conditions obtained under the RIWI Act and WC Act, it is considered the Proposal meets the EPA objective to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected. The EPA objective for Inland Waters will therefore be met for the Proposal.

15.1.4 Social surroundings

Dust and noise are expected to be generated during construction. This impact will be controlled using standard mitigation measures implemented under the Proposal CEMP. Appropriate measures will be implemented to ensure that short term construction related air quality impacts are effectively managed.

Potential impacts to Aboriginal heritage sites associated with the Proposal will be managed through consultation with all relevant groups and works will be undertaken in accordance with AH Act. Potential impacts to Aboriginal heritage will be managed through the AH Act.

Community access and visual amenity to the birdwatching area at Point Mornington will be maintained, via a new access road to the existing carpark at Point Mornington.

Management and mitigation actions will be implemented to control both the direct and indirect impacts of the Proposal on social surroundings values. Based on the above assessment, it is considered unlikely that the Proposal will have a significant impact on Social Surroundings values. The EPA objective for Social Surroundings will therefore be met for the Proposal.

15.1.5 Greenhouse gas emissions

The combined construction and annual maintenance Scope 1 emissions for the Proposal are 1,726 t CO_2-e, below the threshold of the Factor Guideline at approximately 2% of the 100,000 t CO_2-e (Scope 1) limit.

In response to the preliminary stage of design, a 50% up lift to the construction footprint would still put the resultant Scope 1 emissions at 2,938 t CO_2-e, several orders of magnitude below the threshold.

Scope 1 Emissions estimates are negligible compared to the annual emissions from Western Australia and do not trigger the threshold of 100,000 t CO_2-e for the EPA Factor Guideline: GHG Emissions for further assessment (EPA, 2021).

The results of the GHG assessment for construction and operation of the Proposal indicate that the constructed Proposal is unlikely to produce significant GHG emissions. The EPA's objective for the factor GHG is to reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change. Given the above assessment, no residual impacts are expected for this aspect and the Proposal meets the EPA objective for GHG.

15.2 Impact summary

The Proposal will provide a public access road from Estuary Drive across the Preston River north of the existing rail bridges and power lines joining the existing Turkey Point access road, thus bypassing Port areas and Port related traffic. It will also provide alternative access to the Port's northern berths.

There has been significant attention to locating the Turkey Point access road and bridge to minimise its impacts on Key Environmental Factors. Some residual impacts to key environmental factors vegetation and flora are expected which will require offsetting. It is considered that potential residual impacts to other key environmental factors will not be significant and will be manageable through implementation of a CEMP to ensure the EPA's objective for each Key Environmental Factor is met.

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Appendices

Appendix A – Turkey Point Access Road and Bridge 15% Preliminary Design (Arcadis, 2021)

Appendix B – Tidal Inundation Monitoring and Modelling Report (GHD, 2021a)

Appendix C – DWER Contaminated Sites Database

Appendix D – Southern Ports Bunbury – Ecological Investigations (GHD, 2018a)

Appendix E – Turkey Point Access Bridge Greenhouse Gas Assessment (GHD, 2021b)

Appendix F – EPBC Protected Matters Search

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